UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

EFFECTS OF 8-MONTH VIBRATION PLUS RESISTANCE TRAINING ON BONE DENSITY AND BONE METABOLISM IN POSTMENOPAUSAL WOMEN

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

IAN J. PALMER
Norman, Oklahoma
2007

UMI Number: 3264593

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

EFFECTS OF 8-MONTH VIBRATION PLUS RESISTANCE TRAINING ON BONE DENSITY AND BONE METABOLISM IN POSTMENOPAUSAL WOMEN

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF HEALTH AND EXERCISE SCIENCE

BY

Debra A. Bemben, Ph.D.

Michael G. Bemben, Ph.D.

Rosemary Knapp, Ph.D.

Allen Knehans, Ph.D.

Joseph Rodgers, Ph.D.

ACKNOWLEDGMENTS

I would like to thank my wife, Lorna, for her continued support and encouragement over the years. I could not have done this without her. My children, Omri and Olivia, inspire me greatly to do well and take pride in what I have achieved. More importantly, I want them to be proud of me. I want to thank my parents, Ralph and Gunda Palmer, for their being there for me in everything that I have pursued in my life. The courage and strength my mother demonstrated over the last year while battling cancer is the same strength I relied on while defending my dissertation the day after she died. I know she was in the room with me that day. I would like to thank my committee Dr. D. Bemben, Dr. M. Bemben, Dr. Knehans, Dr. Rodgers, and Dr. Knapp for their guidance and collaboration throughout this project. I have great admiration for each of them and I feel honored to have their approval on this project. A special thanks goes to Dr. Debra Bemben for her knowledge, encouragement, and patience during my research. Her knowledge never ceases to amaze me and I feel privileged to have worked under her. She instilled in me her good work ethic and professionalism. I also want to thank the women, who participated in my training study. I honestly feel that I made 55 new friends who care about me, my research, and my family.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Introduction: Whole body vibration has been shown to be osteogenic in animal models; however its application in humans is not clear.

Purpose: The purpose of this study was to examine the effects of an eight month program involving vibration plus resistance training on bone mineral density (BMD) and bone metabolism of older postmenopausal women.

Methods: Fifty-five women were assigned to a resistance training group (R, n=22), a vibration plus resistance training group (VR, n=21), or a control group (C, n=12). R and VR trained 3 days/week for 8 months on 8 exercises. VR received vibration (30-40Hz, 2-2.8g) in three different positions preceding resistance exercise. Training loads were adjusted every 5 weeks. Daily calcium intake; biochemical markers of bone turnover, bone-specific alkaline phosphatase (BAP) and C-telopeptide of Type I collagen (CTX); and BMD and bone mineral content (BMC) of the spine, dual femur, forearm, and total body (DXA) were measured at baseline and month 8.

Results: At baseline, there were no group differences in age, height, weight, calcium intake, strength, BMD, or BMC. Two-way repeated measures ANOVA (group x time) did not detect significant group or time effects for BAP, CTX, or BMD of the total body, spine, left hip (total hip, trochanter, femoral neck), or right trochanter. A significant ($p<0.05$) time effect revealed a decrease in right total hip and right femoral neck BMD. A group x time interaction ($p<0.05$) was detected at the forearm, with C slightly increasing, VR slightly decreasing, and R remaining the same. Repeated measures ANOVA (group X time) revealed a significant ($p<0.01$) main effect and interaction effect for 1RM of the 8 tested exercises. R and VR significantly ($p<0.05$)

increased 1RM strength in 5 exercises, compared with C. ANOVA determined significant ($p<0.01$) group differences in pre-post percent (%) change in strength. VR had significantly ($p<0.05$) higher relative strength increases in 5 of the eight exercises, compared with R. Ranges in %change were 42-138% among VR and 23-88% among R.

Conclusions: No significant alterations in bone biomarkers, BMD, or BMC were detected. Although there were significant increases muscle strength, no benefits for skeletal health were evident.

CHAPTER I

INTRODUCTION

One of the most common characteristics of the aging adult is the loss of bone mass, which if left unchecked could lead to osteoporosis. Osteoporosis is a disease in which the progressive loss of bone mass leaves the bone more susceptible to fracture. In the United States, osteoporosis is an large problem with about 10 million individuals over the age of 50 having osteoporosis of the hip, eight million of which are women[57]. The estimated number of individuals over the age of 50 with osteopenia, consequently placing them at risk for developing osteoporosis, is over 33 million[57]. Approximately 1.3 to 1.5 million osteoporotic hip fractures occur every year [6, 57]. The impact of osteoporosis places a significant burden on the individual's well being and on the society as a whole. Fracture can result in a severely reduced quality of life causing significant morbidity and mortality[12]. In fact, women over the age of 50, who have suffered a hip fracture, have a 5%- 20% increased risk of dying within one year [6]. About half of the population of hip fracture survivors require nursing home care or daily living assistance[6]. Total costs of incident fracture in 2005 is an estimated $17 billion, with hip fractures accounting for 72% of the total cost, yet only 14% of total fractures [12]. Yearly fractures and costs, by the year 2025, are expected to increase by almost 50%[12]. A prediction for future population growth is highest for people 65 -74 years, increasing over 87% by 2025[12].

A large proportion (75 to 85%) of bone strength comes from bone mineral density (BMD)[5, 6]. This is the basis for the use of BMD as a surrogate measure of bone strength. Therefore, a loss of BMD is related to a loss in bone strength which subsequently places an individual at an increased risk of fracture[6]. Measurements of BMD (g/cm^2) are made by Dual Energy X-ray Absorptiometry (DXA), a technique that quantifies bone mineral content (BMC, grams) per area of bone (cm^2) for the total body or at specific sites such as the femur and lumbar spine [6]. The World Health Organization (WHO)[1] has set the criteria for diagnosis of osteoporosis and osteopenia in postmenopausal Caucasian women based on a T-score, or the number of standard deviations a BMD value falls in relation to the average BMD of a young adult reference population . Osteoporosis is diagnosed as a T-score of less than -2.5, which will identify about 30% of postmenopausal Caucasian women as osteoporotic[28]. Bone is a dynamic tissue constantly being metabolized by processes of resorption and formation. Bone resorption breaks down the mineralized bone matrix and bone formation deposits new bone at the resorption site. Bone remodeling is the coupled process of resorption and formation, so that in healthy adult bone, formation will match resorption resulting in a maintenance of bone tissue[5, 6] . The entire process of remodeling is slow and can take to three to six months to complete[5]. Remodeling has two main functions, to replace old weak bone with new stronger bone tissue and aid in the regulation of serum calcium homeostasis. Serum calcium is tightly regulated to remain within 8.5 – 10.5 mg/dL. The skeleton is a vast resource of calcium for the body, which can be liberated through the process of resorption. Two types of bone cells are involved in bone remodeling, osteoclasts and osteoblasts. The osteoclast is the resorbing cell of bone, while the osteoblast is responsible for formation. Hormones associated with serum calcium homeostasis influence osteoclastic and osteoblastic activity. Parathyroid hormone (PTH) and Vitamin D_3 are secreted in response to decreases in serum calcium levels which activate osteoclastgenesis and increase osteoclast activity. Calcitonin is released in response to increasing serum calcium levels, which act by inhibiting osteoclastic resorption and activating osteoblastic activity.

Bone turnover can be assessed by measuring the biochemical markers of bone metabolism in the blood or urine[22, 45, 62]. These markers are by-products, enzymes, or proteins secreted or released during the processes of resorption and formation. Markers of bone resorption include the N-telopeptide crosslink of type I collagen (NTX) and the C-telopeptide crosslink of type I collagen (CTX), which are released during bone matrix degradation. Bone formation markers include osteocalcin (OC), a protein secreted by the osteoblasts, and bone specific alkaline phosphatase (BAP), an enzyme produced by osteoblasts during formation [5, 6].

Exercise has been linked to increases in bone mass. Wolff's law states that that bone function increases with increased demand and that with decreased demand, bone function decreases[56]. Frost[17] expands on this idea to include a stress threshold property of bone cells that must be surpassed to in order to achieve bone maintenance and an even higher stress threshold that must be surpassed to achieve increased bone formation. Frost [17] theorized that bones will adapt to be strong enough to handle the usual loads placed upon them and that muscle mass is needed to generate the required mechanical loading. Therefore, exercise will promote muscle strength and place increasing mechanical stress on the skeleton keeping the stress level above thresholds required to maintain and even increase bone tissue. Three additional concepts for bone adaptation to mechanical loading were proposed by Turner [56]: 1) loading must be dynamic, not static, 2) a short duration of loading is sufficient for adaptation and with increased duration comes diminishing returns, and 3) bone cells accommodate to routine loading, lessening their response to the routine loads.

According to the American College of Sports Medicine's position stand on physical activity and bone health [32], weight bearing endurance activities, activities that involve jumping, and resistance exercise may help to preserve bone health during adulthood. The intensity should be moderate to high and performed three to five days per week (weight bearing endurance activities) and two to three times per week (resistance exercise) [32]. Exercise interventions have been shown to be beneficial for the bone health of older women. The influence of the mode of exercise has been examined by several studies. Effects of ground reaction forces, such as walking and jogging; and joint reaction forces, such as weight lifting and rowing; show similar increases in BMD of the whole body, lumbar spine, Ward's area, and proximal femur (1.5 to 6.1%), with added benefits of joint reaction forces of increased lean body mass and muscular strength, which are important for the prevention of osteoporotic fractures by reducing the risk for falls[33]. Walking exercise performed over one year by postmenopausal women with low bone mass increased spine BMD compared to non-exercising controls, decreased resorption markers and increased formation markers[64]. Repetitive jumping, 50 times, about 3 inches high, 6 days per week has increased BMD in premenopausal women[8]. Low impact aerobic exercise performed by elderly women has been associated with increased bone mass, trabecular density, and bone area at the tibia indicating that the bone response to exercise may be site specific [58]. Evidence of site specificity of resistance training has been found by studies that employ unilateral training, with the non-exercising side serving as the control[30], and the use of peripheral quantitative computed tomography (pQCT) to detect structural changes in bone archetecture[4, 36] .

The magnitude of loading is an important issue in achieving an osteogenic response as suggested by the theories of Frost [17] and Turner[56] and the findings of Kerr[30]. Nelson et al. [42], observed increases in BMD at the lumbar spine and femoral neck as well as increases in OC in postmenopausal women with a high intensity (80% 1RM) training intervention performed for one year. Other studies have also observed increases in BMD using high intensity resistance training protocols[24, 60] and in the markers of bone turnover[60]. In addition, the weight lifted by postmenopausal women in one year has been shown to predict the change in trochanter BMD[15].

A possible source of the conflicting results in the postmenopausal bone research is estrogen status. It is estimated that within the first three years after the start of menopause a women can lose as much as 4% of her bone mass[39]. Within six years after the start of menopause a women may lose approximately 15% BMD [39]. Resorption rates are accelerated during the first two years since menopause, while formation rates slowly begin to increase during years three to five since onset of menopause[39]. HRT has been used as an intervention to prevent this accelerated bone loss. As previously mentioned, jumping exercise by premenopausal women effectively increased femoral BMD by five months while postmenopausal women did not, even after 18 months [8]. Unfortunately HRT did not affect this outcome. This finding helps to reinforce the importance of the magnitude of load for an osteogenic response in postmenopausal women. Some studies controlled for estrogen status by determining years since menopause and HRT history, including years on HRT and years off HRT. Promising results have come from studies on postmenopausal, estrogen deplete women [30, 33, 42, 64]. Other studies' results should be interpreted with caution as exercise groups may have had uneven numbers HRT users and non-users [9, 24, 60]. Another limitation of many postmenopausal bone studies is the length of the intervention. Studies that have been conducted for over six months have shown increases in BMD as measured by DXA [30, 33, 42, 64]. It appears that postmenopausal women require an intervention longer than six months to achieve increases in BMD as studies six months or shorter have not achieved results[9, 38]. Studies that have achieved results within 6 months may have been confounded by HRT status[24, 60] and the inclusion of men [60].

Vibration training consisting of high frequency (25-40 Hz) low amplitude (2-5 mm) stimuli, may be an effective mode for inducing an osteogenic response. Animal studies have provided convincing evidence that vibration stimuli can be dramatically anabolic and stimulate expression of bone formation mRNA[26, 27]. The phenomenon of stochastic resonance, enhancing the response of a nonlinear system to a weak signal by the addition of a noise vibration, has been demonstrated by bone cells. The addition of a vibration stimulus to a dynamically loaded bone resulted in a 3.9 fold increase in bone formation[54]. The mechanism by which bone cells sense mechanical loading is not known, however there are two main theories in place to help explain the mechanosensation of bone cells. The osteocyte is a type bone cell located throughout the entire mineralized matrix of bone with unique properties that qualify it as the sensory cell of bone. Osteocytes are situated within fluid filled spaces, called the canaliculi, throughout the bone matrix. Mechanically loaded bone causes a fluid flow originating at the most stressed area of the bone and radiates away throughout the canaliculi. This interstitial fluid flow excites the osteocytes causing a release of chemical messengers. These chemical signals propagate and make contact with other osteocytes, osteoblasts, and bone lining cells [56]. Another possible mechanism lies in the way the osteocyte is attached, or anchored, to the mineralized matrix. The cytoskeletal adhesion proteins may play a role in mechanotransduction by amplifying the mechanical strain signal to the osteocyte for release of the chemical signal[23].

Human studies have yet to provide sufficient evidence on the efficacy of vibration on bone adaptation as few studies have been conducted which are very inconsistent. Some attractive results have been obtained by Verschueren *et al.* [59]. This six month intervention involved postmenopausal women who were randomly assigned to a vibration training group, a resistance training group, or a control group. The vibration training increased BMD at the hip (0.93%) while the resistance training did not. No changes in biochemical markers of bone turnover were observed in either group. In another study carried out over one year, Rubin *et al.* [50] asked postmenopausal women to stand on a vibration platform twice a day for 10 minutes each bout, seven days per week. Compliance to the protocols as well as body size determined whether there was a change in BMD. Those that were at least 80% compliant indicated relative benefits at the femoral neck and spine compared with control subjects. The most compliant women who were lighter than 65 kg exhibited the greatest relative benefit at the spine. Other studies have not achieved such results;

however the conservative approach in application of the vibration subject gender and age may have been the reason for the lack of results [51, 55].

Osteoporosis is a serious public health issue that could be expected to escalate as the population of older individuals continues to grow. HRT and other drug therapies have been used to treat and prevent osteoporosis; however these drugs are expensive and can have negative side effects. Increasing exercise in a safe and effective manner can be beneficial to the bone health of a postmenopausal woman. Ground reaction forces and joint reaction forces applied to the skeleton can produce an osteogenic effect; however it appears dependent on load magnitude and duration of the intervention. The addition of a vibration stimulus may be an easy and safe mode of enhancing the osteogenic response to exercise. Few studies have examined the bone response to vibration training in older women, and thus far these studies have set the groundwork for new research. It appears that the vibration stimulus may be time dependent, with longer durations providing more of a response, and also need an additional loading that is dynamic in nature as the theory of stochastic resonance suggests.

Purpose

The purpose of this study was to examine and compare the effects of an eight month program involving two high intensity training protocols, combined vibration plus resistance training and resistance training alone, on BMD and bone metabolism of older postmenopausal women. Subjects were healthy women, between the ages of 55 and 75 years, and not taking HRT. Measurement variables included the biochemical markers of bone turnover (BAP and CTX); BMD and BMC of the total body, dual femur, lumbar spine, and radius 33%; and muscle strength (1RM) of eight resistance exercises. The vibration group received a vibration stimulus in three different positions which preceded resistance training exercises. A secondary purpose was to examine muscular strength changes between the two resistance training protocols.

Research Questions

1. Will eight months of a vibration plus resistance training intervention increase BMD in older women beyond that of resistance training alone?
2. Will eight months of resistance training, alter bone metabolism as indicated by changes in bone resorption (CTX) and bone formation (BAP) markers?
3. Will eight months of vibration plus resistance training alter bone metabolism as indicated by changes in bone resorption (CTX) and bone formation (BAP) markers?

Hypotheses

1. Eight months of vibration combined with resistance training will increase BMD beyond that seen with resistance training alone.
2. The bone resorption marker (CTX) will respond quickly to the resistance training, by decreasing at month four, and the bone formation marker (BAP) will lag behind CTX, elevating at month eight.

3. Vibration training plus resistance training will result in decreased CTX levels at month four, similar to resistance training alone. BAP levels will lag behind CTX, however respond quicker than resistance training alone, elevating at month four.

Subquestions

1. Will resistance training influence muscle strength in older women?
2. Does the addition of vibration to a resistance training program influence muscle strength in older women?

Subhypotheses

1. Yes, resistance training will increase muscular strength in older women.
2. Yes, the addition of the vibration stimulus will increase muscle strength beyond that seen by resistance training alone.

Significance Of The Study

The significance of the study is to provide a safe and effective way to enhance the osteogenic response of bone cells in older women. The use of vibration training has been shown to induce an osteogenic response in animal bone tissue; however this mode of stimulus lacks conclusive evidence in humans. The efficacy and safety of vibration training has been shown in older women, however the conservative approach taken by researchers may account for the inconsistent findings. This study will employ the theories on bone adaptation put forth by Frost [17] and Turner[56] and further explore the use of vibration training in enhancing the osteogenic response.

Information from this study will provide insight on how bone cell mechanotransduction could be influenced by the addition of stochastic resonance. Vibration training could provide a safe and easy intervention that may improve compliance to a resistance training program. This study will provide information on the periodicity of changes in bone metabolism in response to resistance training and vibration plus resistance training interventions. Knowledge of the timing of changes in the biochemical markers of bone turnover during the course of an intervention will aid in the establishment of the clinical use of these markers during therapy.

Assumptions

1. All subjects gave maximum effort during 1RM testing.
2. All subjects completed the recorded sets and repetitions during the training program.
3. All subjects were in a fasted state at the time of the blood draws.
4. Subjects were not taking HRT, and those that have taken HRT, were off HRT for at least one year.
5. Subjects were not in the accelerated phase of bone loss that is accompanied by the first five years of menopause. Women accurately reported that they are at least five years since the onset of menopause.
6. Subjects accurately recorded calcium intake.

Delimitations

1. The BMD response to vibration plus resistance training and resistance training alone can only be applied to healthy postmenopausal women not taking HRT between the ages of 55 and 75 years.
2. The bone metabolism response to vibration plus resistance training and resistance training alone can only be applied to healthy postmenopausal women not taking HRT between the ages of 55 and 75 years.

Limitations

1. Daily physical activities performed outside of the training program were not controlled. However, subjects were asked to maintain their normal daily activities that did not include resistance training.
2. Sunlight exposure was not controlled or monitored.

Operational Definitions

Biochemical Markers of Bone Turnover – Proteins, enzymes, or breakdown products of bone released into the blood stream during the process of bone turnover [52].

Bone Mass – The amount of bone in a cross-section, which is related to the strength of the whole bone[17].

Bone Mineral Content (BMC) – Amount of bone measured in grams.

Bone Mineral Density (BMD) – Bone mineral content divided by area (g/cm^2).

Bone Remodeling - The process of activating the osteoclasts that resorb bone leaving cavities on the bone's surface. This is followed by osteoblastic activity that fills in the cavities by forming new bone[41].

Bone-Specific Alkaline Phosphatase (BAP) – A biochemical marker of bone formation. BAP is an osteoblastic membrane bound tetramer found circulating freely in serum and is a bone-specific isoform of Alkaline Phosphatase [52].

Cortical Bone – The compact shell surrounding trabecular tissue, offering most of bone's structural integrity [7].

Cross-linked C-telopeptide of Type I Collagen (CTX) - The generation of the CTX molecule is mediated by osteoclasts on bone and is formed in the serum as a stable end product of degeneration of Type I collagen [52].

Dual Energy X-Ray Absorptiometry (DXA) - A process of measuring the attenuation of two levels of energy passing through human tissue. DXA is used to assess bone mineral density and bone mineral content, expressed as mass per unit of area (g/cm^2).

Hormone Replacement Therapy (HRT) - Low levels of estrogen, often due to menopause, increase osteoclastic resorption efficiency leading to greater bone loss. HRT replaces the estrogen hormone aiming to reduce such bone loss.

Mechanical Loading – The use of skeletal muscle to overcome a set force, thereby stressing the bone at a specific bone site [17].

Mechanotransduction – Detection and response of bone tissue to mechanical loading [56].

Osteoblast – Type of bone cell responsible for bone formation[7].

Osteoclast – Type of bone cell responsible for bone resorption[7].

Osteocyte – Type of bone cell believed to be responsible for mechanotransduction[6].

Osteopenia – Normal loss of bone mass due to aging determined by a BMD T-score 1 to 2.5 standard deviations below the young adult means[1].

Osteoporosis - The increased decline in bone mass, leading to bone fragility and increased risk of fracture as determined by a BMD T-score greater than 2.5 standard deviations below the young adult means[1].

Stochastic Resonance – Enhancement of the response of a nonlinear system to a weak signal by the addition of a noise vibration [54].

Trabecular Bone – Bone tissue that is loosely organized with a porous matrix, very metabolic, and is found at the ends of long bones and in high amounts at the lumbar spine and intertrochanteric area of the femur [7].

Whole Body Vibration – High frequency, low amplitude mechanical accelerations delivered to the body in a standing position by a vibration platform.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The human body is very adaptable, making the necessary adjustments in order to meet the imposed demands placed upon it. This is especially important for the development of bone strength. Wolff first proposed this idea in 1892, suggesting that bone architecture is determined by the stresses placed on bone[56]. Later, Frost expanded on this concept stating that there is a threshold, above which bone must be stressed in order to induce bone adaptation [17]. With the experimental evidence collected over the past 40 years, Turner [56] developed three fundamental rules for bone adaptation: 1) bone is driven by dynamic loading, 2) an adaptive response can be initiated by a short duration of mechanical loading, and 3) bone cells become less responsive to routine loading by accommodating to a customary mechanical loading environment.

The influence of mechanical loading on bone adaptation has been researched to a great extent, leading to the consensus that physical activity is beneficial for the skeleton. The exact biological mechanism by which bone cells adapt is poorly understood. In order to determine the processes involved, one must have an understanding of bone physiology and the biochemical events involved at the level of the bone cell. A crucial concept for understanding bone adaptation is bone turnover. Bone is a dynamic living tissue that undergoes a process of resorption, or breakdown, followed by formation. This is a coupled process and bone mass can be maintained when formation rates equal resorption rates. Involved in bone turnover are two separate types of bone cells, the osteoclast and osteoblast. These two cells have a morphology and biochemical characteristics unique to each type. Resorption is carried out by the osteoclast, while formation is carried out by the osteoblast. *In vivo*, bone cell action cannot be definitively determined; however animal studies and *in vitro* cell cultures provides insight on the functioning of bone cells. By-products of bone resorption and formation can be detected in serum and urine of human subjects, thereby allowing researchers to get an idea of the actions of the osteoblasts and osteoclasts.

Another important issue for bone adaptation is the process by which the stress signal is carried out through bone and the initiation of bone formation. This is called mechanotransduction. A third type of bone cell, the osteocyte, is cited as the cell responsible for transmission of stress signals through bone. Two hypotheses which are postulated to explain the role of the osteocyte in mechanotransduction include: fluid flow over the osteocyte [56]; and strain amplification by adhesion proteins of the cytoskeleton [23].

How can one optimize the mechanotransduction mechanism of bone? It is well documented that mechanical stress applied through muscular contraction, i.e. resistance training, is very beneficial for increasing bone mass. Compliance and safety issues can be a draw back to performing a resistance training routine, especially among the older adult population. Whole body vibration could be an easy low risk intervention for improving bone strength. Animal studies have shown that a vibration stimulus can effectively increase the osteogenic response of bone cells [26, 54]. In humans, few studies involving vibration with bone as the main outcome have been performed[50, 55, 59] and the results show some beneficial aspects for vibration training, but lack the definitive answer to the benefits of vibration training on bone mass.

This review of literature will cover the structure and function of bone tissue. In addition, the process of bone turnover will be reviewed including the cells responsible for bone metabolism and the major hormones that govern bone metabolism. This will lay the foundation for the use of the biochemical markers of bone turnover as an assessment of bone metabolism. The idea of mechanotransduction will be discussed, presenting the theories on how bone cells "sense" strain and transmit signals to initiate bone metabolism. Evidence of mechanical loading's influence on bone adaptation will be covered followed by a review of the bone responses to exercise interventions in postmenopausal women. A major component in postmenopausal bone research is HRT status. The influence of HRT status and menopausal age on BMD will be reviewed. Finally, the idea that vibration training could possibly produce an osteogenic response in postmenopausal women will be discussed.

Structure, Function, and Metabolism of Bone

The skeleton provides support for the body, protection of internal organs, site of muscle attachment, and a reservoir for minerals [7, 35]. Daily activities induce skeletal micro-fractures and fatigue damage that could result in skeletal collapse if not repaired. Bone turnover is the process by which old bone is resorbed then replaced with new bone. This is an ongoing process that is essential for bone health, by maintaining or building bone strength.

Bone is made up of 95% Type I collagen and 5% proteoglycans and noncollagenous proteins [7]. Within calcified bone, crystalline salts called hydroxyapatite are found on and within the collagen fibers. Hydroxyapatite is primarily made up of calcium and phosphate. This provides strength and rigidity of bone allowing for bodily support, muscle attachment for mechanical work, and protection of vital organs [7, 35]. There are two forms of bone, made of the same cells and matrix elements; however these differ in structure and function. Cortical, or compact bone, is found mainly in the shafts of long bones, its function is mechanical and supportive, and its volume is 80-90% calcified [7]. Cancellous, or trabecullar, bone is more loosely organized with a porous matrix, with a structure that is 15 – 25% calcified [7]. The function of cancellous bone is metabolic and is found at the ends of long bones and in high amounts at the lumbar spine and intertrochanteric area of the femur.

As previously stated, the skeleton is a very large reservoir for minerals such as calcium and phosphate. Through bone resorption, minerals are liberated from the bone matrix and delivered into the blood stream [41]. Therefore, bone functions as an aid to maintaining calcium homeostasis. Serum calcium is tightly regulated between 8.5 – 10.5 mg/dL and when serum calcium levels approach the low end, bone resorption is increased, releasing more calcium into the blood[7] .

Bone turnover, or remodeling, is a process that requires 3 – 6 months to complete in a distinct sequence of activation, resorption, and formation (ARF) [41]. The time course of each phase is: activation, 8 days; resorption, 34 days; and formation, 130 or more days. Remodeling does take place over the entire skeleton; however, remodeling occurs in small sections called remodeling packets[41]. These packets are geographically and chronologically separated, so that an entire bone is not in a state of resorption [17, 41]. Neighboring remodeling packets will be in different stages of the ARF sequence. Most remodeling occurs on the bone surfaces, mainly at the endosteal surface. Bone remodeling is a coupled process of resorption and formation, so in healthy adult bone, the amount resorbed is equally replaced during formation [41]. This process can become uncoupled leading to bone loss. This could occur in one of two ways, the resorption rate is greater than the formation rate, or the formation rate is less than the resorption rate. Bone mass could be gained by decreasing resorption or increasing formation rates.

There are two main bone cells responsible for remodeling; osteoclasts and osteoblasts. Within the ARF sequence, osteoclasts are activated and resorb bone then osteoblasts are responsible for the formation of new bone[41]. Morphological and biochemical characteristics of osteoclasts and osteoblasts are quite different. Osteoclasts are very large, multinucleated cells with the distinct properties of a ruffled border, a sealing zone, and a basolateral membrane. The ruffled border is the actual “resorbing organ” of the osteoclast, and is characterized by deep folds of the plasma membrane that increase contact area with the bone. Hydrogen and chloride ions are released by the ruffled border, creating an acidic environment needed to break down hydroxyapatite. Lysosomal enzymes and metaloproteinases are also released which further break down the hydroxyapatite and degrade matrix proteins. The sealing zone acts as the site of attachment to the bone surface and provides a tight seal around the ruffled border that minimizes leakage of any products released during resorption. The basolateral membrane is the outer area of the osteoclast, not in contact with the bone surface, through which minerals that were liberated during resorption are transported and released. Osteoblasts are mononuclear and much smaller in size than osteoclasts. The osteoblast secretes Type I collagen and other bone matrix proteins and is rich in alkaline phosphatase[35]. Following resorption, osteoblasts populate the resorbed area of bone and leave behind an osteoid tissue, or an uncalcified matrix. Calcification of the osteoid lags behind formation, becoming mature in about 10 days[35].

Bone turnover is influenced by many hormones. The main hormones influencing bone turnover are those responsible for serum calcium regulation. Parathyroid hormone (PTH), secreted from the parathyroid gland, responds to a change in serum calcium concentration. When calcium levels fall, PTH secretion increases and when calcium levels increase, PTH secretion decreases. PTH has several actions on different tissues which functions to increase serum calcium levels. In bone, PTH increases bone resorption, at the kidney, PTH increases calcium reabsorption, and in the intestines, PTH increases calcium absorption [41]. Also functioning to increase serum calcium levels is vitamin D. Originating from cholesterol, there are photochemical, thermal, and metabolic pathways for vitamin D, with the active metabolite being 1,25-Dihydroxyvitamin D (1,25(OH)$_2$D). Vitamin D further increases bone resorption and increases calcium absorption by the intestines [41]. Calcitonin, secreted by the thyroid, is stimulated by an increase in serum calcium. The function of calcitonin is to decrease resorption by reducing osteoclast size, reducing the osteoclast into a mononuclear cell, and inhibit osteoclast formation[41].

Biochemical Markers of Bone Turnover

In humans, bone metabolism can be assessed by measuring the biochemical markers of bone turnover found in serum or urine[31, 52]. These markers can be enzymes, proteins, or degradation products produced by the osteoblasts or osteoclasts [31, 52]. Bone formation can be assessed by measuring osteocalcin (OC), a protein secreted by the osteoblast, or by bone-specific alkaline phosphatase (BAP), and enzyme produced by the osteoblast. Resorption markers include N-telopeptide of Type I collagen cross-links (NTX) and C-telopeptide of Type I collagen cross-links (CTX). NTX and CTX are the amino- and carboxy-terminal fragments of Type I collagen that still have the cross-linkages attached[31, 52].

The usefulness of the biochemical markers of bone turnover is still debatable. Some studies have found that they can be clinically useful for the early determination of the effectiveness of interventions [14, 16, 34, 45, 48, 62], however some do not endorse the use of biomarkers as a predictor of postmenopausal bone loss. Rogers *et al.* [47], studied 60 postmenopausal women between 49 and 62 years of age. Spine (L1-L4) BMD measurements and the biochemical markers of bone turnover (OC, BAP, NTX, and others) were taken at two time-points between two and four years apart. A percent change in BMD per year was calculated for comparison to the turnover markers. Significant negative correlations were found between markers and rate of change in BMD, (r= -0.35 to -0.53). However, when each marker was categorically divided into low, medium, and high tertiles and compared with low, medium, and high rates of change in BMD, the strength of agreement was poor. Therefore, it was concluded that the markers may not be useful for prediction of individual rates of bone loss. A limitation to this study is that the markers were obtained between two and four years apart, the same time as the BMD measurements. Any changes in bone metabolism may have been missed during this time frame. Additionally, only the spine was used as the BMD site, the hip sites were not taken into account. The samples were not taken in the morning with subjects in a fasted state; they were obtained in the afternoon in non-fasting subjects. In contrast, Delmas *et al.* [16], determined that bone turnover markers can be useful for monitoring individual BMD responses to HRT. The bone markers BAP, OC, and CTX were measured in 569 women treated for two years with HRT. The resorption marker at three and six months predicted the BMD response in two years and the formation markers at 6 months were predictive of BMD in two years. In recent years the use of biochemical markers of bone turnover has made its way into HRT research as a descriptor of the effectiveness of a number of different HRT interventions [14, 43, 44, 61].

Mechanotransduction

A third type of cell exists in bone, the osteocyte, which may be the "nerve cells" of bone. Characteristics of the osteocyte are different from those of the osteoclast and osteoblast; however, the osteocyte may be the final differentiation stage of a mature osteoblast. During formation, some osteoblasts are incorporated into the newly formed matrix, and begin to lose osteoblast characteristics and form osteocyte characteristics. Osteocytes exist regularly spaced throughout the entire mineralized matrix of bone within caves called lacunae, and exist in amounts about ten times greater than the osteoblast, thereby making up about 90 – 95% of all bone cells. Osteocytes are stellate shaped with large cell body and long thin processes extending away in all directions from the cell body, mainly perpendicular to the bone surface. These processes pass through the mineralized matrix in small tunnels called the canaliculi, thereby creating an extracellular space around the osteocyte. Contact between osteocytes is kept via gap junctions between the tips of the cell processes, forming a syncytium of gap junction coupled cells. Given the shape of the osteocyte; the abundance of cells throughout the matrix; and the extensive communication with other osteocytes, osteoblasts, lining cells, and marrow; the osteocyte could be the mechanosensory cell for bone. How these cells sense has not been fully explained, however several mechanisms have been proposed. Possibilities include changes in hydrostatic pressure, direct cell strain, fluid-flow-induced shear stress, and electric fields resulting from electrokinetic effects with fluid flow. Research is growing to support the interstitial fluid flow and the direct cell strain hypotheses.

Hydrostatic stress arises from dynamic loading causing dilatational strains, or volume changes in the tissue [11, 56]. The diameter of the canaliculi is perfect to allow fluid flow produced by stress to reach the furthest osteocyte from the most stress point. Osteocytes are three times more sensitive to fluid flow stimulation than endothelial cells. Therefore, the osteocyte appears to detect mechanical loading by the canalicular fluid flow generated by axial bending, a sensor indirect of bone deformation. As a result of mechanical stress on bone there is a deformation of the tissue (a strain) causing interstitial fluid flow through the lacunae and canaliculi. A shear stress is placed on the cells due to fluid flow that deforms the osteocytes and dendritic processes [11]. It has not been established however, if the mechanosensors are the dendritic processes, the osteocytes cell body, and/or the cilia[11]. Fluid flow induces a chemical signaling pathway that is not fully understood. Signaling between osteocytes may occur by movement of extracellular calcium into the osteocyte through voltage or mechanosensitive channels [56]. Osteocytes have the capability to generate ATP, nitric oxide (NO), and prostaglandins which are very important for the anabolic response [11, 56]. In a matter of seconds following mechanical strain, osteoblasts and osteocytes release NO, which inhibits resorption and promotes formation[11, 56]. Primary osteocytes subjected to a fluid flow treatment release prostaglandins, which may act in several ways to promote bone formation[11]. Prostaglandin released by osteocytes can activate the Wnt/B-catenin pathway, the proposed initiator of load-induced bone formation[11]. Sclerostin is a protein within bone capable of inhibiting the Wnt pathway, however it has also been suggested that prostaglandin can bypass the inhibitory effects of sclerostin in bone [11].

Osteocytes exist within the canaliculi surrounded by extracellular fluid; however these cells are not free floating through the extracellular space rather they are anchored to the bone matrix by an integrin-cytoskeletal complex [23, 56]. Fluid flow induced by mechanical loading will deform the shape of the attachment elements, creating a drag force at the point of attachment to the cell process, thereby inducing cytoskeletal rearrangement [56]. These matrix connections may be mechanotransducers or act as amplifiers of the mechanical signals[23, 56]. Han *et al.* [23] created a model of the osteocyte process and proposed a strain amplification model that may account for the mechanosensory process of the osteocyte. Han[23] proposes that the point of attachment at the osteocyte process is a hexagonally organized 19-element actin filament bundle. The drag force induces a hoop strain on the central actin bundles amplifying the cellular-level strain resulting in the excitation of osteocytes. Rather than fluid flow across the cell body of the osteocyte or the cell process, it is the strain-amplification resulting from the interaction of the cell process cytoskeleton with the bone matrix.

Mechanical Loading

In 1892, Wolff proposed the idea that the skeleton possesses the property of functional adaptation, in that bone architecture, structure, and bone mass is adaptable to the demands of the mechanical stress placed upon the skeleton [56]. With increased demand, bone will increase in function and with decreased demand, bone decreases in function. Frost [17], expanded upon this idea by stating that bone adaptation is dependent on mechanical strain thresholds that govern whether bone mass is gained, maintained, or lost. The term “modeling” is used to signify that bone mass is increased. For modeling to be “ON”, a strain threshold must be surpassed. Modeling is “OFF” when the strains remain below this threshold. Bone remodeling is the term used for strains below the modeling threshold, when modeling is OFF. Bone remodeling contains several threshold ranges. Strains just below the modeling threshold result in “conservation mode,” when formation equals resorption and bone mass is maintained. Strains below the conservation mode result in “disuse mode,” when resorption exceeds formation and bone is begins to loose mass. With continued reduced strain in disuse mode, a pattern arises called “disuse-pattern osteopenia”. This occurs at a very slow rate and may take years to detect and is characterized by a normal bone length, however with larger marrow cavities.

In order to turn modeling ON, strains must be above the modeling threshold which requires an increased voluntary load placed on the skeleton. The greatest voluntary loads on the skeleton come from the contractions of muscle. Therefore, an important aspect to bone health is muscle strength. The typical pattern of muscle strength as a person ages is that it increases through young adulthood, then plateaus, and after the age of 30 – 40 years, a gradual loss of muscle strength occurs, which continues with increasing age. Bone mass changes with age usually follow those changes is muscle strength. Changes in muscle strength occur much more rapidly than the very slow bone modeling and remodeling process, therefore it takes time for the bone to adapt to the usual strains placed upon them. This could explain the usual age-related bone loss. Frost [17] proposes that muscle strength peaks at about 30, therefore bone mass increases, adapting to the largest voluntary loads applied by the increasing muscle strength, or modeling is ON. The plateau in muscle strength results in modeling turned OFF, however conservation mode remains ON, maintaining bone mass. As an adult ages, muscle strength decreases resulting in bone shifting into disuse mode, and a slow progression into disuse-pattern osteopenia.

Turner [56] proposed three critical rules for bone adaptation. 1) For adaptation to occur, the loading must be dynamic, rather than static, 2) the mechanical loading period need only to be short in duration and extended durations result in diminishing returns, and 3) bone cells become less responsive to routine loading by accommodating to a customary mechanical loading environment. Animal models have shown that the strain stimulus inducing bone adaptation is dependent on strain magnitude and frequency (cycles per second). This implies that a static load has a frequency of zero resulting in no affect on bone adaptation. Likewise, a similar bone adaptation affect could be achieved by, a) increased strain magnitude with a decreased frequency, and b) decreased strain magnitude with and increased frequency. The concept of diminishing returns again comes from animal models that have shown that increasing loading cycles, or duration, beyond a certain point shows no added benefit to the bone adaptation response. Finally, bone cells appear to "error-driven". Abnormal loads generate structural changes to the cells' cytoskeleton, which once adapted to the new load; the cells become steady state and will require a new abnormal load for further adaptation.

Although the exact strain threshold of an individual's bone cannot be determined, it is important to keep in mind that it may exist as Frost describes. In order to do this, the strain must be introduced through mechanical loading of the skeleton my muscular contraction. Therefore, muscle mass and strength must be preserved or increased to keep strains on skeletal tissue above or remodeling threshold, even better the modeling threshold. Next, one must apply Turner's rules of bone adaptation. Mechanical strains must follow a progression of overload as the bone cells will accommodate and no longer respond loads that become customary.

Resistance Exercise and Bone

Many human studies have supported the ideas proposed by Frost and Turner concerning bone adaptation and the influence of muscle contraction, or resistance training. Karlsson *et al.* [29] found that the BMD, OC, and serum calcium of weight lifters was higher than their age matched sedentary counterparts. Fujimura *et al.* [18] found that resistance training increased formation markers OC and alkaline phosphatase without increases in resorption markers in young adult subjects.

Numerous exercise interventions have been conducted in postmenopausal women that have led to the development of a position stand on physical activity and bone health put out by the American College of Sports Medicine [32]. The position stand indicates that adult bone may be preserved by weight bearing endurance activities, activities that involve jumping, and resistance exercise. These activities should be performed at a moderate to high intensity and performed three to five days per week (weight bearing endurance activities) and two to three times per week (resistance exercise) [32]. The influence of the weight bearing activities and resistance exercise on the bone health of postmenopausal women was examined by Kohrt *et al.* [33]. Kohrt[33] studied 39 postmenopausal women between the ages of 60 and 74 years for 11 months of training. Two exercise interventions were applied to stress the skeleton via different actions, ground reaction forces (GRF) and joint reaction forces (JRF). The GRF group worked up to walking, stair climbing, and/or jogging for 45 minutes per day at 80-85% heart rate max. The JRF group performed two to three sets of eight resistance exercises at an intensity of eight to 12-RM, followed by two or three 10 minute bouts of rowing at 80-85% heart rate max. BMD of the proximal femur, lumbar spine, wrist, and total body were assessed at three month intervals. OC was used as a measure of bone turnover at baseline and post intervention. Both groups achieved similar increases in BMD. GRF increased BMD of the whole body (2.0%), lumbar spine (1.8%), Ward's area (6.1%), and femoral neck (3.5%). JRF increased BMD of the whole body (1.6%), lumbar spine (1.5%), and Ward's area (5.1%). OC decreased with JRF, however at the JRF at baseline had higher OC levels than GRF and controls and at the end of the study OC levels were not different from the other two groups. The authors suggest that this was simply a regression toward the mean. Chubak *et al.* [13] aerobically trained 173 sedentary overweight postmenopausal women, 5 days per week for 12 months. Training consisted of 45 minutes or more of 60 – 75% max heart rate of walking or cycling. No differences between control group stretchers and exercisers were detected in BMD or BMC of the total body. The major conclusion was that activities recommended to improve general health would not be counterproductive to other aspects of health such as BMD. While general aerobic exercise is not detrimental to bone health, this study helps to illustrate the importance of intensity on the osteogenic response. Yamazaki *et al.* [64], examined the ground reaction forces of walking in 50 postmenopausal women, aged 49-75 years, with low bone mass. 32 women performed the walking exercise for one year, while 18 served as control subjects. Four days per week, the exercise group walked for one hour at 50% VO_2max. Lumbar spine BMD increased if compared to non-exercising controls, however remained unchanged from baseline. Urinary NTX levels were measured at months 1, 3, 6, 9, and 12 in the exercise group. NTX quickly decreased at month three and remained low at month 12. BAP was slower to respond by decreasing at month 12. These results indicate that walking exercise in these postmenopausal women with low bone mass effectively suppressed bone turnover and that the early change in NTX may be useful for the prediction of long-term lumbar spine responses to exercise. Bassy *et al.* [8] designed an easy and non-athletic exercise regimen that consisted of the mechanical loading of the legs by ground reaction forces, specifically repetitive jumping. The jumping included 50 jumps, about 3 inches high, 6 days per week. Increases in BMD among the premenopausal women were found, however no increases in postmenopausal women were detected, even among those on hormone replacement.

Uusi-Rasi *et al.* [58] examined elderly women and found that low impact aerobic exercise was associated with increased bone mass, trabecullar density, and bone area at the tibia. In this research, site specificity becomes apparent as the tibia showed an increase in area which was the most mechanically loaded bone during the exercise. Also estrogen’s bone-conserving effects may be enhanced with exercise. The women who also took estrogen had increased formation.

To examine the site-specific effects of resistance training, Kerr *et al.* [30] designed a resistance exercise intervention applied to only one side of the body, thereby allowing the non-exercise side of the same individual to serve as a control. The target bone site of the exercise was the wrist and hip regions. Subjects, 56 postmenopausal women between the ages of 40 and 70 years, were assigned to one of two exercise groups that differed by intensity and repetitions. The strength trained group performed three sets of 8-RM and the endurance trained group performed 3 sets of 20-RM. Both groups trained three days per week for 12 months. Only the strength trained group achieved significant increases in BMD on the exercising side compared with the non-exercise side. Increases were observed at the intertrochanteric hip site (exercise 1.5%, control -0.1%), the trochanter (exercise 1.7%, control -0.6%), the Ward's area (exercise 2.3%, control 0.8%), and the ultradistal radial site (exercise 2.4%, control -1.4%). The results support the idea that the bone response is site-specific and that the magnitude of the loading is more important than the number of loading cycles. Other studies have examined the site-specific influence of exercise on bone by utilizing peripheral quantitative computer tomography (pQCT)[4, 36]. The technique of pQCT allows for the measurement of bone area, BMC, and volumetric density for cortical and trabecullar bone. In a study conducted by Adami *et al.*[4], 250 postmenopausal women, aged 52-72 years, performed resistance exercises designed to stress the wrist for a period of six months. While DXA was not able to detect any changes in BMD, pQCT did detect increases in the area and BMC with increased density of the cortical bone. It was suggested by the authors that the bone underwent structural changes that could increase the bending strength of the bone.

Several studies have been conducted to determine the intensity at which resistance training should be performed to cause an osteogenic response in postmenopausal bone. Nelson *et al.*[42], studied the effects of a 12 month exercise intervention in 39 postmenopausal women, aged 50 to 70 years. Exercisers performed three sets of eight repetitions at 80% 1-RM, two days per week. Five exercises were chosen to target the spine and hip regions. Upon completion of the study, femoral neck BMD increased 0.9%, lumbar spine increased 1.0%, while controls lost femoral neck and spine BMD by -2.5% and -1.8%, respectively. OC in the resistance trained women had increased by 14%, while the OC levels of the controls decreased by 5%. That authors speculated that bone turnover and particularly bone formation may be higher in strength trained women.

Bemben *et al.*[9] designed a six month resistance training study involving high and low intensity training in postmenopausal women. Variables examined were BMD, OC, and CTX responses. The high intensity group trained at 80% 1-RM, 8 repetitions per set, and the low group trained at 40% 1-RM, 16 repetitions per set.

Participants performed 3 sets of 12 resistance exercises, three times per week. After six months of training, no change in BMD or CTX levels were seen, however there was a trend for increasing OC levels. The percent change in OC positively correlated to the percent change in the total hip and trochanter BMD. A possible limitation of this study was the short duration of the study suggesting that postmenopausal women may require a longer period of training in order to achieve a detectable change in bone mass. The fact that the women did maintain bone mass may be of clinical significance due to the fact that early postmenopausal women are expected to lose as much as 4% of their bone mass [39].

Vincent and Braith [60] investigated the BMD, OC, BAP, and pyridinoline cross-links (PYD) responses to six months of resistance training in men and women 60 to 83 years of age. Subjects were assigned to either a high intensity group (HEX) training at 80% 1-RM, 8 reps, or a low intensity group (LEX) training at 50% 1-RM, 13 reps. Both groups performed only one set of each exercise, three times per week. Only HEX significantly increased BMD at the femoral neck. Both groups showed increases in OC and BAP. A unique approach applied by the authors was to examine the bone formation to bone resorption ratio. Increasing the formation/resorption ratio could indicate that the formation rate of bone is dominating which could result in increased BMD over time. A ratio equal to or greater than one would indicate a steady-state of remodeling or a state of bone formation. The results found an increase in the ratio of OC/PYD, with LEX greater than control and HEX greater than LEX and control. Only HEX increased in the BAP/PYD ratio.

Hawkins *et al.* [24] examined the BMD response of postmenopausal women training at 70 – 90% 1-RM for four months. Training was performed three days per week on alternating days with intensities equal to 90%, 80%, and 70% 1-RM. Subjects performed 3 sets of 9 resistance exercises incorporating the total body. The relationships between the BMD and reproductive hormone levels also were examined. Significant increases in BMD at the total hip and trochanter were observed, however there were no changes in OC or urinary cross-laps.

Cussler *et al.* [15], investigated 140 postmenopausal women, aged 44 to 66 years, who strength trained for 12 months. Subjects completed two sets of six to eight repetitions, three times per week at 70 -80% 1-RM. The results indicated that increases in BMD at the trochanter were positively related to the total weight lifted. These findings support the usefulness of strength training for the maintenance or improvement of BMD in postmenopausal women. The authors found that certain exercises are more influential than others, such as the squat; however they stress that the performance of one exercise may depend on the success of others. Therefore, a well balanced strength training program would be the best approach for an osteoporosis prevention program.

Much of the research on resistance exercise and bone health has been performed using a traditional strength training strategy, which focuses primarily on strain magnitude. Stengel *et al.* [53], took a unique approach to resistance training and examined the effect of 1 year of power training (PT) versus strength training (ST) in postmenopausal women. Power training involves high-velocity resistance training, rather than slow-velocity resistance training (strength training), which would focus more on strain rate. Subjects included 53 osteopenic postmenopausal pretrained women. The exercise intervention included 12 week intervals of periodized high-intensity (70 – 90% 1-RM) training, followed by four to five weeks of low intensity (50%) training. The strength group (n=28) moved through the range of motion slowly at four seconds concentric and four seconds eccentric, while the power training group (n=25) performed the concentric phase in a fast/explosive manner and the eccentric phase at four seconds. Weight lifting sessions were performed two times per week. Both groups also performed one session per week of coordination, strength, endurance, and flexibility training (a "gymnastics" session) and one session per week of home training consisting of 25 minutes of rope skipping, stretching, isometric exercises, and exercise with rubber bands. Compared with ST, PT achieved significantly ($p<0.001$) higher relative loading magnitude (15.9%), relative loading amplitude (82.3%), loading rate (262%), and unloading rate (611%). After 12 months of training, no differences in with, lean body mass, %body fat, or isometric strength or endurance were detected. PT appeared to have a higher antiresorptive effect than ST. Significant ($p<0.05$) between group differences were detected at the lumbar spine, total hip, and intertrochanter with PT having greater BMD after one year of training. These results owe mainly to relative losses of BMD at each site with ST. ST resulted in significant losses at the total hip, -1.2% ($p<0.01$); femoral neck, -1.6% ($p<0.01$); trochanter, -0.9% ($p<0.05$); intertrochanter, -1.4% ($p<0.01$). PT resulted in no significant ($p<0.05$) relative changes in BMD except at the total forearm, -1.0% ($p<0.01$). The authors suspect that the large loading/unloading rates and loading amplitudes were very important for the PT approach. Also, loading frequencies reached 2.5 Hz with PT as opposed to 1.0 Hz with ST.

For an exercise intervention to be successful, the program must be site specific, of sufficient intensity, and try to maximize total weight lifted during the program. Exercises should be chosen according to muscle groups that exert forces on the bone sites of concern for osteoporosis, the spine and hip. It appears that two to three sets of few repetitions (six to 12) at a high intensity, 70-80% 1-RM is tolerable by postmenopausal women and of a sufficient intensity for an osteogenic response. In order to maximize weight lifted during an intervention period, the frequency of training per week and the number of sets could be manipulated to some extent. Many studies include at least one day of rest between training days to avoid neuromuscular fatigue and injury. So, three days per week might be best coupled with three sets of each exercise. The biochemical markers of bone turnover should be assessed at earlier time points than six or 12 months, as changes in resorption have been shown to occur within three months.

Estrogen Status and Bone Response to Exercise

Within the first three years after the onset of menopause, it is estimated that a women could lose up to 4% BMD and by year six after the onset of menopause a woman could lose 15% BMD [39]. During the first two years of menopause, resorption rates are accelerated followed by a gradual increase in formation rates through the years three to five since menopause [39]. Estrogen may lower the remodeling threshold needed to conserve or improve bone mass [17]. Therefore, with the loss of estrogen at menopause, bone thresholds increase requiring a larger loading magnitude for an osteogenic response in postmenopausal women than premenopausal women. This may have been part of the explanation in the jumping exercise conducted by Bassey [8] in which premenopausal women responded while postmenopausal women did not. The minimal jumping protocol may not have been a sufficient loading magnitude. Unfortunately, in this study, analyses on HRT status did not influence the lack of results in the postmenopausal women. Some studies did control for HRT status [30, 33, 42, 64], while others did not [9, 24, 60]. It also appears that with the increased threshold of estrogen deplete bone; the length of intervention must be increased in order to achieve an osteogenic response. Studies that were conducted for greater than six months have had success in increasing BMD[30, 33, 42, 64]. Exercise studies six months or shorter have failed to find increases in BMD in postmenopausal women [9, 38]. Exercise interventions that have found results within six months should be interpreted with caution as some did not control for women on HRT [60] or the inclusion of men in the sample [60].

Going *et al.* [21], examined 320 postmenopausal women, aged 40 to 65 years. 159 women were on HRT for at least one year and not more than six years. 161 women had not used HRT (NHRT) for the previous one year period. These women were then randomized to an exercise (EX) or non exercise (NEX) groups, giving four groups: HRT, EX (n=86); HRT, NEX (n=73); NHRT, EX (n=91), and NHRT, NEX (n=70). Calcium intake was controlled by the authors, as 800mg/day calcium supplements were given to all subjects. The exercise intervention included both ground reaction forces and joint reaction forces. Ground reaction forces were performed three times weekly and incorporated weight bearing aerobic exercises, such as walking, jogging, skipping, hopping, and stair climbing or box stepping. The stair climbing or box stepping gradually increased in intensity by wearing weighted vests (weight increased by one to three pounds per month) and by increasing the number of steps per day. Joint reaction forces were performed on seven resistance exercises using free weights and machines. Two sets of six to eight reps of each exercise were performed either one day per week at an intensity of 80% 1-RM or two days per week at an intensity of 70% 1-RM. NHRT, EX increased BMD at the trochanter by 1.2%, the femoral neck by 1.5%, the lumbar spine by 0.8%, and the total body by 0.4%. HRT, NEX increased BMD at the lumbar spine by 0.7% and total body by 0.4%. NHRT, NEX decreased total body BMD by 0.3% and femoral neck BMD by 0.4%. The authors could not confirm an additive effect on bone by combining HRT with exercise; however these data suggest that HRT may be a confounding variable in women without exercise. Gallagher *et al.* [19], studied the effects of discontinuation of HRT on BMD in 489 elderly women. These women were divided into three different treatment groups of estrogen replacement/hormone replacement therapy (ERT/HRT), calcitriol, and ERT/HRT plus calcitrol and a placebo group. Treatment continued for three years then subjects were removed from treatment and studied for another two years following discontinuation. At year three, all three treatment groups showed increases in spine, femoral neck, and total body BMD with ERT/HRT and the combination groups increasing by 2 – 7%, while the calcitrol group changes in BMD ranged from -0.4 – 1.8%. Decreases in BMD were observed in all three treatment groups at year one and two following discontinuation. By the end of the first year after discontinuation, ERT/HRT and the combination groups decreased by 1.4 – 4.3%, while the calcitrol group decreased by 0.2 – 1.8%. Placebo total body and total femur BMD decreased by the third year and continued to decrease slightly through years four and five, whereas spine BMD did not change from baseline. Urinary NTx and serum OC decreased by year three in the hormone treated groups and returned to baseline values after discontinuation of treatment. NTx continued to increase by the second year following discontinuation. These data reveal the impact discontinuation of HRT can have on bone health. It appears that any benefits gained by HRT will be largely lost within the first year after stopping treatment. Therefore, years since stopping HRT should be a concern for researchers with subjects who have had a history of HRT.

Estrogen status of postmenopausal women is clearly a confounding factor in exercise intervention research. Careful consideration should be given to recording menopausal age of the subject, whether the subject is on HRT and for how long, whether the subject has discontinued HRT and how long, or has never been on HRT. Measures should be taken to control for this through research design or statistically to ensure sound results from an exercise intervention. In addition to HRT, the length of the exercise intervention must be greater than six months and of a high intensity in order to achieve positive results on bone mass.

Vibration and Bone

The use of a vibration stimulus has been shown to have an effect on the neuromuscular system, enhancing performance and improving strength. Vibration imposed on skeletal muscle has been reported to stimulate the primary endings of the muscle spindle exciting α-motoneurons [25]. This excitation causes homonymous motor units to contract, resulting in a tonic contraction called the tonic vibration reflex [25]. Even in a decerebrate cat, vibration can elicit a tonic vibration reflex [25]. A vibration paradox appears to exist so that even though a tonic vibration reflex is elicited, the stretch reflex and the Hoffman-reflex (H-reflex) are inhibited [25]. The period following vibration results in a potentiated stretch reflex, while the H-reflex requires a gradual return to normal values [25]. In a fatigued state, it is hypothesized that vibration can compensate for reduced γ-motoneuron drive by excitation of the Ia afferents causing greater force output due to the reflexive excitation of the α-motoneurons [25].

Much of the physiological risk associated with vibration come from research done in the workplace. These vibration exposures include long durations of exposure or short exposures of large magnitudes of vibration [25]. Examples of this type of vibration are chainsaw operators and jack-leg-type drills used by miners [25]. These types of workers can experience neurological dysfunction in the hands and even vascular dysfunction [25]. Depending on the total number of hours of exposure, chainsaw operators may experience symptoms from tingling, numbness, and mild pain to vertigo, irritability, and sleeplessness [25]. Whole body vibration produced by motor vehicles, airplanes, and construction work, experienced over a long period of time, have been linked with low-back pain [25]. Therefore, vibration researchers should exercise caution when prescribing a vibration treatment. While exposure time during vibration training is much lower than that seen in the workplace, many vibration platforms are capable of producing frequencies and amplitudes that could be harmful [25]. Careful prescreening of subjects and conscientious consideration of frequency and amplitude should be done when using vibration as a training tool [25].

While studies have been successful in improving power output in athletes, researchers have begun to examine the feasibility of employing a vibration treatment to preserve muscle mass, structure, and function during long durations of bed rest [10, 40]. This type of research is clinically important for conditions requiring bed rest as well as in spaceflight, when muscle atrophy and weakness often occurs. Blottner *et al.* [10] and Mulder *et al.* [40], imposed eight weeks (56 days) of bed rest on 18-20 healthy men. Resistive vibration exercise (RVE) was compared with control who received no exercise or vibration. RVE consisted of twice daily (5 days) and once daily (1 day) six minute exposures of vibration exercise each week. RVE, while in a supine position, included dynamic movements of the knee and ankle joints with feet place on vibration platforms (19-26 Hz) and straps attached to shoulders, hands, and hips of the subjects anchoring them to the platform. It appears that RVE preserves the size of myofiber types I and II in the vastus lateralis while the soleus increased in myofiber size [10]. Bed rest resulted in a shift of muscle phenotype of slow to fast myofiber in the soleus, whereas the REV training conserved the myofiber pattern [10]. RVE increased the expression of nitric oxide synthase (NOS-1) of the soleus when compared with controls [10]. Controls decreased cross-sectional area of the quadriceps femoris muscle linearly during the eight weeks (-14%) [40]. This response was significantly ($p<0.001$) blunted by RVE who decreased -3.5% ($p<0.05$) [40]. Maximum voluntary torque (MVT) decreased by -16% ($p<0.01$) while RVE maintained MVT after eight weeks of bed rest [40]. During this protocol the right leg was tested for MVT at 2 week intervals, therefore a subset of control subjects were MVT tested on the left leg at the end of the study which resulted in a 20.5% reduction in MVT as opposed to an 11% reduction in the right leg [40]. These studies demonstrate the profound effect that vibration can have on muscle alone. Given the dependence of muscle mass and strength on the mechanical loading to the skeleton, vibration could be a potential benefit to bone health.

Vibration training has been receiving some attention in recent years in the area of bone research. The allure of the vibration stimulus is that it could have an osteogenic effect while avoiding the safety and compliance issues associated with progressive resistance training programs. The concept is simple, by standing on a vibration platform that is moving at a high frequency (30 – 40 cycles per second) and displacing at a low amplitude (2 - 5 mm), the subject experiences a number of ground reaction forces in a very short period of time. One could experience 2 – 5 times body weight via vibration training, loading the skeleton to an extent similar to high impact activities such as basketball and sprinting.

Animal models have provides some evidence that a vibration stimulus can have an osteogenic effect. Tanaka *et al.* [54] investigated the phenomenon called stochastic resonance, which is the response of a nonlinear system to a weak signal is enhanced by the presence of noise vibration. Three types of loading were applied to the ulnae of mice; simulated exercise, in which a 3 N amplitude at a 2 Hz frequency sinusoidal loading was applied; vibration alone at 0.3 N and 0 – 50 Hz; and simulated exercise plus vibration. New bone formation occurred with the simulated exercise, however the addition of vibration to the simulated exercise enhanced bone formation as much as 3.9 fold more than the simulated exercise alone. The vibration alone had no osteogenic effect. Judex *et al.* [26] subjected adult female mice to catabolic (disuse) and anabolic (45 Hz vibration, ten minutes per day) situations. Disuse resulted in significant decreases in mRNA levels for several genes, including collagen type I, osteonectin, osterix, and MMP-2 by as much as 55%. These decreases occurred by 4 days and normalized by day 21. Vibration induced expression of inducible nitric oxide synthase, MMP-2, and receptor activator of the nuclear factor kB ligand (RANKL) at day 21 by as much as 54%. In another study by Judex *et al.* [27], the hind limbs of sheep were place on either a vibrating plate (30 Hz, 0.3g) or on an inactive plate. The intervention consisted of 20 minutes per day, five days per week, for one year. The results demonstrated an increase in trabecullar stiffness. Xie *et al.* [63] examined whole body vibration administered at 45 Hz (0.3g) for 15 minutes per day, 5 days per week in young female mice. Vibration resulted in 33% and 31% lower ($p<0.05$) osteoclastic activity in the trabecular components at the epiphysis and metaphysis compared with controls. There was also 30% greater ($p<0.05$) bone formation rates on the endocortical surface of the metaphysis when compared with controls. The authors conclude that the use of this low level vibration in young developing bone may help improve bone quality without influencing longitudinal growth of the bone, thereby decreasing the incidence of osteoporotic or stress fractures later in life.

The insertion of rest periods however, has been demonstrated to be beneficial in restoring the mechanosensitivity of bone cells[46]. Robling *et al.* [46] examined the restoration of mechanosensitivity to bone cells by inserting a wide range of rest periods to mechanically loaded rat tibiae (four point bending). When loading cycles (90 cycles) were administered consecutively without rest, eight hours of recovery time resulted in 100% higher bone formation rates as opposed to 0 and 0.5 hours recovery. When short rest periods were given between loading cycles (36 cycles), 14 seconds recovery resulted in 66-190% higher bone formation rates than .5, 2.5, and 7 seconds. Xie *et al.* [63] examined the effects of adding rest periods during vibration in young mice. One group received the vibration continuously, while the other group received the vibration with 10 seconds of rest every second. There was no potentiation observed with the insertion of rest periods. Results from the Xie *et al.* [63] and Robling *et al.* [46] research are difficult to compare as one used vibration [63] and the other used [46] four point bending. Also the magnitude of loading was quite different as the vibration elicited about 10 μ-strain [63] and the bending protocol elicited over 2,000 μ-strain [46] at the level of the bone. Xie *et al.*[63] suggest that mechanical stimuli of about 1000 μ-strain may increase bone fluid flow when rest is inserted between cycles and since their protocol was much lower, no recovery period was required.

Human studies have been few and have had conflicting results due to differences in research design; i.e. stimulus intensity, time receiving the stimulus, and duration of the studies. One issue that is of concern when vibration is applied to standing humans is the transmissibility of the vibration to the skeletal sites of most importance, the hip and lumbar spine. In contrast to the animal studies, the actual vibration stimulus cannot be directly applied to the bone itself as with the studies using mice, nor are the anatomical features of the hind legs of sheep similar to humans as sheep have hard stiff hooves, thereby allowing for increased transmissibility of vibration to the leg. Rubin *et al.* [49] investigated the transmissibility of vibration to the hip and lumbar spine in standing humans. Transcutaneous pins were inserted in the spinous process of L4 and on the greater trochanter of the femur. Accelerometers were attached to the pins while subjects stood on a vibration platform at frequencies of 15 to 35 Hz, with accelerations reaching up to 1 g. Results indicate that 100% transmissibility to the hip is achieved at frequencies less than 25 Hz and it is reduced to 80% at frequencies higher than 25 Hz. Also affecting transmissibility was the way the person stood, with a more dampening effect observed as knee flexion was increased.

Torvinen *et al.* [55] studied the effects of vibration training for eight months in 56 men and women between the ages of 19 and 38 years. Subjects were randomly assigned to a vibration group or a control group. The control group was asked to not change their habitual physical activity. The vibration group stood on a vibration platform which displaced at 2 mm amplitude for four minutes per day, three to five days per week. The exercise program consisted of the following exercises: light squatting, standing erect, standing relaxed, light jumping, shifting body weight from one leg to the other, and standing on heels. Each exercise was performed consecutively for 10 seconds each, equaling 60 seconds per set. The first four months consisted of a gradual progression of increasing time on the platform and increasing frequency of vibration. The final four months consisted of four minutes on the platform with increasing frequency by 5 Hz each minute, from 30 – 45 Hz. DXA was used for bone BMC at the lumbar spine, right proximal femur, calcaneus and nondominant distal radius. Peripheral quantitative computed tomography (pQCT) measurements were made at the midshaft and distal site of the right tibia. Biochemical markers of bone turnover evaluated were OC, aminoterminal propeptide of type I procollagen (PINP), CTX, and osteoclast-derived TRACP isoform 5b (TRACP-5b). Bone measurements were taken at baseline and post training and biochemical markers of bone turnover were taken at baseline, 3, 6, and 8 months. Some muscle performance tests were obtained at baseline and post training. The authors reported no vibration-related side effects. Vibration training resulted in no changes in bone measurements and no changes in the biochemical markers of bone turnover. The vertical jump performance test did increase after vibration training. The authors stated that the lack of results could have been due to the good health of the young subjects and that the vibration stimulus was not sufficient to produce an osteogenic response for these individuals.

Russo *et al.* [51] examined the effects vibration in 14 postmenopausal women. The subjects stood on a vibration platform at a frequency of 28 Hz for three 2-minute sessions equaling six minutes per day, two days per week. The intervention duration was six months. Muscle power, cortical bone density, and biomarker of bone turnover were assessed. No changes in bone or in the biomarkers of bone turnover were found, although there was an improvement in muscle power.

Rubin *et al.* [50] found some promising results in a one-year prospective, randomized, double-blind, and placebo-controlled trial in 70 postmenopausal women. Subjects stood on a vibration platform providing a magnitude of 0.2 g and frequency set at 30 Hz for two 10-minute treatments per day. BMD at the spine, hip, and distal radius was measured using DXA at baseline, 3, 6, and 12 months. 56 of the 70 women completed the study. Using an intention-to-treat analysis, no changes in BMD were detected. However, the authors did determine a significant effect of compliance concerning the efficacy of the vibration stimulus at the spine. In order to evaluate the possible clinical significance of the intervention, the treatment group was divided into quartiles of compliance then compared to the control subjects obtaining a relative benefit of the treatment. The women in the highest quartile of compliance (86% compliant) resulted in a 2.17% relative benefit of treatment at the femoral neck and a 1.5% relative benefit at the spine. The BMD changes for the treatment group showed a gain of 0.04% at the femoral neck a 0.10% loss at the spine, which were used in calculating the relative benefit. It is important to note that these small changes are within machine error and should not be considered biological changes, however these changes are essentially zero, which can be clinically significant since postmenopausal women are expected to lose as much as 4% bone mass per year [39]. The placebo group did exhibit some of the expected losses in BMD with a loss of 2.13% at the femoral neck and 1.6% at the spine. These values are outside the error of detection, especially at the hip, and could be considered an actual biological change in BMD. The authors inspected the data further and found that the lighter women, weighing less than 65 kg, who were most compliant, resulted in a significant 3.35% relative benefit at the spine. Even the mean compliance group of the lighter women resulted in a significant 2.73% relative benefit at the spine. These results do provide some evidence the potential benefit of vibration training, especially in lighter women.

In another study by Gilsanz *et al.* [20] a similar protocol was used only the magnitude of vibration was 0.3g and the study population included young women with low BMD and a history of fracture. The women were between the ages of 15 and 20 years of age (N=48). Twenty-four of the women were asked to stand on a vibration platform (30Hz, 0.3g), at home, for 10 minutes a day five days per week. Using an intention-to-treat analysis, quantitative computer tomography (QCT) revealed that vibration induced an increase of 2% ($p=0.06$) in cancellous bone of the spine compared with controls. Vibration also resulted in a 2.3% greater ($p<0.05$) increase in the cortical area of the femur compared with controls. Muscle cross-sectional area was computed and vibration revealed significantly ($p<0.05$) greater gains than controls in the total paraspinous musculature (5.4%), the psoas (6%), and the erector spinae (4.4%). In order to examine a dose-response to the vibration, compliance was taken into account by dividing subjects into quartiles of compliance (minutes per month). The lowest quartile included those that were 1 – 13% compliant (n=6), the next three were 21 – 39%, 41 – 71%, and 77 – 100%. The lowest quartile did not respond to the vibration as the first dose effect appeared at 20% compliance (2 minutes per day). Subjects of the top three quartiles (n=18) were compared with the pooled controls with the lowest quartile subjects (n=30). Vibration resulted in a 3.9% greater ($p<0.01$) spine cancellous bone and 2.9% greater ($p<0.01$) femoral cortical area. Psoas, erector spinae and total paraspinous muscular increased 6.8 – 8% ($p<0.01$). DXA revealed significant ($p<0.05$) increases in BMD and BMC by both groups, however there were no significant differences between groups. These results suggest that vibration can stimulate musculoskeletal enhancement even at magnitudes much lower than those typically produced by vigorous exercise. Given the two factors of age and BMD status (young and low BMD), one would immediately point out that this population should improve musculoskeletal parameters over a years time with little intervention, which was backed by the fact that DXA BMD and BMC did increase in both groups (up to 4%) yet were not different from each other. Differences in bone quality were revealed with QCT scans showing the benefit of the vibration exposure. Vibration of this nature may be a safe and effective modality of enhancing bone health in the young developing skeleton. It is very likely that these women's bones were very sensitive, with a very low threshold for mechanical stimuli and therefore required very little stimulation, an idea supported by the 2 minute/day compliance. The authors suggest that the biological response was "triggered" rather than accumulated, as the >2 minutes/day compliers received no additional benefits. So, the question of whether this type of low magnitude vibration would be a large enough stimulus for older women or for those with more dense bones remains to be answered.

Verschueren *et al.* [59] performed a randomized controlled trial in 70 postmenopausal women between the ages of 60 and 70 years. The women were randomly assigned to a vibration group (WBV), a resistance training group (RES), and a control group (CON) and trained three days per week, for 24 weeks. Exercises performed by the WBV group were static and dynamic knee-extensors: squat, deep squat, wide stance squat, one-legged squat, and lunge. The vibration platform was set at a frequency of 35 to 40 Hz, 2.28 to 5.09 g. Training volume and intensity was progressively increased over the six month period. Volume was increased by the vibration duration, the number of series of an exercise, or by the number of different exercises performed. Intensity increased by shortening the rest period or by increasing the amplitude from 1.7 mm to 2.5 mm and/or by increasing the frequency from 35 Hz to 40 Hz. Training load was also manipulated by changing from predominantly two-legged exercises to one-legged exercises. The RES group warmed up for a period of 20 minutes by stepping, running, or cycling at an intensity increasing from 60% to 80% of heart rate reserve. Actual resistance training consisted of leg extensions and leg presses. The first 14 weeks of training was designed to progressively increase intensity from two sets of 20-RM to two sets of 15-RM, two sets of 12-RM, two sets of 10-RM, to two sets of 8-RM. The last 10 weeks consisted of varying volume and intensity by ranging from three sets of 12-RM to one set of 8-RM. Training session duration was 30 minutes or less for WBV and about one hour for RES. The CON group was told to maintain their current level of activity and completed a questionnaire each month concerning their physical activity. Right proximal femur and total body BMD was assessed by DXA at baseline and post intervention. The biochemical markers of bone turnover, CTX and OC were assessed at baseline and post intervention. Isometric and dynamic muscle strength and postural control were evaluated. Increases in isometric and dynamic strength occurred in both WBV and RES groups, while the CON group did not change. Total hip BMD increased 0.93% in the WBV group, while no changes were observed in the RES and CON groups. The relative benefit for vibration training over RES was a significant 1.51%. The gain in hip BMD was not related to the change increase in strength. No changes were observed in total body or lumbar spine BMD. Nor were any changes detected in the biochemical markers of bone turnover OC and CTX. The authors reported no vibration-related side effects. The results of this research design concerning vibration are promising for an osteogenic response.

Summary

Animal models have shown a dramatic osteogenic effect of vibration training which has yet to be seen consistently in humans. The research in animals is easily applied and can be manipulated to extreme extents. Research in humans has taken a very conservative approach to ensure safety and avoid any vibration-related side effects. This aspect may account for the lack of results in several studies [50, 51, 55]. Verschueren *et al.*[59] demonstrated that postmenopausal women can safely handle up to 30 minutes of high amplitude, high frequency vibration training three days per week.

Many differences in protocol between the human studies exist: duration of the vibration bout, rest periods between vibration bouts each day, total accumulated vibration time per day, number of vibration sessions per week, vibration intensity, activities performed while receiving vibration, study length, and age of the subjects. Each study manipulated each of these aspects, which makes it difficult to discern wherein the problem lies. It is imperative that future research applies some of the knowledge gained from the animal studies. It seems impossible to subject a person to 20 continuous minutes of vibration per day, five days per week, as was done in sheep [26], yet the human studies accumulated 20 to 30 discontinuous minutes per day. These were the vibration durations in human research that produced results [50, 59]. The studies with a lack of results consisted of 4 and 6 minutes of vibration [51, 55]. Rest periods between vibration bouts were not clearly defined in discontinuous protocols [50, 51, 59], however it appears that accumulation per day may be more important than the rest period between bouts. To restore bone cell mechanosensitivity to dynamically loaded bone in mice, Robling *et al.* [46], determined that eight hours must separate loading bouts and at least 14 seconds should separate loading cycles. Rubin [50] applied the rule of 10 minimum hours should separate day to day vibration. Time between the two daily 10 minute bouts, however was not regulated. Verschueren [59] indicated that training intensity was increased by shortening the rest period but no indication was given as to how long the rest period was or how long the individual vibration bouts lasted. Weekly accumulated vibration time could be an issue. The dramatic osteogenic response observed in sheep occurred by 20 minutes of vibration per day, five days per week. Rubin[50] requested 20 minutes of vibration per day, seven days per week. He achieved results in those that were at least 80% compliant, which is about 5.6 days per week. Verschueren[59] achieved results with vibration occurring three days per week. Research lacking results applied vibration fewer than three times per week in addition to accumulating less vibration time per day. Russo[51] applied vibration in three two-minute daily bouts, two days per week, and Torvinen[55] applied vibration in 4 minute daily bouts, with a mean of 2.8 ± 0.8 days per week (three days per week was requested).

Activities performed while receiving vibration could be an extremely important element to vibration training. Animal studies demonstrate that the phenomenon of stochastic resonance exists in bone cell mechanosensation. Two human studies included a dynamic load to the skeleton during the vibration stimulus.

Verschueren [59] achieved results, while Torvinen [55] did not. Again, differences in accumulation of vibration per week is present between these two studies, with Verschueren[59] accumulating up to 1.5 hours per week and Torvinen[55] accumulating about 12 minutes. Verschueren[59] also included a larger number of exercises which were much more dynamic than those of Torvinen[55]. Verschueren[59] avoided simply standing and all exercises involved dynamic movements, i.e. lunges and squats. Torvinen[55] included the dynamic movements of light squatting and light jumping, however the majority of the training consisted of standing erect, standing relaxed, and standing on heels.

Vibration intensity was variable between human studies, ranging from 25 to 45 Hz. Studies with a bone response applied 30 Hz[50] and 35 – 40 Hz[59]. Russo[51] used 28 Hz and Torvinen[55] ranged from 25 – 45 Hz. Both Rubin [50] and Torvinen [55] daily exposures were short, six and 4 minutes respectively. Frequencies in the Torvinen[55] protocol were applied in a progressive manner by 5 Hz intervals each minute of the four minute bout, with the final four months resulting in 30, 35, 40, and 45 Hz each minute. Therefore, intensity was kept constant for a full four months with no progressive overload during this time. Russo[51] and Rubin [50]also failed to apply a progressive overload of vibration intensity. Russo[51] and Rubin[50] applied essentially the same frequency of vibration, 28 and 30 Hz respectively. Rubin[50] achieved results which may have resulted from the increased daily and weekly exposure.

Study length and subject age are the final two areas of concern for the human studies on vibration training and bone response. The training periods were six months [59], 8 months [55], and 12 months[20, 50]. Postmenopausal women were the focus of Verschueren[59], Rubin[50], and Russo[51]; while young adult men and women was the focus of Torvinen[55]. Russo[51] found no bone response in postmenopausal women with six months of training, whereas Verschueren[59] did. Differences between these two protocols lie in Verschueren[59] applying progressive overload, increased accumulation of daily and weekly vibration, and including dynamic exercises performed during vibration. Rubin[50] induced a bone response in postmenopausal women with one year of training, provided the vibration was applied in high daily and weekly amounts. The major issue with the lack of results by Torvinen[55] could be the young adult men and women subjects combined with the lack of overload. The very short and conservative vibration stimulus was probably not inducing a strain to which the subject’s healthy bone needed to adapt.

CHAPTER III

METHODOLOGY

The purpose of this study was to examine and compare the effects of an eight month program involving two high intensity training protocols, combined vibration plus resistance training and resistance training alone, on BMD and bone metabolism of older postmenopausal women. Subjects were healthy women, between the ages of 55 and 75 years, and who were not taking HRT. Measurement variables included the biochemical markers of bone turnover (BAP and CTX); BMD and BMC of the total body, dual femur, lumbar spine, and radius 33%; and muscle strength (1RM) of eight resistance exercises. The vibration group received a vibration stimulus in three different positions which preceded resistance training exercises. A secondary purpose was to examine muscular strength changes between the two resistance training protocols.

Subjects

Subjects for this study were postmenopausal women between 55 and 75 years of age (N=55). Volunteers were recruited from the Oklahoma City Metropolitan area via advertisements that were placed in area newspapers, on the University's local cable access channel, on the University radio station, flyers posted in public areas, and letters via the postal service (Appendix A). Subjects read and signed a written informed consent form, Authorization to Use or Disclose Protected Health Information and obtained medical clearance from their personal physician (Appendix B). All methods and procedures were approved by the University of Oklahoma Institutional Review Board (IRB No. 10918/Protocol No. FY2005-374) (Appendix

D). Based on data from our laboratory of the biomarker response to one year of resistance training, to achieve a power > 0.80, alpha < 0.05, 23 subjects were needed within each group. Vibration and BMD and vibration and biomarker effect sizes could not be calculated due to lack of means and standard deviations reported by Verschueren *et al.*[59].

Inclusion Factors

1. The subjects were normal healthy women volunteers, 55–75 years of age.
2. Subjects provided information on menopausal status, menstrual history, and hormone replacement therapy (HRT) status obtained by a menstrual history questionnaire.
3. Subjects were at least five years postmenopausal.
4. Subjects were not taking HRT.
5. Subjects who had a history of HRT had not taken HRT for at least one year.
6. The subjects had not participated in a weight training program for at least one year prior to the study.
7. Recruited subjects were medically stable, ambulatory, and capable of undergoing physical strength testing and training.
8. Subjects were of a mental capacity to give written informed consent and comply with the protocols.

Exclusion Factors

1. Women with diagnosed osteoporosis or a BMD site with a T-score less than -2.5 were not allowed to participate.

2. Any persons with physical disabilities preventing them from being strength tested and trained, including orthopedic or arthritic problems were not allowed to participate.
3. Those with heart problems such as congestive heart failure and arrhythmias, chronic high blood pressure, or those on Beta Blockers were not allowed to participate.
4. Subjects who were current smokers or past smokers within the previous 15 years were not allowed to participate.
5. Women with current diagnosis or a history of renal disease, chronic digestive or eating disorders, rheumatoid arthritis, or uncontrolled thyroid disease were not allowed to participate.
6. Those who were taking medications that affected bone density, such as steroid hormones, calcitonin, or corticosteroids were not allowed to participate.

Research Design

Subjects obtained medical clearance from their personal physician and signed an informed consent. Once cleared, the subjects were assigned to a resistance training group (R, n=22), a vibration plus resistance training group (VR, n=21), or a control group (C, n=12). Subjects were assigned to groups based on their availability to attend specified training sessions, which were 6:30 am (VR), 8 am (R), 11:30 am (R), and 5 pm (VR) held on Mondays, Wednesdays, and Fridays. The first visit to the Bone Density Laboratory, located at the Department of Health and Exercise Science on the University of Oklahoma-Norman Campus, consisted of completing questionnaires about physical activity (PASE), menstrual history, calcium intake, and health status (Appendix C); a baseline bone scan and blood draw. Subjects began a supervised eight month training program held three days per week at the Neuromuscular Laboratory at the Department of Health and Exercise Science. Strength was assessed at baseline and every four weeks during training, so that the principle of progressive overload could be applied. Blood draws were obtained at baseline and at months four and eight. BMD was assessed at baseline and at the end of months four and eight of training.

Resistance and Vibration Training

The resistance training that both the R and VR groups performed consisted of resistance exercises that targeted the bone sites of the hip and spine, including both upper and lower body muscle groups. The exercises included the following:

- Supine leg press
- Hip flexion (standing position on a multi-hip machine)
- Hip extension (standing position on a multi-hip machine)
- Hip abduction (standing position on a multi-hip machine)
- Hip adduction (standing position on a multi-hip machine)
- Seated military press
- Latissimus pull down
- Seated row
- Dumbell wrist curls
- Seated abdominal flexion

The resistance exercises were performed on isotonic weight training equipment. Cybex (Cybex Inc.) which eliminated and reduced issues of balance and safety often encountered by free weights. A two-week acclimation period was given to the subjects to ensure participant comfort and familiarity with the equipment. Proper techniques for lifting were taught to the subjects during this period by trained personnel. The third week was considered the first week of the training program. During this third week, the 1RM for eight exercises was determined. The wrist curl and abdominal flexion exercises were not tested for 1RM. A proper warm up, consisting of a 5 minute walking or cycling warm up and a warm up at each exercise machine, was administered to subjects before the onset of strength testing. The 1RM was obtained by finding the maximum weight lifted through an entire range of motion in a single repetition. The 1RM was found within 5 attempts, giving 1 minute of rest between attempts. 1RM testing was monitored and recorded by project staff (Appendix E).

Each training group performed three sets of 10 repetitions for each exercise during a single session. Intensity was set at 80% 1RM for all exercises except the wrist curl and abdominal flexion, which were performed and a self-selected light to moderate intensity. Each session was completed in less than one hour. The overload principle was applied to the program, thus loads were adjusted following 1RM testing as strength increased. Daily, each subject personally recorded the number of repetitions they completed for each set of exercises on an individualized computer generated log that specified the correct load for each exercise (Appendix E)

Vibration training consisted of a high frequency, low magnitude vibration stimulus (30-45 Hz, 3-5 mm) on a Powerplate (Northbrooke, IL) vibration platform. Subjects received the vibration in three different positions, each of which preceded specific resistance exercises. Exposure to the vibration occurred in one or more 15 - 60 second intervals with at least 15 seconds of rest between vibration bouts. The subjects performed dynamic movements during vibration in order to induce a stochastic resonance effect on the bone cells which was then followed by a high intensity dynamic loading stress. The vibration position (V) and specific resistance exercises (R) that followed were:

Vibration Position	Resistance Exercise
Seated, while performing a shoulder press using rigid straps fixed to the platform	Shoulder Press, Hip Abduction, Hip Adduction, Abdominal Flexion
Wrist Curls, using rigid straps fixed to platform	Wrist Curls, Lat Pull Down, Low Row
Squat, standing performing a dynamic squat movement	Leg Press, Hip Flexion, Hip Extension

The order in which subjects received vibration was not controlled nor was the order in which they completed the resistance exercise following vibration controlled.

The vibration stimulus began on week two following the baseline 1RM testing to eliminate a vibration effect on initial strength. The principle of progressive overload was applied to the vibration stimulus and intensities were gradually increased. Increases in intensity were made by manipulating frequency, duration, and number of bouts. Vibration amplitude was held constant at the low (3 mm) setting. Vibration training proceeded as follows:

Week	Sets	Duration (sec)	Frequency (Hz)	Magnitude (g)
2, 3	1	15	30	2.16
4-8	2	15	30	2.16
9	3	15	30	2.16
10-12	2	30	30	2.16
13	2	30	30/35	2.16/2.49
14-16	2	30	35	2.49
Pre 17 M	1	30	30	2.16
W	2	30	30	2.16
F	2	30	35	2.49
17	3	30	30	2.16
18, 19	2	45	30	2.16
20	3	30	35	2.49
21-25	2	45	35	2.49
26-28	2	60	35	2.49
29	2	60	35/40	2.49/2.80
30-32	2	60	40	2.80

Bone Mineral Density Measurements

Dual Energy X-Ray Absorptiometry (GE Medical Systems, Lunar Prodigy, Encore software version 8.80) was used to assess the BMD and BMC of total body; AP lumbar spine (L1-L4, L2-L4); dual proximal femur (femoral neck, trochanter, total hip); and the forearm (33% radius) sites assessed at baseline and at months four and eight during the training period.

The DXA scan technique is based on the attenuation of two energy levels (high and low) of an X-ray passing through tissue. There is an exposure to radiation during a DXA scan, however the range of this exposure is 0.05 - 1.5 mrem which is about a tenth of a dental X-ray. The x-ray tube is equipped with a filter to convert the polychromatic X-ray beam into low and high-energy peaks. The low energy beam (38 keV) is capable of passing through soft tissue but not through denser material such as bone. The high-energy beam (70 keV) is capable of passing through bone.

Subjects lay supine on the DXA table, below which the X-ray source is located. The scanning arm, equipped with the energy-discriminating detector, passes over the subject and detects the x-ray energy that passes through the body in a posterior to anterior direction. The attenuation of the x-ray has a direct relationship with the mass of the tissue through which it passes[37].

One qualified technician performed all scan analyses using the encore 2002 software (GE Medical Systems, version 8.80). Quality Assurance and spine phantom calibration procedures were performed daily prior to each scanning session to ensure no machine drift during the intervention period. Because body mass and tissue type affect energy attenuation, the scan mode was selected based on the subject's trunkal thickness as follows: Thick, >25 cm; Standard, 13 – 25 cm; and Thin, <13 cm. Skeletal regions of interest (ROI) were manually adjusted so that the lumbar spine vertebrae were correctly identified and bone tissue was separated from the soft tissue, allowing for the correct separation of body regions. The scans provide an analysis of the subject's BMD (g/cm^2) and bone mineral content (g). (Example scans are given in Appendix F) Radius BMD and BMC data was reported using the Prodigy BMD Forearm Calibration. At baseline, a subset of 15 subjects volunteered for three repeat forearm scans so that the precision of forearm BMD could be evaluated. The *in vivo* precision for the investigator on this DXA for the BMD of total body, spine, trochanter, total hip, and forearm are 0.5%, 0.8%, 1.7%, 1.2%, and 1.5% respectively.

Blood Sampling

Venipuncture blood collection occured in the morning with the subjects in an eight hour fasting state. The site of venipuncture was the antecubital vein and was performed by a qualified nurse or phlebotomist. A 6 ml sample of blood was taken and within two hours of collection, the samples were centrifuged and serum samples will then be aliquoted into 0.5 ml vials and frozen at –70° C until the time of the assays. To reduce protein degradation, the vials were thawed only one time prior to each bone marker assay.

Biochemical Assays

The resorption marker measured was the cross-linked C-telopeptide of Type-I collagen (CTX) in human serum. CTX was measured in duplicate by enzyme-linked immunosorbent assay (ELISA) (Nordic Bioscience Diagnostics, Denmark)[3]. The enzyme absorbance was determined spectrophotometrically and the CTX concentration was then calculated using a standard calibration curve. CTX units are reported in ng/ml. The intra-assay coefficient of variation ranged from 0.1 – 4.7% and the inter-assay coefficient of variation range was 0.4 – 4.7%.

The CTX assay protocol was conducted according to the following instructions[3] (Appendix G):

1. Allow specimens and kit to come to room temperature.
2. Wash Solution: (1 + 50) Wash + deionized Water
3. Antibody Solution: (1 + 1 + 100) Biotinylated Antibody + Peroxidase conjugated Antibody + Incubation Buffer. This Solution must be used within 30 minutes of preparation, so a lab aid mixed this solution 15 minutes before finishing step 4.
4. Pipette 50µL of the Standards (A-F), Controls (high and low), and Unknowns Followed by 150 µL of the Antibody Solution.

5. Cover with sealing tape and incubate at room temperature for 120±5 minutes on the Innova 2000 platform shaker (New Brunswick Scientific, Edison, NJ) (300 rpm).
6. The microwells are washed 5 times with 400µL of the wash solution using the MultiWash Microplate Washer (Tri Continent, Grass Valley, CA). The second wash cycle included a one minute soak. After the last wash, the wells are blotted dry.
7. Add 100 µL of the Substrate Solution to each well and incubate at room temperature 15 ± 2 minutes in the dark on the mixing plate (300 rpm).
8. Add 100 µL of Stopping Solution to each well.
9. Measure absorbance at 450 nm with 650nm as reference in the Spectracount Plate Reader (Packard, Downers Grove, IL).

The marker of formation measured was bone-specific alkaline phosphatase (BAP). BAP was measured in duplicate with the Metra BAP EIA kit (Quidel Corporation, Mountain View, CA)[2]. Metra BAP is an enzyme immunoassay utilizing a monoclonal anti-BAP antibody. The catalytic activity of the captured enzyme is used to measure BAP activity in serum. Enzyme activity is determined spectrophotometrically and the BAP levels are then calculated from a calibration curve fit with a quadratic equation. Values are expressed as Units per Liter (U/L), with each unit representing one mole of p-nitrophenyl phosphate (pNPP) hydrolyzed per minute at 25° C. The intra-assay coefficient of variation ranged from 0.3 – 12% and the inter-assay coefficient of variation range was 0.1 – 12.5%.

The BAP assay protocol was conducted according to the following instructions[2](Appendix G):

1. Allow kit and specimens to come to room temperature, about one hour.
2. Add 125µL Assay Buffer to each well.
3. Add 20µL Standards, Controls, and samples to the appropriate well then swirl.
4. Incubate for 3 hrs ± 10 min at room temperature.
5. Wash 4 times with 1x Wash Buffer and blot dry after the last wash.
6. Add 150µL Working Substrate Solution.
7. Incubate for 30 ± 5 minutes at room temperature.
8. Add 100µL Stop Solution and Read at 405 nm with the Spectracount Plate Reader (Packard, Downers Grove, IL).

Data Analyses

All descriptive analyses were reported in means ± standard error for the dependent variables. The effects of the intervention on BMD, BMC, biomarkers, and strength were analyzed by a two-way repeated measures ANOVA (Time x Group). When a significant interaction had been determined, the file was split by group and paired t-tests (pre vs. post) were used to determine significant time differences. Percent changes from baseline in BMD, BMC, biomarkers, and strength were calculated and one-way ANOVA, with the Bonferroni *post hoc* procedure, was used to determine group differences. The significance level was set at $p \leq 0.05$ and statistical analysis was performed by SPSS (version 14).

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this study was to examine and compare the effects of an eight month program involving two high intensity training protocols, combined vibration plus resistance training and a resistance training alone, on BMD and bone metabolism of older postmenopausal women. Subjects were healthy women, between the ages of 55 and 75 years, and who were not taking HRT. Measurement variables included the biochemical markers of bone turnover (BAP and CTX); BMD and BMC of the total body, dual femur, lumbar spine, and radius 33%; and muscle strength (1RM) of eight resistance exercises. The vibration group received a vibration stimulus in three different positions which preceded resistance training exercises. A secondary purpose was to examine muscular strength changes between the two resistance training protocols.

Subject Characteristics

A total of 82 subjects were recruited, however, 20 subjects did not start the study for a variety of reasons ranging from not showing up to cancer. Exclusion of the 20 that did not start were due to: three subjects with a BMD T-score <-2.5, eight subjects cited medical problems/illness or their physician did not grant medical clearance, one subject was recently diagnosed with cancer, one could not make the commitment due to the commute, one cited ulcerative colitis and was taking steroid medication, one could not afford parking fees, and five were “no shows” and could not be contacted. 62 subjects started the study, one of which was excluded due to poor attendance. 61 subjects completed the first four months of the study; however six subjects were unable to continue. Three were advised by their physician to stop, two did not come back and could not be contacted, and one cited personal reasons. 55 subjects completed the entire 32 weeks of the study.

All subjects were healthy postmenopausal women between the ages of 55 and 75 years. Subjects were assigned to groups based on their availability for training session times. Table 1 displays the baseline physical characteristics, calcium intake, and physical activity (PASE) data for each group. There were no significant differences between groups at baseline. Subjects with a calcium intake of less than 1500 mg/day were instructed to increase their intake to at least 1500 mg/day. All subjects received their estimated daily intake on an informational sheet about dietary and supplemental calcium (Appendix H). Two-way repeated measures ANOVA detected a significant ($p<0.05$) time effect for increasing calcium intake at month eight from baseline.

Table 1. Physical Characteristics at Baseline for each Group.

	Group		
Variable	VR (n=21)	R (n=22)	C (n=12)
Age (years)	62.8 ± 1.1	64 ± 0.9	63.1 ± 1.4
Height (cm)	164.0 ± 1.5	160.6 ± 1.7	162.9 ± 1.5
Weight (kg)	73.56 ± 2.82	76.6 ± 3.16	77.92 ± 4.53
BMI	27 ± 1	30 ± 1	29 ± 1
PASE	183 ± 16	158 ± 16	150 ± 18
Ca^{2+} Intake (mg/day) Pre	1597 ± 132	1373 ± 173	1376 ± 138
Ca^{2+} Intake (mg/day) Post*	1987 ± 98	1844 ± 57	1746 ± 63

*, $p<0.05$ Time effect. Ca^{2+}, Calcium; VR, vibration plus resistance; R, resistance; C, control. Values are means ± SE.

Biochemical Markers of Bone Turnover Response to Training

All data for VR and R were obtained in the following months: August (baseline), December (mid), and May (post). Three control subjects, however, missed their December (mid) appointment and were tested in February/March. Therefore, in order to avoid the possible influence of a seasonal effect on the biomarker data that midpoint data was not included in the biomarker analyses. One subject in group R was removed from BAP and ratio analyses due to an unusually high BAP measure. This subject's medical history revealed a history of alcoholism which may have compromised her liver in a way such that there was an elevated level of the liver alkaline phosphatase in her system, which could cause elevated results in the Metra BAP assay[2]. In Table 2, the data for bone-specific alkaline phosphatase (BAP), c-telopeptide of Type I collagen (CTX), and the ratio of BAP to CTX are shown for each group at baseline and post-training. There was no significant group, time, or group x time interaction detected. The biomarker data was normalized using z-score transformations and analyses were repeated. No significant group, time, or group x time interaction was detected (Appendix I). The BAP reference range for postmenopausal women >45 years of age is 14.2 – 42.7 U/L[2]. The 95% range of CTX values for postmenopausal women is 0.142 – 1.351ng/ml[3].

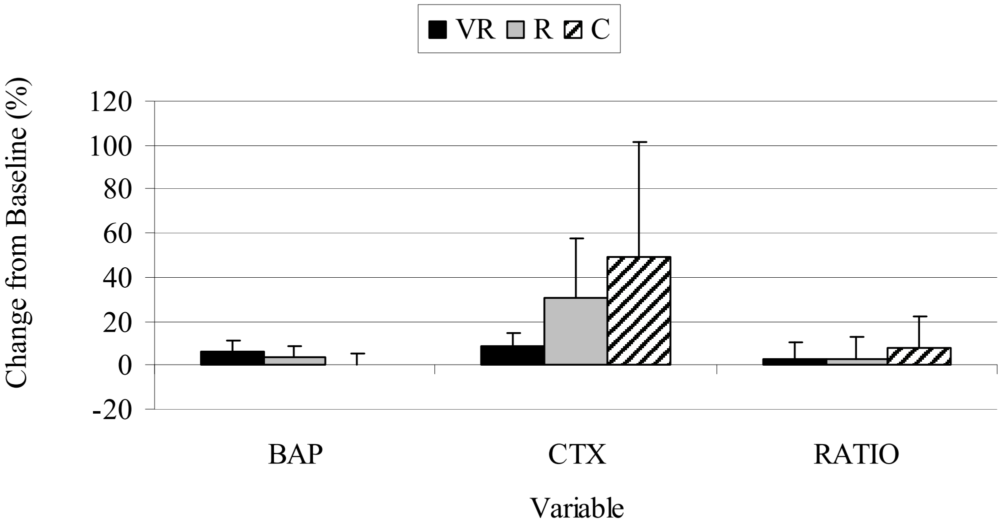
Table 2. Biochemical Markers of Bone Turner Before and After Training.

Variable		Group					
		VR	n	R	n	C	n
BAP (U/L)	Baseline	39.54 ± 2.56	21	42.38 ± 3.27	21	37.47 ± 2.48	12
	Post	40.96 ± 2.66	21	43.20 ± 3.41	21	37.28 ± 2.77	12
CTX (ng/ml)	Baseline	0.559 ± 0.043	21	0.703 ± 0.073	22	0.605 ± 0.081	12
	Post	0.594 ± 0.055	21	0.729 ± 0.059	22	0.603 ± 0.062	12
Ratio	Baseline	79.00 ± 8.26	21	76.82 ± 10.08	21	77.60 ± 14.47	12
	Post	77.96 ± 7.76	21	64.98 ± 6.49	21	66.12 ± 5.59	12

BAP, bone-specific alkaline phosphatase; CTX, C- telopeptide of Type I collagen; Ratio of BAP to CTX. Values are Mean ± SE.

Figure 1 shows the percent change in the biochemical markers of bone turnover. There were no significant group differences in absolute or percent change variables. There was a considerable amount of variability in %change CTX for the control group (1sd=180%) and R (1sd=125%), whereas VR was much more homogeneous (1sd=27%).

Figure 1. Biochemical Marker Percent Change After 8 Months of Training.



Data reported as Means ± SE.

Bone Mineral Density Response to Training

Mid data was omitted from BMD analyses due to the three control subjects who were not tested at the true midpoint, December. For all total body BMD analyses one subject in group R was omitted due to her refusal for her head to be scanned, which resulted in a falsely low total body BMD value. For all right and left hip (total hip, femoral neck, and trochanter) BMD analyses, one subject in group VR was removed due to a double hip replacement. For all analyses of spine (L1-L4 and L2-L4) BMD, one subject in group VR was omitted due to a severe curvature of the spine which resulted in the inability to locate the correct regions of interest.

At baseline, no differences in BMD at each bone site existed between groups. Table 3 displays the baseline values of BMD for each site by group.

Table 3. Baseline BMD Values for each Group.

Variable		Group					
		VR	n	R	n	C	n
Total Body		1.135 ± 0.017	21	1.150 ± 0.021	21	1.132 ± 0.020	12
Right	Total Hip	0.954 ± 0.024	20	0.955 ± 0.025	22	0.940 ± 0.020	12
	Femoral Neck	0.908 ± 0.027	20	0.902 ± 0.021	22	0.907 ± 0.025	12
	Trochanter	0.758 ± 0.023	20	0.768 ± 0.022	22	0.770 ± 0.016	12
Left	Total Hip	0.956 ± 0.025	20	0.965 ± 0.028	22	0.953 ± 0.017	12
	Femoral Neck	0.901 ± 0.027	20	0.900 ± 0.023	22	0.915 ± 0.024	12
	Trochanter	0.768 ± 0.022	20	0.781 ± 0.027	22	0.777 ± 0.013	12
Spine	L1-L4	1.130 ± 0.035	20	1.163 ± 0.028	22	1.131 ± 0.036	12
	L2-L4	1.153 ± 0.036	20	1.195 ± 0.028	22	1.159 ± 0.037	12
Radius 33%		0.825 ± 0.017	21	0.825 ± 0.023	22	0.809 ± 0.028	12

All values expressed in g/cm^2. Values reported as Mean ± SE.

Table 4 shows the baseline and post-training values for each group at the total body. No significant main effects were detected by the two-way repeated measures ANOVA.

Table 4. Total Body BMD Before and After 8 Months of Training.

	Total Body	
Group	Baseline	Post
VR (n=21)	1.135 ± 0.017	1.135 ± 0.017
R (n=21)	1.150 ± 0.021	1.149 ± 0.022
C (n=12)	1.132 ± 0.020	1.133 ± 0.018

All values expressed in g/cm^2. Values reported as Mean ± SE.

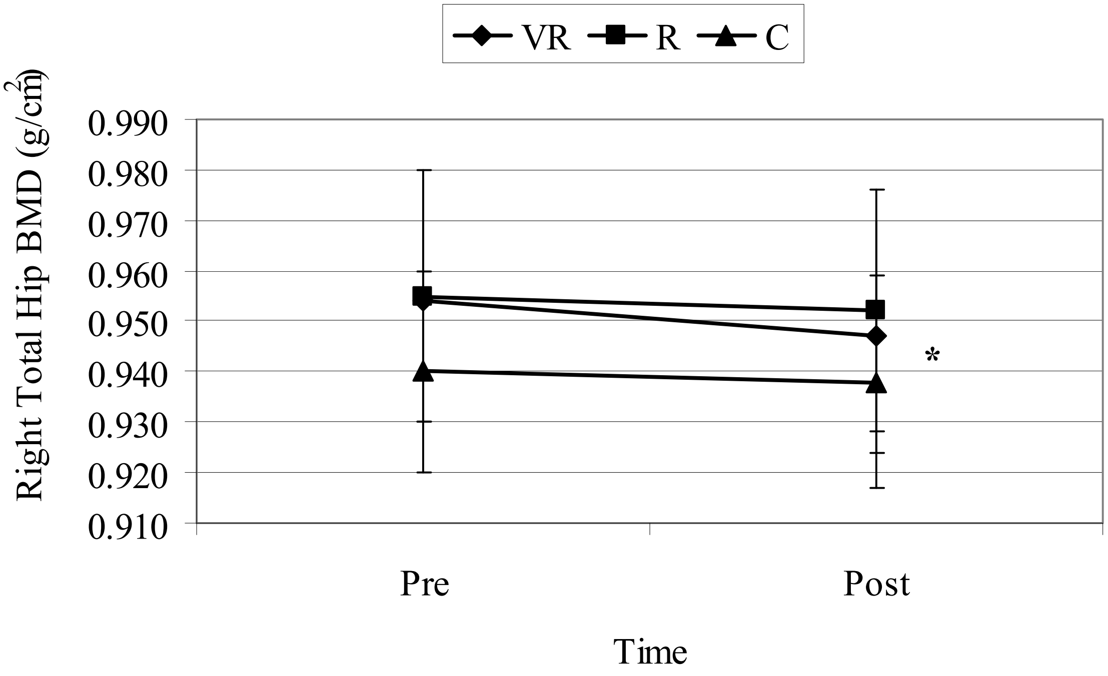
Table 5 shows mean values of the right hip BMD for the total hip and femoral neck sites at baseline and post-intervention. Although no significant group differences were detected, repeated measures ANOVA revealed a significant main effect for Time at the right total hip ($p=0.022$) and at the right femoral neck ($p=0.013$). In Figures 2 and 3, baseline and post BMD values are plotted for each group at the right total hip and right femoral neck, respectively. The right total hip grand mean ± SE showed a decrease from 0.952 ± 0.014 to 0.947 ± 0.014 g/cm^2. The right femoral neck grand mean ± SE showed a decrease from 0.905 ± 0.014 to 0.899 ± 0.014 g/cm^2.

Table 5. Right Hip BMD Before and After 8 Months of Training.

	Right Hip			
	Total Hip*		Femoral Neck*	
Group	Baseline	Post	Baseline	Post
VR (n=20)	0.954 ± 0.024	0.947 ± 0.023	0.908 ± 0.027	0.896 ± 0.026
R (n=22)	0.955 ± 0.025	0.952 ± 0.024	0.902 ± 0.021	0.898 ± 0.021
C (n=12)	0.940 ± 0.020	0.938 ± 0.021	0.907 ± 0.025	0.905 ± 0.026

*$p<0.05$ Time effect. All values expressed in g/cm^2. Values reported as Mean ± SE.

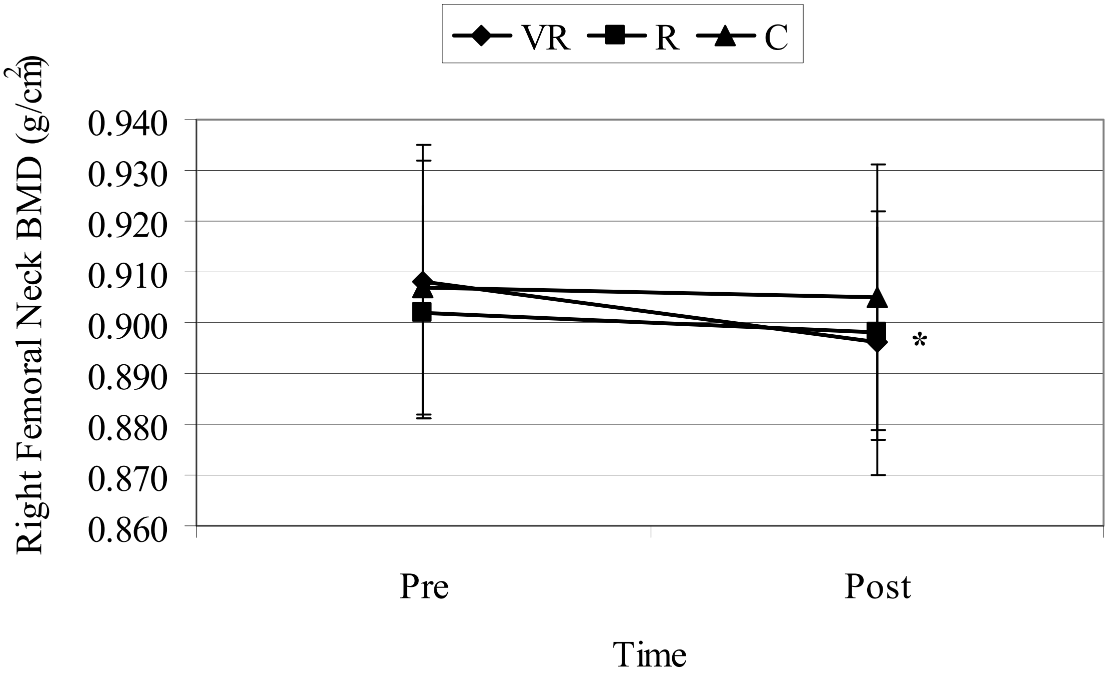
Figure 2. Right Total Hip BMD Before and After Training for each Group.



---

*p<0.05 Time effect. Values reported as Mean ± SE.

Figure 3. Right Femoral Neck BMD Before and After Training for each Group.



---

*p<0.05 Time effect. Values reported as Mean ± SE.

Left hip total hip and femoral neck at baseline and post-training are shown in Table 6. No significant group, time, or group x time effects were detected.

Table 6. Left Hip BMD Before and After 8 Months of Training.

	Left Hip			
	Total Hip		Femoral Neck	
Group	Baseline	Post	Baseline	Post
VR (n=20)	0.956 ± 0.025	0.954 ± 0.024	0.901 ± 0.027	0.901 ± 0.024
R (n=22)	0.965 ± 0.028	0.959 ± 0.028	0.900 ± 0.023	0.892 ± 0.024
C (n=12)	0.953 ± 0.017	0.953 ± 0.019	0.915 ± 0.024	0.910 ± 0.027

All values expressed in g/cm^2. Values reported as Mean ± SE.

Left and right hip trochanter BMD at baseline and post-training are shown in Table 7. No significant group, time, or group x time interaction was detected.

Table 7. Left and Right Trochanter BMD Before and After 8 Months of Training.

	Right Hip		Left Hip	
	Trochanter		Trochanter	
Group	Baseline	Post	Baseline	Post
VR (n=20)	0.758 ± 0.023	0.750 ± 0.022	0.768 ± 0.022	0.764 ± 0.023
R (n=22)	0.768 ± 0.022	0.764 ± 0.022	0.781 ± 0.027	0.774 ± 0.026
C (n=12)	0.770 ± 0.016	0.770 ± 0.016	0.777 ± 0.013	0.780 ± 0.015

All values expressed in g/cm^2. Values reported as Mean ± SE.

In Table 8, the lumbar spine BMD data at baseline and post-training are shown. No significant main effects were detected by the two-way repeated measures ANOVA.

Table 8. Lumbar Spine BMD Before and After 8 Months of Training.

	Spine			
	L1-L4		L2-L4	
Group	Baseline	Post	Baseline	Post
VR (n=20)	1.130 ± 0.035	1.121 ± 0.034	1.153 ± 0.036	1.143 ± 0.034
R (n=22)	1.163 ± 0.028	1.156 ± 0.030	1.195 ± 0.028	1.190 ± 0.030
C (n=12)	1.131 ± 0.036	1.129 ± 0.038	1.159 ± 0.037	1.165 ± 0.039

All values expressed in g/cm^2. Values reported as Mean ± SE.

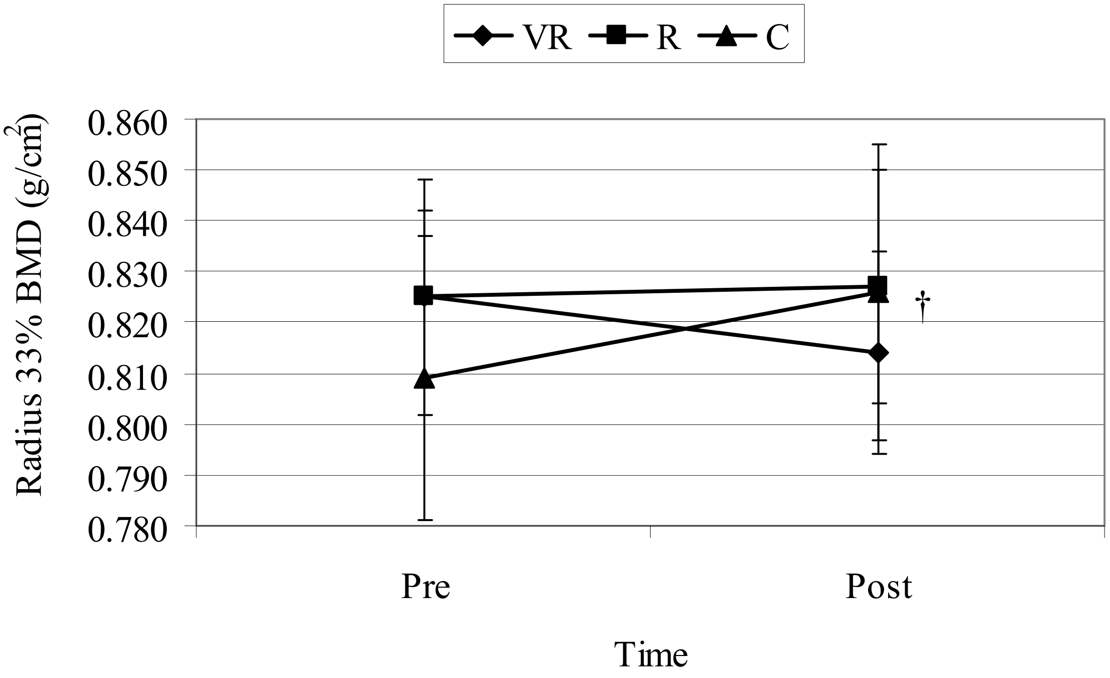
In Table 9, BMD of the radius 33% site is displayed at baseline and post-training. Repeated measures ANOVA detected a significant (p=0.011) Group X Time interaction. Figure 4 plots the radius 33% BMD responses for each group. The group VR showed a decrease in BMD while group C showed an increase in BMD at the radius 33% site.

Table 9. Forearm Radius 33% BMD Before and After 8 Months of Training.

	Radius 33%†	
Group	Baseline	Post
VR (n=21)	0.825 ± 0.017	0.814 ± 0.020
R (n=22)	0.825 ± 0.023	0.827 ± 0.023
C (n=12)	0.809 ± 0.028	0.826 ± 0.029

†, p<0.05 group x time interaction. All values expressed in g/cm2. Values reported as Mean ± SE.

Figure 4. Radius 33% BMD Response to 8 Months of Training.

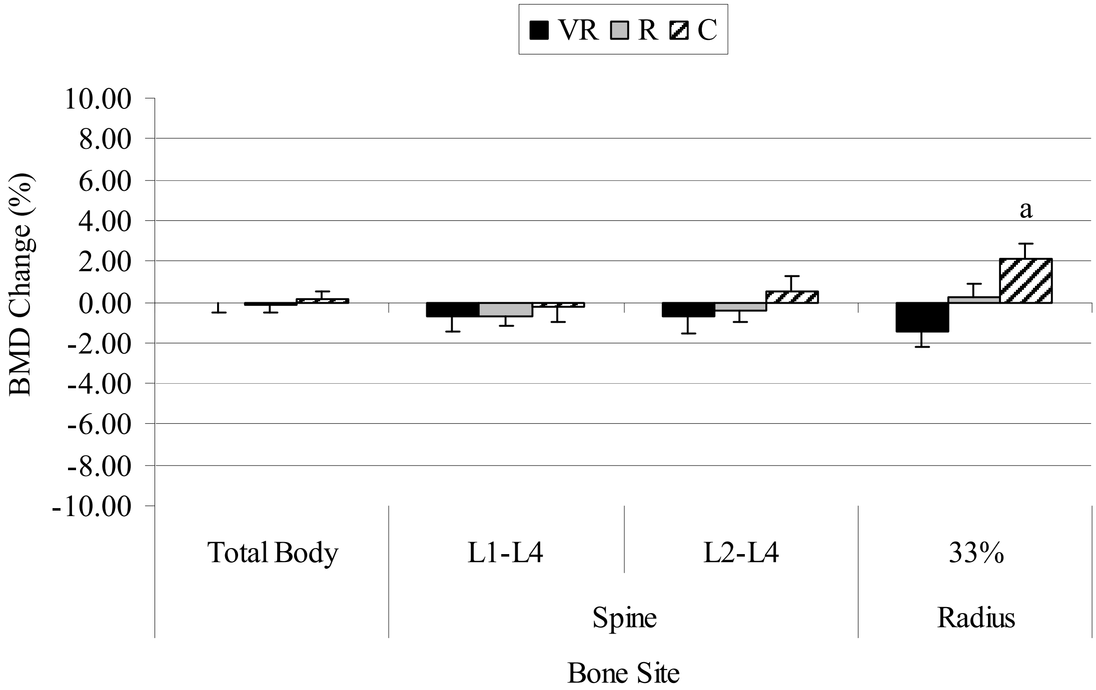


---

†, p<0.05 group x time interaction. Values reported as Mean ± SE.

The total body, lumbar spine, and radius 33% BMD percent changes from baseline to the end of the study are shown in Figure 5. One-Way ANOVA detected a significant group difference (p=.009) in %change from pre to post at the radius 33% site. Bonferroni *post hoc* analyses revealed a significant difference (p=0.008) between VR and C. C increased radius 33% BMD by 2.0 ± 0.8%, while VR decreased radius 33% BMD by 1.5 ± 0.8%. No significant differences in %change for the total body, L1-L4, or L2-L4 were detected.

Figure 5. Total Body, Spine, and Radius 33% BMD Percent Change From Baseline for each Group.

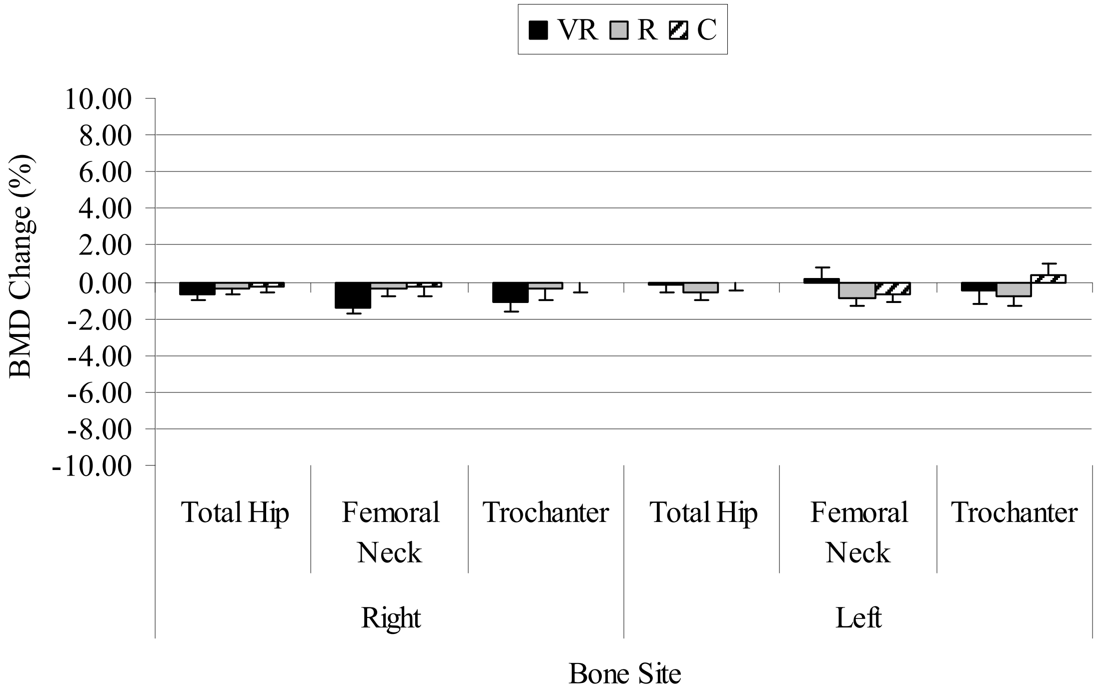


---

[a] $p<0.05$ significant difference from VR. Values reported as Mean ± SE.

No significant group differences were detected in total hip, femoral neck, or trochanter of the right and left hip, which are shown in Figure 6.

Figure 6. Right and Left Hip BMD Percent Change From Baseline for each Group.



Values reported as Mean ± SE.

Bone Mineral Content Response to Training

Mid data was omitted from BMC analyses due to the three control subjects who were not tested at the true midpoint, December. For all total body BMC analyses one subject in group R was omitted due to her refusal for her head to be scanned, which resulted in a falsely low total body BMC value. For all right and left hip (total hip, femoral neck, and trochanter) BMC analyses, one subject in group VR was removed due to a double hip replacement. For all analyses of spine (L1-L4 and L2-L4) BMC, one subject in group VR was omitted due to a severe curvature of the spine which resulted in the inability to locate the correct regions of interest.

At baseline, no differences in BMC at each bone site existed between groups. Table 10 displays the baseline values of BMC for each site by group.

Table 10. Baseline BMC Values for each Group.

		Group					
Variable		VR	n	R	n	C	n
Total Body		2439 ± 67	21	2504 ± 93	21	2418 ± 73	12
Right	Total Hip	30.1 ± 0.9	20	30.2 ± 1.1	22	29.5 ± 0.7	12
	Femoral Neck	4.4 ± 0.2	20	4.3 ± 0.1	22	4.4 ± 0.1	12
	Trochanter	9.7 ± 0.5	20	10.1 ± 0.5	22	9.8 ± 0.4	12
Left	Total Hip	30.2 ± 1.0	20	30.5 ± 1.1	22	30.0 ± 0.7	12
	Femoral Neck	4.3 ± 0.2	20	4.3 ± 0.1	22	4.4 ± 0.1	12
	Trochanter	10.0 ± 0.4	20	10.4 ± 0.5	22	10.3 ± 0.4	12
Spine	L1-L4	63.5 ± 2.5	20	62.5 ± 2.2	22	59.2 ± 2.5	12
	L2-L4	50.5 ± 2.1	20	50.4 ± 1.7	22	47.4 ± 1.9	12
Radius 33%		2.0 ± 0.1	21	2.1 ± 0.1	22	2.0 ± 0.1	12

All values expressed in g. Values reported as Mean ± SE.

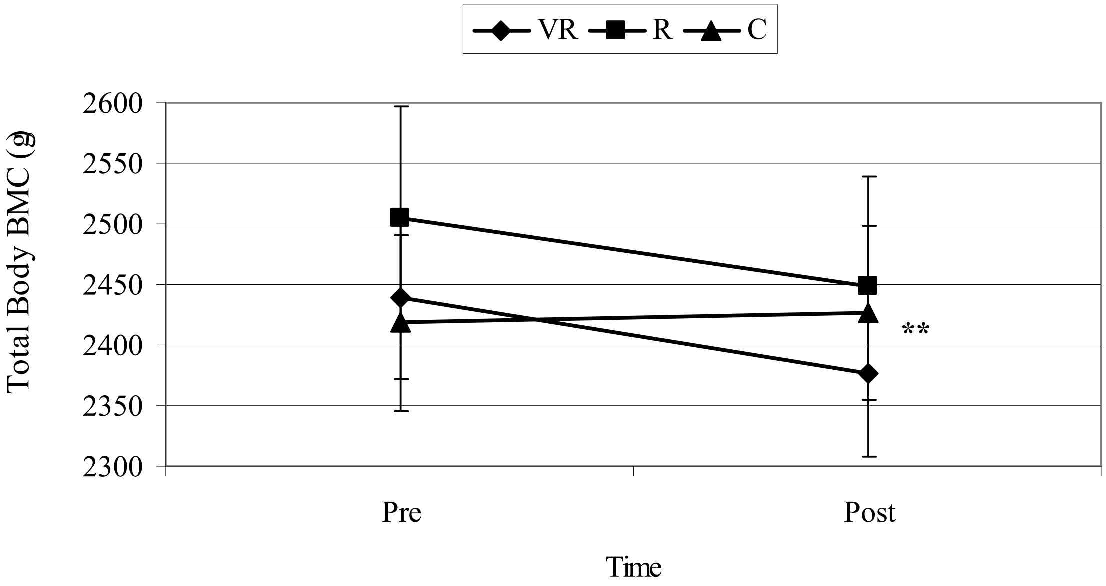
Two-way repeated measures ANOVA (group x time) revealed a significant (p=0.005) main effect of time (pre to post) on total body BMC. Table 11 shows the baseline and post values for BMC of the total body. Figure 7 shows the total body BMC response to the eight month intervention for each group. The grand mean decreased from 2460 ± 47g at baseline to 2415 ± 46 at eight months. There was a trend for an interaction of Group X Time (p=0.08).

Table 11. Total Body BMC Values Before and After Training.

	Total Body**	
Group	Baseline	Post
VR (n=21)	2439 ± 67	2377 ± 69
R (n=21)	2504 ± 93	2448 ± 91
C (n=12)	2418 ± 73	2426 ± 72

**p<0.01 Time effect. All values expressed in g. Values reported as Mean ± SE.

Figure 7. Total Body BMC Response to 8 Months of Training.



**p<0.01 Time effect. Values reported as Mean ± SE.

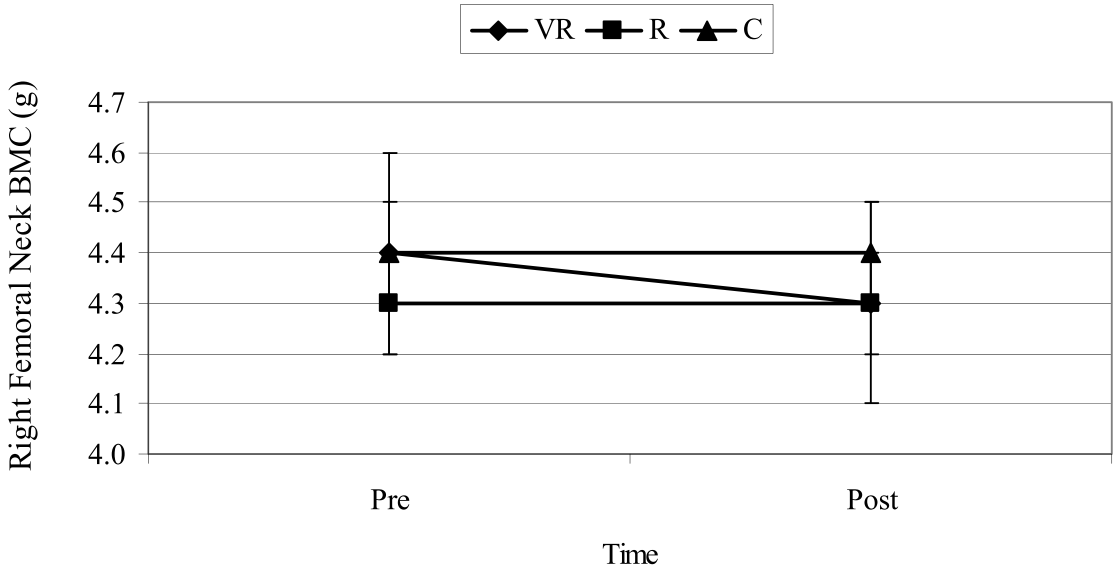
Right hip total hip and femoral neck BMC values at baseline and post-training are shown in Table 12. No significant group, time, or group x time interaction was detected, although there was a trend (p=0.098) for a Group X Time interaction at the right hip femoral neck. Figure 8 plots the right femoral neck BMC response to the intervention for each group.

Table 12. Right Total Hip and Femoral Neck BMC Before and After Training.

	Right Hip			
	Total Hip		Femoral Neck	
Group	Baseline	Post	Baseline	Post
VR (n=20)	30.1 ± 0.9	29.8 ± 0.9	4.4 ± 0.2	4.3 ± 0.1
R (n=22)	30.2 ± 1.1	30.1 ± 1.1	4.3 ± 0.1	4.3 ± 0.2
C (n=12)	29.5 ± 0.7	29.6 ± 0.7	4.4 ± 0.1	4.4 ± 0.1

All values expressed in g. Values reported as Mean ± SE.

Figure 8. Right Femoral Neck BMC Response to Training.



Values reported as Mean ± SE.

Left hip total hip and femoral neck BMC values at baseline and post-training are shown in Table 13. No significant group, time, or group x time interaction was detected, although there was a trend (p=0.056) for a group x time interaction at the left femoral neck.

Table 13. Left Total Hip and Femoral Neck BMC Before and After Training.

	Left Hip			
	Total Hip		Femoral Neck	
Group	Baseline	Post	Baseline	Post
VR (n=20)	30.2 ± 1.0	30.2 ± 1.0	4.3 ± 0.2	4.3 ± 0.1
R (n=22)	30.5 ± 1.1	30.4 ± 1.2	4.3 ± 0.1	4.3 ± 0.1
C (n=12)	30.0 ± 0.7	30.2 ± 0.8	4.4 ± 0.1	4.4 ± 0.1

All values expressed in g. Values reported as Mean ± SE.

Right and left hip trochanter BMC at baseline and post-intervention are given in Table 14. No significant group, time, or group x time interaction was detected.

Table 14. Right and Left Trochanter BMC Before and After Training.

	Right Hip		Left Hip	
	Trochanter		Trochanter	
Group	Baseline	Post	Baseline	Post
VR (n=20)	9.7 ± 0.5	9.4 ± 0.4	10.0 ± 0.4	10.0 ± 0.5
R (n=22)	10.1 ± 0.5	10.0 ± 0.5	10.4 ± 0.5	10.2 ± 0.6
C (n=12)	9.8 ± 0.4	9.9 ± 0.3	10.3 ± 0.4	10.3 ± 0.4

All values expressed in g. Values reported as Mean ± SE.

Lumbar spine L1-L4 and L2-L4 BMC at baseline and post-intervention are shown in Table 15. No significant group, time, or group x time interaction was detected.

Table 15. Lumbar Spine BMC Before and After Training.

	Spine			
	L1-L4		L2-L4	
Group	Baseline	Post	Baseline	Post
VR (n=20)	63.5 ± 2.5	62.8 ± 2.7	50.5 ± 2.1	50.2 ± 2.2
R (n=22)	62.5 ± 2.2	62.2 ± 2.3	50.4 ± 1.7	50.3 ± 1.8
C (n=12)	59.2 ± 2.5	59.1 ± 3.5	47.4 ± 1.9	48.9 ± 2.2

All values expressed in g. Values reported as Mean ± SE.

Radius 33% BMC at baseline and post-intervention are given in Table 16. No significant group, time, or group x time interaction was detected in Radius 33% BMC.

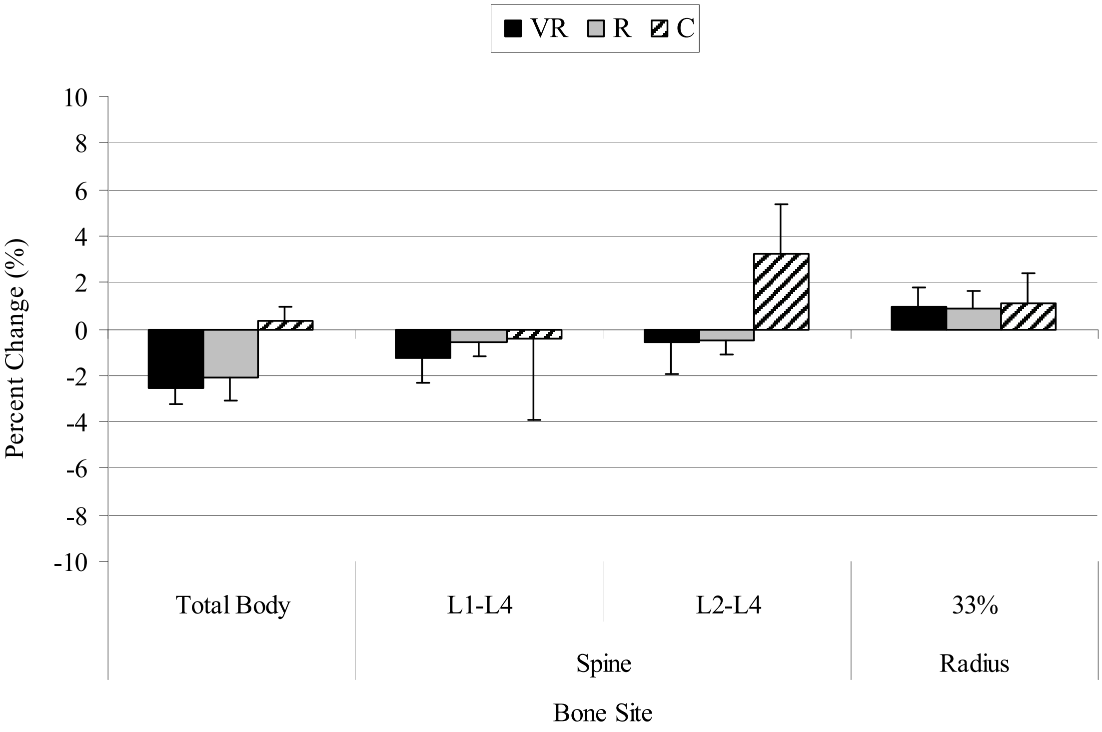
Table 16. Radius 33% BMC Before and After Training.

	Radius 33%	
Group	Baseline	Post
VR (n=21)	2.0 ± 0.1	2.0 ± 0.1
R (n=22)	2.1 ± 0.1	2.1 ± 0.1
C (n=12)	2.0 ± 0.1	2.0 ± 0.1

All values expressed in g. Values reported as Mean ± SE.

Percent change from baseline BMC values for the total body, lumbar spine, and radius 33% are shown in Figure 9. One-way ANOVA did not detect significant differences in %change in total body, spine, or radius 33% BMC, however there was a trend (p=0.059) for a difference in total body BMC %change.

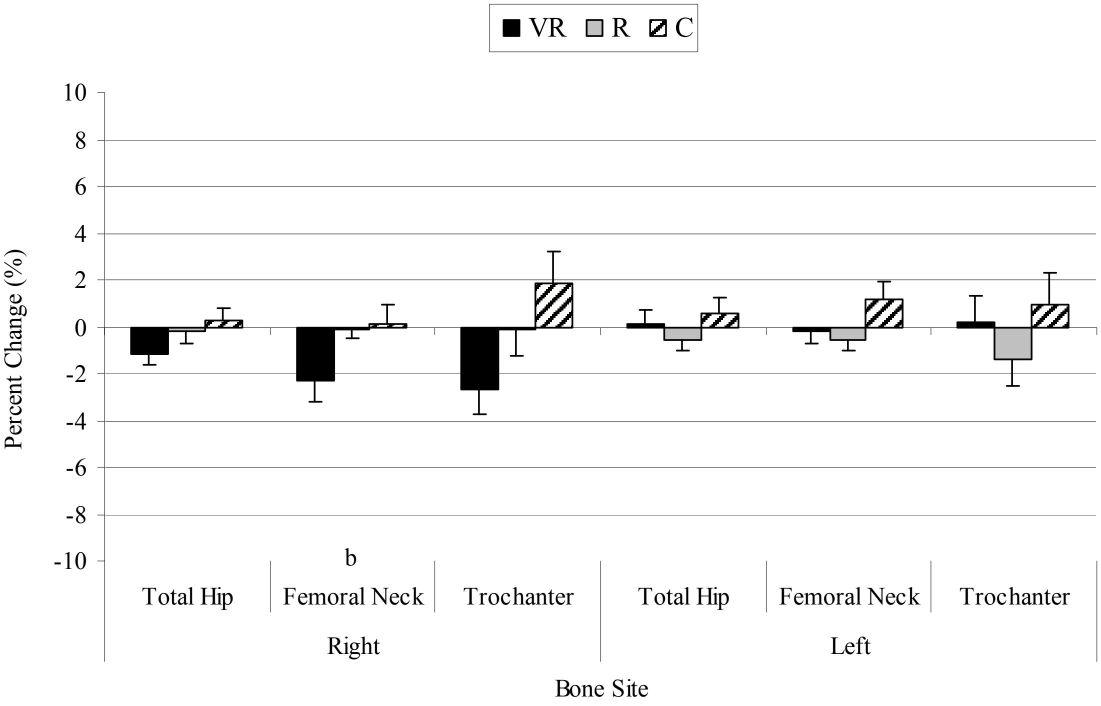
Figure 9. Total Body, Lumbar Spine, and Radius 33% BMC Percent Change from Baseline.



Values reported as Mean ± SE.

Percent change from baseline BMC values for the right and left hip (total hip, femoral neck, and trochanter) are shown in Figure 10. One-way ANOVA detected a significant (p=0.046) difference in right femoral neck BMC %change. The Bonferroni *post hoc* procedure was unable to detect group differences. There was a trend (p=0.053) for right trochanter BMC %change (C greater than VR).

Figure 10. Right and Left Hip BMC Percent Change from Baseline.



---

[b], Significant (p<0.05) ANOVA. Values reported as Mean ± SE.

Muscle Strength Response to Training.

Muscle strength 1RM (kg) for the eight tested exercises (low row, lat pulldown, shoulder press, leg press, hip abduction, hip adduction, hip extension, and hip flexion) are shown in Table 17. No significant differences between groups existed at baseline.

Table 17. Baseline Muscle Strength for Each Group.

		Group		
Variable		VR (n=21)	R (n=22)	C (n=12)
Low Row		34.0 ± 1.7	36.0 ± 1.5	33.8 ± 1.9
Lat Pulldown		30.0 ± 1.3	33.6 ± 1.6	33.8 ± 2.7
Shoulder Press		29.5 ± 1.6	28.5 ± 1.4	28.4 ± 2.3
Leg Press		83.2 ± 5.6	72.1 ± 4.4	85.0 ± 7.4
Hip	Abduction	29.7 ± 2.1	33.7 ± 1.7	31.5 ± 3.1
	Adduction	37.3 ± 2.1	41.0 ± 2.2	37.5 ± 2.6
	Extension	52.4 ± 3.9	54.5 ± 3.6	54.6 ± 3.9
	Flexion	35.6 ± 1.7	35.5 ± 2.3	36.9 ± 4.5

All values expressed in kg. Values reported as Mean ± SE.

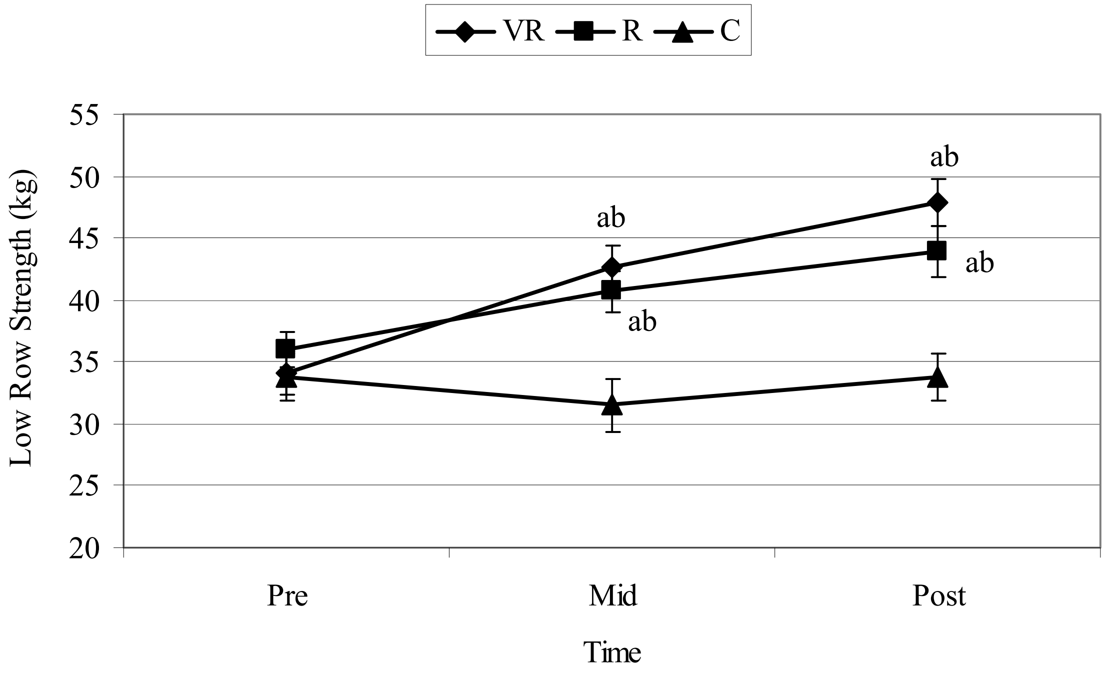
Two-way ANOVA with repeated measures detected significant ($p<0.01$) time, group, and group x time interaction effects for low row strength. The Bonferroni multiple comparison procedure determined that VR and R were significantly ($p=<0.05$) greater in strength than C. Table 18 shows mean ± SE values of low row strength at each time point. In Figure 11, the mean values of low row strength are plotted by time for each group. VR and R significantly increased low row strength at the mid and post time points, compared with baseline ($p<0.01$), while C did not change. VR and R also had significantly increased ($p<0.05$) low row strength at the mid and post time points compared with C.

Table 18. Low Row 1RM at Baseline, Mid, and Post Training

	Low Row (kg)		
Group	Pre	Mid	Post
VR (n=21)	34.04 ± 1.74	42.58 ± 1.75^{ab}	47.89 ± 1.88^{ab}
R (n=22)	36.03 ± 1.46	40.68 ± 1.61^{ab}	43.91 ± 2.03^{ab}
C (n=12)	33.81 ± 1.91	31.53 ± 2.14	33.81 ± 1.87

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values are means ± SE.

Figure 11. Low Row Strength Response to 8 Months of Training.



---

[a], p<0.05 vs. baseline; [b], p<0.05 vs. C; [c], p<0.05 vs. R. Values reported as Mean ± SE.

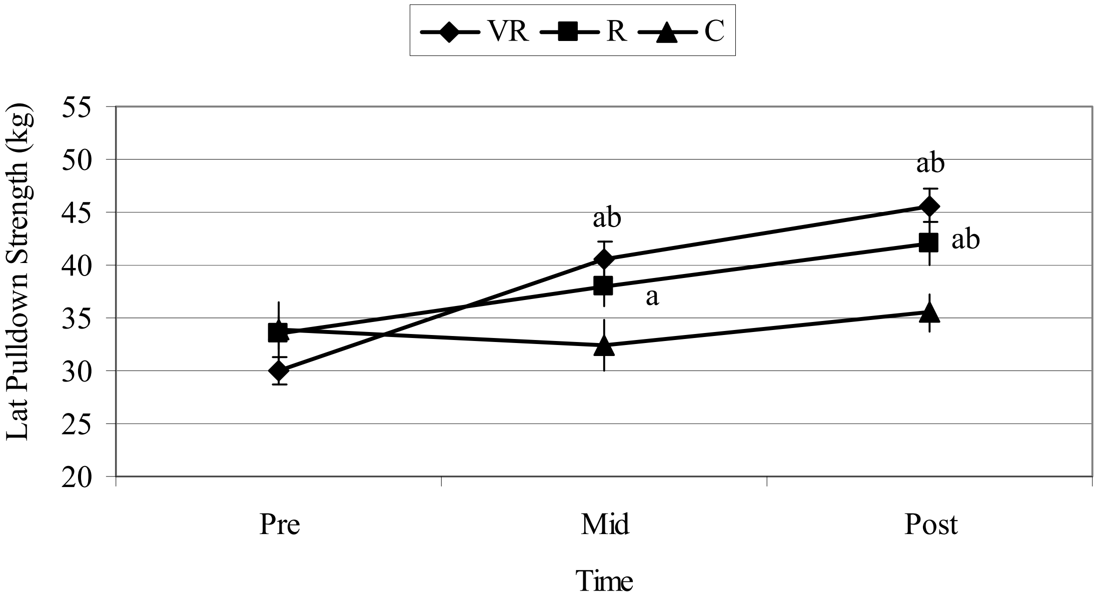
For lat pulldown strength, a significant (p<0.01) time effect and group x time interaction were found. Table 19 shows mean ± SE values of lat pulldown strength at each time point. In Figure 12, lat pulldown strength is plotted by time for each group. Compared to baseline; both VR and R increased (p<0.01) at months four and eight, while C did not change. VR had significantly increased lat pulldown strength at months four (p=0.042) and eight (p=0.002), compared with C. R had significantly (p=0.041) increased strength at month eight, compared with C.

Table 19. Lat Pulldown 1RM at Baseline, Mid, and Post Training

	Lat Pulldown (kg)		
Group	Pre	Mid	Post
VR (n=21)	30.03 ± 1.31	40.50 ± 1.79^{ab}	45.59 ± 1.59^{ab}
R (n=22)	33.57 ± 1.60	38.00 ± 1.84^{a}	42.01 ± 2.13^{ab}
C (n=12)	33.81 ± 2.66	32.39 ± 2.40	35.51 ± 1.76

^{a}, $p<0.05$ vs. baseline; ^{b}, $p<0.05$ vs. C; ^{c}, $p<0.05$ vs. R. Values are means ± SE.

Figure 12. Lat Pulldown Strength Response to 8 Months of Training.



^{a}, $p<0.05$ vs. baseline; ^{b}, $p<0.05$ vs. C; ^{c}, $p<0.05$ vs. R. Values reported as Mean ± SE.

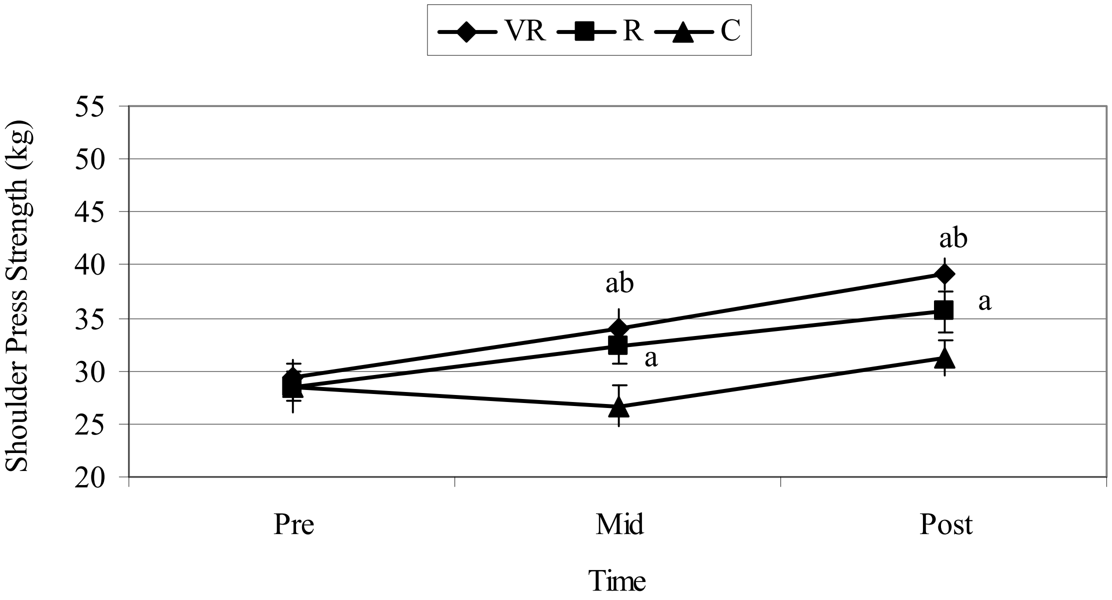
A significant ($p<0.01$) time effect and group x time interaction was detected for shoulder press strength. Table 20 shows mean ± SE values of shoulder press strength at each time point. In Figure 13, shoulder press strength is plotted by time for each group. Compared to baseline; both VR and R significantly increased shoulder press strength at four months ($p<0.01$), and eight months ($p<0.01$), while C did not change. VR had significantly increased shoulder press strength at months four ($p=0.047$) and eight ($p=0.028$), compared with C.

Table 20. Shoulder Press 1RM at Baseline, Mid, and Post Training

	Shoulder Press (kg)		
Group	Pre	Mid	Post
VR (n=21)	29.45 ± 1.62	34.01 ± 1.78[ab]	39.10 ± 1.49[ab]
R (n=22)	28.54 ± 1.37	32.41 ± 1.64[a]	35.64 ± 1.95[a]
C (n=12)	28.41 ± 2.32	26.71 ± 1.86	31.25 ± 1.64

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values are means ± SE.

Figure 13. Shoulder Press Strength Response to 8 Months of Training.



---

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values reported as Mean ± SE.

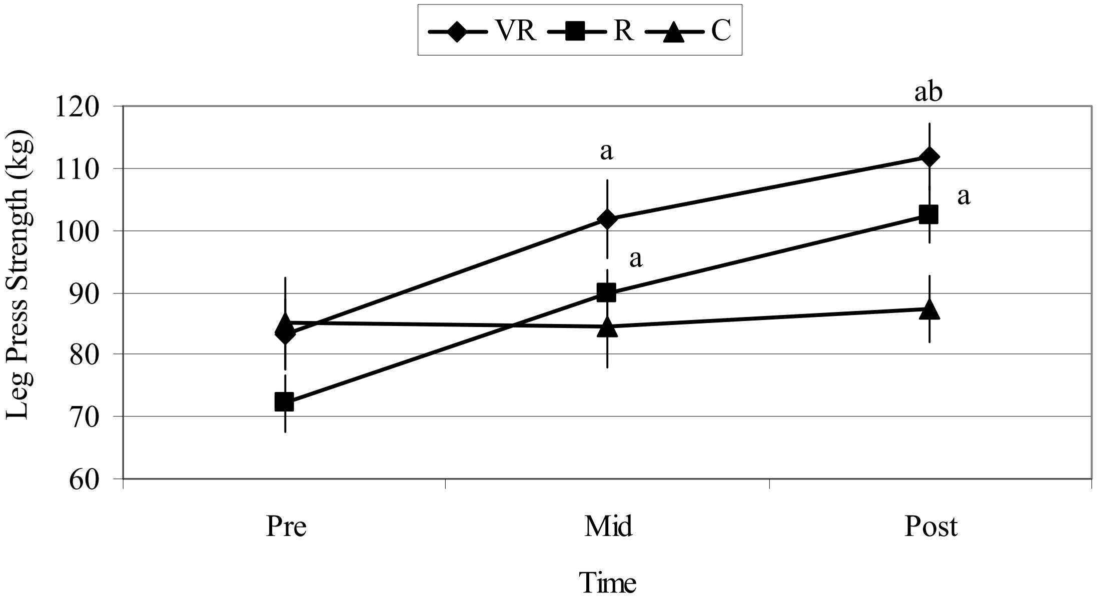
For leg press strength, a significant ($p<0.01$) time effect and group x time interaction were detected. Table 21 shows mean ± SE values of leg press strength at each time point. In Figure 14, leg press strength is plotted by time for each group. Compared to baseline; both VR and R increased at months four and eight ($p=0.001$), while C did not change. VR had significantly increased leg press strength at the month eight ($p=0.04$), compared with C.

Table 21. Leg Press 1RM at Baseline, Mid, and Post Training

	Leg Press (kg)		
Group	Pre	Mid	Post
VR (n=21)	83.21 ± 5.58	101.73 ± 6.24[a]	111.91 ± 5.29[ab]
R (n=22)	72.11 ± 4.42	89.88 ± 3.66[a]	102.48 ± 4.52[a]
C (n=12)	85.00 ± 7.36	84.55 ± 6.65	87.27 ± 5.28

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values are means ± SE.

Figure 14. Leg Press Strength Response to 8 Months of Training.



---

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values reported as Mean ± SE.

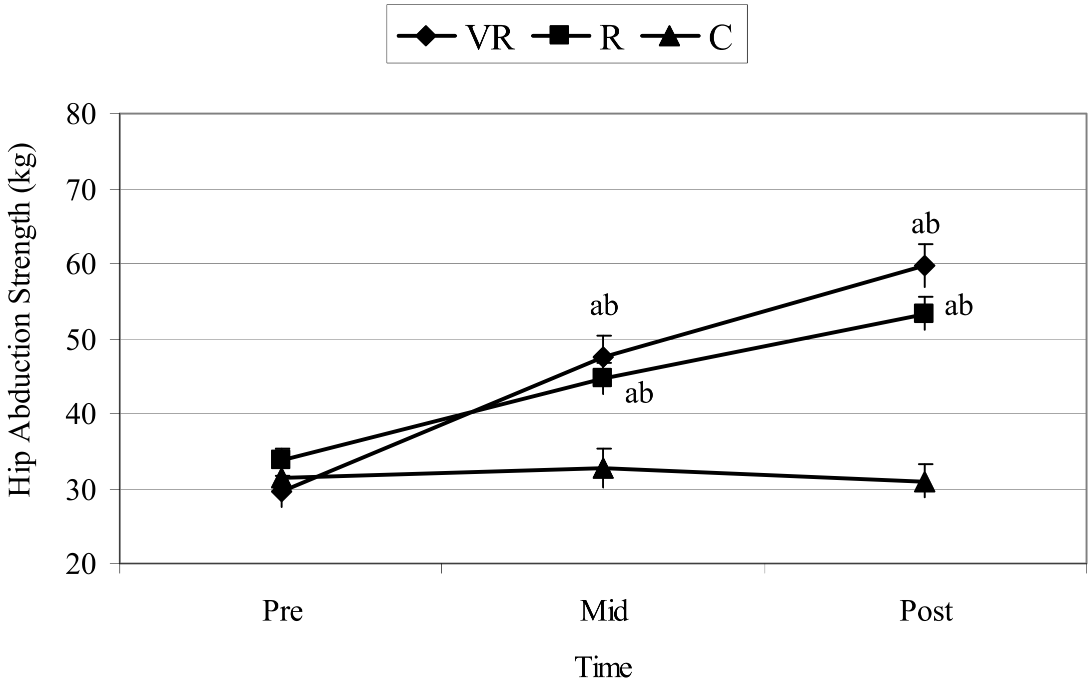
For hip abduction strength, a significant ($p<0.01$) time effect, group x time interaction, and group effect were detected. Table 22 shows mean ± SE values of hip abduction strength at each time point. In Figure 15, hip abduction strength is plotted by time for each group. Compared to baseline; both VR and R significantly ($p<0.01$), increased hip abduction strength at months four and eight months while C did not change. VR had significantly ($p<0.01$) increased hip abduction strength at months four and eight, compared with C. R had significantly increased hip abduction strength at month four ($p=0.016$) and eight ($p<0.01$) when compared with C.

Table 22. Hip Abduction 1RM at Baseline, Mid, and Post Training

	Hip Abduction (kg)		
Group	Pre	Mid	Post
VR (n=21)	29.71 ± 2.06	47.66 ± 2.81[ab]	59.79 ± 2.83[ab]
R (n=22)	33.69 ± 1.69	44.78 ± 2.06[ab]	53.30 ± 2.26[ab]
C (n=12)	31.53 ± 3.10	32.67 ± 2.55	30.97 ± 2.26

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values are means ± SE.

Figure 15. Hip Abduction Strength Response to 8 Months of Training.



---

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values reported as Mean ± SE.

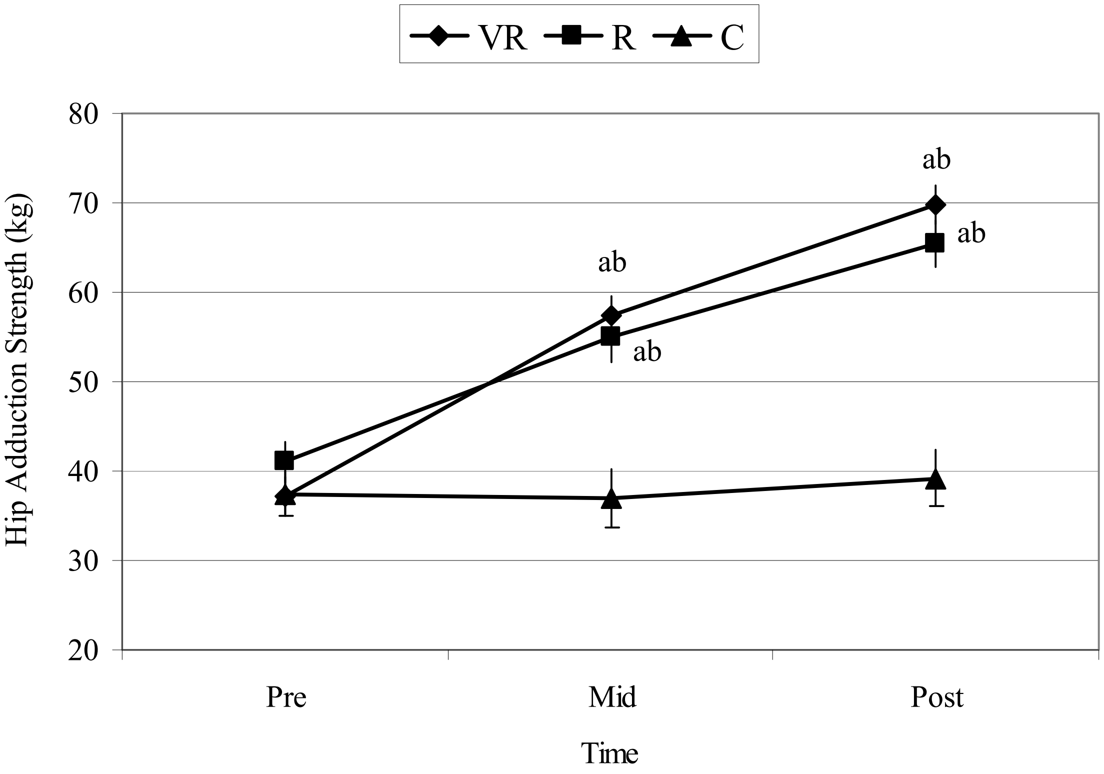
Hip adduction strength showed a significant ($p<0.01$) time effect, group x time interaction, and group effect. Table 23 shows mean ± SE values of hip adduction strength at each time point. In Figure 16, hip adduction strength is plotted by time for each group. Compared to baseline; VR and R significantly ($p<0.01$) increased hip adduction strength at months four and eight, while C did not change. Compared with C, VR and R had significantly ($p<0.01$) increased hip adduction strength at the mid and post time points.

Table 23. Hip Adduction 1RM at Baseline, Mid, and Post Training

	Hip Adduction (kg)		
Group	Pre	Mid	Post
VR (n=21)	37.26 ± 2.11	57.35 ± 2.27^{ab}	69.80 ± 2.22^{ab}
R (n=22)	40.99 ± 2.22	55.06 ± 2.82^{ab}	65.47 ± 2.68^{ab}
C (n=12)	37.50 ± 2.60	36.93 ± 3.20	39.20 ± 3.19

^{a}, p<0.05 vs. baseline; ^{b}, p<0.05 vs. C; ^{c}, p<0.05 vs. R. Values are means ± SE.

Figure 16. Hip Adduction Strength Response to 8 Months of Training.



^{a}, p<0.05 vs. baseline; ^{b}, p<0.05 vs. C; ^{c}, p<0.05 vs. R. Values reported as Mean ± SE.

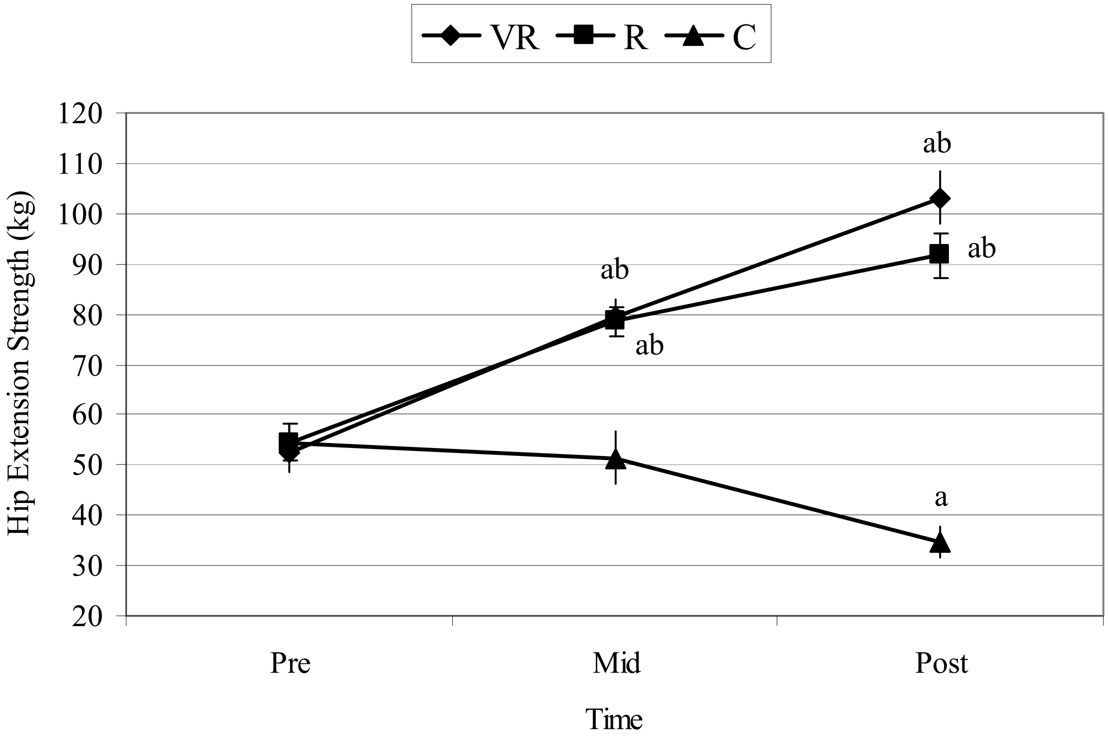
For hip extension strength, a significant (p<0.01) time effect, group x time interaction, and group effect were detected. Table 24 shows mean ± SE values of hip extension strength at each time point. In Figure 17, hip extension strength is plotted by time for each group. Compared to baseline; VR and R significantly (p<0.01) increased hip extension strength at months four and eight, while C significantly (p<0.01) decreased at month eight. Both VR and R had significantly (p<0.01) increased hip extension strength at the mid and post time points compared with C.

Table 24. Hip Extension 1RM at Baseline, Mid, and Post Training

	Hip Extension (kg)		
Group	Pre	Mid	Post
VR (n=21)	52.37 ± 3.89	79.44 ± 3.57[ab]	103.15 ± 5.21[ab]
R (n=22)	54.49 ± 3.58	78.51 ± 2.98[ab]	91.73 ± 4.37[ab]
C (n=12)	54.55 ± 3.85	51.42 ± 5.23	34.66 ± 3.19[a]

[a], p<0.05 vs. baseline; [b], p<0.05 vs. C; [c], p<0.05 vs. R. Values are means ± SE.

Figure 17. Hip Extension Strength Response to 8 Months of Training.



---

[a], p<0.05 vs. baseline; [b], p<0.05 vs. C; [c], p<0.05 vs. R. Values reported as Mean ± SE.

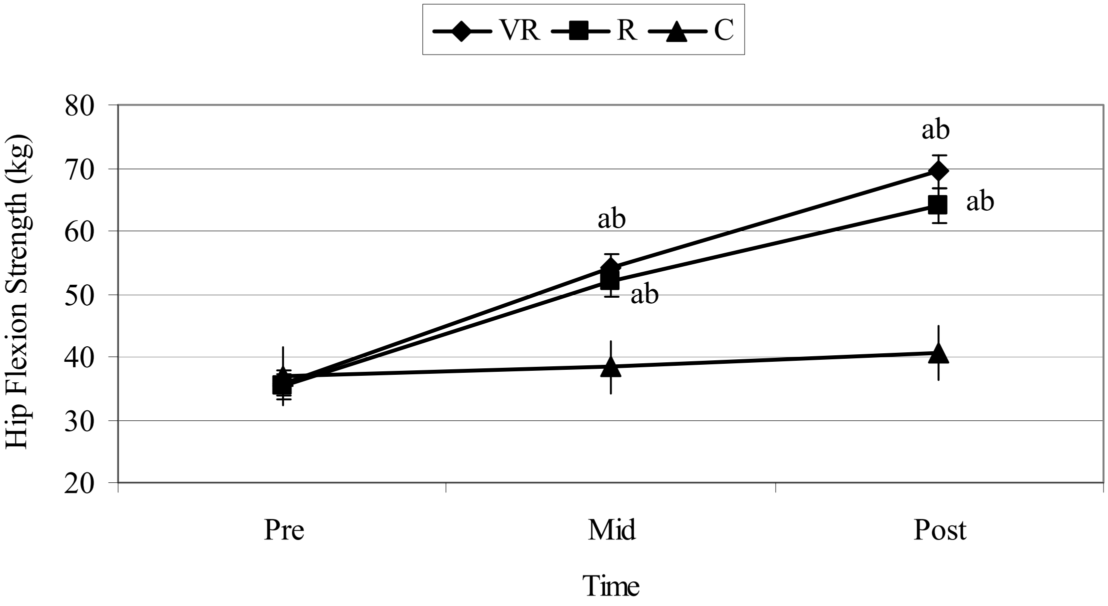
Hip flexion strength showed a significant (p<0.01) time effect, group x time interaction, and group effect. Table 25 shows mean ± SE values of hip flexion strength at each time point. In Figure 18, hip flexion strength is plotted by time for each group. Compared to baseline; VR and R significantly (p<0.01) increased hip flexion strength at months four and eight, while C did not change. Compared with C, both VR and R had significantly ($p<0.01$) increased hip flexion strength at the mid and post time points.

Table 25. Hip Flexion 1RM at Baseline, Mid, and Post Training

	Hip Flexion (kg)		
Group	Pre	Mid	Post
VR (n=21)	35.60 ± 1.70	54.19 ± 2.15^{ab}	69.40 ± 2.48^{ab}
R (n=22)	35.51 ± 2.31	51.91 ± 2.34^{ab}	63.92 ± 2.71^{ab}
C (n=12)	36.93 ± 4.48	38.35 ± 4.18	40.63 ± 4.26

[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values are means ± SE.

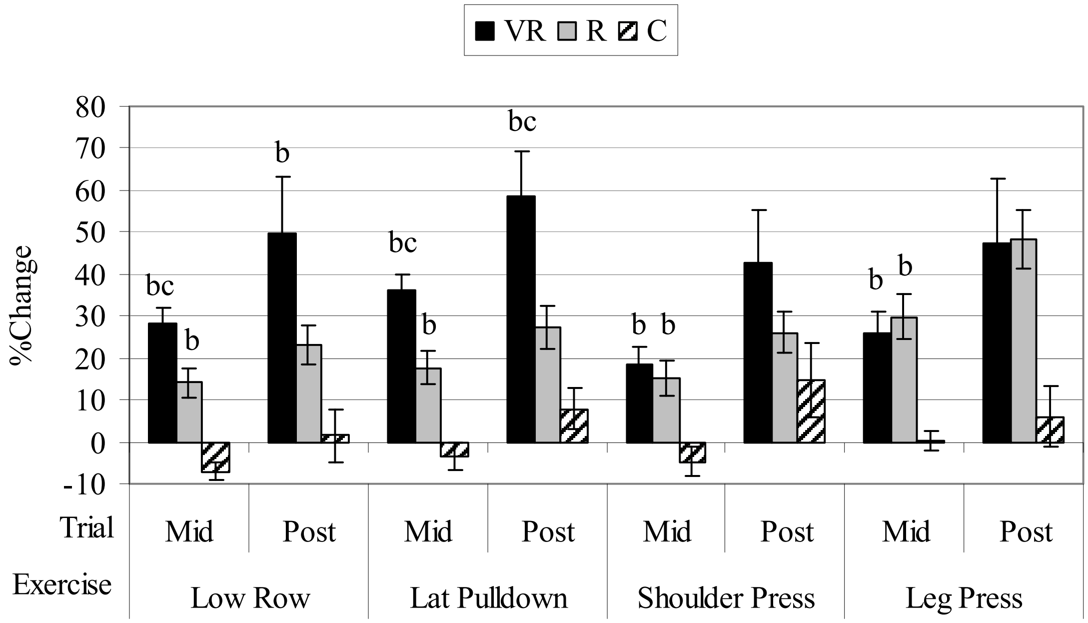
Figure 18. Hip Flexion Strength Response to 8 Months of Training.



[a], $p<0.05$ vs. baseline; [b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values reported as Mean ± SE.

Relative changes in strength from baseline at the midpoint and post-training were calculated for each exercise. Percent change in strength at months four and eight for upper body and leg press exercises are shown in Figure 19 and the %change in strength at months four and eight for the hip exercises are shown in Figure 20. One-way ANOVA determined significant ($p<0.01$) between group differences in %change at moth four for all exercises. At month eight significant ($p<0.01$) group differences were detected in the low row, lat pulldown, and hip exercises, while no significant ($p>0.05$) group differences were seen in the strength %change of the shoulder press or leg press. There was a trend ($p=0.06$) for group differences in leg press strength %change at month eight. Significant ($p<0.05$) group differences in low row %change were detected at month four with VR being significantly greater than R and C, and R being significantly greater than C. At month eight, only VR was significantly ($p<0.01$) greater than C. Significant ($p<0.01$) group differences in lat pulldown %change were detected at month four with VR being significantly greater than R and C, and R being significantly greater than C. At month eight VR was significantly greater than R and C ($p<0.05$). Significant ($p<0.05$) group differences in shoulder press %change were detected with VR and R being significantly greater than C ($p<0.05$) at month 4. At month eight, no significant group differences for this exercise existed due to the greater variability in %change and by the fairly high increase exhibited by C (13 ± 8%). Differences in leg press %change at the midpoint were VR being significantly greater than R and C ($p<0.05$), and R being significantly greater than C ($p<0.05$). No group differences were detected in post %change, however, there was a trend for R to be greater than C ($p=0.089$).

Figure 19. Upper Body and Leg Press Percent Change in Relative Strength at 4 and 8 Months of Training for Each Group.

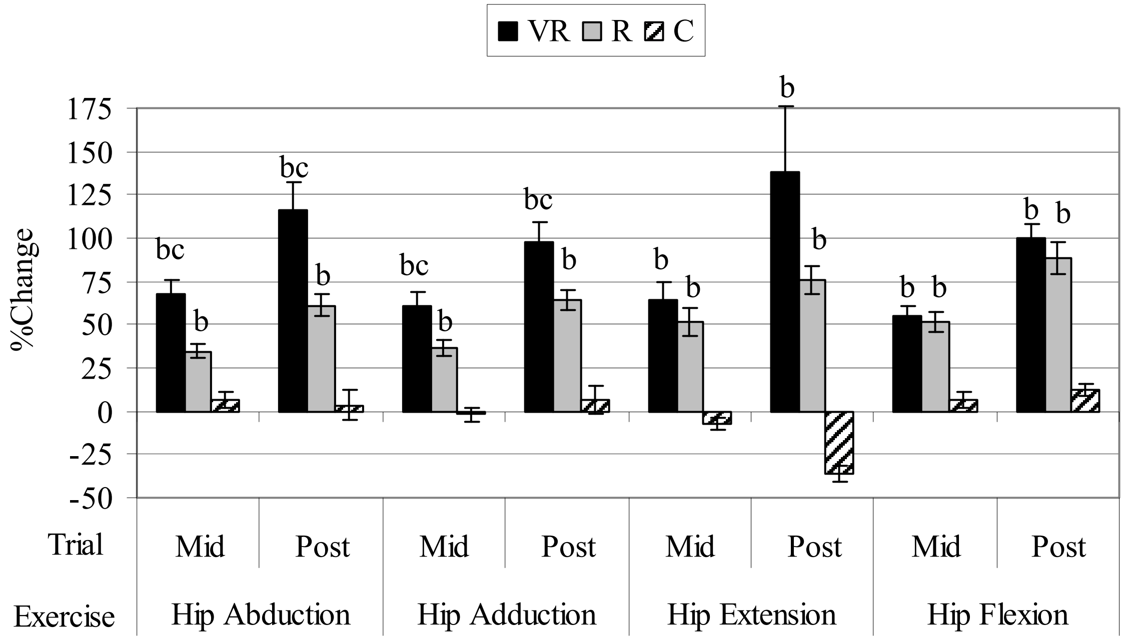


---

[b], $p<0.05$ vs. C; [c], $p<0.05$ vs. R. Values reported as Mean ± SE.

Hip abduction relative change group differences were VR being greater than R and C ($p<0.01$) and R being greater than C ($p<0.05$) at the midpoint. At post, VR was greater than R and C ($p<0.01$) and R was greater than C ($p<0.05$). Group differences in hip adduction at month four were VR greater than R and C ($p<0.05$), and R greater than C ($p<0.05$). At month eight VR was greater than R and C ($p<0.05$), and R was greater than C ($p<0.05$). Hip extension group differences in relative strength change were VR and R greater than C ($p<0.01$) at mid, and VR and R greater than C ($p<0.05$) at post. Hip flexion relative change at mid were VR and R greater than C ($p<0.01$) at mid and post-training.

Figure 20. Hip Exercise Percent Change in Relative Strength at 4 and 8 Months of Training for Each Group.



---

^{b}, $p<0.05$ vs. C; ^{c}, $p<0.05$ vs. R. Values reported as Mean ± SE.

DISCUSSION

The current study was designed to determine the effectiveness of a novel approach to increasing bone health in healthy post menopausal women, low frequency vibration. This study incorporated well known and agreed upon methods of enhancing bone health through resistance training, such as Frost's theory of Global Bone Remodeling[17], Turner's three rules for bone adaptation[56], and the ACSM Position Stand for Bone Health[32]. The uniqueness of the current study lies in the addition of a low frequency vibration stimulus preceding resistance exercise. In previous animal model research, the osteogenic effect of vibration has been well documented; however human research is limited and has had conflicting results. The results of this study provide some interesting data about the role low frequency vibration may play in enhancing the bone health of postmenopausal women.

The exact mechanism by which vibration may be osteogenic is not known, however it may act at the cellular level on the bone cells (osteocytes, osteoblasts, and/or osteoclasts), imposing unique disruptions of intracellular fluid flow, cytoskeletal deformation, or upregulated osteogenic cellular signaling. During low frequency vibration, a person can receive very high gravitational forces. In this way, bones are being loaded in a similar manner to the ground reaction forces experienced during jumping or running, in a very short period of time with little physical exertion. In theory, one could simulate 900 small jumps within 30 second while standing on a vibration platform set at 30 Hz. Vibration training has been used to enhance muscle strength and power output and can preserve muscle mass and strength during bed rest. An important aspect of an older individual's bone health is preserving muscle mass and strength as they age. Therefore, vibration training could be useful for maintaining or improving muscle mass and strength needed to properly load the skeleton thereby minimizing the bone loss of an aging individual.

Biochemical Markers of Bone Turnover

The biochemical markers of bone turnover could provide information on the metabolic state of bone and could be a useful tool for monitoring an intervention. One would expect that the alterations in bone turnover markers will precede changes in BMD. Increases in the formation marker and/or decreases in the resorption marker would suggest that increases in BMD will follow, while decreases in the formation and/or increases in the resorption marker would suggest that decreases in BMD will follow. Normative reference data is limited for the biochemical markers of bone turnover but assay manuals do provide expected values or reference ranges for various populations. These manuals advise that each laboratory establish its own range of normal values[2, 3]. Therefore, it is difficult to interpret baseline values but with serial measurements of the markers, the effectiveness of therapy can be monitored. The marker of bone formation chosen for this study was BAP, for which there was no change after eight months of training by any of the groups. The resorption marker, CTX, also did not change after eight months of training in any of the groups. Although there were no significant findings, it is interesting to note that there was a considerable amount of variation in the relative change in CTX at post in R (30.6 ± 26.7%) and C (49.2 ± 60.0%), while VR (8.8 ± 5.9%) remained fairly homogenous. It remains to be seen whether vibration training can protect bone cells from increasing bone resorption. Calculating a ratio of formation to resorption provides insight on the direction of bone turnover, such as in a state of formation or a state of resorption. There were no differences between groups at baseline and no change after eight months of training.

Similar to the results of the current study are those of Torvinen *et al.*[55]and Verschueren *et al.*[59] who used vibration training that resulted in no changes in the biochemical markers of bone turnover. Differences of these studies to the current study lie in the population studied, duration of the vibration bout, and the intensity of the exercises performed. The population studied by Torvinen *et al.*[55] was young (19-38 years) and subjects stood on a vibration platform four minutes per day, three to five days per week, while performing light exercises on the platform. The bone markers of interest were OC, aminoterminal propeptide of type I procollagen (PINP), CTx, and osteoclast-derived TRACP isoform 5b (TRACP-5b). The population studied by Verschueren *et al.*[59] was older (60 and 70 years) postmenopausal women who performed more intense exercises while receiving vibration, lasting about 30 minutes per day. The bone markers of interest were CTx and OC. The postmenopausal women in the current study received a total of about six minutes or less of vibration per day, three days a week; however the total vibration was divided into 30 to 60 second intervals over a course of about an hour. Light exercises were performed while receiving vibration but very high intensity resistance training was performed following vibration. The design of the current study was to use a vibration stimulus similar to Torvinen *et al.*[55], short in duration, and couple it with high intensity resistance training similar to the resistance training used by Nelson *et al.*[42], Vincent and Braith[60] who had positive biomarker results. Nelson *et al.*[42] found an increase of 14% in OC in postmenopausal women who resistance trained at 80%1RM for 12 months, while controls decreased by 5%. Vincent and Braith[60] similarly used 80% 1RM for six months, which resulted in increases in OC, BAP, and an increase in the ratio of OC/PYD and BAP/PYD ratios. The population studied by Vincent and Braith[60] however, included men. Similar to the findings of the current study, other studies have not had results with high intensity training. Bemben[9] also examined the high intensity resistance training in postmenopausal women for six months and no changes in OC or CTX were detected, although there was a trend for increasing OC. Hawkins *et al.*[24] studied postmenopausal women who trained at 70-90% 1RM with no changes in OC or urinary CTX.

Bone Mineral Density

At baseline, VR, R, and C were similar in the BMD of the total body, right and left total hip, femoral neck, and trochanter, lumbar spine L1-L4 and L2-L4, and radius 33%. No group differences in BMD were detected at any site. Interestingly, in the current study, the population as a whole significantly ($p<0.05$) decreased right femoral neck and right total hip BMD. At the radius 33%, an interaction ($p<0.05$) was detected with VR slightly decreasing, R remaining the same, and C slightly increasing BMD. The relative percent change from baseline by group C (2 ± 0.8%) was significantly ($p<0.05$) higher than VR (-1.5 ± 0.7%). The coefficient of variation for the radius 33% for the DXA technician who performed and analyzed all the scans is 1.2%, so it appears that the decrease by VR as well as the increase by C are real changes. The reason for an increase by C is not known, however the small sample size should be noted. The no change by R is not unexpected as the design of the study did not place high loads on the forearms. The lat pulldown, low row, shoulder press and wrist curl were the exercises that placed stress on the forearm; however the type and intensity of the stresses the forearm receives is variable. Although VR did receive vibration at the wrist, the vibration was carried out through cloth straps fixed to the platform. The amount of vibration that was actually transmitted to the subject's forearm was probably quite variable due to the dependency of how taught the strap was held by the subject. The looser the strap was held, the less vibration that actually was received.

In contrast to the current study, Verschueren *et al.*[59] did find a significant increase of hip BMD, +0.93%. The magnitude and frequency of vibration used by Verschueren *et al.*[59] was quite similar to the current study, however the duration was much longer (about 20 minutes as opposed to <six minutes). Verschueren *et al.*[59] administered vibration continuously whereas the current study broke the vibration stimulus up into three separate bouts throughout the hour spent exercising. It is important to note that in the current study, while subjects received up to six minutes of vibration, these were received in three different positions. Therefore, two of the six minutes were only received by the forearms with the wrist curl application. However, one would suspect that the two minute seated vibration exposure would translate much better at the hip and spine than while standing, resulting in a better response at the hip and spine. Even still this would accumulate only four minutes of exposure to the hip and spine skeletal sites, not 20 minutes.

The study conducted by Rubin *et al.*[50] examined a very low magnitude high frequency vibration stimulus in 70 postmenopausal women. Subjects stood on a vibration platform providing a magnitude of 0.2 g and a frequency of 30 Hz for two 10-minute treatments per day. Similar to the current study, no changes in spine, hip, or distal radius BMD were detected when using intention-to-treat analyses. However, a significant effect of compliance was found with the vibration stimulus. Women who were at least 86% compliant showed a 2.17% benefit at the femoral neck and a 1.5% benefit at the spine, relative to controls. Two major differences in the vibration between Rubin *et al.*[50] and the current study are the magnitude and duration of the vibration. The current study used a much larger magnitude, 2-4g, and a much shorter exposure, at most 6 minutes per day, 3 days per week.

Another study in which a low magnitude, 0.3g, of vibration was used was by Gilsanz *et al.*[20]. The interpretation of these data in comparison to the current study is difficult as the study population was young women with low BMD. However the data suggest that, in these young women, a minimum threshold of vibration exposure was two minutes per day. The BMD increased in both the vibration and control groups; however bone quality, as assessed by pQCT, was enhanced in the vibration group. Greater amounts of exposure time were not additive beyond the results seen at the two minute per day threshold. Young bone, and especially bone with low BMD, is more responsive to mechanical stimuli. Therefore, if a minimum threshold of two minutes truly exists for young low BMD bone, then the threshold for healthy, denser, older bone must be much greater. The gradual increase in exposure duration used by the current study may not have triggered the desired response.

Torvinen *et al.*[55] and Russo *et al.*[51] used vibration magnitudes (>1g) and study durations (eight and six months, respectively) most similar to the current study. Both of which found no changes in bone parameters. The Torvinen *et al.*[55] study population was young but of normal bone density and vibration exposure reached four minutes per day three to five days per week. This may suggest that the time limit threshold for young healthy bone is beyond four minutes and again, would probably place older bone at an even greater duration. Russo *et al.*[51] examined postmenopausal women, who received vibration for six minutes per day, two days per week. This may further suggest that older normal bone requires more than six minutes of vibration exposure. As said before, the duration of the current research protocol reached six minutes per day, three days per week.

The research design of the current study approached the vibration stimulus in the same manner that one approaches resistance training with respect to bone adaptation, which is that it should be of a high magnitude[1, 17, 56]. This may not be the case when bone is the main outcome of vibration training. Rubin *et al.*[50] may be on the correct pathway for incorporating vibration into enhancing bone health, suggesting that the magnitude must be low, possibly on the order 0.2 to 0.3 g. He likens the larger magnitudes of vibration as being similar to a light that is so bright or a noise that is so loud that it cannot be processed physiologically[50]. The current research thus may have used a magnitude too large for bone cells to respond. Torvinen *et al.*[55] used a similar magnitude of vibration as the current study and detected no change in bone parameters. The authors suggested that the stimulus may not have been great enough due to the young and healthy population. On the other hand Torvinen *et al.*[55] did not discount the possibility that the magnitude was too great and made note that in theory, an undisturbed pure sinusoidal waveform can only be achieved with <1g. If >1g, the subject will not stand steadily and loading becomes intermittent[55]. The findings of Verschueren *et al.*[59], however do suggest that the larger magnitude vibration could cause an osteogenic response. While the optimal magnitude and frequency of vibration to stimulate bone formation is not yet clear, there does seem to be an important component of the duration of vibration exposure.

Bone Mineral Content

At baseline; VR, R, and C had similar quantities of bone mineral content (g) for the total body; right and left total hip, femoral neck, and trochanter; lumbar spine L1-L4 and L2-L4; and radius 33%. No significant group differences were detected at any of the bone sites measured. A significant main effect for Time ($p<0.05$) was detected by Two-way ANOVA and the study population as a whole decreased BMC of the total body by 44 ± 12 g, or -1.7 ± 0.5%, although each group did not significantly change from pre to post. For the total body, there was a significant group x time interaction ($p<0.05$) with both VR and R decreasing BMC and C remaining stable over the eight month intervention. Relative changes in BMC at each site were not significantly ($p>0.05$) between groups. Upon inspection of the BMC values, there appears to be a considerable amount of variability in the BMC measurement.

Torvinen *et al.*[55] used BMC as an outcome variable and did not detect any significant changes at the lumbar spine, right proximal femur, calcaneus and nondominant distal radius. ROI heights and lengths were adjusted, or “normalized” in their measurements of BMC so that the ROI could be anatomically comparable between subjects. The current study did not incorporate this technique as each scan was analyzed by the Prodigy software and adjusted by the visual inspection of the technician on an individual basis.

Muscle Strength

Muscle strength was tested by 1RM (kg) for eight exercises targeting the large muscle groups of the entire body. The research design of the current study emphasized the skeletal regions most susceptible to osteoporotic fracture, the hip and lumbar spine. The eight tested exercises included the low row, lat pulldown, shoulder press, leg press, hip abduction, hip adduction, hip extension, and hip flexion. At baseline, no significant ($p>0.05$) differences existed between groups. From baseline, VR and R significantly ($p<0.05$) increased 1RM strength for all exercises at months four and eight. From baseline, C remained unchanged at months four and eight with the exception of a significant ($p<0.01$) decrease in hip extension 1RM strength at post. VR and R had significantly ($p<0.05$) higher 1RM strength at mid and post compared with C. For lat pulldown 1RM strength, VR was significantly ($p<0.05$) higher than C at mid and post, while R was significantly ($p<0.05$) than C only at post. Group differences in shoulder press 1RM occurred at mid and post with only VR significantly ($p<0.05$) higher than C. VR leg press 1RM strength was significantly ($p<0.05$) higher than C only at post. VR and R were significantly ($p<0.05$) higher than C at both mid and post for all hip exercises.

Relative changes in strength (%change) at mid and post compared with baseline revealed some dramatic increases by both treatment groups, especially VR. At month four, VR low row %change was significantly ($p<0.05$) greater than R, which was significantly ($p<0.05$) greater than C. However at month eight, only VR was significantly ($p<0.05$) greater than C. By the end of the study VR had a 50% increase in low row strength. Lat pulldown %change at mid also showed that VR was significantly ($p<0.05$) greater than R, and R was significantly ($p<0.05$) greater than C. Owing to greater variability at post, only VR was significantly ($p<0.05$) greater than R and C. Post %change in lat pulldown strength reached 58%. Shoulder press %change at mid resulted in VR and R significantly ($p<0.05$) greater than C. At post, due to a 12% increase in shoulder press there were no group differences, however VR had increased 42%. Leg press %changes were VR and R significantly ($p<0.05$) greater than C, only at mid. At post, both VR and R has similar increases of about 48%. Hip abduction and adduction %change in strengths at both mid and post resulted in VR significantly ($p<0.05$) greater than R, and R significantly ($p<0.05$) greater than C. At post VR had increased 118% in hip abduction and 99% in hip adduction strengths. Hip extension and hip flexion %change in strengths at both mid and post resulted in VR and R significantly ($p<0.05$) greater than C. By the end of the study VR had increased by 130% hip extension strength and 100% hip flexion strength.

Exercises performed by the WBV group of Verschueren *et al.*[59], were static and dynamic knee-extensors: squat, deep squat, wide stance squat, one-legged squat, and lunge. Similar to the current study, the vibration platform was set at a frequency of 35 to 40 Hz, 2.28 to 5.09 g. Training load was manipulated by changing from predominantly two-legged exercises to one-legged exercises. The RES group training consisted of leg extensions and leg presses. The first 14 weeks of training progressively increased intensity from two sets of 20-RM to two sets of 8-RM. The last 10 weeks consisted of three sets of 12-RM to one set of 8-RM. Training session duration was 30 minutes or less for WBV and about one hour for RES. Strength parameters included isometric knee extension (130°), and 100°/sec isokinetic knee extension. Increases in isometric strength of 15% and 16% were observed by the WBV and RES groups respectively. Dynamic strength increases occurred in both WBV and RES groups of 17% and 11%, respectively. The CON group did not change in strength parameters.

The exercises used by Torvinen *et al.*[55] consisted of the following: light squatting, standing erect, standing relaxed, light jumping, shifting body weight from one leg to the other, and standing on heels. These were done for four minutes on the vibration platform. Muscle performance tests included counter movement jump, maximal 90° isometric leg extension, shuttle run, and postural sway, and grip strength; for which only vertical jump performance test increased after vibration training. Russo *et al.*[51] examined the effects vibration in 14 postmenopausal women. The subjects stood on a vibration platform at a frequency of 28 Hz for three 2-minute sessions equaling six minutes per day, two days per week. After six months there was an improvement in muscle power.

Rubin *et al.*[50] did not investigate any muscular parameters. However in a similar study by Gilsanz *et al.*[20] some muscle QCT data was obtained. Although Gilsanz *et al.*[20] studied young women with low BMD the vibration was similar to Rubin *et al.*[50] (30Hz, 0.3g) for 10 minutes a day five days per week. Muscle cross-sectional area was computed and vibration revealed significantly ($p<0.05$) greater gains than controls in the total paraspinous musculature (5.4%), the psoas (6%), and the erector spinae (4.4%). The dose-response to the vibration of at least two minutes per day was also seen in the psoas, erector spinae and total paraspinous musculature, which increased 6.8 – 8% ($p<0.01$).

The current study combined much less vibration exposure with a much more intense resistance program, which achieved very large changes in strength. The current study also varied the application of vibration by including sitting on the platform and holding straps connected to the platform so that the stimulus would be distributed to a greater proportion of the body, not limited to the lower body as is the case with standing on the platform. In theory, the benefits of vibration training performed while standing would not translate to the upper body musculature. As much as 30% of a 25Hz signal is lost at the hip and spine[49]. Transmission of this signal is also effected by how the person stands on the platform, with greater amounts of flexion causing a greater loss of the signal to the hip and spine[49]. Therefore, bypassing the lower body musculature, sitting on the platform and holding straps connected to the platform would the upper body to larger amounts of the vibration stimulus. Although no electromyography data were collected, it appears as though this method of applying vibration had a beneficial neuromuscular effect in regards to muscle strength. As seen with the low row and lat pulldown, there appears to have been an effective muscular enhancement realized by month four as VR %change increased by 28% and 35%, respectively; while R increased by 15% and 18%, respectively. VR further increased in lat pulldown relative strength at post by 59% as opposed to 28% by R. Even more dramatic increases were observed in hip exercises, specifically abduction and adduction. VR had greater ($p<0.05$) increases in hip abduction and adduction of 72% (R, 30%) and 60% (R, 31%), respectively, at month four. By the end of the study VR also showed greater ($p<0.05$) increases in hip abduction and adduction of 112% (R, 60%) and 99% (R, 60%), respectively. Although not statistically significant ($p>0.05$) from R due the variability in the VR group, VR showed 130% increase in hip extension (R, 75%) at month eight.

CHAPTER V

CONCLUSIONS

The purpose of this study was to examine and compare the effects of an eight month program involving two high intensity training protocols, combined vibration plus resistance training and resistance training alone, on BMD and bone metabolism of older postmenopausal women. The following research questions were investigated: 1) Will eight months of a vibration plus resistance training intervention increase BMD in older women beyond that of resistance training alone? 2) Will eight months of resistance training, alter bone metabolism as indicated by changes in bone resorption (CTX) and bone formation (BAP) markers? 3) Will eight months of vibration plus resistance training alter bone metabolism as indicated by changes in bone resorption (CTX) and bone formation (BAP) markers?

Research Hypothesis 1. Eight months of vibration combined with resistance training will increase BMD beyond that seen with resistance training alone.

No, the findings of the current study do not support this hypothesis, as there were no significant increases in BMD in response to either the combined vibration stimulus with a high intensity resistance training protocol or to resistance training alone over the eight month programs. The study population as a whole significantly ($p<0.05$) decreased right total hip and right femoral neck BMD. A group x time interaction ($p<0.05$) was detected at the radius 33% site, with controls slightly increasing, the vibration group slightly decreasing, and the resistance alone group remaining the same.

Research Hypothesis 2. The bone resorption marker (CTX) will respond quickly to the resistance training, by decreasing at month four, and the bone formation marker (BAP) will lag behind CTX, elevating at month eight.

No, the current study does not support this hypothesis. No change in CTX or BAP occurred as a result of combining vibration with a high resistance training program, nor with the resistance only training program. Evaluation of relative change in BAP resulted in non-significant ($p>0.05$) increases of only 6% in the vibration group, 4% in the resistance only group, and 0% in the control group. Relative change in CTX was quite variable in the resistance only and control groups, whereas the vibration group showed much more consistency after the eight months of training. Non-significant ($p>0.05$) increases were 9% in the vibration group, 31% in the resistance only group, and 49% in the control group.

Research Hypothesis 3. Vibration training plus resistance training will result in decreased CTX levels at month four, similar to resistance training alone. BAP levels will lag behind CTX, however respond quicker than resistance training alone, elevating at month four.

No, the results of this study do not this hypothesis. There were no changes in CTX or BAP during the eight month protocol.

The following subquestions were investigated: 1) Will resistance training influence muscle strength in older women? 2) Does the addition of vibration to a resistance training program influence muscle strength in older women?

Subhypothesis 1. Resistance training will increase muscular strength in older women.

Yes, the data obtained in this research retain this hypothesis. Muscular strength, measured by 1RM, increased from baseline at months four and eight in each tested exercise by resistance training alone. Resistance training resulted in greater strength compared with controls at months four and eight in all hip exercises, and only at month eight in lat pulldown. At month four, moderate increases in relative strength by resistance training alone were achieved in all exercises (15-18% in upper body exercises and 30-50% in lower body exercises). At month four, these %changes were significantly ($p<0.05$) greater than controls. However, at month eight, due to greater variability in the control group, the upper body exercises and leg press exercise %changes were not significantly ($p<0.05$) greater than controls. All hip exercise increases in %change (60-80%) were significantly ($p<0.05$) greater than controls.

Subhypothesis 2. The addition of the vibration stimulus will increase muscle strength beyond that seen by resistance training alone.

Yes, the results of this study support this hypothesis. While strength means were statistically similar ($p>0.05$) for the two protocols, there were dramatic increases in relative strength of two upper body and two lower body exercises for the vibration plus resistance training group. At month four, the addition of short bouts of vibration during resistance training showed significantly ($p<0.05$) greater increases in the relative strength of the low row (28%), lat pulldown (35%), hip abduction (70%), and hip adduction (60%) exercises, compared to resistance training alone. At month eight, the vibration group remained significantly ($p<0.05$) greater than the resistance training alone group in %change of the lat pulldown (59%), hip abduction (115%), and hip adduction (99%).

CLINICAL SIGNIFICANCE

Three very important aspects for the bone health of postmenopausal women are hormone status, calcium and vitamin D intake, and exercise. The current study incorporated the mode and intensity of exercise that should facilitate an osteogenic response. Calcium intake was estimated by a questionnaire and subjects were informed and recommended to get 1500 mg of calcium daily. Subjects however, were left to their own resources to actually consume the recommended amounts.. Hormone status and vitamin D intakes were not evaluated in the current study, which implies that one or both of these components are key aspects of bone health in healthy non-HRT postmenopausal women and should not be overlooked. Exercise alone cannot overcome a loss of bone due to the estrogen deficiency associated with menopause. Owing to menopause, these subjects were estrogen deplete and exercise alone did not adequately stimulate an osteogenic response, in fact the population as a whole showed decreases in right hip BMD and total body BMC.

It appears that whole body vibration (30-40 Hz, 2.2-2.8 g) appears to be a safe and effective mode of enhancing muscular strength in older healthy postmenopausal women. Aging is associated with osteopenia and sarcopenia, often with sarcopenia preceding the loss of bone. For this reason, low muscle strength is a risk factor for hip fracture. Bone is a dynamic tissue that responds and adapts to the loads placed upon them with mechanical loading being the optimal mode for bone adaptation. The amount of stress that can be placed upon the skeleton is dependent on the muscle strength of the individual. Muscular strength therefore, is a modifiable risk factor for hip fracture. The study may have been too short to detect any positive effects on bone. There is the possibility that more time is required for the observed increases in muscle strength to impose stresses on the skeleton that are large enough to elicit an osteogenic response.

FUTURE RESEARCH DIRECTIONS

Research on the use of high frequency, low magnitude vibration as a bone health intervention is limited in humans and deserves further exploration. Future research should focus on two major areas: 1) the optimal magnitude of vibration, and 2) the duration of vibration exposure. Bone research has evolved to accept moderate to high intensity resistance training, in terms of bone loading, and this approach has been employed with vibration training with spurious results. Magnitude of vibration may not need to be as intense as the magnitude of resistance training for a physiological response in bone to occur. It could be possible that higher magnitudes of vibration produce a signal that is too intense for bone cells to process, such as a light that is too bright or a sound that is too loud. Future research should further explore this idea and assess the effects of various magnitudes of a smaller scale, such as less than 1g. In addition to studying the effects of reduced vibration magnitude, employing various resistance training protocols should be examined. Manipulations should include a low magnitude (<1g) of vibration in conjunction with low, moderate, and high intensity training applied either during the resistance training session or as a separate session allowing for a rest period for bone cells to recover and process the two types of signals (low magnitude vibration and high magnitude loading).

The second important aspect of vibration training deals with the duration of the exposure. Researchers should not be too quick to accept the notion that high magnitude vibration is too intense. It appears as though there may be a threshold in terms of duration of exposure that must be exceeded for bone cells to respond. This duration threshold may be different for different populations with older postmenopausal women of normal bone density requiring greater durations of exposure, such as 10 minutes or more per day. Another aspect of vibration training for bone health that should possibly be viewed as separate from resistance training is that vibration training may need to be done more frequently, such as five to seven days per week. Future research should continue to explore higher magnitude (>1g) vibration for longer durations applied more frequently and used in conjunction with various resistance training protocols. Separating vibration training from resistance training in the realm of higher magnitude vibration deserves exploration as well.

The use of the biochemical markers of bone turnover as a method of monitoring intervention deserves further research. Given the time course of the bone turnover process, activation – resorption – formation, the markers of bone turnover should be altered at differing time points. Therefore, more frequent assessment of the biomarkers should be employed. This is quite difficult and somewhat unreasonable to expect due to the expense of these measurements. The measurement of the biochemical markers of bone turnover is still fairly new to bone research and the technology continues to advance. Research should continue so that standardized procedures can be employed and a reliable reference range can be established. This is not to suggest that the biochemical markers of bone turnover should not take the place of a bone scan for the diagnosis of osteoporosis, however if used in conjunction with a bone scan, the biomarkers could advance the prevention of osteoporosis.

Future research should also incorporate the use of peripheral quantitative computer tomography (pQCT) so that changes in bone quality can be examined. Cortical and trabecular bone can be differentiated with pQCT as well as the calculation of several indices of bone strength. A rearrangement in the architecture of the cortical and trabecular components of bone may occur, causing increases in bone strength that could not be detected by DXA. Study durations of less than a year are often too short to detect significant BMD changes in healthy postmenopausal women. Even when significant increases in BMD do occur, the change is only one to two percent. Small changes in BMD greatly increase the strength of bone and therefore it would be beneficial to use a technique such as pQCT to examine the changes in the architecture of bone.

REFERENCES

1. Assessment of fracture risk and its application to screening for postmenopausal osteoporosis. Report of a WHO Study Group. *World Health Organ Tech Rep Ser*. 843:1-129, 1994.

2. An enzyme immunoassay for the quantitation of bone-specific alkaline phosphatase (BAP) in human serum. M. B. E. Kit (Ed.) San Diego, CA: Quidel Corporation, 2005.

3. Serum CrossLaps ELISA Herlev, Denmark: Nordic Bioscience Diagnostics A/S, 2006.

4. Adami, S., D. Gatti, V. Braga, D. Bianchini, and M. Rossini. Site-specific effects of strength training on bone structure and geometry of ultradistal radius in postmenopausal women. *J Bone Miner Res*. 14:120-124, 1999.

5. Arnaud, C. D. Osteoporosis: using 'bone markers' for diagnosis and monitoring. *Geriatrics*. 51:24-30, 1996.

6. Baran, D. T. New ways to manage the old problem of osteoporosis. *JAAPA*. 12:42-52, 1999.

7. Baron, R. Anatomy and ultrastructure of bone. In: *Primer on the metabolic bone diseases and disorders of mineral metabolism.* M. J. Favus (Ed.) Philadelphia, PA: Lippincott Williams and Wilkins, 1999, pp. 3-10.

8. Bassey, E. J., M. C. Rothwell, J. J. Littlewood, and D. W. Pye. Pre- and postmenopausal women have different bone mineral density responses to the same high-impact exercise. *J Bone Miner Res*. 13:1805-1813, 1998.

9. Bemben, D. A., N. L. Fetters, M. G. Bemben, N. Nabavi, and E. T. Koh. Musculoskeletal responses to high- and low-intensity resistance training in early postmenopausal women. *Med Sci Sports Exerc*. 32:1949-1957, 2000.

10. Blottner, D., M. Salanova, B. Puttmann, G. Schiffl, D. Felsenberg, B. Buehring, and J. Rittweger. Human skeletal muscle structure and function preserved by vibration muscle exercise following 55 days of bed rest. *Eur J Appl Physiol*. 97:261-271, 2006.

11. Bonewald, L. F. Mechanosensation and transduction in osteocytes. In: *BoneKEy-Osteovision*, 2006, pp. 7-15.

12. Burge, R., B. Dawson-Hughes, D. H. Solomon, J. B. Wong, A. King, and A. Tosteson. Incidence and economic burden of osteoporosis-related fractures in the United States, 2005-2025. *J Bone Miner Res*. 22:465-475, 2007.

13. Chubak, J., C. M. Ulrich, S. S. Tworoger, B. Sorensen, Y. Yasui, M. L. Irwin, F. Z. Stanczyk, J. D. Potter, and A. McTiernan. Effect of exercise on bone mineral density and lean mass in postmenopausal women. *Med Sci Sports Exerc*. 38:1236-1244, 2006.

14. Cosman, F., J. Nieves, C. Wilkinson, D. Schnering, V. Shen, and R. Lindsay. Bone density change and biochemical indices of skeletal turnover. *Calcif Tissue Int*. 58:236-243, 1996.

15. Cussler, E. C., T. G. Lohman, S. B. Going, L. B. Houtkooper, L. L. Metcalfe, H. G. Flint-Wagner, R. B. Harris, and P. J. Teixeira. Weight lifted in strength training predicts bone change in postmenopausal women. *Med Sci Sports Exerc*. 35:10-17, 2003.

16. Delmas, P. D., P. Hardy, P. Garnero, and M. Dain. Monitoring individual response to hormone replacement therapy with bone markers. *Bone*. 26:553-560, 2000.

17. Frost, H. M. On our age-related bone loss: insights from a new paradigm. *J Bone Miner Res*. 12:1539-1546, 1997.

18. Fujimura, R., N. Ashizawa, M. Watanabe, N. Mukai, H. Amagai, T. Fukubayashi, K. Hayashi, K. Tokuyama, and M. Suzuki. Effect of resistance exercise training on bone formation and resorption in young male subjects assessed by biomarkers of bone metabolism. *J Bone Miner Res*. 12:656-662, 1997.

19. Gallagher, J. C., P. B. Rapuri, G. Haynatzki, and J. R. Detter. Effect of discontinuation of estrogen, calcitriol, and the combination of both on bone density and bone markers. *J Clin Endocrinol Metab*. 87:4914-4923, 2002.

20. Gilsanz, V., T. A. Wren, M. Sanchez, F. Dorey, S. Judex, and C. Rubin. Low-level, high-frequency mechanical signals enhance musculoskeletal development of young women with low BMD. *J Bone Miner Res*. 21:1464-1474, 2006.

21. Going, S., T. Lohman, L. Houtkooper, L. Metcalfe, H. Flint-Wagner, R. Blew, V. Stanford, E. Cussler, J. Martin, P. Teixeira, M. Harris, L. Milliken, A. Figueroa-Galvez, and J. Weber. Effects of exercise on bone mineral density in calcium-replete postmenopausal women with and without hormone replacement therapy. *Osteoporos Int*. 14:637-643, 2003.

22. Greenspan, S. L., R. A. Parker, L. Ferguson, H. N. Rosen, L. Maitland-Ramsey, and D. B. Karpf. Early changes in biochemical markers of bone turnover predict the long-term response to alendronate therapy in representative elderly women: a randomized clinical trial. *J Bone Miner Res*. 13:1431-1438, 1998.

23. Han, Y., S. C. Cowin, M. B. Schaffler, and S. Weinbaum. Mechanotransduction and strain amplification in osteocyte cell processes. *Proc Natl Acad Sci U S A*. 101:16689-16694, 2004.

24. Hawkins, S. A., R. A. Wiswell, and E. T. Schroeder. The relationship between bone adaptations to resistance exercise and reproductive-hormone levels. *J. of Aging and Physical Activity*. 10:65-75, 2002.

25. Jordan, M. J., S. R. Norris, D. J. Smith, and W. Herzog. Vibration training: an overview of the area, training consequences, and future considerations. *J Strength Cond Res*. 19:459-466, 2005.

26. Judex, S., S. Boyd, Y. X. Qin, S. Turner, K. Ye, R. Muller, and C. Rubin. Adaptations of trabecular bone to low magnitude vibrations result in more uniform stress and strain under load. *Ann Biomed Eng*. 31:12-20, 2003.

27. Judex, S., N. Zhong, M. E. Squire, *et al.* Mechanical modulation of molecular signals which regulate anabolic and catabolic activity in bone tissue. *J. Cell Biochem.*, 2004.

28. Kanis, J. A., L. J. Melton, 3rd, C. Christiansen, C. C. Johnston, and N. Khaltaev. The diagnosis of osteoporosis. *J Bone Miner Res*. 9:1137-1141, 1994.

29. Karlsson, M. K., P. Vergnaud, P. D. Delmas, and K. J. Obrant. Indicators of bone formation in weight lifters. *Calcif Tissue Int*. 56:177-180, 1995.

30. Kerr, D., A. Morton, I. Dick, and R. Prince. Exercise effects on bone mass in postmenopausal women are site-specific and load-dependent. *J Bone Miner Res*. 11:218-225, 1996.

31. Khosla, S., and M. Kleerkoper. Biochemical markers of bone turnover. In: *Primer on the metabolic bone diseases and disorders of mineral metabolism*. M. J. Favus (Ed.) Philadelphia, PA: Lippincott Williams and Wilkins, 1999, pp. 128-133.

32. Kohrt, W. M., S. A. Bloomfield, K. D. Little, M. E. Nelson, and V. R. Yingling. American College of Sports Medicine Position Stand: physical activity and bone health. *Med Sci Sports Exerc*. 36:1985-1996, 2004.

33. Kohrt, W. M., A. A. Ehsani, and S. J. Birge, Jr. Effects of exercise involving predominantly either joint-reaction or ground-reaction forces on bone mineral density in older women. *J Bone Miner Res*. 12:1253-1261, 1997.

34. Krall, E. A., B. Dawson-Hughes, K. Hirst, J. C. Gallagher, S. S. Sherman, and G. Dalsky. Bone mineral density and biochemical markers of bone turnover in healthy elderly men and women. *J Gerontol A Biol Sci Med Sci*. 52:M61-67, 1997.

35. Lian, J. B., G. S. Stein, E. Canalis, P. G. Robey, and A. L. Boskey. Bone formation: Osteoblast lineage cells, growth factors, matrix proteins, and the mineralization process. In: *Primer on the metabolic bone diseases and disorders of mineral metabolism*. M. J. Favus (Ed.) Philadelphia, PA: Lippincott Williams and Wilkins, 1999, pp. 14-29.

36. Liu-Ambrose, T. Y., K. M. Khan, J. J. Eng, A. Heinonen, and H. A. McKay. Both resistance and agility training increase cortical bone density in 75- to 85-year-old women with low bone mass: a 6-month randomized controlled trial. *J Clin Densitom*. 7:390-398, 2004.

37. Lohman, T. Dual Energy X-Ray Absorptiometry. In: *Human Body Composition*, pp. 63-78.

38. Maddalozzo, G. F. and C. M. Snow. High intensity resistance training: effects on bone in older men and women. *Calcif Tissue Int*. 66:399-404, 2000.

39. Mazzuoli, G., M. Acca, D. Pisani, D. Diacinti, A. Scarda, L. Scarnecchia, M. T. Pacitti, E. D'Erasmo, S. Minisola, G. Bianchi, and G. Manfredi. Annual skeletal balance and metabolic bone marker changes in healthy early postmenopausal women: results of a prospective study. *Bone*. 26:381-386, 2000.

40. Mulder, E. R., D. F. Stegeman, K. H. Gerrits, M. I. Paalman, J. Rittweger, D. Felsenberg, and A. de Haan. Strength, size and activation of knee extensors followed during 8 weeks of horizontal bed rest and the influence of a countermeasure. *Eur J Appl Physiol*. 97:706-715, 2006.

41. Mundy, G. R. Bone remodeling. In: *Primer on the metabolic bone diseases and disorders of mineral metabolism*. M. J. Favus (Ed.) Philadelphia, PA: Lippincott Williams and Wilkins, 1999, pp. 30-38.

42. Nelson, M. E., M. A. Fiatarone, C. M. Morganti, I. Trice, R. A. Greenberg, and W. J. Evans. Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures. A randomized controlled trial. *Jama*. 272:1909-1914, 1994.

43. Prestwood, K. M., M. Gunness, D. B. Muchmore, Y. Lu, M. Wong, and L. G. Raisz. A comparison of the effects of raloxifene and estrogen on bone in postmenopausal women. *J Clin Endocrinol Metab*. 85:2197-2202, 2000.

44. Prestwood, K. M., A. M. Kenny, C. Unson, and M. Kulldorff. The effect of low dose micronized 17beta-estradiol on bone turnover, sex hormone levels, and side effects in older women: a randomized, double blind, placebo-controlled study. *J Clin Endocrinol Metab*. 85:4462-4469, 2000.

45. Riggs, B. L. Are biochemical markers for bone turnover clinically useful for monitoring therapy in individual osteoporotic patients? *Bone*. 26:551-552, 2000.

46. Robling, A. G., D. B. Burr, and C. H. Turner. Recovery periods restore mechanosensitivity to dynamically loaded bone. *J Exp Biol*. 204:3389-3399, 2001.

47. Rogers, A., R. A. Hannon, and R. Eastell. Biochemical markers as predictors of rates of bone loss after menopause. *J Bone Miner Res*. 15:1398-1404, 2000.

48. Rosen, C. J., C. H. Chesnut, 3rd, and N. J. Mallinak. The predictive value of biochemical markers of bone turnover for bone mineral density in early postmenopausal women treated with hormone replacement or calcium supplementation. *J Clin Endocrinol Metab*. 82:1904-1910, 1997.

49. Rubin, C., M. Pope, J. C. Fritton, M. Magnusson, T. Hansson, and K. McLeod. Transmissibility of 15-hertz to 35-hertz vibrations to the human hip and lumbar spine: determining the physiologic feasibility of delivering low-level anabolic mechanical stimuli to skeletal regions at greatest risk of fracture because of osteoporosis. *Spine*. 28:2621-2627, 2003.

50. Rubin, C., R. Recker, D. Cullen, J. Ryaby, J. McCabe, and K. McLeod. Prevention of postmenopausal bone loss by a low-magnitude, high-frequency mechanical stimuli: a clinical trial assessing compliance, efficacy, and safety. *J Bone Miner Res*. 19:343-351, 2004.

51. Russo, C. R., F. Lauretani, S. Bandinelli, B. Bartali, C. Cavazzini, J. M. Guralnik, and L. Ferrucci. High-frequency vibration training increases muscle power in postmenopausal women. *Arch Phys Med Rehabil*. 84:1854-1857, 2003.

52. Seibel, M. J., S. P. Robins, and C. M. Grundberg. Biochemical dynamics. In: *The Aging Skeleton*, 1999.

53. Stengel, S. V., W. Kemmler, R. Pintag, C. Beeskow, J. Weineck, D. Lauber, W. A. Kalender, and K. Engelke. Power training is more effective than strength

training for maintaining bone mineral density in postmenopausal women. *J Appl Physiol*. 99:181-188, 2005.

54. Tanaka, S. M., I. M. Alam, and C. H. Turner. Stochastic resonance in osteogenic response to mechanical loading. *Faseb J*. 17:313-314, 2003.

55. Torvinen, S., P. Kannus, H. Sievanen, T. A. Jarvinen, M. Pasanen, S. Kontulainen, A. Nenonen, T. L. Jarvinen, T. Paakkala, M. Jarvinen, and I. Vuori. Effect of 8-month vertical whole body vibration on bone, muscle performance, and body balance: a randomized controlled study. *J Bone Miner Res*. 18:876-884, 2003.

56. Turner, C. H. Three rules for bone adaptation to mechanical stimuli. *Bone*. 23:399-407, 1998.

57. United States. Public Health Service. Office of the Surgeon General. *Bone health and osteoporosis : a report of the Surgeon General*. Rockville, Md.: U.S. Dept. of Health and Human Services, Public Health Service, Office of the Surgeon General, 2004, xxxii, 404 p.

58. Uusi-Rasi, K., H. Sievanen, I. Vuori, A. Heinonen, P. Kannus, M. Pasanen, M. Rinne, and P. Oja. Long-term recreational gymnastics, estrogen use, and selected risk factors for osteoporotic fractures. *J Bone Miner Res*. 14:1231-1238, 1999.

59. Verschueren, S. M., M. Roelants, C. Delecluse, S. Swinnen, D. Vanderschueren, and S. Boonen. Effect of 6-month whole body vibration training on hip density, muscle strength, and postural control in postmenopausal women: a randomized controlled pilot study. *J Bone Miner Res*. 19:352-359, 2004.

60. Vincent, K. R. and R. W. Braith. Resistance exercise and bone turnover in elderly men and women. *Med Sci Sports Exerc*. 34:17-23, 2002.

61. Warming, L., P. Ravn, D. Spielman, P. Delmas, and C. Christiansen. Trimegestone in a low-dose, continuous-combined hormone therapy regimen prevents bone loss in osteopenic postmenopausal women. *Menopause*. 11:337-342, 2004.

62. Watts, N. B. Clinical utility of biochemical markers of bone remodeling. *Clin Chem*. 45:1359-1368, 1999.

63. Xie, L., J. M. Jacobson, E. S. Choi, B. Busa, L. R. Donahue, L. M. Miller, C. T. Rubin, and S. Judex. Low-level mechanical vibrations can influence bone resorption and bone formation in the growing skeleton. *Bone*. 39:1059-1066, 2006.

64. Yamazaki, S., S. Ichimura, J. Iwamoto, T. Takeda, and Y. Toyama. Effect of walking exercise on bone metabolism in postmenopausal women with osteopenia/osteoporosis. *J Bone Miner Metab*. 22:500-508, 2004.

APPENDICIES

Appendix A. Recruitment Flyer, Recruitment Letter, News Release

Appendix B. Informed Consent, Medical Clearance, Authorization to Use or Disclose Protected Health Information

Appendix C. Health History Questionnaire, Calcium Intake, Menstrual History

Appendix D. IRB Approval Letter

Appendix E. Training Log, 1RM Log

Appendix F. Sample DXA Scans

Appendix G. Metra BAP Instructions, Serum Crosslaps Instructions

Appendix H. Calcium Information

Appendix I. Data

Appendix A.

Recruitment Flyer, Recruitment Letter, News Release

Recruitment Flyer

Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women

Ian Palmer, M.S., and Debra Bemben, Ph.D., are conducting a study examining the effects of resistance training and vibration plus resistance training on bone metabolism and bone mineral density. This study will be conducted at the Bone Density Research Laboratory on the University of Oklahoma Norman campus. The researchers are seeking postmenopausal women, age 60 to 75, who are healthy, not taking hormone replacement therapy, and not currently resistance trained to participate. Individuals who are taking medications that effect bone density, have physical limitations preventing them from participation, diagnosed osteoporosis, or untreated cardiovascular disease will not be allowed to participate. Total participation time is eight months, during which, the subjects will be required to give blood samples and receive bone scans at baseline, 4 months, and post-intervention. Participants will be required to complete an eight-month exercise intervention that will meet for one hour, three times per week.

If interested, contact Ian Palmer at 802-2209, ipalmer@ou.edu, or 325-5211 for more information. Please include your name, telephone number and the best time to reach you in your message.

Department of Health and Exercise Science

August 16, 2005

Subject: Bone Density Study in Postmenopausal Women (a non-profit newsletter)

Dear

A study on the effects of weight training on bone mineral density in postmenopausal women is being conducted by Ian Palmer and Debra Bemben at the University of Oklahoma.

Osteoporosis is a bone disease that results from a decrease in bone mass and bone strength with a consequent increase in bone fragility and susceptibility to fracture. One beneficial treatment for reducing age-related bone loss is weight training. Another novel intervention that may have additional bone building effects is low frequency vibration which involves minimal effort by the subject. This study will examine weight training and weight training in combination with low frequency vibration.

The participants will receive information about their bone status and osteoporosis risk at no cost. Free supervised weight training will be provided by qualified personnel at the Neuromuscular Laboratory in the Department of Health and Exercise Science OU-Norman Campus. The time commitment for the training is about one hour a day, three days a week for eight months.

The researchers are seeking postmenopausal women between 55 and 75 years of age, who have not participated in resistance training for the previous year, to participate. Women who are taking hormone replacement therapy or other medications which affect bone are not eligible for the study. Interested women are asked to contact Ian Palmer at 802-2209, ipalmer@ou.edu, or 325-5211 for more information.

Thank you,

Ian Palmer, M.S., Doctoral Candidate

Dr. Debra Bemben

NEWS RELEASE
For Immediate Release
Contact Ian Palmer: 802-2209

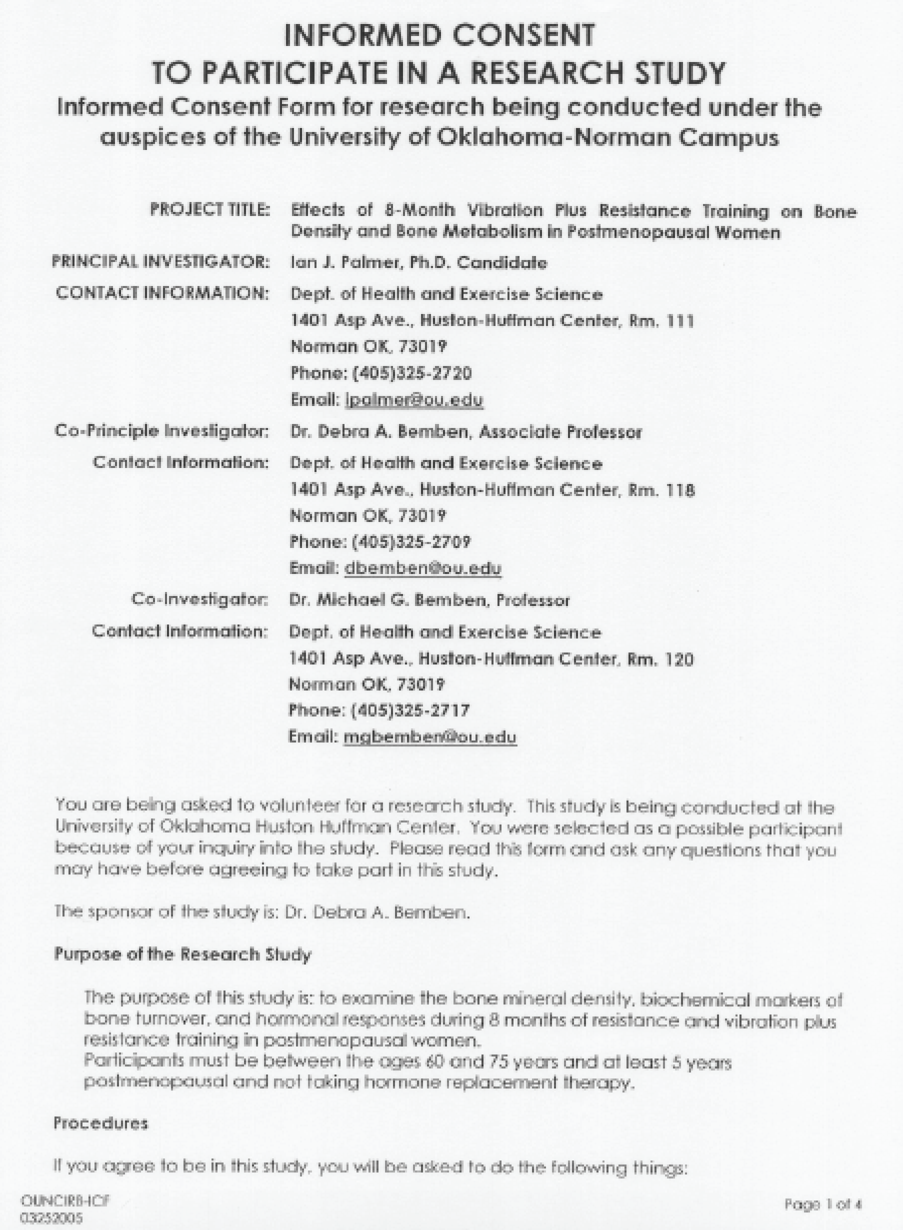
Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women

The role of resistance training and vibration plus resistance training on bone mineral density and bone metabolism in postmenopausal women will be examined in a study being conducted by Ian Palmer and Debra Bemben at the University of Oklahoma. Osteoporosis is a bone disease that results from a decrease in bone mass and bone strength with a consequent increase in bone fragility and susceptibility to fracture. One beneficial treatment for reducing age-related bone loss is resistance training. Another intervention that has been shown to have a profound bone building effect in animals is vibration training, which is comparable to downhill snow or water skiing at a moderate to fast pace, yet considerably lower than the vibration experienced while riding a motor cycle or riding on public transportation. Research on the bone building effects of vibration training in humans is lacking and requires additional investigation.

The researchers are seeking postmenopausal women between 60 and 75, who have not participated in resistance training for the previous year, to participate. Participants will be required to complete surveys to provide information about health status, menstrual history, hormone replacement therapy status, and calcium intake. Participants will be required to have blood samples drawn and to perform bone scans to obtain information about bone mineral density status. Participants will be randomized into a control group, a resistance training group, or a vibration plus resistance training group. Resistance training and vibration plus resistance training programs will be conducted for 8 months at the Department of Health and Exercise Science. The time commitment during training is about one hour a day, three days a week. Women taking medications that affect bone density, such as hormone replacement therapy; who have medical conditions that affect bone density (e.g., osteoporosis, thyroid disease, epilepsy, diabetes, kidney stones); and who are current smokers will not be eligible for participation in the study. Interested women who meet these qualifications are asked to contact Palmer or Bemben, at 802-2209, ipalmer@ou.edu, or 325-5211 for more information.

Appendix B.

Informed Consent, Medical Clearance, Authorization to Use or Disclose Protected Health Information



INFORMED CONSENT
TO PARTICIPATE IN A RESEARCH STUDY
Informed Consent Form for research being conducted under the auspices of the University of Oklahoma-Norman Campus

PROJECT TITLE:	Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women
PRINCIPAL INVESTIGATOR:	Ian J. Palmer, Ph.D. Candidate
CONTACT INFORMATION:	Dept. of Health and Exercise Science 1401 Asp Ave., Huston-Huffman Center, Rm. 111 Norman OK, 73019 Phone: (405)325-2720 Email: lpalmer@ou.edu
Co-Principle Investigator:	Dr. Debra A. Bemben, Associate Professor
Contact Information:	Dept. of Health and Exercise Science 1401 Asp Ave., Huston-Huffman Center, Rm. 118 Norman OK, 73019 Phone: (405)325-2709 Email: dbemben@ou.edu
Co-Investigator:	Dr. Michael G. Bemben, Professor
Contact Information:	Dept. of Health and Exercise Science 1401 Asp Ave., Huston-Huffman Center, Rm. 120 Norman OK, 73019 Phone: (405)325-2717 Email: mgbemben@ou.edu

You are being asked to volunteer for a research study. This study is being conducted at the University of Oklahoma Huston Huffman Center. You were selected as a possible participant because of your inquiry into the study. Please read this form and ask any questions that you may have before agreeing to take part in this study.

The sponsor of the study is: Dr. Debra A. Bemben.

Purpose of the Research Study

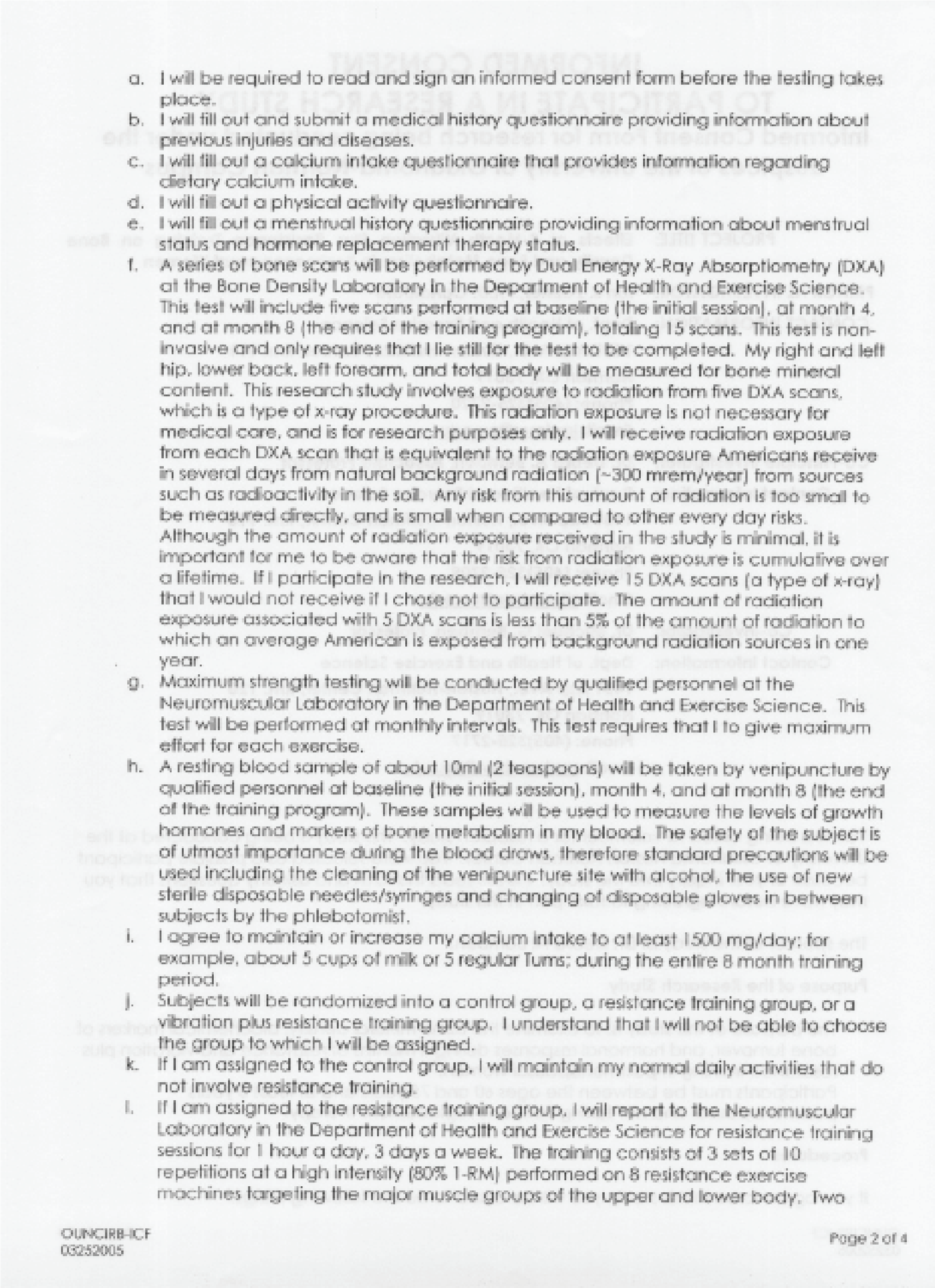
The purpose of this study is: to examine the bone mineral density, biochemical markers of bone turnover, and hormonal responses during 8 months of resistance and vibration plus resistance training in postmenopausal women.
Participants must be between the ages 60 and 75 years and at least 5 years postmenopausal and not taking hormone replacement therapy.

Procedures

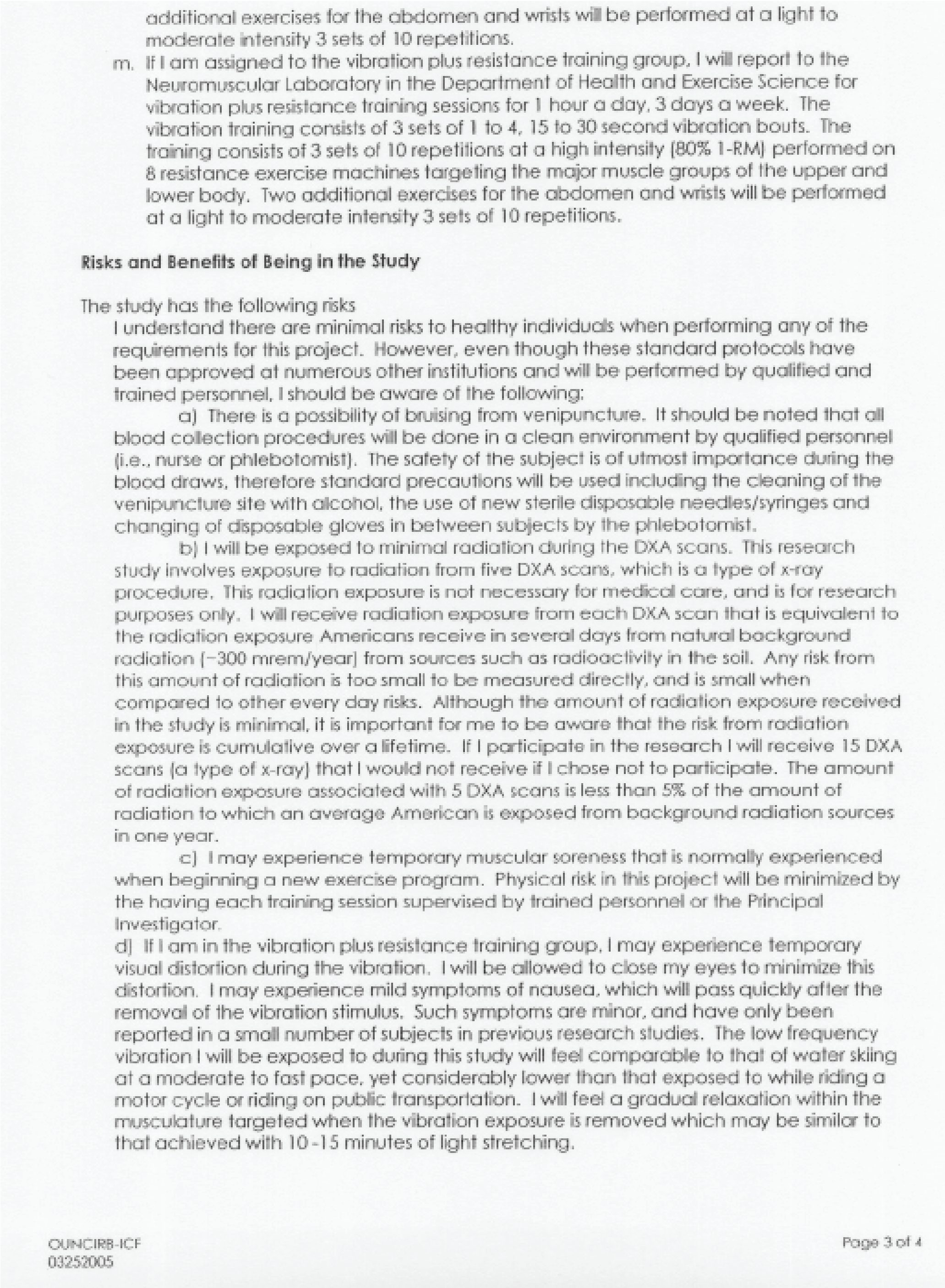
If you agree to be in this study, you will be asked to do the following things:

OUNCIRB-ICF
03252005

Page 1 of 4



a. I will be required to read and sign an informed consent form before the testing takes place.
b. I will fill out and submit a medical history questionnaire providing information about previous injuries and diseases.
c. I will fill out a calcium intake questionnaire that provides information regarding dietary calcium intake.
d. I will fill out a physical activity questionnaire.
e. I will fill out a menstrual history questionnaire providing information about menstrual status and hormone replacement therapy status.
f. A series of bone scans will be performed by Dual Energy X-Ray Absorptiometry (DXA) at the Bone Density Laboratory in the Department of Health and Exercise Science. This test will include five scans performed at baseline (the initial session), at month 4, and at month 8 (the end of the training program), totaling 15 scans. This test is non-invasive and only requires that I lie still for the test to be completed. My right and left hip, lower back, left forearm, and total body will be measured for bone mineral content. This research study involves exposure to radiation from five DXA scans, which is a type of x-ray procedure. This radiation exposure is not necessary for medical care, and is for research purposes only. I will receive radiation exposure from each DXA scan that is equivalent to the radiation exposure Americans receive in several days from natural background radiation (~300 mrem/year) from sources such as radioactivity in the soil. Any risk from this amount of radiation is too small to be measured directly, and is small when compared to other every day risks. Although the amount of radiation exposure received in the study is minimal, it is important for me to be aware that the risk from radiation exposure is cumulative over a lifetime. If I participate in the research, I will receive 15 DXA scans (a type of x-ray) that I would not receive if I chose not to participate. The amount of radiation exposure associated with 5 DXA scans is less than 5% of the amount of radiation to which an average American is exposed from background radiation sources in one year.
g. Maximum strength testing will be conducted by qualified personnel at the Neuromuscular Laboratory in the Department of Health and Exercise Science. This test will be performed at monthly intervals. This test requires that I to give maximum effort for each exercise.
h. A resting blood sample of about 10ml (2 teaspoons) will be taken by venipuncture by qualified personnel at baseline (the initial session), month 4, and at month 8 (the end of the training program). These samples will be used to measure the levels of growth hormones and markers of bone metabolism in my blood. The safety of the subject is of utmost importance during the blood draws, therefore standard precautions will be used including the cleaning of the venipuncture site with alcohol, the use of new sterile disposable needles/syringes and changing of disposable gloves in between subjects by the phlebotomist.
i. I agree to maintain or increase my calcium intake to at least 1500 mg/day; for example, about 5 cups of milk or 5 regular Tums; during the entire 8 month training period.
j. Subjects will be randomized into a control group, a resistance training group, or a vibration plus resistance training group. I understand that I will not be able to choose the group to which I will be assigned.
k. If I am assigned to the control group, I will maintain my normal daily activities that do not involve resistance training.
l. If I am assigned to the resistance training group, I will report to the Neuromuscular Laboratory in the Department of Health and Exercise Science for resistance training sessions for 1 hour a day, 3 days a week. The training consists of 3 sets of 10 repetitions at a high intensity (80% 1-RM) performed on 8 resistance exercise machines targeting the major muscle groups of the upper and lower body. Two



additional exercises for the abdomen and wrists will be performed at a light to moderate intensity 3 sets of 10 repetitions.

m. If I am assigned to the vibration plus resistance training group, I will report to the Neuromuscular Laboratory in the Department of Health and Exercise Science for vibration plus resistance training sessions for 1 hour a day, 3 days a week. The vibration training consists of 3 sets of 1 to 4, 15 to 30 second vibration bouts. The training consists of 3 sets of 10 repetitions at a high intensity (80% 1-RM) performed on 8 resistance exercise machines targeting the major muscle groups of the upper and lower body. Two additional exercises for the abdomen and wrists will be performed at a light to moderate intensity 3 sets of 10 repetitions.

Risks and Benefits of Being in the Study

The study has the following risks

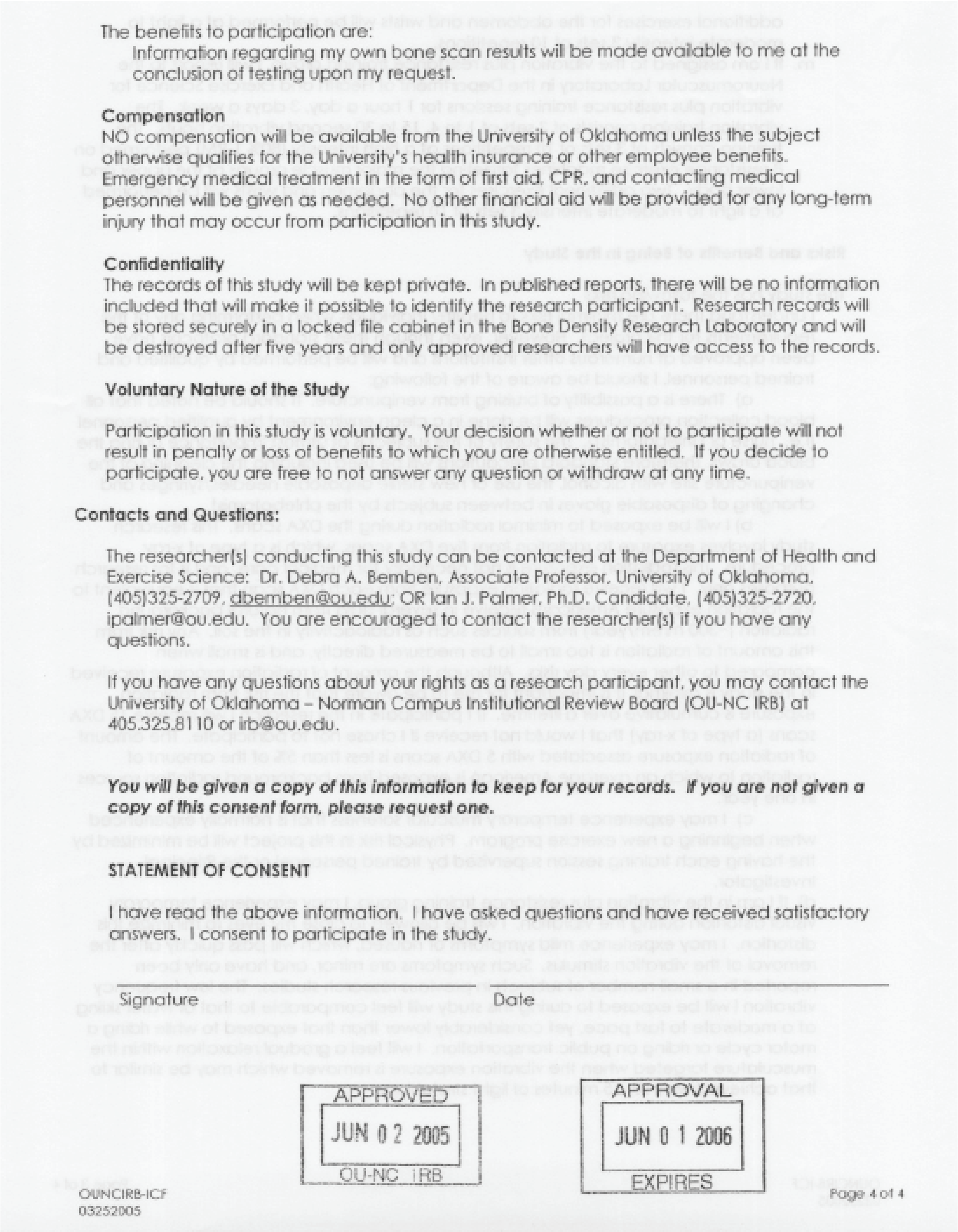
I understand there are minimal risks to healthy individuals when performing any of the requirements for this project. However, even though these standard protocols have been approved at numerous other institutions and will be performed by qualified and trained personnel, I should be aware of the following:

a) There is a possibility of bruising from venipuncture. It should be noted that all blood collection procedures will be done in a clean environment by qualified personnel (i.e., nurse or phlebotomist). The safety of the subject is of utmost importance during the blood draws, therefore standard precautions will be used including the cleaning of the venipuncture site with alcohol, the use of new sterile disposable needles/syringes and changing of disposable gloves in between subjects by the phlebotomist.

b) I will be exposed to minimal radiation during the DXA scans. This research study involves exposure to radiation from five DXA scans, which is a type of x-ray procedure. This radiation exposure is not necessary for medical care, and is for research purposes only. I will receive radiation exposure from each DXA scan that is equivalent to the radiation exposure Americans receive in several days from natural background radiation (~300 mrem/year) from sources such as radioactivity in the soil. Any risk from this amount of radiation is too small to be measured directly, and is small when compared to other every day risks. Although the amount of radiation exposure received in the study is minimal, it is important for me to be aware that the risk from radiation exposure is cumulative over a lifetime. If I participate in the research I will receive 15 DXA scans (a type of x-ray) that I would not receive if I chose not to participate. The amount of radiation exposure associated with 5 DXA scans is less than 5% of the amount of radiation to which an average American is exposed from background radiation sources in one year.

c) I may experience temporary muscular soreness that is normally experienced when beginning a new exercise program. Physical risk in this project will be minimized by the having each training session supervised by trained personnel or the Principal Investigator.

d) If I am in the vibration plus resistance training group, I may experience temporary visual distortion during the vibration. I will be allowed to close my eyes to minimize this distortion. I may experience mild symptoms of nausea, which will pass quickly after the removal of the vibration stimulus. Such symptoms are minor, and have only been reported in a small number of subjects in previous research studies. The low frequency vibration I will be exposed to during this study will feel comparable to that of water skiing at a moderate to fast pace, yet considerably lower than that exposed to while riding a motor cycle or riding on public transportation. I will feel a gradual relaxation within the musculature targeted when the vibration exposure is removed which may be similar to that achieved with 10-15 minutes of light stretching.



The benefits to participation are:

Information regarding my own bone scan results will be made available to me at the conclusion of testing upon my request.

Compensation

NO compensation will be available from the University of Oklahoma unless the subject otherwise qualifies for the University's health insurance or other employee benefits. Emergency medical treatment in the form of first aid, CPR, and contacting medical personnel will be given as needed. No other financial aid will be provided for any long-term injury that may occur from participation in this study.

Confidentiality

The records of this study will be kept private. In published reports, there will be no information included that will make it possible to identify the research participant. Research records will be stored securely in a locked file cabinet in the Bone Density Research Laboratory and will be destroyed after five years and only approved researchers will have access to the records.

Voluntary Nature of the Study

Participation in this study is voluntary. Your decision whether or not to participate will not result in penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to not answer any question or withdraw at any time.

Contacts and Questions:

The researcher(s) conducting this study can be contacted at the Department of Health and Exercise Science: Dr. Debra A. Bemben, Associate Professor, University of Oklahoma, (405)325-2709, dbemben@ou.edu; OR Ian J. Palmer, Ph.D. Candidate, (405)325-2720, ipalmer@ou.edu. You are encouraged to contact the researcher(s) if you have any questions.

If you have any questions about your rights as a research participant, you may contact the University of Oklahoma – Norman Campus Institutional Review Board (OU-NC IRB) at 405.325.8110 or irb@ou.edu.

You will be given a copy of this information to keep for your records. If you are not given a copy of this consent form, please request one.

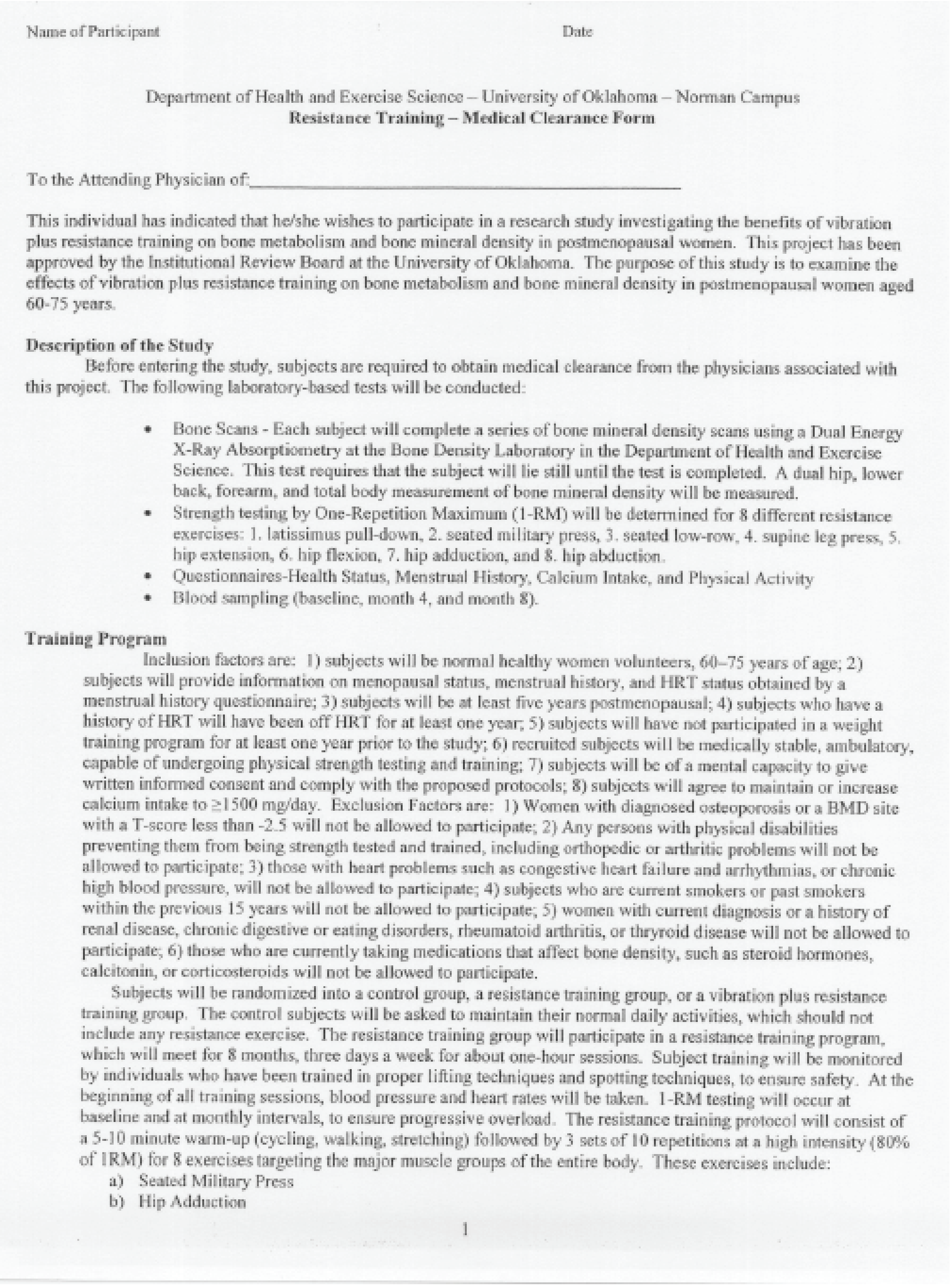
STATEMENT OF CONSENT

I have read the above information. I have asked questions and have received satisfactory answers. I consent to participate in the study.

Signature　　　　　　　　　　　　Date

APPROVED
JUN 0 2 2005
OU-NC IRB

APPROVAL
JUN 0 1 2006
EXPIRES



Name of Participant Date

Department of Health and Exercise Science – University of Oklahoma – Norman Campus

Resistance Training – Medical Clearance Form

To the Attending Physician of:____

This individual has indicated that he/she wishes to participate in a research study investigating the benefits of vibration plus resistance training on bone metabolism and bone mineral density in postmenopausal women. This project has been approved by the Institutional Review Board at the University of Oklahoma. The purpose of this study is to examine the effects of vibration plus resistance training on bone metabolism and bone mineral density in postmenopausal women aged 60-75 years.

Description of the Study

Before entering the study, subjects are required to obtain medical clearance from the physicians associated with this project. The following laboratory-based tests will be conducted:

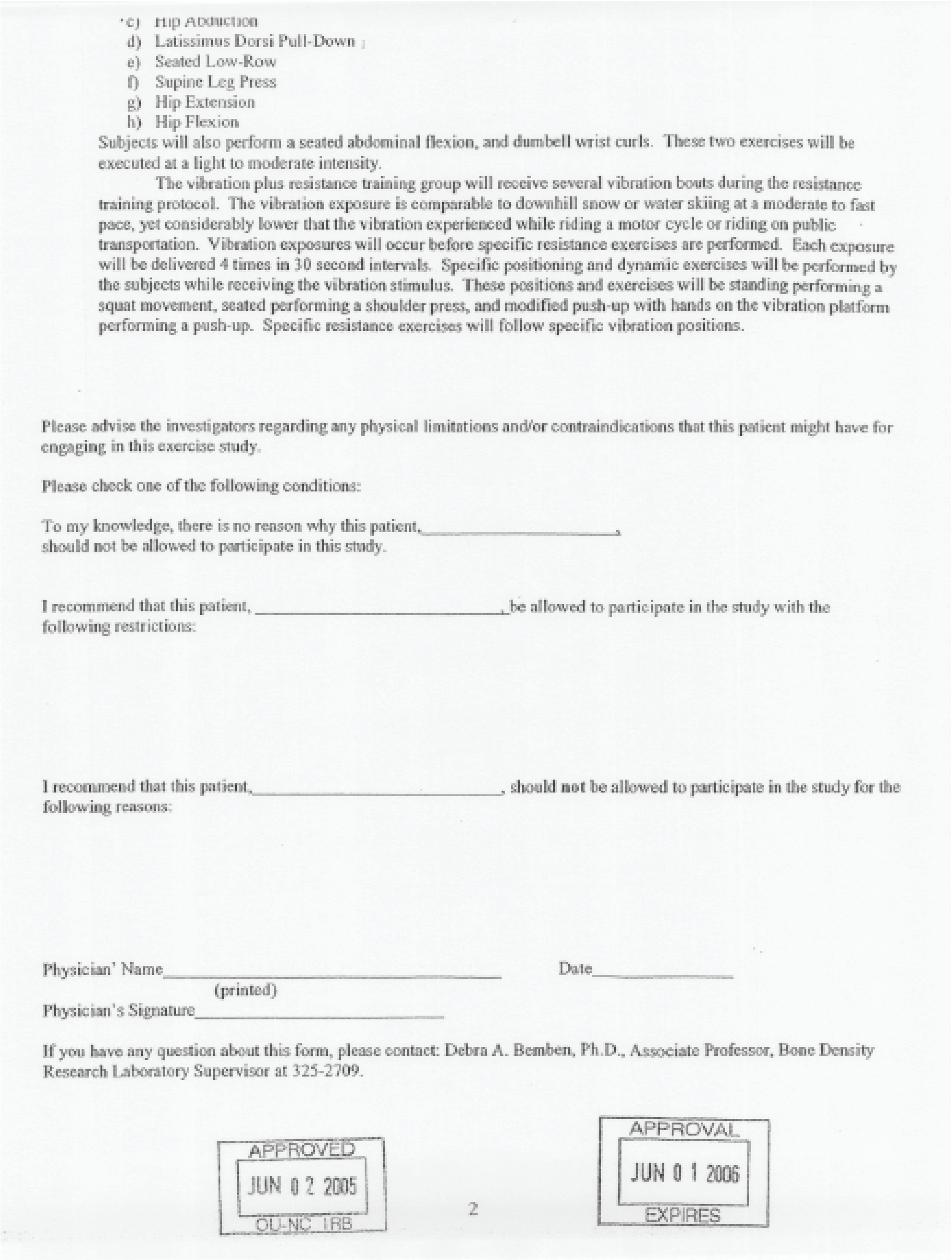
- Bone Scans - Each subject will complete a series of bone mineral density scans using a Dual Energy X-Ray Absorptiometry at the Bone Density Laboratory in the Department of Health and Exercise Science. This test requires that the subject will lie still until the test is completed. A dual hip, lower back, forearm, and total body measurement of bone mineral density will be measured.
- Strength testing by One-Repetition Maximum (1-RM) will be determined for 8 different resistance exercises: 1. latissimus pull-down, 2. seated military press, 3. seated low-row, 4. supine leg press, 5. hip extension, 6. hip flexion, 7. hip adduction, and 8. hip abduction.
- Questionnaires-Health Status, Menstrual History, Calcium Intake, and Physical Activity
- Blood sampling (baseline, month 4, and month 8).

Training Program

Inclusion factors are: 1) subjects will be normal healthy women volunteers, 60–75 years of age; 2) subjects will provide information on menopausal status, menstrual history, and HRT status obtained by a menstrual history questionnaire; 3) subjects will be at least five years postmenopausal; 4) subjects who have a history of HRT will have been off HRT for at least one year; 5) subjects will have not participated in a weight training program for at least one year prior to the study; 6) recruited subjects will be medically stable, ambulatory, capable of undergoing physical strength testing and training; 7) subjects will be of a mental capacity to give written informed consent and comply with the proposed protocols; 8) subjects will agree to maintain or increase calcium intake to ≥1500 mg/day. Exclusion Factors are: 1) Women with diagnosed osteoporosis or a BMD site with a T-score less than -2.5 will not be allowed to participate; 2) Any persons with physical disabilities preventing them from being strength tested and trained, including orthopedic or arthritic problems will not be allowed to participate; 3) those with heart problems such as congestive heart failure and arrhythmias, or chronic high blood pressure, will not be allowed to participate; 4) subjects who are current smokers or past smokers within the previous 15 years will not be allowed to participate; 5) women with current diagnosis or a history of renal disease, chronic digestive or eating disorders, rheumatoid arthritis, or thryroid disease will not be allowed to participate; 6) those who are currently taking medications that affect bone density, such as steroid hormones, calcitonin, or corticosteroids will not be allowed to participate.

Subjects will be randomized into a control group, a resistance training group, or a vibration plus resistance training group. The control subjects will be asked to maintain their normal daily activities, which should not include any resistance exercise. The resistance training group will participate in a resistance training program, which will meet for 8 months, three days a week for about one-hour sessions. Subject training will be monitored by individuals who have been trained in proper lifting techniques and spotting techniques, to ensure safety. At the beginning of all training sessions, blood pressure and heart rates will be taken. 1-RM testing will occur at baseline and at monthly intervals, to ensure progressive overload. The resistance training protocol will consist of a 5-10 minute warm-up (cycling, walking, stretching) followed by 3 sets of 10 repetitions at a high intensity (80% of 1RM) for 8 exercises targeting the major muscle groups of the entire body. These exercises include:

a) Seated Military Press
b) Hip Adduction



c) Hip Abduction
d) Latissimus Dorsi Pull-Down
e) Seated Low-Row
f) Supine Leg Press
g) Hip Extension
h) Hip Flexion

Subjects will also perform a seated abdominal flexion, and dumbell wrist curls. These two exercises will be executed at a light to moderate intensity.

The vibration plus resistance training group will receive several vibration bouts during the resistance training protocol. The vibration exposure is comparable to downhill snow or water skiing at a moderate to fast pace, yet considerably lower that the vibration experienced while riding a motor cycle or riding on public transportation. Vibration exposures will occur before specific resistance exercises are performed. Each exposure will be delivered 4 times in 30 second intervals. Specific positioning and dynamic exercises will be performed by the subjects while receiving the vibration stimulus. These positions and exercises will be standing performing a squat movement, seated performing a shoulder press, and modified push-up with hands on the vibration platform performing a push-up. Specific resistance exercises will follow specific vibration positions.

Please advise the investigators regarding any physical limitations and/or contraindications that this patient might have for engaging in this exercise study.

Please check one of the following conditions:

To my knowledge, there is no reason why this patient,______________________, should not be allowed to participate in this study.

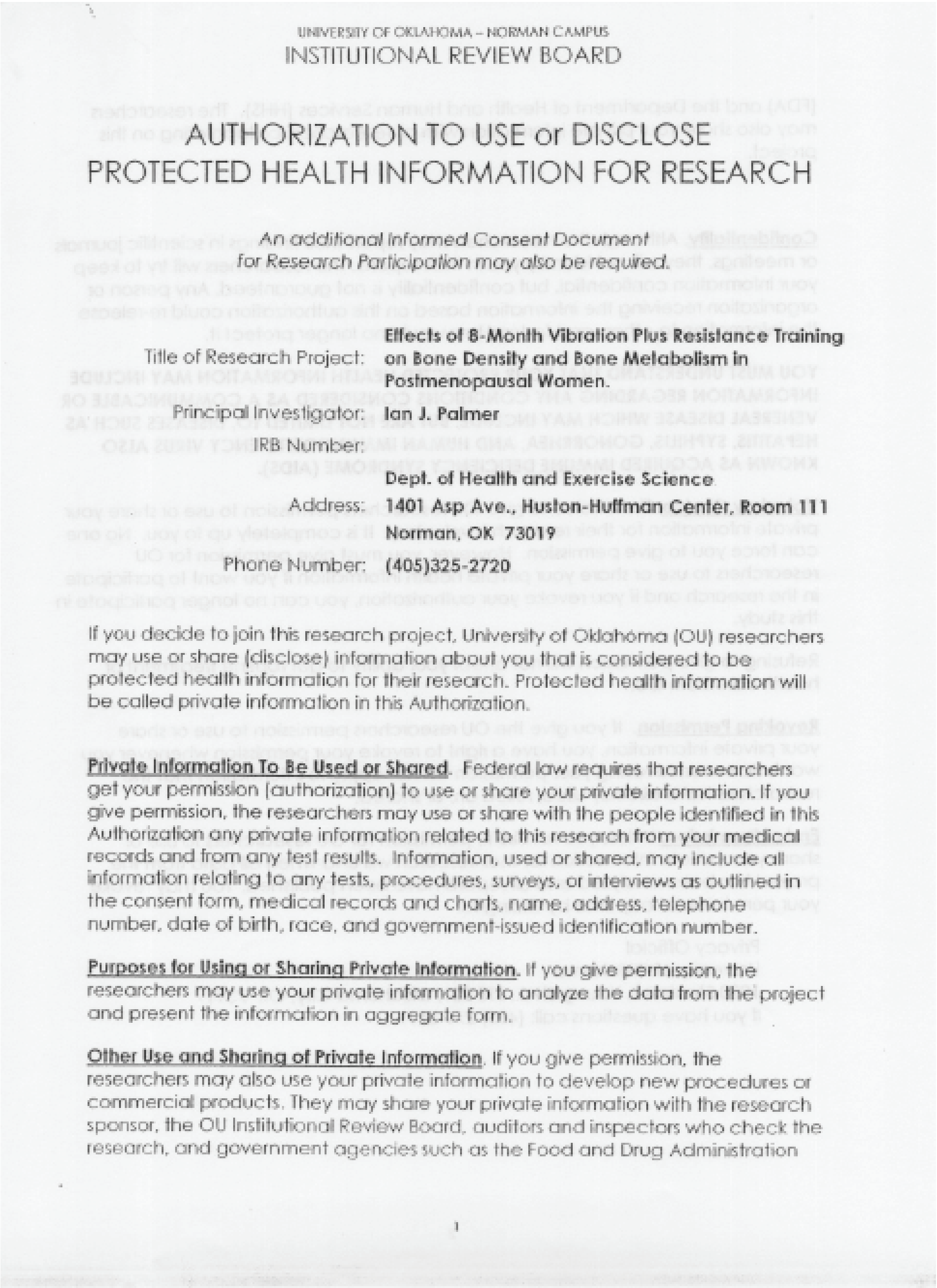
I recommend that this patient, ____________________________, be allowed to participate in the study with the following restrictions:

I recommend that this patient,____________________________, should not be allowed to participate in the study for the following reasons:

Physician' Name_______________________________________ Date_______________
(printed)
Physician's Signature____________________________

If you have any question about this form, please contact: Debra A. Bemben, Ph.D., Associate Professor, Bone Density Research Laboratory Supervisor at 325-2709.

2



UNIVERSITY OF OKLAHOMA – NORMAN CAMPUS
INSTITUTIONAL REVIEW BOARD

AUTHORIZATION TO USE or DISCLOSE PROTECTED HEALTH INFORMATION FOR RESEARCH

An additional Informed Consent Document
for Research Participation may also be required.

Title of Research Project: **Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women.**
Principal Investigator: **Ian J. Palmer**
IRB Number:
Address: **Dept. of Health and Exercise Science**
1401 Asp Ave., Huston-Huffman Center, Room 111
Norman, OK 73019
Phone Number: **(405)325-2720**

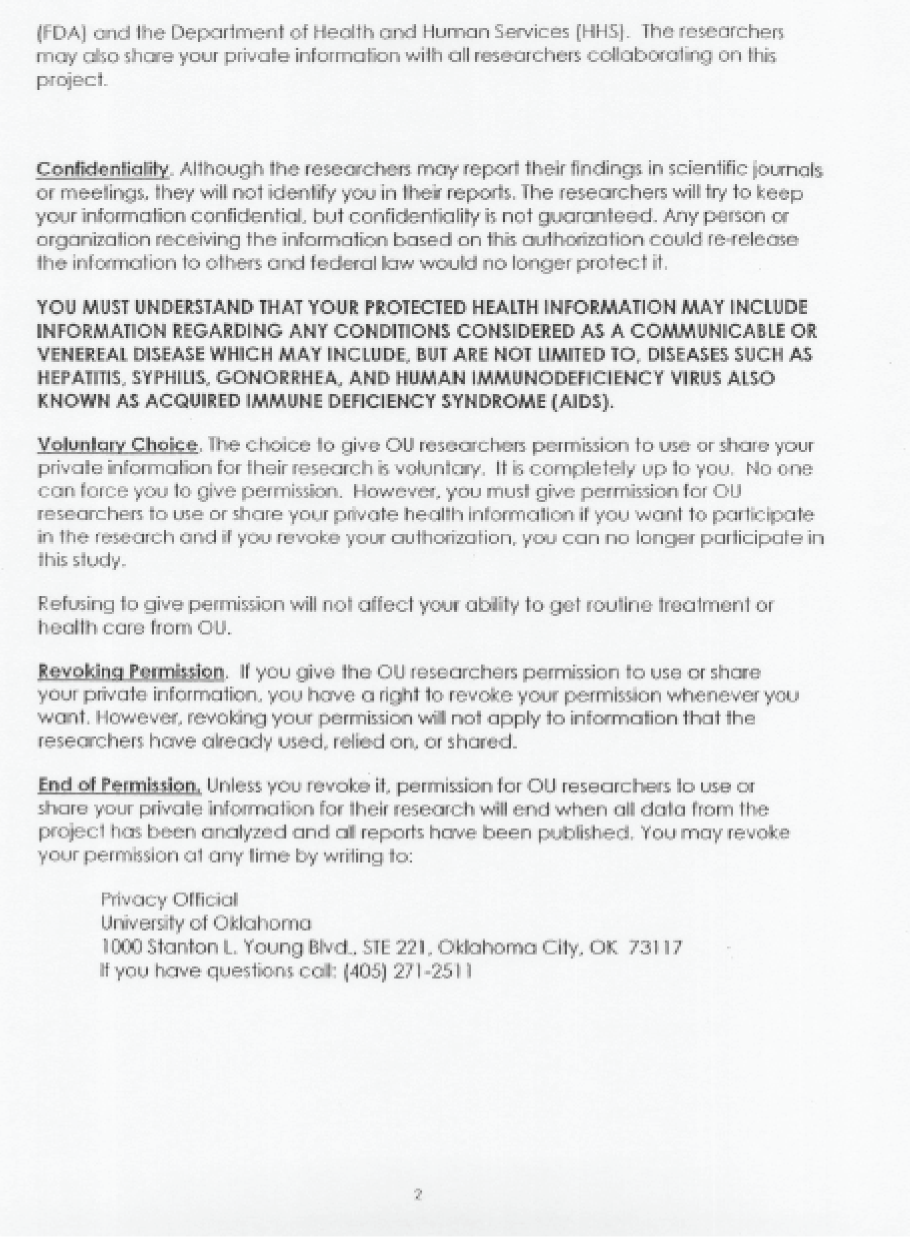
If you decide to join this research project, University of Oklahoma (OU) researchers may use or share (disclose) information about you that is considered to be protected health information for their research. Protected health information will be called private information in this Authorization.

Private Information To Be Used or Shared. Federal law requires that researchers get your permission (authorization) to use or share your private information. If you give permission, the researchers may use or share with the people identified in this Authorization any private information related to this research from your medical records and from any test results. Information, used or shared, may include all information relating to any tests, procedures, surveys, or interviews as outlined in the consent form, medical records and charts, name, address, telephone number, date of birth, race, and government-issued identification number.

Purposes for Using or Sharing Private Information. If you give permission, the researchers may use your private information to analyze the data from the project and present the information in aggregate form.

Other Use and Sharing of Private Information. If you give permission, the researchers may also use your private information to develop new procedures or commercial products. They may share your private information with the research sponsor, the OU Institutional Review Board, auditors and inspectors who check the research, and government agencies such as the Food and Drug Administration

1



(FDA) and the Department of Health and Human Services (HHS). The researchers may also share your private information with all researchers collaborating on this project.

Confidentiality. Although the researchers may report their findings in scientific journals or meetings, they will not identify you in their reports. The researchers will try to keep your information confidential, but confidentiality is not guaranteed. Any person or organization receiving the information based on this authorization could re-release the information to others and federal law would no longer protect it.

YOU MUST UNDERSTAND THAT YOUR PROTECTED HEALTH INFORMATION MAY INCLUDE INFORMATION REGARDING ANY CONDITIONS CONSIDERED AS A COMMUNICABLE OR VENEREAL DISEASE WHICH MAY INCLUDE, BUT ARE NOT LIMITED TO, DISEASES SUCH AS HEPATITIS, SYPHILIS, GONORRHEA, AND HUMAN IMMUNODEFICIENCY VIRUS ALSO KNOWN AS ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS).

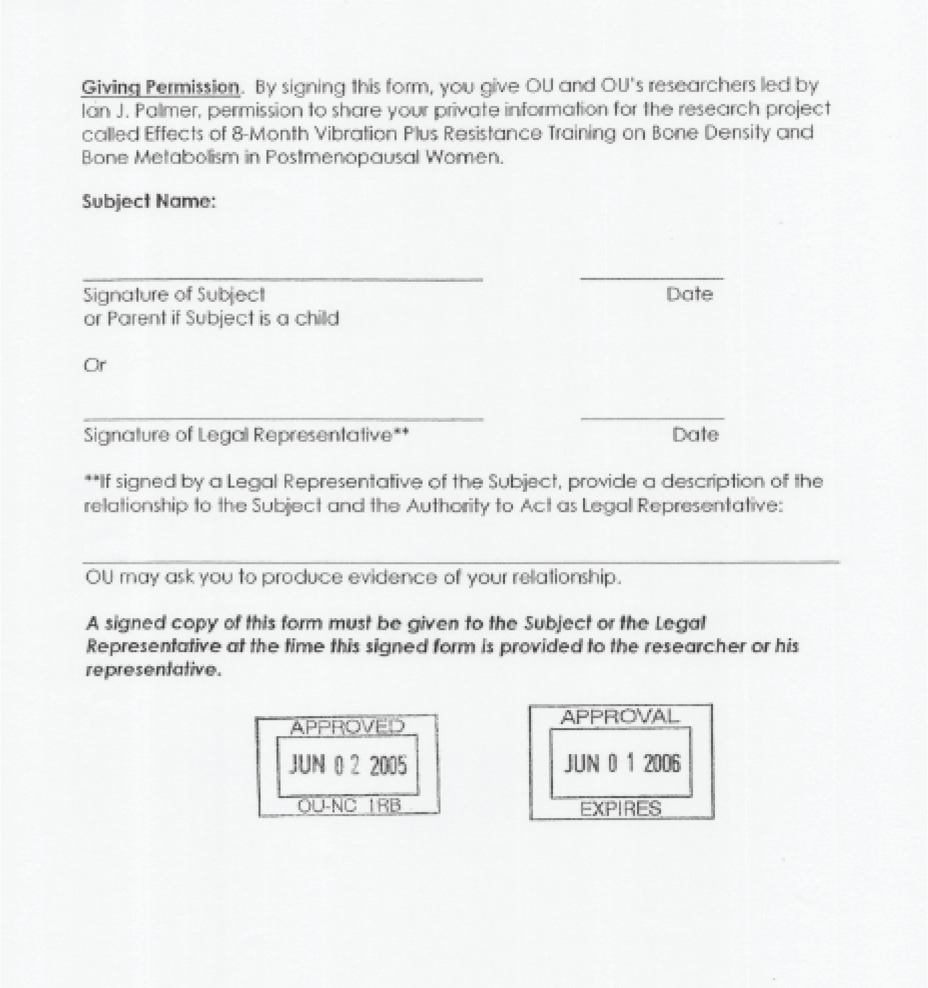
Voluntary Choice. The choice to give OU researchers permission to use or share your private information for their research is voluntary. It is completely up to you. No one can force you to give permission. However, you must give permission for OU researchers to use or share your private health information if you want to participate in the research and if you revoke your authorization, you can no longer participate in this study.

Refusing to give permission will not affect your ability to get routine treatment or health care from OU.

Revoking Permission. If you give the OU researchers permission to use or share your private information, you have a right to revoke your permission whenever you want. However, revoking your permission will not apply to information that the researchers have already used, relied on, or shared.

End of Permission. Unless you revoke it, permission for OU researchers to use or share your private information for their research will end when all data from the project has been analyzed and all reports have been published. You may revoke your permission at any time by writing to:

Privacy Official
University of Oklahoma
1000 Stanton L. Young Blvd., STE 221, Oklahoma City, OK 73117
If you have questions call: (405) 271-2511



Giving Permission. By signing this form, you give OU and OU's researchers led by Ian J. Palmer, permission to share your private information for the research project called Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women.

Subject Name:

____________________________________ ____________
Signature of Subject Date
or Parent if Subject is a child

Or

____________________________________ ____________
Signature of Legal Representative** Date

**If signed by a Legal Representative of the Subject, provide a description of the relationship to the Subject and the Authority to Act as Legal Representative:

____
OU may ask you to produce evidence of your relationship.

A signed copy of this form must be given to the Subject or the Legal Representative at the time this signed form is provided to the researcher or his representative.

APPROVED
JUN 02 2005
OU-NC IRB

APPROVAL
JUN 01 2006
EXPIRES

Appendix C.

Health History Questionnaire, Calcium Intake, Menstrual History, PASE

Bone Density Laboratory
OU Department of Health and Sport Sciences
Health Status Questionnaire

Instructions Complete each question accurately. All information provided is confidential.
(NOTE: The following codes are for office use only: RF; MC; SLA; SEP)

Part 1. Information about the individual

1. ______________________________ ______________
Social Security no. Date

2. ______________________________ ______________
Legal name Nickname

3. ______________________________ ______________
Mailing address Home phone
______________________________ ______________
Business phone

4. Gender (circle one): Female Male (RF)

5. Date of birth: ______________ Age ______
Month Day Year

6. Number of hours worked per week: Less than 20 20-40 41-60 Over 60

(SLA) More than 25% of time spent on job (circle all that apply)

Sitting at desk Lifting or carrying loads Standing Walking Driving

Part 2. Medical history

7. (RF) Circle any who died of heart attack before age 50:

Father Mother Brother Sister Grandparent

8. Date of: Last medical physical exam: ______ Last physical fitness test: ______
Year Year

9. Circle operations you have had:

Back (SLA) Heart (MC) Kidney (SLA) Eyes (SLA) Joint (SLA) Neck (SLA)
Ears (SLA) Hernia (SLA) Lung (SLA) Other ______________

10. Please circle any of the following for which you have been diagnosed or treated by a physician or health professional:

Alcoholism (SEP)
Anemia, sickle cell (SEP)
Anemia, other (SEP)
Asthma (SEP)
Back strain (SLA)
Bleeding trait (SEP)
Bronchitis, chronic (SEP)
Cancer (SEP)
Cirrhosis, liver (MC)
Concussion (MC)
Congenital defect (SEP)
Diabetes (SEP)
Emphysema (SEP)
Epilepsy (SEP)
Eye problems (SLA)
Gout (SLA)
Hearing loss (SLA)
Heart problems (SLA)
High blood pressure (RF)
Hypoglycemia (SEP)
Hyperlipidemia (RF)
Infectious mononucleosis (MC)
Kidney problem (MC)
Mental illness (SEP)
Neck strain (SLA)
Obesity (RF)
Osteoporosis
Phlebitis (MC)
Rheumatoid arthritis (SLA)
Stroke (MC)
Thyroid problem (SEP)
Ulcer (SEP)
Other ______________

Blood thinner (MC)
Diabetic pill (SEP)
Digitalis (MC)
Diuretic (MC)
Asthma

Epilepsy medication (SEP)
Heart-rhythm medication (MC)
High-blood-pressure medication (MC)
Insulin (MC)
Other ____________________

Nitroglycerin (MC)
Estrogen
Thyroid
Corticosteroids

12. Any of these health symptoms that occurs frequently is the basis for medical attention. Circle the number indicating how often you have each of the following:

1 = Practically never 2 = Infrequently 3 = Sometimes 4 = Fairly often 5 = Very often

a. Cough up blood (MC)
1 2 3 4 5
b. Abdominal pain (MC)
1 2 3 4 5
c. Low back pain (SLA)
1 2 3 4 5
d. Leg pain (MC)
1 2 3 4 5
e. Arm or shoulder pain (MC)
1 2 3 4 5
f. Chest pain (RF) (MC)
1 2 3 4 5
g. Swollen joints (MC)
1 2 3 4 5
h. Feel faint (MC)
1 2 3 4 5
I. Dizziness (MC)
1 2 3 4 5
j. Breathless with slight exertion (MC)
1 2 3 4 5

Part 3. Health-related behavior

13. (RF) Do you now smoke? Yes No

14. If you are a smoker, indicate number smoked per day:

Cigarettes:	40 or more	20-39	10-19	1-9
Cigars or pipes only:	5 or more or any inhaled		Less than 5, none inhaled	

15. Weight now: ________lb. One year ago: ________lb.. Age 21: ________lb.

16. Thinking about the things you do at work, how would you rate yourself as to the amount of physical activity you get compared with others of your age and sex?

1. Much more active
2. Somewhat more active
3. About the same
4. Somewhat less active
5. Much less active
6. Not applicable

17. Now, thinking about the things you do outside of work, how would you rate yourself as to the amount of physical activity you get compared with others of your age and sex?

1. Much more active
2. Somewhat more active
3. About the same
4. Somewhat less active
5. Much less active
6. Not applicable

18. Do you regularly engage in strenuous exercise or hard physical labor?

1. Yes (answer question # 19) 2. No (stop)

19. Do you exercise or labor at least three times a week?

1. Yes 2. No

BONE DENSITY LABORATORY
DEPT. OF HEALTH AND SPORT SCIENCES UNIVERSITY OF OKLAHOMA

CALCIUM INTAKE ESTIMATION

NAME:____________________________ TODAY'S DATE:______________

Complete this form (where indicated) to represent your dietary intake in the past year.

				I EAT THIS FOOD: EVERY WEEK	EVERY DAY
Tally (*office use only*)	Score (*office use only*)	Food Type	serving size	write in # servings/week	write in # servings/day
	300	Milk- whole, 2%, skim	1 cup		
	150	Cheese food or spread	1 oz		
	150	Cheese sauce	1/4 cup		
	150	American cheese	1 slice		
	150	Cottage cheese	1 cup		
	250	Ricotta cheese	1 oz		
	150	Blue cheese	½ cup		
	200	Natural cheese (except cream cheese) includes cheddar, Swiss, mozzarella, and so forth	1 oz		
	285	Buttermilk	1 cup		
	300	Yogurt, flavored or plain	1 cup		
	450	Fast Food Milkshake	12 oz		
	165	Cocoa from mix	1 packet		
	330	Eggnog	1 cup		
	280	Chocolate milk	1 cup		
	250	Macaroni and cheese, cheese souffle, lasagna, quiche, cannelloni, pizza	1 serving		
	180	Cream soup or chowder with milk	1 cup		
	115	Almonds	1/3 cup		
	180	Broccoli	1 cup		
	85	Beet greens, spinach	½ cup		
	160	Baked beans	1 cup		
	100	Figs	5 dried		
	140	Scalloped potatoes	1 cup		
	150	Soybeans	1 cup		
	150	Tofu	½ cup		

Tally *(office use only)*	Score *(office use only)*	Food Type	serving size	write in # servings/week	write in # servings/day
	30	Bread, white or whole grain	1 slice		
	120	Waffle or pancake	1 large		
	50	Muffin, biscuit, cornbread	1 medium		
	40	Rolls, buns	½		
	225	Egg McMuffin	1		
	130	Fast food cheeseburger or hamburger	1		
	110	Enchilada or bean burrito	1		
	125	Creamed fish and meats	1 cup		
	130	Shellfish, cooked	4 oz		
	200	Canned salmon with bones	½ cup		
	200	Sardines, smelts, herring	½ cup		
	100	Fudgesicle	1		
	125	Custard pie	1 slice		
	175	Ice cream or ice milk	1 cup		
	190	Pudding with milk	½ cup		
	200	Frozen yogurt	1 cup		

Please list any dietary supplements (single and multi-vitamins, calcium, herbal etc.) you take below, including the brand name and amount (mg).

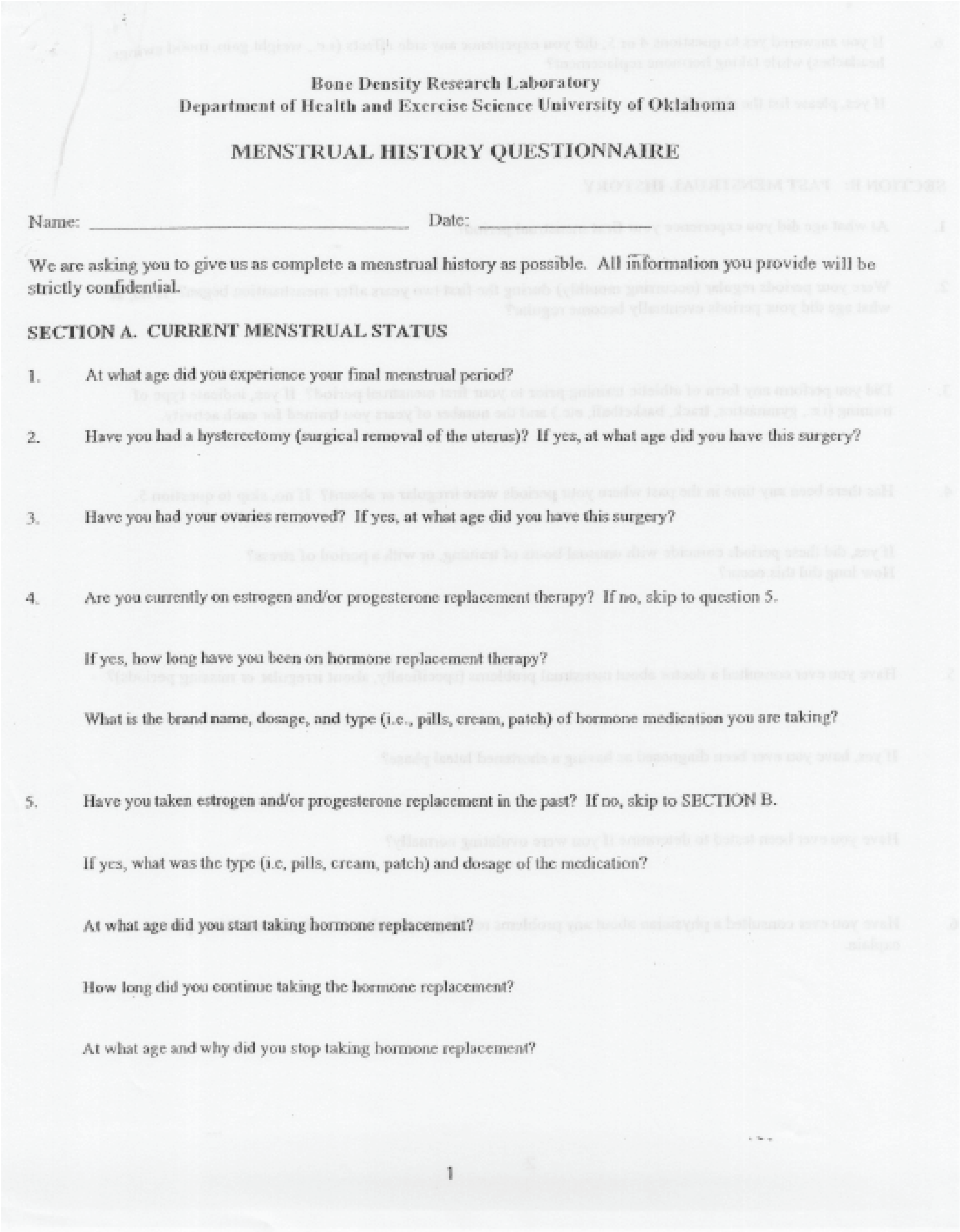
1. ______________________________

2. ______________________________

3. ______________________________

4. ______________________________

5. ______________________________



Bone Density Research Laboratory
Department of Health and Exercise Science University of Oklahoma

MENSTRUAL HISTORY QUESTIONNAIRE

Name: ______________________ Date: ______________

We are asking you to give us as complete a menstrual history as possible. All information you provide will be strictly confidential.

SECTION A. CURRENT MENSTRUAL STATUS

1. At what age did you experience your final menstrual period?

2. Have you had a hysterectomy (surgical removal of the uterus)? If yes, at what age did you have this surgery?

3. Have you had your ovaries removed? If yes, at what age did you have this surgery?

4. Are you currently on estrogen and/or progesterone replacement therapy? If no, skip to question 5.

   If yes, how long have you been on hormone replacement therapy?

   What is the brand name, dosage, and type (i.e., pills, cream, patch) of hormone medication you are taking?

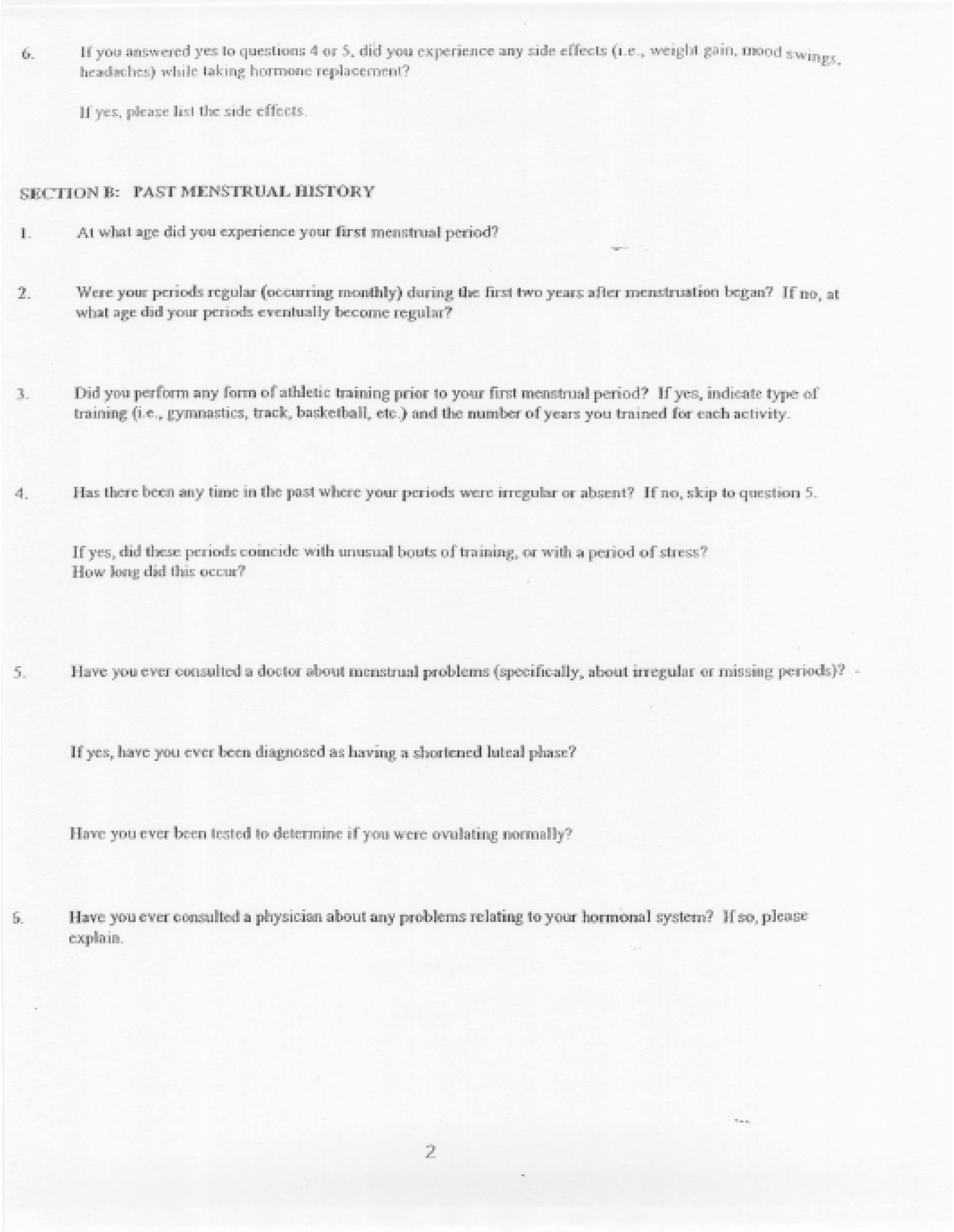
5. Have you taken estrogen and/or progesterone replacement in the past? If no, skip to SECTION B.

   If yes, what was the type (i.e, pills, cream, patch) and dosage of the medication?

   At what age did you start taking hormone replacement?

   How long did you continue taking the hormone replacement?

   At what age and why did you stop taking hormone replacement?



6. If you answered yes to questions 4 or 5, did you experience any side effects (i.e., weight gain, mood swings, headaches) while taking hormone replacement?

If yes, please list the side effects.

SECTION B: PAST MENSTRUAL HISTORY

1. At what age did you experience your first menstrual period?

2. Were your periods regular (occurring monthly) during the first two years after menstruation began? If no, at what age did your periods eventually become regular?

3. Did you perform any form of athletic training prior to your first menstrual period? If yes, indicate type of training (i.e., gymnastics, track, basketball, etc.) and the number of years you trained for each activity.

4. Has there been any time in the past where your periods were irregular or absent? If no, skip to question 5.

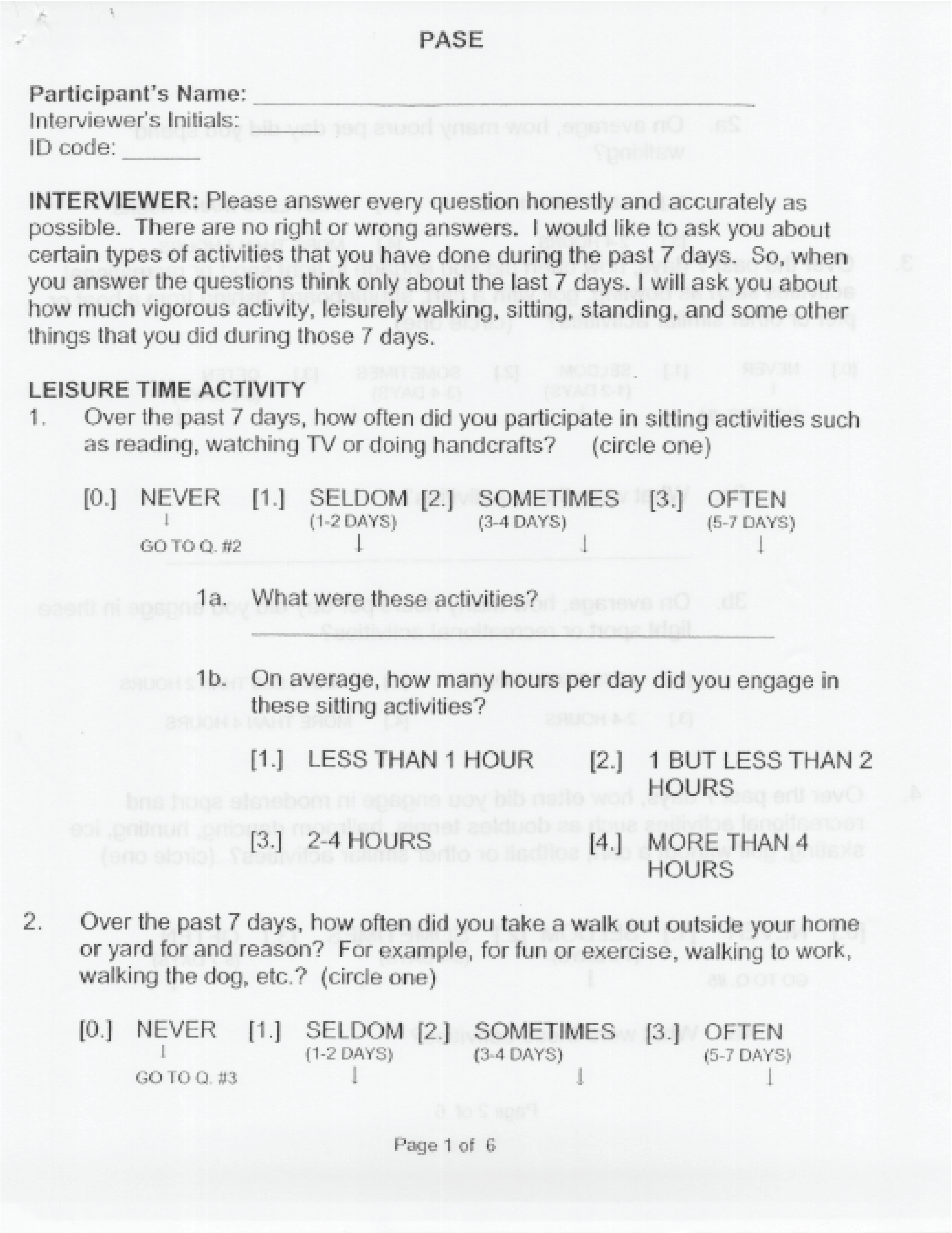
If yes, did these periods coincide with unusual bouts of training, or with a period of stress?
How long did this occur?

5. Have you ever consulted a doctor about menstrual problems (specifically, about irregular or missing periods)?

If yes, have you ever been diagnosed as having a shortened luteal phase?

Have you ever been tested to determine if you were ovulating normally?

6. Have you ever consulted a physician about any problems relating to your hormonal system? If so, please explain.



PASE

Participant's Name: ______________________________
Interviewer's Initials:
ID code: ______

INTERVIEWER: Please answer every question honestly and accurately as possible. There are no right or wrong answers. I would like to ask you about certain types of activities that you have done during the past 7 days. So, when you answer the questions think only about the last 7 days. I will ask you about how much vigorous activity, leisurely walking, sitting, standing, and some other things that you did during those 7 days.

LEISURE TIME ACTIVITY

1. Over the past 7 days, how often did you participate in sitting activities such as reading, watching TV or doing handcrafts? (circle one)

[0.] NEVER ↓ GO TO Q. #2   [1.] SELDOM (1-2 DAYS) ↓   [2.] SOMETIMES (3-4 DAYS) ↓   [3.] OFTEN (5-7 DAYS) ↓

1a. What were these activities?
____

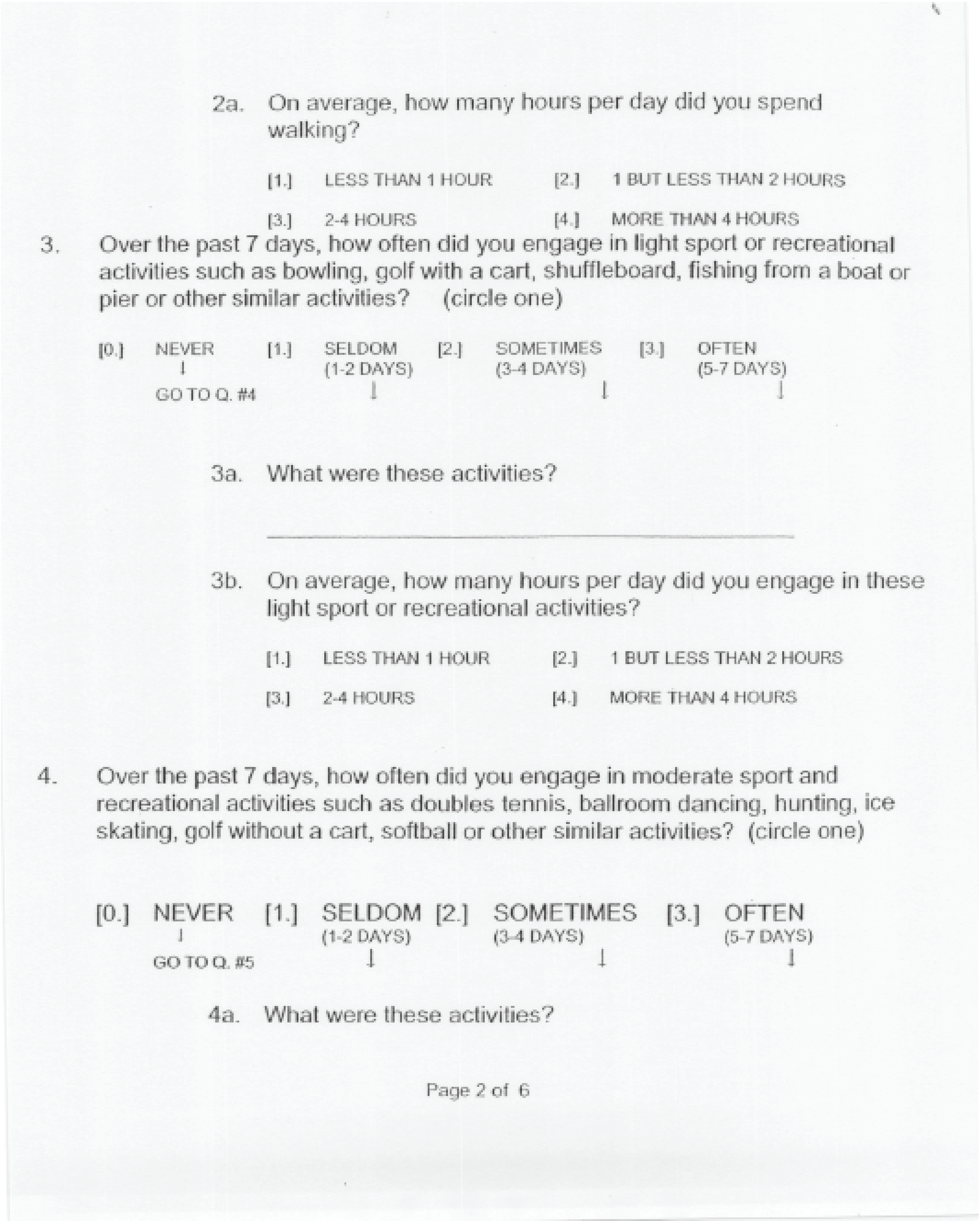
1b. On average, how many hours per day did you engage in these sitting activities?

[1.] LESS THAN 1 HOUR   [2.] 1 BUT LESS THAN 2 HOURS
[3.] 2-4 HOURS   [4.] MORE THAN 4 HOURS

2. Over the past 7 days, how often did you take a walk out outside your home or yard for and reason? For example, for fun or exercise, walking to work, walking the dog, etc.? (circle one)

[0.] NEVER ↓ GO TO Q. #3   [1.] SELDOM (1-2 DAYS) ↓   [2.] SOMETIMES (3-4 DAYS) ↓   [3.] OFTEN (5-7 DAYS) ↓

Page 1 of 6



2a. On average, how many hours per day did you spend walking?

[1.]	LESS THAN 1 HOUR	[2.]	1 BUT LESS THAN 2 HOURS
[3.]	2-4 HOURS	[4.]	MORE THAN 4 HOURS

3. Over the past 7 days, how often did you engage in light sport or recreational activities such as bowling, golf with a cart, shuffleboard, fishing from a boat or pier or other similar activities? (circle one)

[0.]	NEVER ↓ GO TO Q. #4	[1.]	SELDOM (1-2 DAYS) ↓	[2.]	SOMETIMES (3-4 DAYS) ↓	[3.]	OFTEN (5-7 DAYS) ↓

3a. What were these activities?

____

3b. On average, how many hours per day did you engage in these light sport or recreational activities?

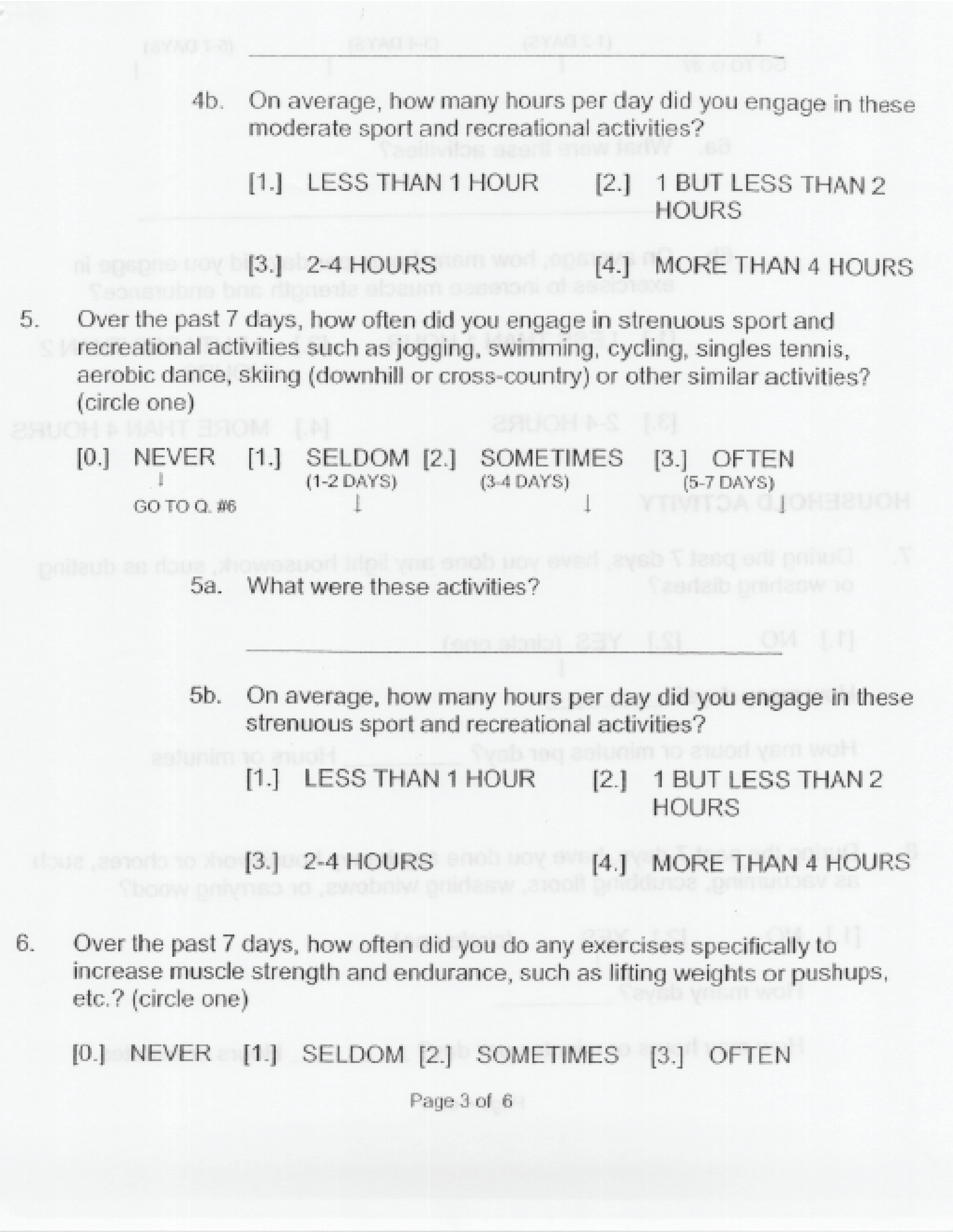
[1.]	LESS THAN 1 HOUR	[2.]	1 BUT LESS THAN 2 HOURS
[3.]	2-4 HOURS	[4.]	MORE THAN 4 HOURS

4. Over the past 7 days, how often did you engage in moderate sport and recreational activities such as doubles tennis, ballroom dancing, hunting, ice skating, golf without a cart, softball or other similar activities? (circle one)

[0.]	NEVER ↓ GO TO Q. #5	[1.]	SELDOM (1-2 DAYS) ↓	[2.]	SOMETIMES (3-4 DAYS) ↓	[3.]	OFTEN (5-7 DAYS) ↓

4a. What were these activities?

Page 2 of 6



4b. On average, how many hours per day did you engage in these moderate sport and recreational activities?

[1.] LESS THAN 1 HOUR [2.] 1 BUT LESS THAN 2 HOURS

[3.] 2-4 HOURS [4.] MORE THAN 4 HOURS

5. Over the past 7 days, how often did you engage in strenuous sport and recreational activities such as jogging, swimming, cycling, singles tennis, aerobic dance, skiing (downhill or cross-country) or other similar activities? (circle one)

[0.] NEVER [1.] SELDOM (1-2 DAYS) [2.] SOMETIMES (3-4 DAYS) [3.] OFTEN (5-7 DAYS)

↓ GO TO Q. #6 ↓ ↓ ↓

5a. What were these activities?

____

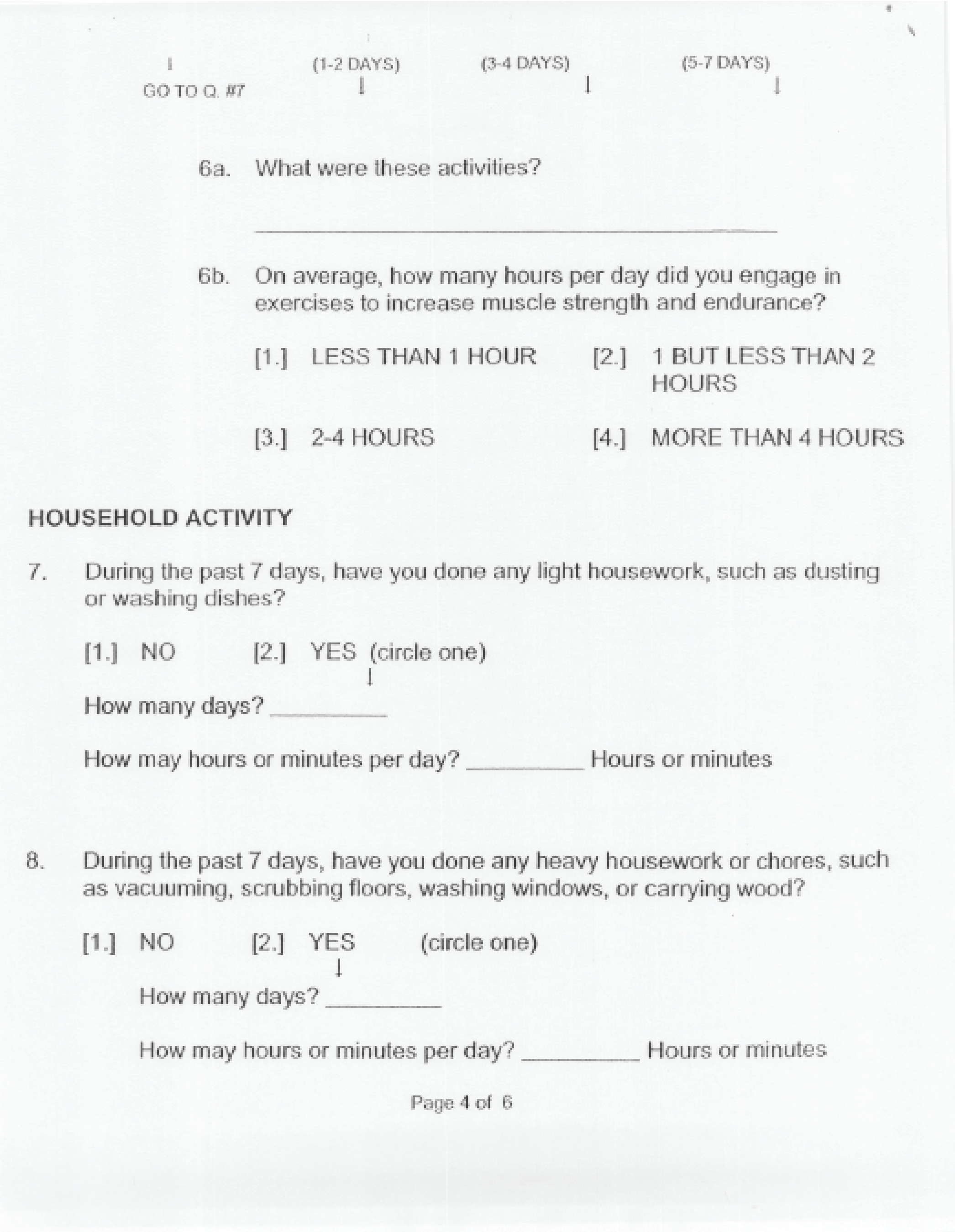
5b. On average, how many hours per day did you engage in these strenuous sport and recreational activities?

[1.] LESS THAN 1 HOUR [2.] 1 BUT LESS THAN 2 HOURS

[3.] 2-4 HOURS [4.] MORE THAN 4 HOURS

6. Over the past 7 days, how often did you do any exercises specifically to increase muscle strength and endurance, such as lifting weights or pushups, etc.? (circle one)

[0.] NEVER [1.] SELDOM [2.] SOMETIMES [3.] OFTEN



↓ (1-2 DAYS) (3-4 DAYS) (5-7 DAYS)
GO TO Q. #7 ↓ ↓ ↓

6a. What were these activities?

____

6b. On average, how many hours per day did you engage in exercises to increase muscle strength and endurance?

[1.] LESS THAN 1 HOUR
[2.] 1 BUT LESS THAN 2 HOURS
[3.] 2-4 HOURS
[4.] MORE THAN 4 HOURS

HOUSEHOLD ACTIVITY

7. During the past 7 days, have you done any light housework, such as dusting or washing dishes?

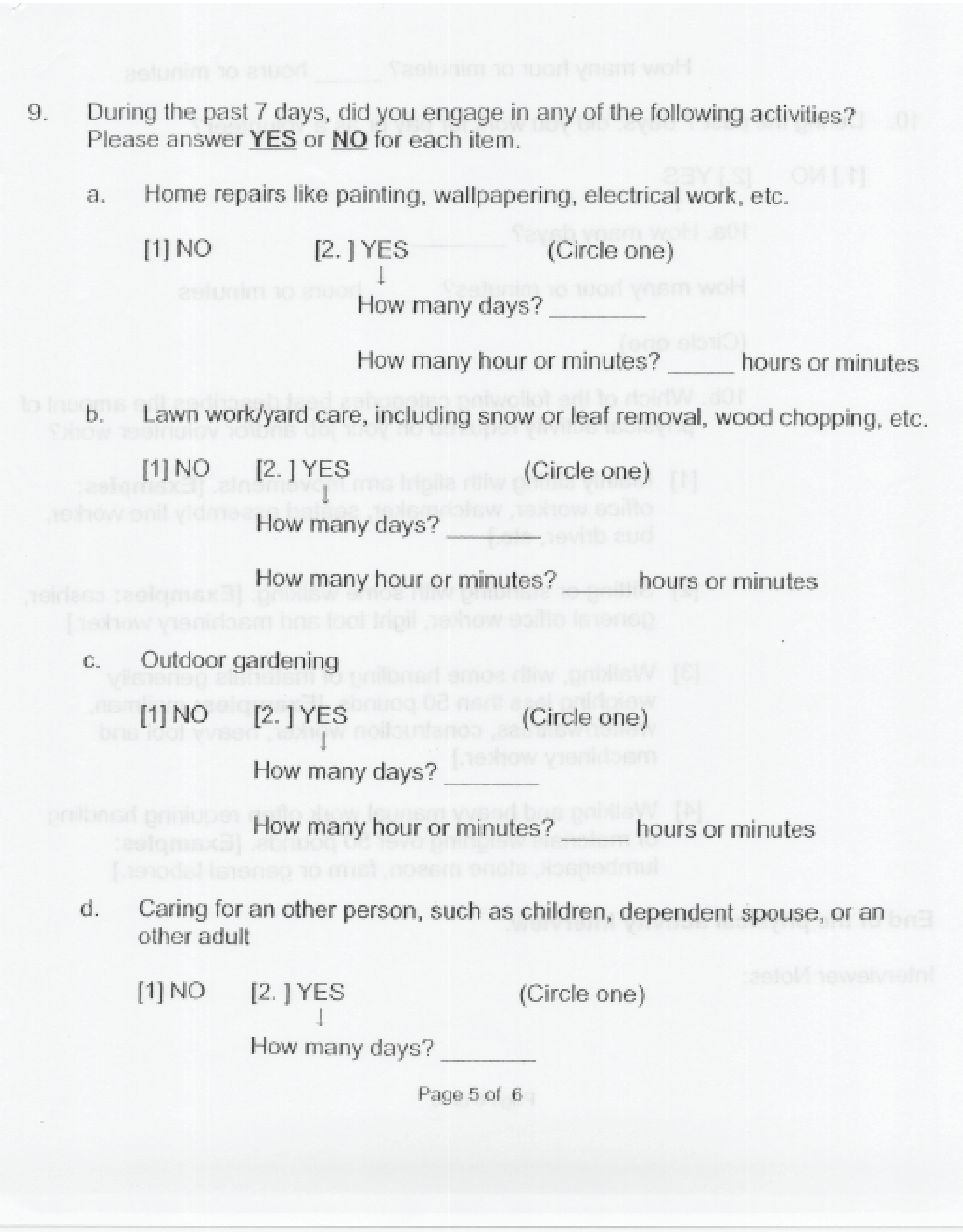
[1.] NO [2.] YES (circle one)
↓
How many days? _________

How may hours or minutes per day? _________ Hours or minutes

8. During the past 7 days, have you done any heavy housework or chores, such as vacuuming, scrubbing floors, washing windows, or carrying wood?

[1.] NO [2.] YES (circle one)
↓
How many days? _________

How may hours or minutes per day? _________ Hours or minutes



9. During the past 7 days, did you engage in any of the following activities? Please answer **YES** or **NO** for each item.

a. Home repairs like painting, wallpapering, electrical work, etc.

[1] NO [2.] YES (Circle one)

↓

How many days? ________

How many hour or minutes? _____ hours or minutes

b. Lawn work/yard care, including snow or leaf removal, wood chopping, etc.

[1] NO [2.] YES (Circle one)

↓

How many days? ________

How many hour or minutes? _____ hours or minutes

c. Outdoor gardening

[1] NO [2.] YES (Circle one)

↓

How many days? ________

How many hour or minutes? _____ hours or minutes

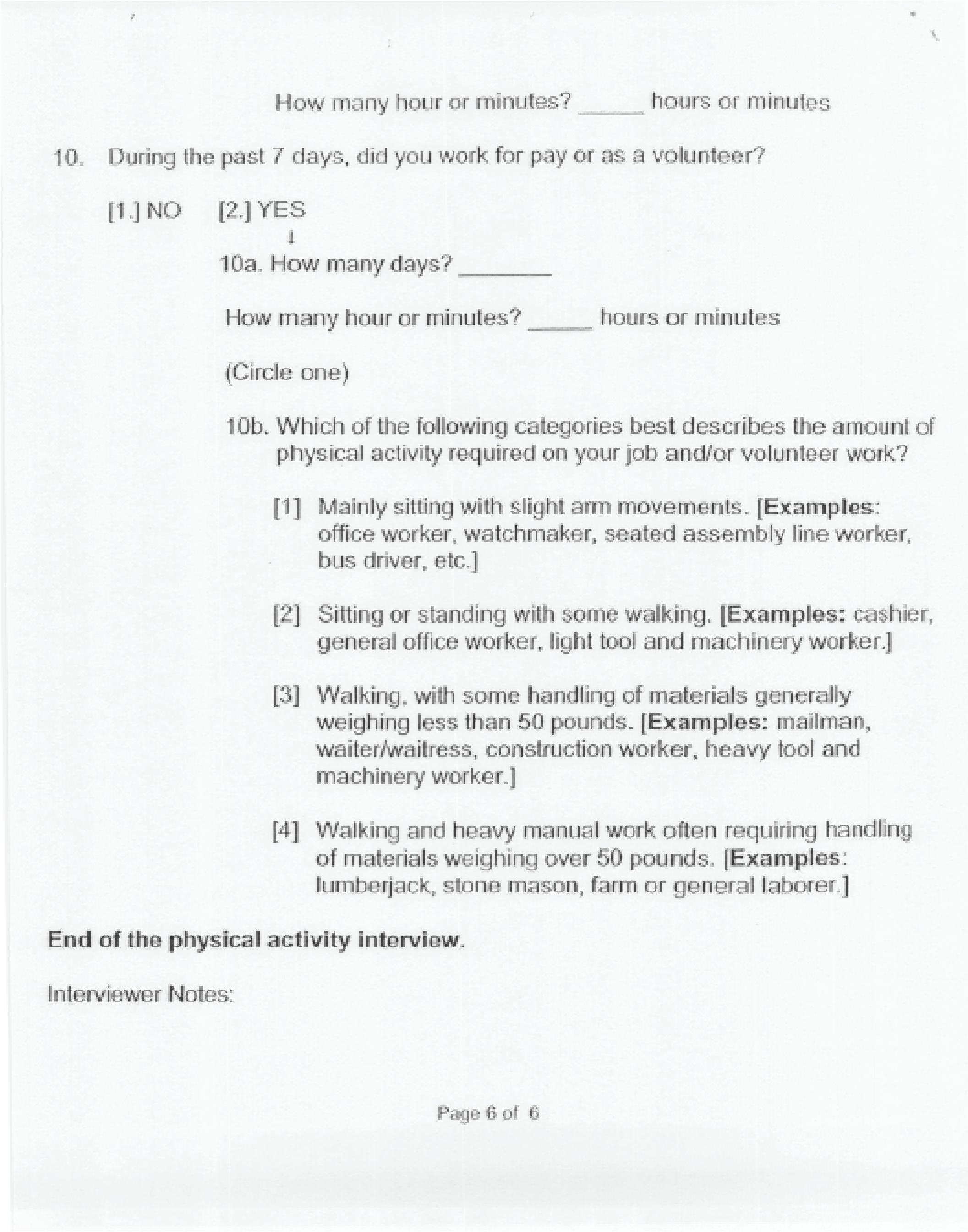
d. Caring for an other person, such as children, dependent spouse, or an other adult

[1] NO [2.] YES (Circle one)

↓

How many days? ________

Page 5 of 6



How many hour or minutes? _____ hours or minutes

10. During the past 7 days, did you work for pay or as a volunteer?

[1.] NO [2.] YES
↓
10a. How many days? _______

How many hour or minutes? _____ hours or minutes

(Circle one)

10b. Which of the following categories best describes the amount of physical activity required on your job and/or volunteer work?

[1] Mainly sitting with slight arm movements. [**Examples**: office worker, watchmaker, seated assembly line worker, bus driver, etc.]

[2] Sitting or standing with some walking. [**Examples:** cashier, general office worker, light tool and machinery worker.]

[3] Walking, with some handling of materials generally weighing less than 50 pounds. [**Examples:** mailman, waiter/waitress, construction worker, heavy tool and machinery worker.]

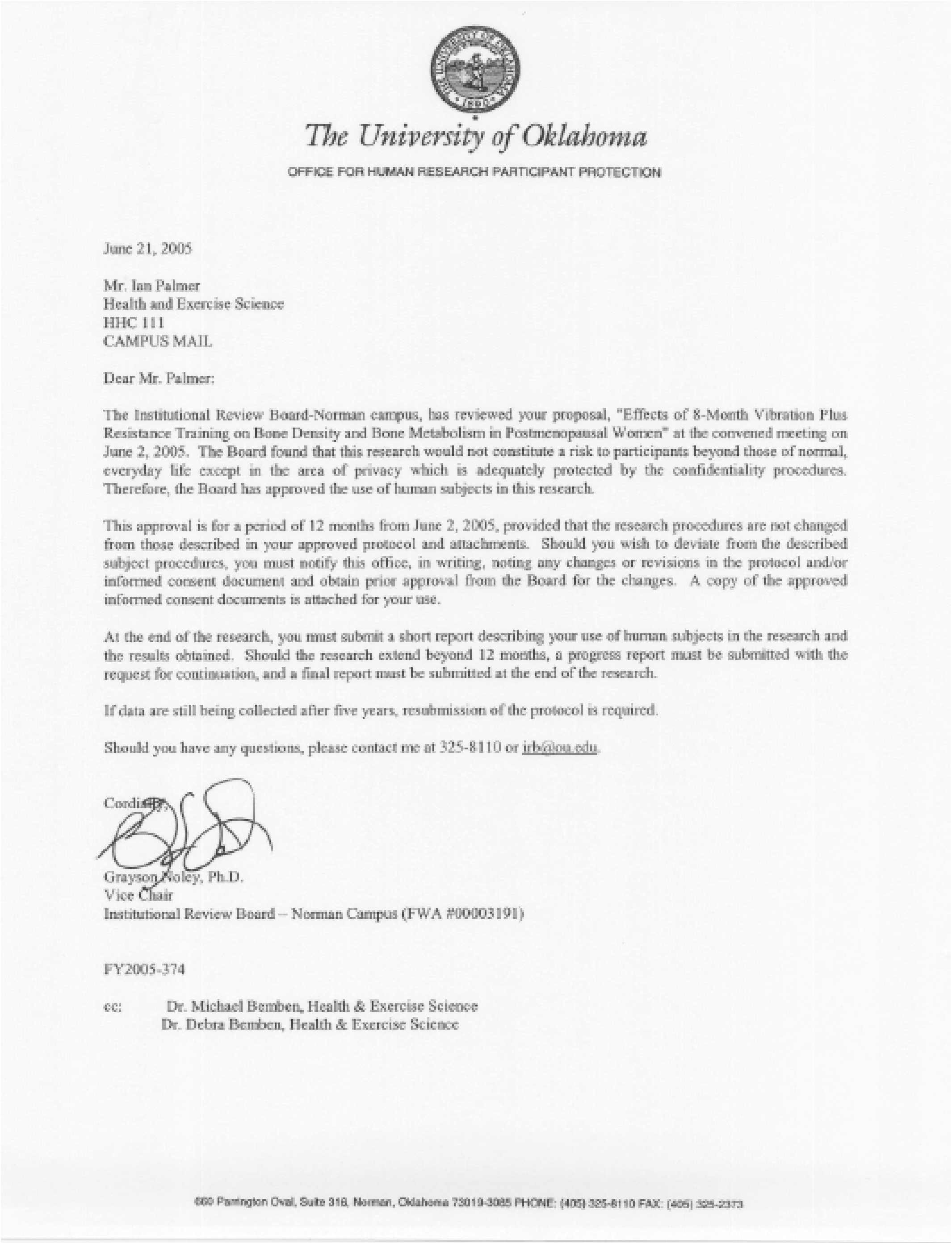
[4] Walking and heavy manual work often requiring handling of materials weighing over 50 pounds. [**Examples**: lumberjack, stone mason, farm or general laborer.]

End of the physical activity interview.

Interviewer Notes:

Appendix D.

IRB Approval Letter



The University of Oklahoma

OFFICE FOR HUMAN RESEARCH PARTICIPANT PROTECTION

June 21, 2005

Mr. Ian Palmer
Health and Exercise Science
HHC 111
CAMPUS MAIL

Dear Mr. Palmer:

The Institutional Review Board-Norman campus, has reviewed your proposal, "Effects of 8-Month Vibration Plus Resistance Training on Bone Density and Bone Metabolism in Postmenopausal Women" at the convened meeting on June 2, 2005. The Board found that this research would not constitute a risk to participants beyond those of normal, everyday life except in the area of privacy which is adequately protected by the confidentiality procedures. Therefore, the Board has approved the use of human subjects in this research.

This approval is for a period of 12 months from June 2, 2005, provided that the research procedures are not changed from those described in your approved protocol and attachments. Should you wish to deviate from the described subject procedures, you must notify this office, in writing, noting any changes or revisions in the protocol and/or informed consent document and obtain prior approval from the Board for the changes. A copy of the approved informed consent documents is attached for your use.

At the end of the research, you must submit a short report describing your use of human subjects in the research and the results obtained. Should the research extend beyond 12 months, a progress report must be submitted with the request for continuation, and a final report must be submitted at the end of the research.

If data are still being collected after five years, resubmission of the protocol is required.

Should you have any questions, please contact me at 325-8110 or irb@ou.edu.

Cordially,

Grayson Noley, Ph.D.
Vice Chair
Institutional Review Board – Norman Campus (FWA #00003191)

FY2005-374

cc: Dr. Michael Bemben, Health & Exercise Science
Dr. Debra Bemben, Health & Exercise Science

660 Parrington Oval, Suite 316, Norman, Oklahoma 73019-3085 PHONE: (405) 325-8110 FAX: (405) 325-2373

Appendix E.

Training Log, 1RM Log

Vibration Plus Resistance Training Sheet

Name: ______________________ **Week:** **30, 4/24 - 4/28**

		Monday			Wednesday			Friday		
		Record Actual Reps Completed			**Record Actual Reps Completed**			**Record Actual Reps Completed**		
VIBRATION Seated	Time: **60s**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Freq/Amp: **40**Hz/low	**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**	
Shoulder Press	Load: **5.50**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
Hip Abduction (left & right)	Load: **7.50**	Set 1	Set 2		Set 1	Set 2		Set 1	Set 2	
	Goal Reps: 10									
Hip Adduction (left & right)	Load: **9.50**	Set 1	Set 2		Set 1	Set 2		Set 1	Set 2	
	Goal Reps: 10									
Abdominals	Load: **Self Select**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
VIBRATION wrist	Time: **60s**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Freq/Amp: **40** Hz/low	**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**	
Wrist Curls	Load: **Self Select**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
Lat Pull Down	Load: **6.00**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
Low Row	Load: **6.50**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
VIBRATION squat	Time: **60s**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Freq/Amp: **40** Hz/low	**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**		**40 Hz/Low**	**40 Hz/Low**	
Leg Press	Load: **10.50**	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
	Goal Reps: 10									
Hip Flexion (left & right)	Load: **9.50**	Set 1	Set 2		Set 1	Set 2		Set 1	Set 2	
	Goal Reps: 10									
Hip Extension (left & right)	Load: **15.00**	Set 1	Set 2		Set 1	Set 2		Set 1	Set 2	
	Goal Reps: 10									

One Repetition Max Sheet

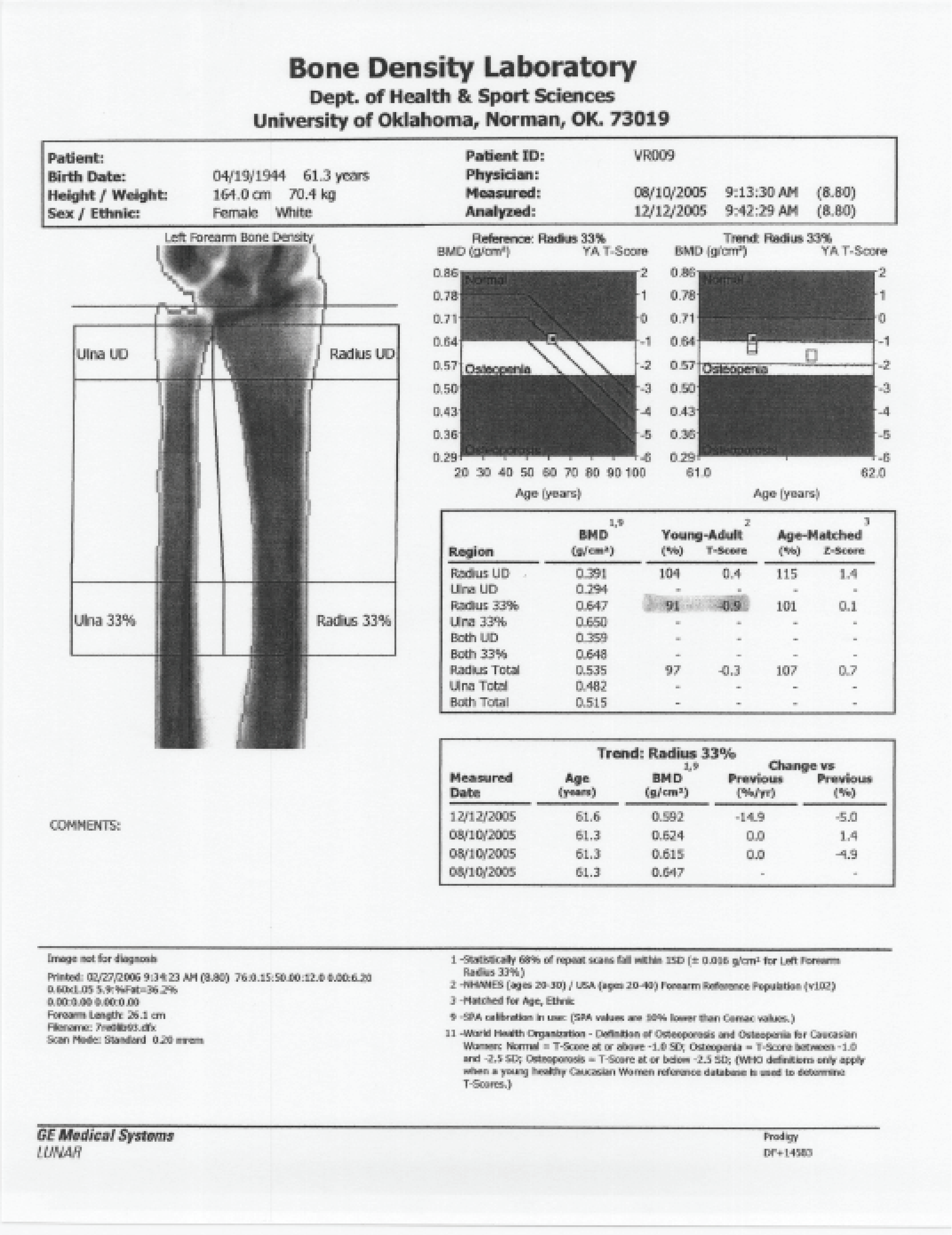
Name: ____________________ Week: 22

	Warm up	Max Load	x % Max =	New Work Load
Shoulder Press		7.5	0.8	6
Hip Abduction (right)		8.5	0.8	6.8
Hip Adduction (right)		12.5	0.8	10
Lat Pull Down		9.5	0.8	7.6
Low Row		8.5	0.8	6.8
Leg Press		10	0.8	8
Hip Flexion (right)		9.5	0.8	7.6
Hip Extension (right)		16.5	0.8	13.2
Heart Rate & Blood Pressure				

Comments:

Appendix F.

Sample DXA Scans



Bone Density Laboratory

Dept. of Health & Sport Sciences
University of Oklahoma, Norman, OK. 73019

Patient:		**Patient ID:**	VR009
Birth Date:	04/19/1944 61.3 years	**Physician:**	
Height / Weight:	164.0 cm 70.4 kg	**Measured:**	08/10/2005 9:13:30 AM (8.80)
Sex / Ethnic:	Female White	**Analyzed:**	12/12/2005 9:42:29 AM (8.80)

Region	BMD[1,9] (g/cm²)	Young-Adult[2] (%)	Young-Adult T-Score	Age-Matched[3] (%)	Age-Matched Z-Score
Radius UD	0.391	104	0.4	115	1.4
Ulna UD	0.294	-	-	-	-
Radius 33%	0.647	91	-0.9	101	0.1
Ulna 33%	0.650	-	-	-	-
Both UD	0.359	-	-	-	-
Both 33%	0.648	-	-	-	-
Radius Total	0.535	97	-0.3	107	0.7
Ulna Total	0.482	-	-	-	-
Both Total	0.515	-	-	-	-

Trend: Radius 33%

Measured Date	Age (years)	BMD[1,9] (g/cm²)	Change vs Previous (%/yr)	Change vs Previous (%)
12/12/2005	61.6	0.592	-14.9	-5.0
08/10/2005	61.3	0.624	0.0	1.4
08/10/2005	61.3	0.615	0.0	-4.9
08/10/2005	61.3	0.647	-	-

COMMENTS:

Image not for diagnosis

Printed: 02/27/2006 9:34:23 AM (8.80) 76:0.15:50.00:12.0 0.00:6.20
0.60x1.05 5.9:%Fat=36.2%
0.00:0.00 0.00:0.00
Forearm Length: 26.1 cm
Filename: 7re0lb93.dfx
Scan Mode: Standard 0.20 mrem

1 -Statistically 68% of repeat scans fall within 1SD (± 0.016 g/cm² for Left Forearm Radius 33%)

2 -NHANES (ages 20-30) / USA (ages 20-40) Forearm Reference Population (v102)

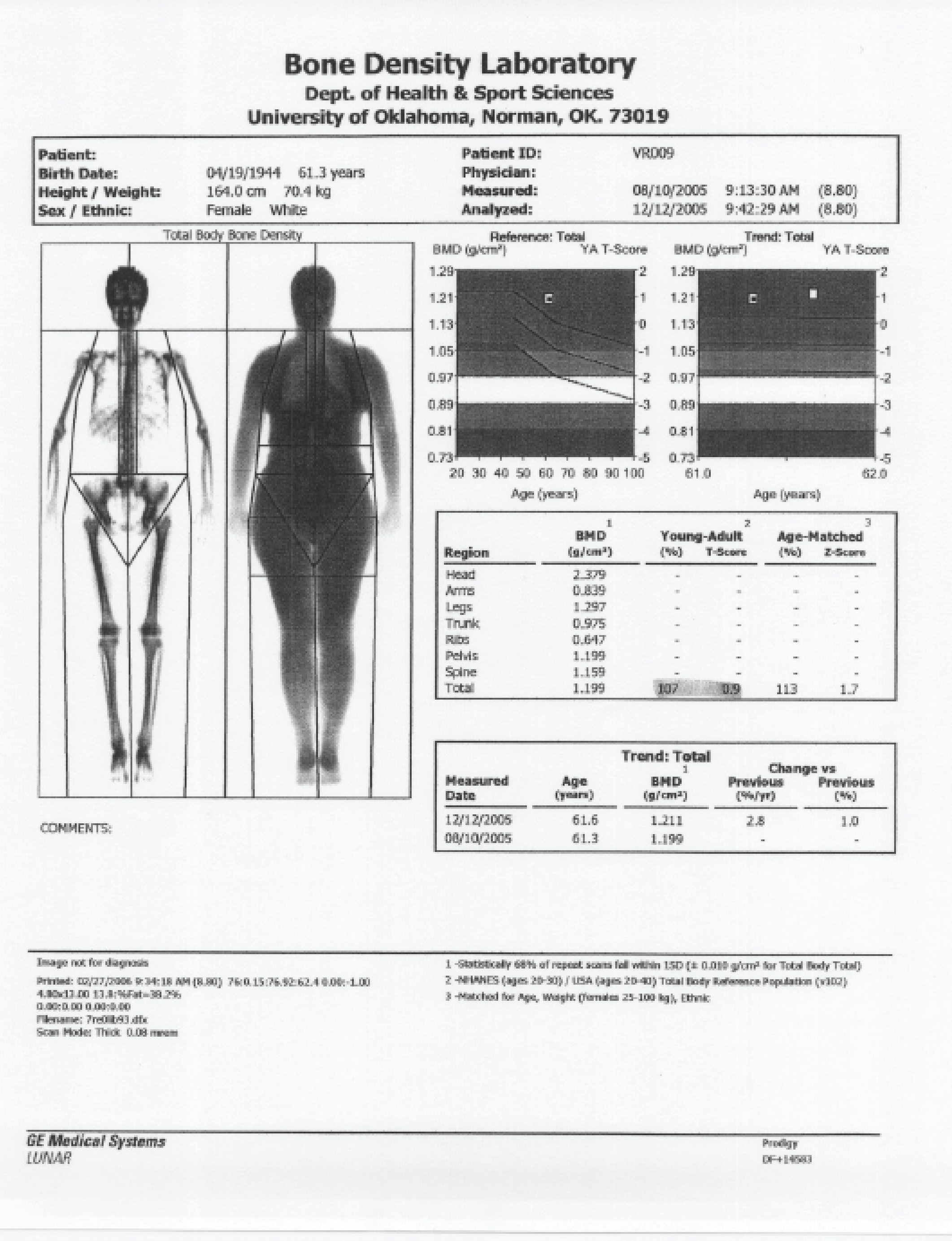
3 -Matched for Age, Ethnic

9 -SPA calibration in use: (SPA values are 10% lower than Cemac values.)

11 -World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-Score at or above -1.0 SD; Osteopenia = T-Score between -1.0 and -2.5 SD; Osteoporosis = T-Score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-Scores.)

GE Medical Systems
LUNAR

Prodigy
DF+14583



Bone Density Laboratory

Dept. of Health & Sport Sciences

University of Oklahoma, Norman, OK. 73019

Patient:		**Patient ID:**	VR009
Birth Date:	04/19/1944 61.3 years	**Physician:**	
Height / Weight:	164.0 cm 70.4 kg	**Measured:**	08/10/2005 9:13:30 AM (8.80)
Sex / Ethnic:	Female White	**Analyzed:**	12/12/2005 9:42:29 AM (8.80)

Total Body Bone Density

Region	BMD[1] (g/cm²)	Young-Adult[2] (%)	Young-Adult[2] T-Score	Age-Matched[3] (%)	Age-Matched[3] Z-Score
Head	2.379	-	-	-	-
Arms	0.839	-	-	-	-
Legs	1.297	-	-	-	-
Trunk	0.975	-	-	-	-
Ribs	0.647	-	-	-	-
Pelvis	1.199	-	-	-	-
Spine	1.159	-	-	-	-
Total	1.199	107	0.9	113	1.7

Trend: Total

Measured Date	Age (years)	BMD[1] (g/cm²)	Change vs Previous (%/yr)	Change vs Previous (%)
12/12/2005	61.6	1.211	2.8	1.0
08/10/2005	61.3	1.199	-	-

COMMENTS:

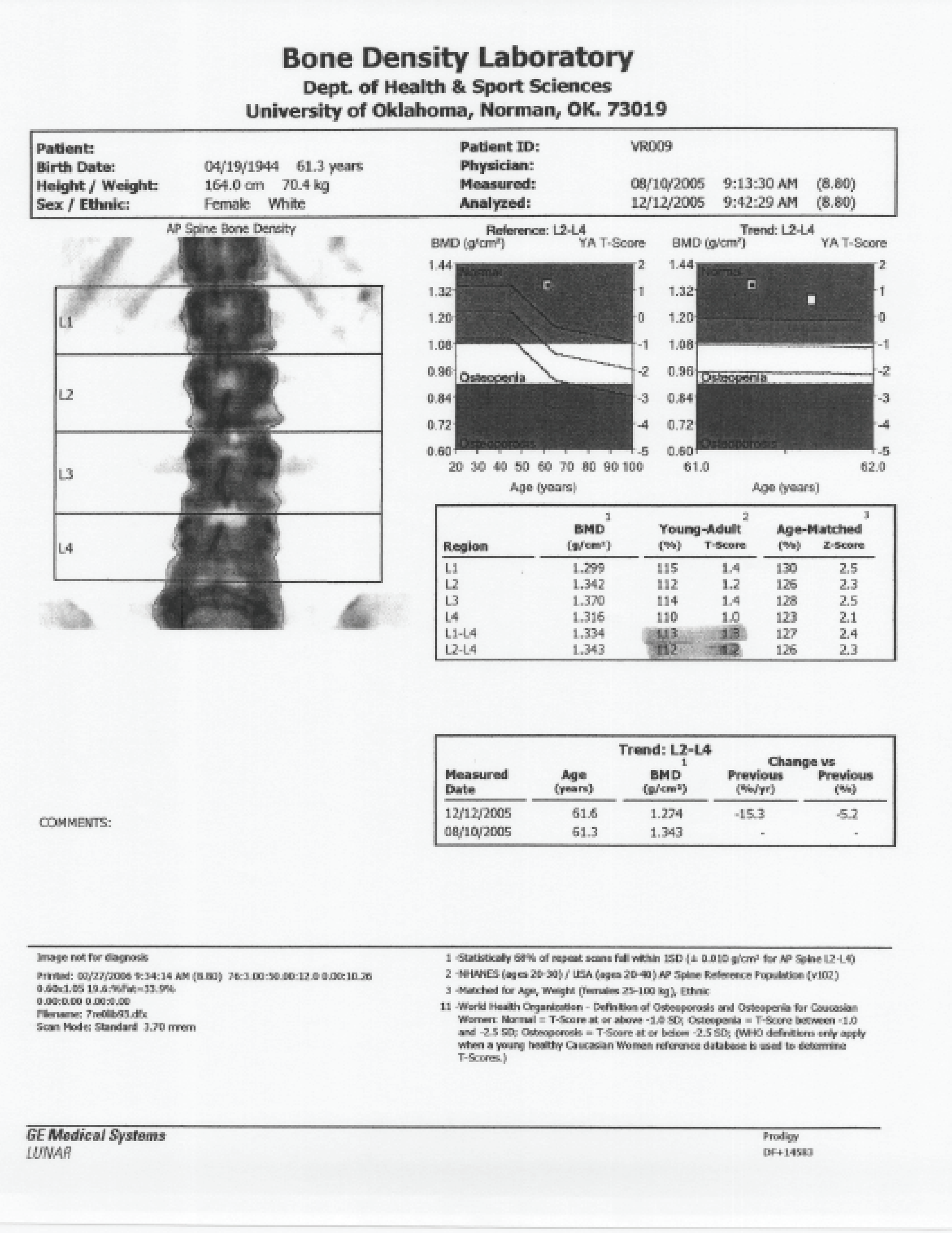
Image not for diagnosis

Printed: 02/27/2006 9:34:18 AM (8.80) 76:0.15:76.92:62.4 0.00:-1.00
4.80x13.00 13.8:%Fat=38.2%
0.00:0.00 0.00:0.00
Filename: 7re0llb93.dfx
Scan Mode: Thick 0.08 mrem

1 -Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for Total Body Total)
2 -NHANES (ages 20-30) / USA (ages 20-40) Total Body Reference Population (v102)
3 -Matched for Age, Weight (females 25-100 kg), Ethnic

GE Medical Systems
LUNAR

Prodigy
DF+14583



Bone Density Laboratory

Dept. of Health & Sport Sciences

University of Oklahoma, Norman, OK. 73019

Patient:		**Patient ID:**	VR009
Birth Date:	04/19/1944 61.3 years	**Physician:**	
Height / Weight:	164.0 cm 70.4 kg	**Measured:**	08/10/2005 9:13:30 AM (8.80)
Sex / Ethnic:	Female White	**Analyzed:**	12/12/2005 9:42:29 AM (8.80)

Region	BMD[1] (g/cm²)	Young-Adult[2] (%)	Young-Adult T-Score	Age-Matched[3] (%)	Age-Matched Z-Score
L1	1.299	115	1.4	130	2.5
L2	1.342	112	1.2	126	2.3
L3	1.370	114	1.4	128	2.5
L4	1.316	110	1.0	123	2.1
L1-L4	1.334	113	1.3	127	2.4
L2-L4	1.343	112	1.2	126	2.3

COMMENTS:

Trend: L2-L4

Measured Date	Age (years)	BMD[1] (g/cm²)	Change vs Previous (%/yr)	Change vs Previous (%)
12/12/2005	61.6	1.274	-15.3	-5.2
08/10/2005	61.3	1.343	-	-

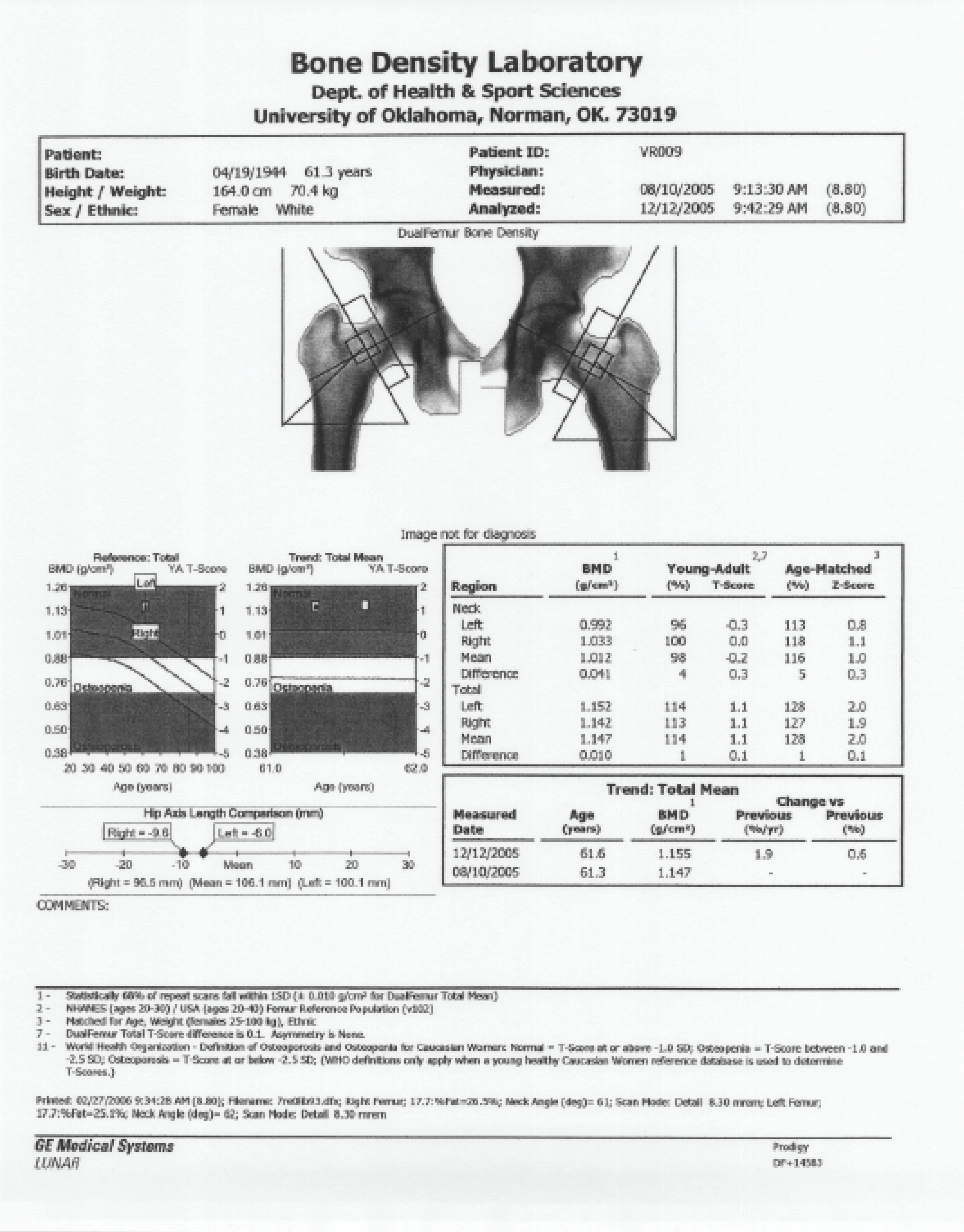
Image not for diagnosis

Printed: 03/27/2006 9:34:14 AM (8.80) 76:3.00:50.00:12.0 0.00:10.26
0.60x1.05 19.6:%Fat=33.9%
0.00:0.00 0.00:0.00
Filename: 7re0lb93.dfx
Scan Mode: Standard 3.70 mrem

1 -Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for AP Spine L2-L4)
2 -NHANES (ages 20-30) / USA (ages 20-40) AP Spine Reference Population (v102)
3 -Matched for Age, Weight (females 25-100 kg), Ethnic
11 -World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-Score at or above -1.0 SD; Osteopenia = T-Score between -1.0 and -2.5 SD; Osteoporosis = T-Score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-Scores.)

GE Medical Systems
LUNAR

Prodigy
DF+14583



Bone Density Laboratory

Dept. of Health & Sport Sciences

University of Oklahoma, Norman, OK. 73019

Patient:		**Patient ID:**	VR009
Birth Date:	04/19/1944 61.3 years	**Physician:**	
Height / Weight:	164.0 cm 70.4 kg	**Measured:**	08/10/2005 9:13:30 AM (8.80)
Sex / Ethnic:	Female White	**Analyzed:**	12/12/2005 9:42:29 AM (8.80)

(Right = 96.5 mm) (Mean = 106.1 mm) (Left = 100.1 mm)

Region	**BMD**[1] (g/cm²)	**Young-Adult**[2,7] (%)	T-Score	**Age-Matched**[3] (%)	Z-Score
Neck					
Left	0.992	96	-0.3	113	0.8
Right	1.033	100	0.0	118	1.1
Mean	1.012	98	-0.2	116	1.0
Difference	0.041	4	0.3	5	0.3
Total					
Left	1.152	114	1.1	128	2.0
Right	1.142	113	1.1	127	1.9
Mean	1.147	114	1.1	128	2.0
Difference	0.010	1	0.1	1	0.1

Trend: Total Mean

Measured Date	**Age** (years)	**BMD**[1] (g/cm²)	**Change vs Previous** (%/yr)	**Change vs Previous** (%)
12/12/2005	61.6	1.155	1.9	0.6
08/10/2005	61.3	1.147	-	-

COMMENTS:

---

1 - Statistically 68% of repeat scans fall within 1SD (± 0.010 g/cm² for DualFemur Total Mean)
2 - NHANES (ages 20-30) / USA (ages 20-40) Femur Reference Population (v102)
3 - Matched for Age, Weight (females 25-100 kg), Ethnic
7 - DualFemur Total T-Score difference is 0.1. Asymmetry is None.
11 - World Health Organization - Definition of Osteoporosis and Osteopenia for Caucasian Women: Normal = T-Score at or above -1.0 SD; Osteopenia = T-Score between -1.0 and -2.5 SD; Osteoporosis = T-Score at or below -2.5 SD; (WHO definitions only apply when a young healthy Caucasian Women reference database is used to determine T-Scores.)

Printed: 02/27/2006 9:34:28 AM (8.80); Filename: [illegible]; Right Femur; 17.7:%Fat=26.5%; Neck Angle (deg)= 61; Scan Mode: Detail 8.30 mrem; Left Femur; 17.7:%Fat=25.1%; Neck Angle (deg)= 62; Scan Mode: Detail 8.30 mrem

GE Medical Systems
LUNAR

Prodigy
DF+14583

Appendix G.

Metra BAP Instructions, Serum Crosslaps Instructions

QUICK GUIDE TO ASSAY STEPS

1. Add 125 µL Assay Buffer.
2. Add 20 µL Standards, Controls, and samples; swirl.
3. Incubate 3 hours ± 10 minutes at 20–28°C.
4. Wash 4 times with 1X Wash Buffer.
5. Add 150 µL 20–28°C Working Substrate Solution.
6. Incubate 30 ± 5 minutes at 20–28°C.
7. Add 100 µL Stop Solution and read optical density at 405 nm.

INTENDED USE

The Metra™ BAP immunoassay provides a quantitative measure of bone-specific alkaline phosphatase (BAP) activity in serum as an indicator of osteoblastic activity. Measurement of BAP is intended for use as an aid in the:

- management of postmenopausal osteoporosis and Paget's disease;
- monitoring of postmenopausal women on hormonal or bisphosphonate therapy;
- prediction of skeletal response to hormonal therapy in postmenopausal women.

SUMMARY AND EXPLANATION

The skeletal, or bone-specific, isoform of alkaline phosphatase is a tetrameric glycoprotein found on the cell surface of osteoblasts.[1] Osteoblasts are the cells responsible for synthesis of new bone matrix and its mineralization. The function of BAP has not been fully elucidated, though its role in skeletal mineralization has been confirmed.[1,2,3]

Bone is constantly undergoing a metabolic process called remodeling.[3,4] This includes a degradation process, bone resorption, mediated by the action of osteoclasts, and a building process, bone formation, mediated by the action of osteoblasts.[3,4] Remodeling is required for the maintenance and overall health of bone and is tightly coupled; that is, resorption and formation are in balance.[3,4] In abnormal states of bone metabolism this process becomes uncoupled and, when resorption exceeds formation, this results in a net loss of bone which can lead to osteoporosis,[3,4] or to the disordered bone tissue of pagetic lesions.[5] The measurement of specific biochemical markers of these remodeling events provides analytical data regarding the rate of bone metabolism or "turnover".[3,4]

Osteoporosis is a metabolic bone disease characterized by abnormal bone remodeling. It is a systemic skeletal disease characterized by low bone mass and microarchitectural deterioration of bone tissue, with a consequent increase in susceptibility to fractures.[6] The most common type of osteoporosis occurs in postmenopausal women as a result of the estrogen deficiency produced by the cessation of ovarian function.[3] Restoration of premenopausal estrogen levels by replacement therapy prevents bone loss and osteoporosis.[3,6] Estrogens and a class of compounds known as bisphosphonates are antiresorptive therapies which can be used to prevent bone loss or treat osteoporosis.[3,6,7]

Osteoporosis can also result from attaining an inadequate peak bone mass during the growing years, an age-related imbalance of bone remodeling with a net excess of resorption, and a number of clinical conditions and therapies which induce bone loss or bone remodeling imbalances.[3] These include endocrine diseases such as hypogonadism, hyperthyroidism, hyperparathyroidism, and hypercortisolism; renal failure; cancers metastatic to bone; gastrointestinal diseases related to nutrition and mineral metabolism; connective tissue diseases; multiple myeloma; chronic immobilization, alcoholism, or tobacco use; and chronic therapy with heparin or corticosteroids.[3]

Paget's disease of bone is a focal disorder resulting in pain and skeletal deformity in symptomatic patients.[5] Pagetic lesions are characterized by bone matrix of highly abnormal structure arising from excessive rates of remodeling activity. The lesions occur predominantly in the skull, spine, pelvis and long bones, and can result in fractures and neurological impairment.[5] The etiology of Paget's disease is unknown but hypotheses involving genetic and viral factors are compelling.[5] Bisphosphonates and calcitonin are currently used to suppress the high rate of biochemical activity to normal levels, enabling restoration of normal bone structure.[5]

As a quantitative measure of a marker of bone turnover, BAP provides useful information on bone remodeling in osteoporosis and Paget's disease, and changes in disease activity produced by antiresorptive therapy.[8-9] For the Metra™ BAP assay, antibody technology was employed to produce a monoclonal antibody that demonstrates specificity for BAP.[10] The specificity of the monoclonal antibody used in the assay allows for simple, convenient, reproducible and direct quantitation of BAP activity in serum.

PRINCIPLE OF THE PROCEDURE

Metra BAP is an immunoassay in a microtiter strip format utilizing a monoclonal anti-BAP antibody coated on the strip to capture BAP in the sample. The enzyme activity of the captured BAP is detected with a pNPP substrate.

REAGENTS AND MATERIALS PROVIDED

96 Assays for Bone-specific Alkaline Phosphatase

Metra BAP EIA contains the following:

A B C D E F	**BAP Standards A - F** (A = 0, B = 2, C = 20, D = 50, E = 80, F = 140 U/L BAP) BAP purified from osteosarcoma SAOS-2 cells in a buffered solution containing magnesium chloride, zinc sulfate, surfactant, carrier protein, blue dye, and sodium azide (0.05%) as a preservative.	**Parts 4395 through 4400**	**0.3 mL each**
L H	**Low/High Controls** BAP purified from osteosarcoma SAOS-2 cells in a buffered solution containing magnesium chloride, zinc sulfate, surfactant, carrier protein, blue dye, and sodium azide (0.05%) as a preservative.	**Parts 4401, 4402**	**0.3 mL each**

❶ **Coated Strips** Purified murine monoclonal Anti-BAP IgG antibody adsorbed onto stripwells.	**Part 4660**	**12 each**
❷ **Stop Solution** 0.5N NaOH	**Part 4702**	**15 mL**
❸ **10X Wash Buffer** Nonionic detergent in a buffered solution containing sodium azide (0.05%) as a preservative.	**Part 4703**	**55 mL**
❹ **Assay Buffer** A buffered solution containing magnesium chloride, zinc sulfate, surfactant, and sodium azide (0.05%) as a preservative.	**Part 4403**	**27 mL**
❺ **Substrate Buffer** A 2-amino-2-methyl-1-propanol solution containing HEDTA, magnesium chloride, zinc sulfate, and sodium azide (0.05%) as a preservative.	**Part 4404**	**3 x 10 mL**
❻ **Substrate Tablets** p-Nitrophenyl phosphate	**Part 0012**	**3 x 20 mg**

MATERIALS REQUIRED BUT NOT PROVIDED

Micropipettes to deliver 20 µL and 100–300 µL

Items suitable for liquid measurement of 100–300 mL

Container for wash buffer dilution

Deionized or distilled water

Plate reader capable of Optical Density readings at $A_{405} > 2.0$

Quadratic calibration curve fitting software

WARNINGS AND PRECAUTIONS

1. For *In Vitro* Diagnostic Use.
2. Treat specimen samples as potentially biohazardous material. Follow Universal Precautions when handling contents of this kit and any patient samples.
3. Dispose of containers and unused contents in accordance with Federal, State and Local regulatory requirements.
4. Use the supplied reagents as an integral unit prior to the expiration date indicated on the package label.
5. Store assay reagents as indicated.
6. Do not use Coated Strips if pouch is punctured.
7. Test each sample in duplicate.
8. 0.5N NaOH is considered corrosive and can cause severe burns. Do not ingest. Avoid contact with skin, eyes or clothing. If contact is made, wash with water. If ingested, call a physician.
9. Sodium azide is used as a preservative. Incidental contact with or ingestion of buffers containing sodium azide may cause irritation to the skin, eyes, or mouth. Only use buffers for intended purposes and avoid contact with acids. Sodium azide may react with lead and copper plumbing to form highly explosive metal azides. Upon disposal, flush with a large volume of water to prevent azide build-up.
10. The substrate buffer contains 2-amino-2-methyl-1-propanol and may cause irritation to the eyes and/or skin with prolonged contact. Wear suitable protective clothing, gloves, and eye/face protection. Contacted areas should be immediately washed with soap and water.
11. Use of multichannel pipets or repeat pipetors is recommended to ensure timely delivery of reagents.
12. For accurate measurement of samples, add samples and standards precisely. Pipet carefully using only calibrated equipment.
13. Dilute samples greater than 140 U/L in Assay Buffer and retest. Include the dilution factor in the final calculation.
14. This assay may be performed with any validated washing method.

REAGENT PREPARATION

Bring reagents and materials for the assay to 20–28°C before use. After removing the needed reagents and materials, return unused items to 2–8°C.

Coated Strips

Remove Stripwell Frame and the required number of Coated Strips from the pouch (See table in *ASSAY PROCEDURE* Section). Ensure that the pouch containing any unused strips is completely resealed.

Wash Buffer

Prepare required amount of 1X Wash Buffer (see table) by diluting 10X Wash Buffer concentrate 1:10 with deionized water. Store at 20–28°C. Use 1X Wash Buffer within 21 days of preparation.

Working Substrate Solution

Prepare Working Substrate Solution within 1 hour of use. Put one Substrate Tablet into each required bottle of 20–28°C Substrate Buffer (see table). Allow 30-60 minutes for tablet(s) to dissolve. Vigorously shake bottle(s) to completely mix. Discard remaining Working Substrate Solution after use.

STORAGE

Store kit at 2–8°C. Do not freeze. Store unused reagents at 2–8°C. Equilibrate reagents to 20–28°C before use. Store 1X Wash Buffer (10X diluted) at 20–28°C.

SPECIMEN COLLECTION AND STORAGE

Collect serum using standard venipuncture technique. Specimens should be collected without anticoagulants and in such a way to avoid hemolysis. Allow the blood to clot and separate the serum by centrifugation. Serum can be stored for 5 days at 2–8°C, at ≤ -40°C for 12 months, or at ≤ -80°C for 36 months. Do not subject samples to more than 3 freeze/thaw cycles.

"Off the clot" serum, serum separator tube serum, Na heparin plasma, and Li heparin plasma yield substantially equivalent results. It is recommended that plasma samples not be prepared using chelating agents such as EDTA or citrate.

ASSAY PROCEDURE

Read entire product insert before beginning the assay.

See REAGENT PREPARATION before proceeding.

Determine amount of each reagent required for the number of strips to be used.

# of Strips	4	6	8	12
# of Samples (tested in duplicate)	8	16	24	40
Substrate (bottle)	1	1	2*	2*
1X Wash Buffer (mL)	100	150	200	300

*When more than one bottle or vial is to be used, combine the contents and mix prior to use.

Sample Incubation

1. Remove Stripwell Frame and the required number of Coated Strips from the pouch (see table) just prior to use. Ensure that the foil pouch containing any unused strips is completely resealed.
2. Place desired number of Coated Strips in the Stripwell Frame. Label strips to prevent mix-up in case of accidental removal from Stripwell Frame.
3. Add 125 µL Assay Buffer to each well.
4. Add 20 µL of Standard, Control or sample to each well. **Do not** mix with Assay Buffer by repeat pipetting. This step should be completed within 30 minutes. **Gently swirl strips to ensure mixing of sample and buffer.**
5. Incubate for 3 hours (± 10 minutes) at 20–28°C.
6. Prepare Working Substrate Solution within 1 hour of use. Put one Substrate Tablet into each required bottle of 20–28°C Substrate Buffer (see table). Allow 30–60 minutes for tablet(s) to dissolve. Vigorously shake bottle(s) to completely mix.

Washing Step

7. Prepare required amount of 1X Wash Buffer (see table) by diluting 10X Wash Buffer 1:10 with deionized water. Store at 20–28°C. Use 1X Wash Buffer within 21 days of preparation.
8. Manually invert/empty strips. Add at least 250 µL of 1X Wash Buffer to each well and manually invert/empty strips. Repeat three more times for a total of four washes. Vigorously blot the strips dry on paper towels after the last wash.

Substrate Incubation

9. Add 150 µL of Working Substrate Solution to each well. Discard remaining Working Substrate Solution after use.
10. Incubate for 30 minutes (± 5 minutes) at 20–28°C.

Stop/Read

11. Add 100 µL of Stop Solution to each well. Add Stop Solution in the same pattern and time intervals as the Substrate Solution addition.
12. Read the optical density at 405 nm. Assure that no large bubbles are present in the wells and that the bottoms of the strips are clean. Strips should be read within **15 minutes** of Stop Solution addition.
13. Quantitation software with a quadratic calibration curve fitting equation **must** be used to analyze the Metra™ BAP assay results.
    Equation: $y = A + Bx + Cx^2$

QUALITY CONTROL

The Certificate of Analysis included in this kit is lot specific and is to be used to verify that the results obtained by your laboratory are similar to those obtained at Quidel. The optical density values are provided and are to be used as a guideline only. The results obtained by your laboratory may differ.

Quality control ranges are provided. The control values are intended to verify the validity of the curve and sample results. Each laboratory should establish its own parameters for acceptable assay limits. If the control values are NOT within your laboratory's acceptance limits, the assay results should be considered questionable and the samples should be repeated.

If the optical density of the Metra BAP Standard F is less than 1.0, the results should be considered questionable and the samples should be repeated.

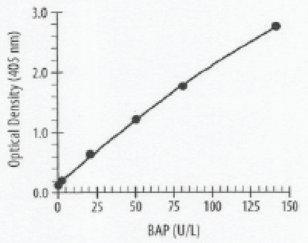
INTERPRETATION OF RESULTS

Sample results are expressed as U/L and **do not** need to be corrected for dilution (unless sample was diluted prior to testing).

In the Metra BAP assay, 1 Unit represents 1 µmol of pNPP hydrolyzed per minute at 25°C in 2-amino-2-methyl-1-propanol buffer.

Representative Standard Curve

Standard BAP levels: 0, 2, 20, 50, 80, 140 U/L



LIMITATIONS OF THE PROCEDURE

HAMA Interference

Some individuals have antibodies to mouse antibodies (HAMA), which can cause interference in immunoassays that employ antibodies derived from mice. In particular, it has been reported that serum samples from patients who have undergone therapy or diagnostic procedures that include infusion of mouse monoclonal antibody may produce erroneous results. Therefore, Metra BAP results for such patients should be used only in conjunction with results from some other diagnostic procedure and with information available from the clinical evaluation of the patient.

Samples with significant elevations of liver alkaline phosphatase activity may cause aberrantly elevated results in the Metra BAP assay.

Paget's patients who have low levels of disease may have bone-specific alkaline phosphatase levels that fall within the Metra BAP reference range.

SAMPLE VALUES

BAP reference ranges have been established for normal males over 25 years of age (n = 126), normal premenopausal females between the ages of 25 and 44 (n = 178), and normal postmenopausal females (n = 107). For the purposes of establishing reference ranges, normal subjects were defined as:

- Basically healthy, no bone, endocrine or chronic disorders
- Regular menstrual cycles (premenopausal females)
- Not pregnant or breast feeding (females)
- Not currently taking any medication known to influence bone metabolism

Values may be influenced by such factors as low estrogen production, low calcium intake or low physical activity.[8] Estrogen deficiency in postmenopausal women can result in elevated bone turnover.[3,4] Each laboratory should establish its own normal reference range. The ranges are expressed as nonparametric reference intervals (90% CI).

	Age (Yr)		Range (U/L)	Median
Females	25 - 44	Premenopausal	11.6 - 29.6	18.3
Females	≥ 45	Postmenopausal	14.2 - 42.7	25.0
Males	≥ 25		15.0 - 41.3	23.2

PERFORMANCE CHARACTERISTICS

Antibody Specifications

The bone-specific alkaline phosphatase antibody has selective, high affinity for the bone-specific alkaline phosphatase isoform, low cross-reactivity to the liver form of alkaline phosphatase, and negligible binding of intestinal and placental isoenzymes.

AP Isoenzyme	% Reactivity
Bone	100
Liver	3 – 8
Placental	0
Intestine	0.4

Sensitivity

The minimum detection limit of the Metra BAP assay is 0.7 U/L, determined by the upper 3 SD limit in a zero standard precision study.

Recovery - Spike Recovery

Spike recovery was determined by adding a known quantity of purified BAP to serum samples with different levels of endogenous BAP. Typical results are provided after spiking serum samples with low, medium, and high concentrations of BAP and assaying in triplicate.

Endogenous (U/L)	Added (U/L)	Observed (U/L)	Recovery (%)
13.4	15.7	29.1	99
17.6	37.5	55.1	99
27.2	57.2	88.1	106

Recovery - Linearity

Linearity was determined by serially diluting samples and comparing observed values with expected values. Typical results are provided below.

Sample	Dilution factor	Observed (U/L)	Expected (U/L)	Recovery (%)
1	neat	108.5	-	-
	1:2	51.1	54.2	94
	1:4	25.8	27.1	99
	1:6	18.0	18.1	99
2	neat	39.1	-	-
	1:2	20.1	19.5	103
	1:4	10.3	9.8	105
	1:6	6.7	6.5	103
3	neat	58.4	-	-
	1:2	29.9	29.2	102
	1:4	15.7	14.6	108
	1:6	9.7	9.7	100

Precision

Within-run precision was determined for ≥ 21 replicates of 3 samples on 3 plates from each of 3 kit lots (9 plates total). Between-run precision was determined for 3 samples run in 6 separate plates from each of 3 kit lots (18 plates total). Typical results are provided below.

BAP (U/L BAP)	Within-run[1] CV%	Between-run[2] CV%
12	5.8	5.2
35	3.9	7.6
100	5.2	5.0

[1] n=21 [2] n=6 runs

Interfering Substances

The following substances were tested at the specified concentrations, and were found not to interfere with the assay.

Substance	Concentration
Hemoglobin	500 mg/dL
Bilirubin	25 mg/dL
Triglycerides	1420 mg/dL
Total Protein	6.0 g/dL †
Total Protein	15.6 g/dL †
Total Protein	6.0 g/dL ‡
Total Protein	15.6 g/dL ‡

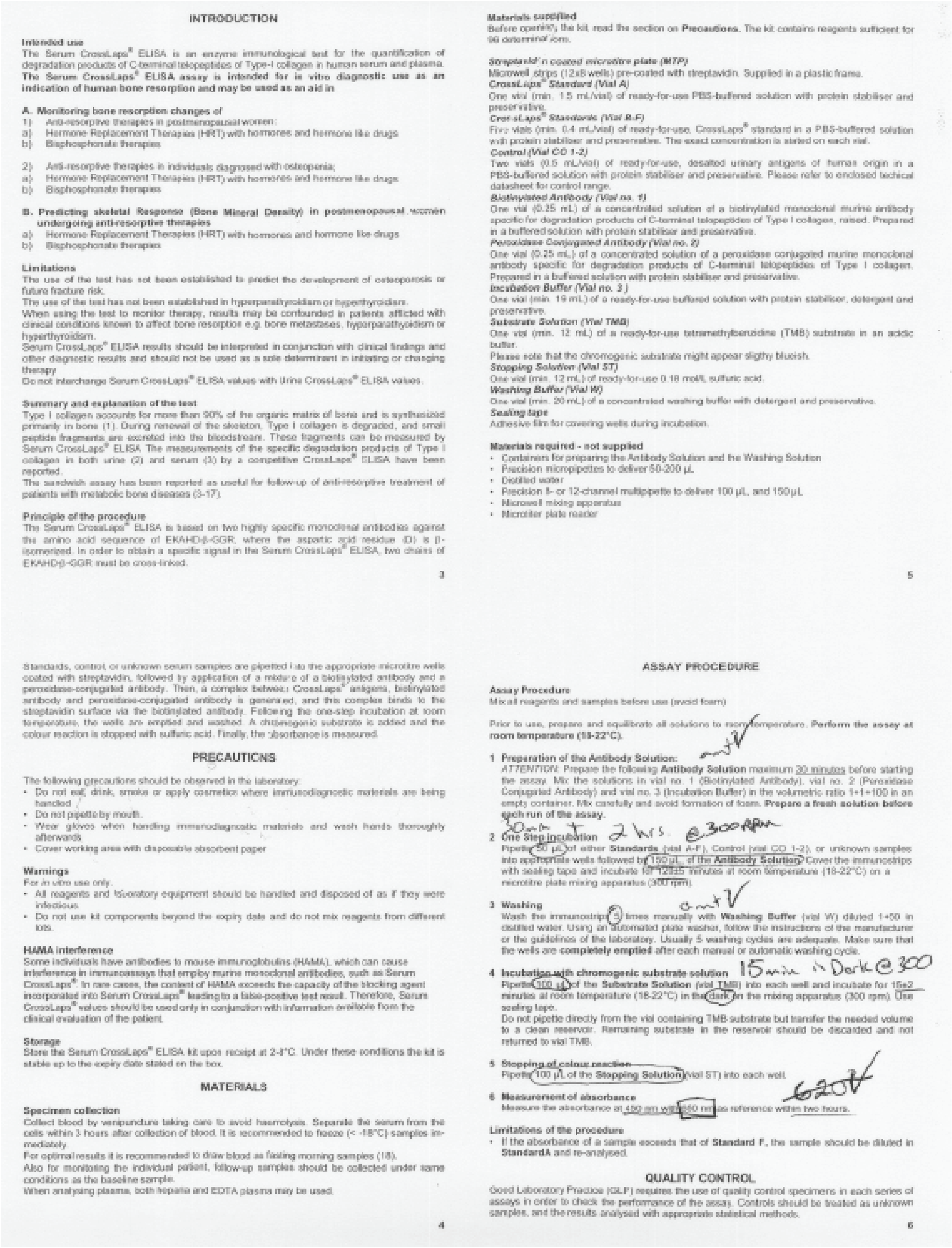
† Protein with water

‡ Protein with BAP (BAP concentration = 43.6 U/L)

Drug Interferences

Various concentrations of drugs were added to three separate serum pools containing approximately 35, 70, and 105 U/L BAP and assayed in triplicate. The drugs and the highest concentrations tested were:

Substance	Highest Concentration
Etidronate	350 µg/mL
Estrogen	100 µg/mL
Ibuprofen	150 µg/mL
Acetaminophen	350 µg/mL
Aspirin	350 µg/mL
Calcitonin – Human	80 pg/mL
Calcitonin – Salmon	80 pg/mL
Calcium	500 µg/mL
Norethindrone/ethynil estradiol mixture (oral contraceptive)	3 mg/mL
Vitamin D	400 IU/mL



INTRODUCTION

Intended use

The Serum CrossLaps® ELISA is an enzyme immunological test for the quantification of degradation products of C-terminal telopeptides of Type-I collagen in human serum and plasma. **The Serum CrossLaps® ELISA assay is intended for in vitro diagnostic use as an indication of human bone resorption and may be used as an aid in**

A. Monitoring bone resorption changes of

1) Anti-resorptive therapies in postmenopausal women:
a) Hormone Replacement Therapies (HRT) with hormones and hormone like drugs
b) Bisphosphonate therapies

2) Anti-resorptive therapies in individuals diagnosed with osteopenia;
a) Hormone Replacement Therapies (HRT) with hormones and hormone like drugs
b) Bisphosphonate therapies

B. Predicting skeletal Response (Bone Mineral Density) in postmenopausal women undergoing anti-resorptive therapies

a) Hormone Replacement Therapies (HRT) with hormones and hormone like drugs
b) Bisphosphonate therapies

Limitations

The use of the test has not been established to predict the development of osteoporosis or future fracture risk.

The use of the test has not been established in hyperparathyroidism or hyperthyroidism.

When using the test to monitor therapy, results may be confounded in patients afflicted with clinical conditions known to affect bone resorption e.g. bone metastases, hyperparathyoidism or hyperthyroidism.

Serum CrossLaps® ELISA results should be interpreted in conjunction with clinical findings and other diagnostic results and should not be used as a sole determinant in initiating or changing therapy

Do not interchange Serum CrossLaps® ELISA values with Urine CrossLaps® ELISA values.

Summary and explanation of the test

Type I collagen accounts for more than 90% of the organic matrix of bone and is synthesized primarily in bone (1). During renewal of the skeleton, Type I collagen is degraded, and small peptide fragments are excreted into the bloodstream. These fragments can be measured by Serum CrossLaps® ELISA. The measurements of the specific degradation products of Type I collagen in both urine (2) and serum (3) by a competitive CrossLaps® ELISA have been reported.

The sandwich assay has been reported as useful for follow-up of anti-resorptive treatment of patients with metabolic bone diseases (3-17).

Principle of the procedure

The Serum CrossLaps® ELISA is based on two highly specific monoclonal antibodies against the amino acid sequence of EKAHD-β-GGR, where the aspartic acid residue (D) is β-isomerized. In order to obtain a specific signal in the Serum CrossLaps® ELISA, two chains of EKAHD-β-GGR must be cross-linked.

Standards, control, or unknown serum samples are pipetted into the appropriate microtitre wells coated with streptavidin, followed by application of a mixture of a biotinylated antibody and a peroxidase-conjugated antibody. Then, a complex between CrossLaps® antigens, biotinylated antibody and peroxidase-conjugated antibody is generated, and this complex binds to the streptavidin surface via the biotinylated antibody. Following the one-step incubation at room temperature, the wells are emptied and washed. A chromogenic substrate is added and the colour reaction is stopped with sulfuric acid. Finally, the absorbance is measured.

PRECAUTIONS

The following precautions should be observed in the laboratory:

- Do not eat, drink, smoke or apply cosmetics where immunodiagnostic materials are being handled
- Do not pipette by mouth.
- Wear gloves when handling immunodiagnostic materials and wash hands thoroughly afterwards
- Cover working area with disposable absorbent paper

Warnings

For *in vitro* use only.

- All reagents and laboratory equipment should be handled and disposed of as if they were infectious.
- Do not use kit components beyond the expiry date and do not mix reagents from different lots.

HAMA interference

Some individuals have antibodies to mouse immunoglobulins (HAMA), which can cause interference in immunoassays that employ murine monoclonal antibodies, such as Serum CrossLaps®. In rare cases, the content of HAMA exceeds the capacity of the blocking agent incorporated into Serum CrossLaps® leading to a false-positive test result. Therefore, Serum CrossLaps® values should be used only in conjunction with information available from the clinical evaluation of the patient.

Storage

Store the Serum CrossLaps® ELISA kit upon receipt at 2-8°C. Under these conditions the kit is stable up to the expiry date stated on the box.

MATERIALS

Specimen collection

Collect blood by venipuncture taking care to avoid haemolysis. Separate the serum from the cells within 3 hours after collection of blood. It is recommended to freeze (< -18°C) samples immediately.

For optimal results it is recommended to draw blood as fasting morning samples (18).

Also for monitoring the individual patient, follow-up samples should be collected under same conditions as the baseline sample.

When analysing plasma, both heparin and EDTA plasma may be used.

Materials supplied

Before opening the kit, read the section on **Precautions.** The kit contains reagents sufficient for 96 determinations.

Streptavidin coated microtitre plate (MTP)

Microwell strips (12x8 wells) pre-coated with streptavidin. Supplied in a plastic frame.

CrossLaps® Standard (Vial A)

One vial (min. 1.5 mL/vial) of ready-for-use PBS-buffered solution with protein stabiliser and preservative.

CrossLaps® Standards (Vial B-F)

Five vials (min. 0.4 mL/vial) of ready-for-use, CrossLaps® standard in a PBS-buffered solution with protein stabiliser and preservative. The exact concentration is stated on each vial.

Control (Vial CO 1-2)

Two vials (0.5 mL/vial) of ready-for-use, desalted urinary antigens of human origin in a PBS-buffered solution with protein stabiliser and preservative. Please refer to enclosed techical datasheet for control range.

Biotinylated Antibody (Vial no. 1)

One vial (0.25 mL) of a concentrated solution of a biotinylated monoclonal murine antibody specific for degradation products of C-terminal telopeptides of Type I collagen, raised. Prepared in a buffered solution with protein stabiliser and preservative.

Peroxidase Conjugated Antibody (Vial no. 2)

One vial (0.25 mL) of a concentrated solution of a peroxidase conjugated murine monoclonal antibody specific for degradation products of C-terminal telopeptides of Type I collagen. Prepared in a buffered solution with protein stabiliser and preservative.

Incubation Buffer (Vial no. 3)

One vial (min. 19 mL) of a ready-for-use buffered solution with protein stabiliser, detergent and preservative.

Substrate Solution (Vial TMB)

One vial (min. 12 mL) of a ready-for-use tetramethylbenzidine (TMB) substrate in an acidic buffer.

Please note that the chromogenic substrate might appear sligthy blueish.

Stopping Solution (Vial ST)

One vial (min. 12 mL) of ready-for-use 0.18 mol/L sulfuric acid.

Washing Buffer (Vial W)

One vial (min. 20 mL) of a concentrated washing buffer with detergent and preservative.

Sealing tape

Adhesive film for covering wells during incubation.

Materials required - not supplied

- Containers for preparing the Antibody Solution and the Washing Solution
- Precision micropipettes to deliver 50-200 µL
- Distilled water
- Precision 8- or 12-channel multipipette to deliver 100 µL, and 150 µL
- Microwell mixing apparatus
- Microtiter plate reader

ASSAY PROCEDURE

Assay Procedure

Mix all reagents and samples before use (avoid foam)

Prior to use, prepare and equilibrate all solutions to room temperature. **Perform the assay at room temperature (18-22°C).**

amt ✓

1 **Preparation of the Antibody Solution:**
ATTENTION: Prepare the following **Antibody Solution** maximum 30 minutes before starting the assay. Mix the solutions in vial no. 1 (Biotinylated Antibody), vial no. 2 (Peroxidase Conjugated Antibody) and vial no. 3 (Incubation Buffer) in the volumetric ratio 1+1+100 in an empty container. Mix carefully and avoid formation of foam. **Prepare a fresh solution before each run of the assay.**

30 min ↓ 2 hrs. @ 300 RPM

2 **One Step incubation**
Pipette 50 µL of either **Standards** (vial A-F), Control (vial CO 1-2), or unknown samples into appropriate wells followed by 150 µL of the **Antibody Solution**. Cover the immunostrips with sealing tape and incubate for 120±5 minutes at room temperature (18-22°C) on a microtitre plate mixing apparatus (300 rpm).

amt ✓

3 **Washing**
Wash the immunostrips 5 times manually with **Washing Buffer** (vial W) diluted 1+50 in distilled water. Using an automated plate washer, follow the instructions of the manufacturer or the guidelines of the laboratory. Usually 5 washing cycles are adequate. Make sure that the wells are **completely emptied** after each manual or automatic washing cycle.

4 **Incubation with chromogenic substrate solution** 15 min in Dark @ 300
Pipette 100 µL of the **Substrate Solution** (vial TMB) into each well and incubate for 15±2 minutes at room temperature (18-22°C) in the dark on the mixing apparatus (300 rpm). Use sealing tape.
Do not pipette directly from the vial containing TMB substrate but transfer the needed volume to a clean reservoir. Remaining substrate in the reservoir should be discarded and not returned to vial TMB.

5 **Stopping of colour reaction**
Pipette 100 µL of the **Stopping Solution** (vial ST) into each well.

620 ✓

6 **Measurement of absorbance**
Measure the absorbance at 450 nm with 650 nm as reference within two hours.

Limitations of the procedure

- If the absorbance of a sample exceeds that of **Standard F**, the sample should be diluted in **StandardA** and re-analysed.

QUALITY CONTROL

Good Laboratory Practice (GLP) requires the use of quality control specimens in each series of assays in order to check the performance of the assay. Controls should be treated as unknown samples, and the results analysed with appropriate statistical methods.

Appendix H.

Calcium Information

Increasing Your Daily Calcium Intake

Your estimated calcium intake is: _________________________ mg/day and

the recommended optimal calcium intake for postmenopausal women not taking hormones is about **1400-1500** mg/day.

You need to increase your calcium intake by __________________ mg/day to fall within the recommended range.

The information below gives you suggestions on how to increase your calcium intake by consuming foods with higher calcium contents or by taking calcium supplements

Food Sources (National Osteoporosis Foundation, www.nof.org)

One way to increase the amount of calcium in your diet is to eat calcium-rich foods like low-fat milk, cheese, broccoli and others. Many foods are fortified with calcium and are readily available and affordable. Foods like orange juice, cereals and breakfast bars have calcium added to them, so it is easier than ever before to consume the recommended level of calcium for every age.

Another easy and economical way to boost the calcium content of many meals is to add nonfat powdered dry milk to puddings, homemade cookies, breads or muffins, soups, gravy, casseroles and even a glass of milk. A single tablespoon of nonfat powdered dry milk adds 52 mg of calcium, and 2 to 4 tablespoons can be added to most recipes.

You may add:

- 3 tablespoons to each cup of milk in puddings, cocoa or custard
- 4 tablespoons to each cup of hot cereal before cooking
- 2 tablespoons sifted into each cup of flour in cakes, cookies or breads

Vitamin D plays a major role in calcium absorption and bone health. Vitamin D is manufactured in the skin following direct exposure to sunlight. The amount of vitamin D produced in the skin varies depending on time of day, season, latitude and skin pigmentation. Usually 10-15 minutes exposure of hands, arms and face two to three times a week (depending on one's skin sensitivity) is enough to satisfy the body's vitamin D requirement. As adults age, the ability to make vitamin D through the skin decreases. The major food sources of vitamin D are vitamin D-fortified dairy products, egg yolks, saltwater fish and liver. Some calcium supplements and most multivitamins contain vitamin D, so it is important to check the labels to determine how much each contains. Experts recommend a daily intake of between 400 and 800 international units (IU). Do not take more than 800 IU per day unless your doctor prescribes it, since massive doses of vitamin D may be harmful.

The nutrition labels

Example: Macaroni and Cheese

Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Amount Per Serving

Calories 250 Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Cholesterol 30 mg	10%
Sodium 470 mg	20%
Total Carbohydrate 31 g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	

Vitamin A 4% * Vitamin C 2%

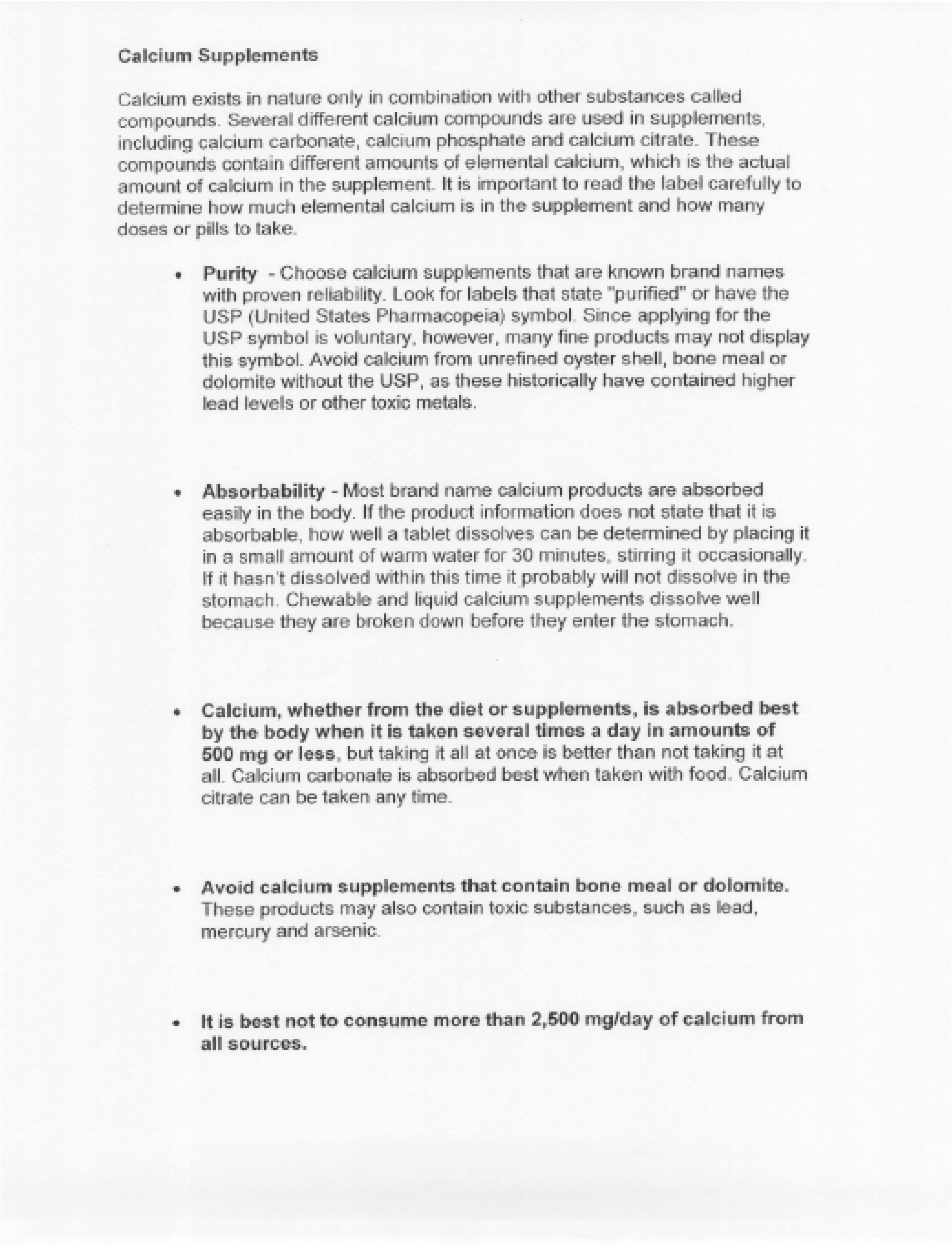
Calcium 20% * Iron 4%

*Percent Daily Values are based on a 2,000 calorie diet

To find the calcium content of foods, read the nutrition label or use the on-line data-base from the **U.S. Department of Agriculture.**

The nutrition labels show a "percent daily value" for calcium. The daily value used for these labels is **1000 mg**. This makes it very easy to calculate the calcium content: just add a zero to the % daily value! For the example shown here, the label says one serving has calcium 20%, therefore, it has 200 mg of calcium. Remember to check the serving size on the top of the label; sometimes it is not what you would expect.

Calcium 20% = 200mg



Calcium Supplements

Calcium exists in nature only in combination with other substances called compounds. Several different calcium compounds are used in supplements, including calcium carbonate, calcium phosphate and calcium citrate. These compounds contain different amounts of elemental calcium, which is the actual amount of calcium in the supplement. It is important to read the label carefully to determine how much elemental calcium is in the supplement and how many doses or pills to take.

- **Purity** - Choose calcium supplements that are known brand names with proven reliability. Look for labels that state "purified" or have the USP (United States Pharmacopeia) symbol. Since applying for the USP symbol is voluntary, however, many fine products may not display this symbol. Avoid calcium from unrefined oyster shell, bone meal or dolomite without the USP, as these historically have contained higher lead levels or other toxic metals.

- **Absorbability -** Most brand name calcium products are absorbed easily in the body. If the product information does not state that it is absorbable, how well a tablet dissolves can be determined by placing it in a small amount of warm water for 30 minutes, stirring it occasionally. If it hasn't dissolved within this time it probably will not dissolve in the stomach. Chewable and liquid calcium supplements dissolve well because they are broken down before they enter the stomach.

- **Calcium, whether from the diet or supplements, is absorbed best by the body when it is taken several times a day in amounts of 500 mg or less,** but taking it all at once is better than not taking it at all. Calcium carbonate is absorbed best when taken with food. Calcium citrate can be taken any time.

- **Avoid calcium supplements that contain bone meal or dolomite.** These products may also contain toxic substances, such as lead, mercury and arsenic.

- **It is best not to consume more than 2,500 mg/day of calcium from all sources.**

- **Calcium Interactions** - It is important to talk with a physician or pharmacist about possible interactions between prescription or over-the-counter medications and calcium supplements. For example, calcium supplements also may reduce the absorption of the antibiotic tetracycline. Calcium also interferes with iron absorption, so a calcium supplement should not be taken at the same time as an iron supplement. The exception to this is when the iron supplement is taken with vitamin C or calcium citrate. Any medication to be taken on an empty stomach should not be taken with calcium supplements.

- **Combination Products** - Calcium supplements are available in a dazzling array of combinations with vitamins and other minerals. While vitamin D is necessary for the absorption of calcium, it is not necessary that it be in the calcium supplement. Minerals such as magnesium and phosphorus also are important, but usually are obtained through food or multivitamins. Most experts recommend that nutrients come from a balanced diet, with multivitamins used to supplement dietary deficiencies.

Appendix I.

Data

	id	group	age	ht	weight1	weight2	weight3	bmi1	bmi2	bmi3
1	1	1	64.60	162.5	100.9	106.20	108.20	38.2	40.2	40.98
2	10	1	61.30	164.0	70.4	71.50	68.80	26.2	26.6	25.58
3	19	1	64.70	157.3	84.5	86.20	86.20	34.2	34.8	34.84
4	25	1	64.80	162.5	61.7	62.50	62.70	23.4	23.7	23.74
5	26	1	64.40	154.5	54.9	56.90	56.20	23.0	23.8	23.54
6	29	1	68.00	174.0	65.9	65.90	61.00	21.8	21.8	20.15
7	32	1	57.50	162.5	78.1	76.80	74.90	29.6	29.1	28.36
8	39	1	67.30	164.3	76.8	77.00	80.70	28.5	28.5	29.89
9	44	1	59.20	165.4	60.4	61.60	62.30	22.1	22.5	22.77
10	49	1	65.10	165.5	102.0	105.30	105.80	37.2	38.4	38.63
11	50	1	69.80	166.5	101.8	93.80	97.80	36.7	33.8	35.28
12	52	1	63.10	166.0	97.7	99.80	97.90	35.5	36.2	35.53
13	56	1	68.80	159.0	73.7	74.10	74.40	29.2	29.3	29.43
14	58	1	67.10	165.5	84.4	86.10	86.90	30.8	31.4	31.73
15	60	1	64.80	161.5	77.2	79.30	79.80	29.6	30.4	30.60
16	61	1	64.20	144.5	62.0	63.90	63.10	29.7	30.6	30.22
17	71	1	57.60	152.0	57.1	59.60	58.10	24.7	25.8	25.15
18	72	1	70.70	152.5	82.3	82.30	81.20	35.4	35.4	34.92
19	73	1	58.90	154.5	80.2	77.90	75.90	33.6	32.6	31.80
20	75	1	59.90	163.0	76.3	76.90	76.80	28.7	28.9	28.91
21	79	1	56.50	173.3	80.8	88.80	88.40	26.9	29.6	29.43
22	81	1	69.20	143.0	56.5	56.90	55.10	27.6	27.8	26.95
23	2	3	64.00	156.5	80.4	.	83.50	32.8	.	34.09
24	6	3	69.80	168.0	63.6	65.40	63.40	22.5	23.2	22.46
25	7	3	70.50	159.5	62.8	64.40	65.70	24.7	25.3	25.83
26	12	3	55.30	167.0	77.5	77.50	80.60	27.8	27.8	28.90
27	16	3	66.30	166.5	75.3	74.30	72.30	27.2	26.8	26.08
28	21	3	61.10	169.0	102.7	100.90	101.10	36.0	35.3	35.40
29	31	3	64.00	164.0	94.9	90.20	89.00	35.3	33.5	33.09
30	47	3	64.40	154.6	71.8	72.50	70.40	30.0	30.3	29.45
31	59	3	58.10	158.5	65.8	64.80	66.30	26.2	25.8	26.39
32	64	3	59.70	162.4	66.4	65.80	67.50	25.2	24.9	25.59
33	69	3	66.10	159.0	65.9	65.90	66.30	26.1	26.1	26.23
34	77	3	57.70	169.5	107.9	115.30	114.10	37.6	40.1	39.71
35	8	5	66.20	153.0	51.9	52.90	51.50	22.2	22.6	22.00
36	11	5	61.00	156.0	89.4	85.20	87.60	36.7	35.0	36.00
37	13	5	58.50	169.5	69.7	69.70	68.40	24.3	24.3	23.81
38	28	5	63.40	168.0	79.2	76.50	75.00	28.1	27.1	26.57
39	30	5	66.40	159.0	57.9	59.70	59.50	22.9	23.6	23.54
40	33	5	57.90	154.8	77.6	77.60	80.80	32.4	32.4	33.72
41	36	5	59.10	172.0	71.7	75.10	73.90	24.2	25.4	24.98
42	37	5	56.60	174.0	56.2	56.20	56.20	18.6	18.6	18.56
43	38	5	74.00	173.5	103.1	104.60	107.00	34.2	34.7	35.55
44	43	5	59.80	155.5	62.2	65.20	64.60	25.7	27.0	26.72
45	45	5	60.40	152.5	55.8	56.90	56.00	24.0	24.5	24.08
46	48	5	62.00	161.5	63.1	62.10	63.00	24.2	23.8	24.15
47	51	5	65.70	162.5	80.9	81.10	80.70	30.6	30.7	30.56
48	53	5	59.80	159.5	71.1	74.40	67.70	27.9	29.2	26.61
49	54	5	73.50	164.0	69.0	70.80	69.80	25.7	26.3	25.95
50	57	5	65.80	169.2	76.4	75.00	77.00	26.7	26.2	26.90
51	62	5	60.60	167.5	87.5	87.50	86.30	31.2	31.2	30.76
52	65	5	56.20	169.5	72.3	77.30	76.70	25.2	26.9	26.70
53	66	5	66.80	164.0	80.0	80.30	75.40	29.7	29.9	28.03
54	67	5	66.60	167.5	84.7	84.40	84.40	30.2	30.1	30.08
55	78	5	57.90	170.5	85.1	88.50	90.10	29.3	30.4	30.99

	pcwtmid	pcwtpost	pcbmimid	pcbmipos	acwtmid	acwtpost	acbmimid	acbmipos	pase	calcium1
1	5.25	7.23	5.25	7.23	5.30	7.30	2.01	2.76	63.20	1,036
2	1.56	-2.27	1.56	-2.27	1.10	-1.60	0.41	-0.59	145.68	1,461
3	2.01	2.01	2.01	2.01	1.70	1.70	0.69	0.69	158.85	1,300
4	1.30	1.62	1.30	1.62	0.80	1.00	0.30	0.38	191.85	505
5	3.64	2.37	3.64	2.37	2.00	1.30	0.84	0.54	220.77	3,034
6	0.00	-7.44	0.00	-7.44	0.00	-4.90	0.00	-1.62	157.17	1,703
7	-1.66	-4.10	-1.66	-4.10	-1.30	-3.20	-0.49	-1.21	214.60	609
8	0.26	5.08	0.26	5.08	0.20	3.90	0.07	1.44	170.82	1,454
9	1.99	3.15	1.99	3.15	1.20	1.90	0.44	0.69	91.58	1,938
10	3.24	3.73	3.24	3.73	3.30	3.80	1.20	1.39	.	1,120
11	-7.86	-3.93	-7.86	-3.93	-8.00	-4.00	-2.89	-1.44	103.05	601
12	2.15	0.20	1.97	0.08	2.10	0.20	0.70	0.03	272.00	1,589
13	0.54	0.95	0.54	0.95	0.40	0.70	0.16	0.28	163.75	3,376
14	2.01	2.96	2.01	2.96	1.70	2.50	0.62	0.91	76.20	1,182
15	2.72	3.37	2.72	3.37	2.10	2.60	0.81	1.00	63.30	1,959
16	3.06	1.77	3.06	1.77	1.90	1.10	0.91	0.53	55.00	524
17	4.38	1.75	4.45	1.81	2.50	1.00	1.10	0.45	145.00	2,169
18	0.00	-1.34	0.00	-1.37	0.00	-1.10	0.00	-0.48	123.00	2,086
19	-2.87	-5.36	-2.98	-5.37	-2.30	-4.30	-1.00	-1.80	185.00	398
20	0.79	0.66	0.79	0.66	0.60	0.50	0.23	0.19	246.00	788
21	9.90	9.41	9.90	9.41	8.00	7.60	2.66	2.53	322.00	763
22	0.71	-2.48	0.71	-2.48	0.40	-1.40	0.20	-0.68	.	603
23	.	3.86	.	3.94	.	3.10	.	1.29	127.00	1,200
24	2.83	-0.31	3.11	-0.16	1.80	-0.20	0.70	-0.04	111.00	1,560
25	2.55	4.62	2.43	4.56	1.60	2.90	0.60	1.13	60.00	1,702
26	0.00	4.00	0.00	3.96	0.00	3.10	0.00	1.10	285.00	740
27	-1.33	-3.98	-1.47	-4.12	-1.00	-3.00	-0.40	-1.12	196.00	1,352
28	-1.75	-1.56	-1.94	-1.67	-1.80	-1.60	-0.70	-0.60	153.00	2,174
29	-4.95	-6.22	-5.10	-6.26	-4.70	-5.90	-1.80	-2.21	165.00	1,438
30	0.97	-1.95	1.00	-1.82	0.70	-1.40	0.30	-0.55	110.00	1,000
31	-1.52	0.76	-1.53	0.73	-1.00	0.50	-0.40	0.19	150.00	1,456
32	-0.90	1.66	-1.19	1.56	-0.60	1.10	-0.30	0.39	239.00	490
33	0.00	0.61	0.00	0.48	0.00	0.40	0.00	0.13	102.00	1,420
34	6.86	5.75	6.65	5.62	7.40	6.20	2.50	2.11	104.00	1,979
35	1.93	-0.77	1.80	-0.90	1.00	-0.40	0.40	-0.20	162.00	1,958
36	-4.70	-2.01	-4.63	-1.92	-4.20	-1.80	-1.70	-0.70	172.00	561
37	0.00	-1.87	0.00	-2.03	0.00	-1.30	0.00	-0.49	207.00	2,220
38	-3.41	-5.30	-3.56	-5.43	-2.70	-4.20	-1.00	-1.53	135.00	2,004
39	3.11	2.76	3.06	2.77	1.80	1.60	0.70	0.64	153.00	1,186
40	0.00	4.12	0.00	4.07	0.00	3.20	0.00	1.32	278.00	1,168
41	4.74	3.07	4.96	3.22	3.40	2.20	1.20	0.78	201.00	1,416
42	0.00	0.00	0.00	-0.20	0.00	0.00	0.00	-0.04	.	1,169
43	1.45	3.78	1.46	3.93	1.50	3.90	0.50	1.35	116.00	1,375
44	4.82	3.86	5.06	3.95	3.00	2.40	1.30	1.02	181.00	1,243
45	1.97	0.36	2.08	0.33	1.10	0.20	0.50	0.08	27.00	2,152
46	-1.58	-0.16	-1.65	-0.19	-1.00	-0.10	-0.40	-0.05	217.00	2,740
47	0.25	-0.25	0.33	-0.13	0.20	-0.20	0.10	-0.04	251.00	1,359
48	4.64	-4.78	4.66	-4.62	3.30	-3.40	1.30	-1.29	290.00	936
49	2.61	1.16	2.33	0.98	1.80	0.80	0.60	0.25	181.00	900
50	-1.83	0.79	-1.87	0.73	-1.40	0.60	-0.50	0.20	148.00	2,822
51	0.00	-1.37	0.00	-1.41	0.00	-1.20	0.00	-0.44	296.00	2,006
52	6.92	6.09	6.75	5.94	5.00	4.40	1.70	1.50	237.00	1,096
53	0.37	-5.75	0.67	-5.61	0.30	-4.60	0.20	-1.67	129.00	1,984
54	-0.35	-0.35	-0.33	-0.39	-0.30	-0.30	-0.10	-0.12	100.00	1,879
55	4.00	5.88	3.75	5.78	3.40	5.00	1.10	1.69	.	1,354

	calcium2	calcium3	accapost	pccapt	armtpf1	legtpf1	trutpf1	andtpf1	gyntpf1	armrpf1
1	1,897	1,712	676	65.25	49.8	57.2	51.7	53.7	51.7	48.1
2	1,608	1,512	51	3.49	26.8	41.4	40.4	43.8	47.8	25.5
3	1,672	1,633	333	25.62	42.9	54.7	49.8	53.1	56.4	41.1
4	1,408	2,007	1,502	297.43	40.9	39.9	43.1	46.3	46.7	39.4
5	2,301	2,049	-985	-32.47	33.3	40.2	43.5	46.9	46.4	31.7
6	1,862	1,829	126	7.40	25.4	36.3	28.9	26.0	39.7	24.0
7	1,607	2,351	1,742	286.04	40.1	41.9	43.3	48.7	46.7	38.5
8	1,537	1,645	191	13.14	31.9	36.2	43.9	49.2	41.8	30.6
9	1,729	1,817	-121	-6.24	40.7	42.9	41.9	46.2	49.1	39.1
10	1,612	1,954	834	74.46	46.1	53.8	54.2	56.2	52.1	44.4
11	1,776	1,687	1,086	180.70	41.5	49.0	47.2	49.6	48.7	40.3
12	2,000	1,766	177	11.14	43.3	55.0	47.6	50.0	53.5	41.5
13	2,117	2,001	-1,375	-40.73	41.4	42.5	45.3	47.9	48.3	40.0
14	1,829	1,801	619	52.37	45.5	56.1	46.5	44.8	55.2	43.6
15	1,665	1,734	-225	-11.49	33.5	47.1	44.0	48.9	50.0	31.7
16	1,576	1,342	818	156.11	48.3	48.0	45.7	53.1	52.2	46.6
17	1,859	1,621	-548	-25.27	40.5	40.1	31.2	28.2	43.3	38.8
18	2,052	2,216	130	6.23	44.5	45.6	41.8	46.0	45.2	43.0
19	1,577	1,534	1,136	285.43	44.4	54.3	47.2	54.5	54.9	42.6
20	2,000	2,228	1,440	182.74	41.4	53.6	49.1	51.2	56.9	39.7
21	1,685	1,828	1,065	139.58	36.1	43.3	49.0	52.1	48.4	34.4
22	1,891	2,294	1,691	280.43	37.9	44.4	45.6	46.5	52.0	36.1
23	1,408	1,846	646	53.83	50.5	57.1	55.7	60.2	59.1	48.4
24	2,009	1,979	419	26.86	36.4	45.5	40.0	42.6	47.4	34.7
25	1,806	1,843	141	8.28	40.7	38.9	40.2	39.8	43.5	38.9
26	1,502	1,450	710	95.95	39.5	48.9	44.3	49.2	51.3	37.5
27	1,573	1,958	606	44.82	41.3	53.0	49.3	50.2	56.4	39.4
28	2,014	1,827	-347	-15.96	44.7	48.6	47.7	51.7	52.1	43.2
29	1,510	1,564	126	8.76	48.1	53.3	53.0	58.3	53.6	46.5
30	1,603	1,485	485	48.50	44.6	45.5	46.5	52.3	49.7	42.9
31	1,556	1,503	47	3.23	31.9	44.9	43.2	46.2	49.9	30.5
32	1,572	2,046	1,556	317.55	38.9	47.5	40.9	47.2	51.0	37.2
33	1,789	1,897	477	33.59	40.3	35.7	40.6	46.7	42.9	38.8
34	1,843	1,558	-421	-21.27	61.9	60.4	54.9	57.4	56.9	60.5
35	1,900	1,863	-95	-4.85	32.0	27.4	30.3	34.2	35.6	30.6
36	2,331	2,421	1,860	331.55	51.4	60.4	58.2	61.7	60.9	49.9
37	1,756	2,457	237	10.68	38.2	45.2	42.0	45.8	50.2	36.6
38	2,301	1,979	-25	-1.25	36.3	51.9	34.2	26.8	48.5	34.8
39	2,173	1,782	596	50.25	29.3	40.7	26.2	20.2	36.1	27.7
40	1,571	1,770	602	51.54	36.4	39.1	44.9	48.7	47.1	35.0
41	2,160	1,733	317	22.39	45.7	53.3	48.3	51.7	55.3	43.3
42	1,751	1,794	625	53.46	21.4	35.1	25.7	20.1	39.3	20.4
43	1,573	1,557	182	13.24	34.1	46.3	52.7	56.1	47.0	32.6
44	1,762	1,676	433	34.84	41.0	45.8	43.4	47.4	50.3	39.1
45	2,021	1,846	-306	-14.22	34.0	34.5	35.8	38.8	43.0	32.4
46	1,624	2,016	-724	-26.42	36.0	40.8	38.2	40.7	46.2	34.3
47	2,132	1,933	574	42.24	40.2	53.1	51.0	55.2	53.9	38.4
48	1,542	1,692	756	80.77	35.4	50.7	43.5	48.8	52.4	33.9
49	1,867	1,972	1,072	119.11	38.2	44.5	44.5	48.7	48.6	36.5
50	2,444	3,034	212	7.51	45.4	55.1	43.6	46.8	55.5	43.4
51	1,621	1,761	-245	-12.21	43.1	55.9	47.5	53.1	56.8	41.3
52	2,208	3,219	2,123	193.70	34.5	42.2	32.6	35.1	45.3	32.7
53	1,833	2,068	84	4.23	45.0	55.3	48.7	54.3	54.1	42.9
54	1,552	1,657	-222	-11.81	38.4	34.0	42.4	47.3	35.6	37.0
55	1,697	1,498	144	10.64	39.9	49.8	45.7	53.5	52.9	38.3

	legrpf1	trurpf1	andrpf1	gynrpf1	armtg1	legtg1	trutg1	andtg1	gyntg1	armfg1
1	55.4	50.7	53.3	50.7	7,730	35,047	50,651	7,829	16,360	3,846
2	39.8	39.4	43.3	46.6	6,335	24,000	32,815	5,065	11,269	1,699
3	52.6	48.9	52.7	55.1	7,052	26,784	43,470	6,553	12,825	3,024
4	38.3	42.2	45.8	45.5	5,637	17,018	32,078	4,444	8,406	2,306
5	38.7	42.5	46.4	45.3	4,773	16,736	26,804	3,777	7,768	1,590
6	34.8	28.3	25.7	38.8	5,606	20,727	32,781	4,968	10,881	1,426
7	40.4	42.4	48.4	45.8	7,488	22,634	40,300	6,624	11,438	3,002
8	34.7	43.2	48.9	40.8	6,164	23,208	40,545	6,350	11,139	1,966
9	41.3	41.2	45.7	48.1	5,662	19,421	28,801	4,253	9,453	2,307
10	52.0	53.2	55.9	51.0	6,907	36,387	50,733	8,359	16,204	3,183
11	47.6	46.6	49.3	47.9	7,842	37,373	49,735	8,084	16,082	3,256
12	53.2	46.5	49.6	52.2	8,855	37,048	44,663	7,700	18,064	3,830
13	41.0	44.6	47.6	47.4	6,826	22,111	37,745	6,245	11,520	2,825
14	54.1	45.1	44.2	54.1	9,260	30,439	36,685	5,913	14,343	4,218
15	45.4	43.2	48.5	49.0	6,326	27,008	36,914	6,286	12,640	2,116
16	46.4	45.0	52.7	51.3	7,238	19,343	28,561	4,436	9,528	3,494
17	38.6	30.6	27.9	42.5	5,543	18,034	27,048	4,220	9,037	2,247
18	44.2	41.2	45.7	44.3	8,887	26,756	39,006	5,603	10,487	3,951
19	52.3	46.3	54.1	53.5	7,096	27,468	38,338	6,587	12,442	3,153
20	51.6	48.1	50.7	55.8	6,922	25,688	36,131	5,608	13,125	2,868
21	41.6	47.8	51.6	47.2	6,925	25,540	40,836	6,178	12,026	2,498
22	42.6	44.8	46.1	51.0	4,016	15,609	31,208	4,761	8,343	1,522
23	55.1	54.8	59.9	57.8	5,534	24,355	43,682	7,681	12,661	2,795
24	43.7	39.1	42.2	46.3	5,550	21,638	29,597	4,546	10,356	2,023
25	37.0	39.2	39.3	42.4	6,659	18,001	31,551	4,654	8,915	2,713
26	46.9	43.5	48.8	50.3	5,003	23,864	41,969	5,761	12,868	1,975
27	51.2	48.2	49.6	55.4	6,876	25,272	35,408	5,067	13,169	2,839
28	47.0	47.1	51.5	51.3	9,653	32,667	53,089	9,670	16,274	4,318
29	51.8	52.4	58.0	52.8	7,638	30,403	49,421	8,343	14,931	3,671
30	43.7	45.7	52.0	48.6	7,333	21,417	36,411	5,576	10,324	3,272
31	43.2	42.1	45.7	48.9	6,090	21,103	31,648	4,054	10,742	1,944
32	45.9	40.0	46.8	50.0	6,180	22,959	30,645	4,761	11,479	2,404
33	34.3	39.9	46.4	41.9	6,759	19,673	33,357	5,000	9,034	2,723
34	58.6	53.8	56.9	55.9	15,361	35,943	47,576	7,593	15,935	9,516
35	26.3	29.7	33.8	34.7	4,786	16,567	24,526	3,462	8,008	1,534
36	58.7	57.1	61.2	59.9	8,008	33,162	40,716	7,542	16,054	4,119
37	43.6	41.2	45.3	49.2	6,532	22,392	33,548	5,240	10,853	2,495
38	50.3	33.5	26.6	48.1	7,508	27,258	34,283	5,168	11,021	2,722
39	38.7	25.3	19.8	35.0	5,517	22,050	23,224	2,952	7,598	1,617
40	37.8	44.2	48.4	46.1	6,858	22,018	40,891	6,189	11,058	2,496
41	51.0	47.2	51.1	54.1	6,307	23,838	34,079	5,641	12,330	2,880
42	33.7	25.2	19.8	38.5	5,250	17,904	26,984	3,628	9,704	1,124
43	44.6	51.9	55.8	46.0	6,257	31,994	56,727	9,549	15,912	2,134
44	43.9	42.3	47.0	49.0	5,927	19,169	30,057	4,295	9,509	2,432
45	32.9	35.0	38.4	41.9	5,527	15,227	28,596	3,887	8,272	1,879
46	39.1	37.6	40.4	45.2	5,231	18,090	32,584	5,020	9,599	1,884
47	51.1	50.0	54.8	52.7	6,775	27,284	39,392	6,273	12,908	2,721
48	49.0	42.9	48.5	51.5	5,297	25,220	33,824	4,902	11,744	1,876
49	42.8	43.5	48.1	47.6	5,810	22,677	36,343	5,634	10,631	2,217
50	53.1	42.7	46.4	54.4	7,221	26,591	35,419	5,798	13,033	3,279
51	53.8	46.8	52.8	55.6	7,769	30,491	41,705	6,197	12,796	3,348
52	40.4	31.8	34.7	44.3	6,629	25,424	33,261	5,216	12,287	2,288
53	53.2	47.7	53.7	52.9	6,782	26,443	39,349	5,906	12,653	3,053
54	32.7	41.8	47.0	34.8	6,739	24,570	46,805	7,217	12,203	2,591
55	48.2	45.0	53.2	52.0	7,243	30,198	40,757	6,417	14,020	2,890

	legfg1	trufg1	andfg1	gynfg1	armlg1	leglg1	trulg1	andlg1	gynlg1	armbmcg1
1	20,057	26,163	4,206	8,461	3,884	14,990	24,488	3,623	7,899	261
2	9,928	13,264	2,220	5,387	4,637	14,072	19,551	2,845	5,882	314
3	14,650	21,637	3,470	7,228	4,029	12,134	21,833	3,063	5,596	298
4	6,795	13,835	2,056	3,922	3,331	10,223	18,242	2,388	4,484	215
5	6,735	11,667	1,772	3,606	3,183	10,001	15,137	2,005	4,161	238
6	7,528	9,484	1,291	4,324	4,181	13,199	23,297	3,677	6,556	334
7	9,490	17,448	3,229	5,343	4,486	13,144	22,852	3,395	6,095	304
8	8,394	17,809	3,124	4,653	4,198	14,815	22,736	3,226	6,486	251
9	8,341	12,067	1,964	4,640	3,356	11,080	16,734	2,290	4,814	244
10	19,577	27,487	4,698	8,437	3,724	16,810	23,246	3,661	7,767	265
11	18,307	23,493	4,008	7,835	4,586	19,066	26,242	4,076	8,247	228
12	20,376	21,241	3,852	9,656	5,025	16,672	23,422	3,847	8,408	369
13	9,390	17,116	2,992	5,567	4,001	12,721	20,630	3,253	5,953	245
14	17,073	17,057	2,651	7,923	5,042	13,366	19,627	3,262	6,420	405
15	12,710	16,251	3,077	6,326	4,209	14,298	20,663	3,209	6,314	340
16	9,290	13,058	2,355	4,974	3,744	10,052	15,503	2,081	4,554	254
17	7,236	8,438	1,190	3,915	3,296	10,798	18,610	3,030	5,122	255
18	12,214	16,293	2,576	4,737	4,936	14,542	22,713	3,026	5,751	293
19	14,920	18,104	3,590	6,831	3,942	12,549	20,233	2,998	5,612	306
20	13,764	17,755	2,869	7,471	4,055	11,924	18,376	2,739	5,654	299
21	11,061	20,002	3,216	5,821	4,427	14,479	20,834	2,962	6,205	332
22	6,935	14,238	2,213	4,339	2,494	8,675	16,969	2,548	4,005	205
23	13,908	24,346	4,623	7,479	2,739	10,447	19,336	3,058	5,182	242
24	9,843	11,829	1,937	4,905	3,527	11,795	17,769	2,609	5,451	280
25	6,994	12,689	1,853	3,881	3,946	11,007	18,863	2,801	5,034	323
26	11,677	18,613	2,836	6,601	3,028	12,187	23,357	2,925	6,267	257
27	13,399	17,464	2,541	7,427	4,038	11,873	17,944	2,526	5,742	334
28	15,865	25,317	4,998	8,484	5,334	16,802	27,772	4,672	7,790	339
29	16,218	26,183	4,861	7,999	3,967	14,185	23,237	3,482	6,932	258
30	9,746	16,921	2,919	5,132	4,060	11,671	19,491	2,657	5,192	302
31	9,471	13,678	1,871	5,364	4,146	11,632	17,970	2,182	5,378	273
32	10,906	12,539	2,248	5,854	3,776	12,053	18,107	2,513	5,625	287
33	7,019	13,532	2,336	3,872	4,036	12,654	19,824	2,664	5,162	251
34	21,701	26,098	4,356	9,068	5,845	14,242	21,479	3,237	6,867	363
35	4,545	7,440	1,184	2,850	3,252	12,022	17,086	2,278	5,157	219
36	20,025	23,712	4,652	9,780	3,888	13,137	17,004	2,890	6,274	256
37	10,116	14,104	2,400	5,450	4,036	12,275	19,444	2,841	5,403	289
38	14,149	11,719	1,386	5,350	4,786	13,110	22,563	3,783	5,671	320
39	8,967	6,081	596	2,746	3,900	13,083	17,143	2,356	4,852	327
40	8,617	18,375	3,013	5,205	4,362	13,401	22,516	3,176	5,853	270
41	12,703	16,470	2,918	6,822	3,426	11,135	17,609	2,723	5,509	344
42	6,280	6,922	728	3,809	4,127	11,624	20,062	2,900	5,895	250
43	14,800	29,883	5,353	7,475	4,124	17,194	26,843	4,195	8,436	279
44	8,774	13,038	2,038	4,780	3,495	10,395	17,019	2,257	4,729	299
45	5,259	10,244	1,508	3,558	3,648	9,968	18,353	2,378	4,714	276
46	7,380	12,457	2,044	4,433	3,347	10,710	20,128	2,976	5,166	268
47	14,484	20,104	3,465	6,963	4,054	12,801	19,288	2,808	5,945	305
48	12,775	14,729	2,394	6,149	3,421	12,445	19,095	2,507	5,595	238
49	10,086	16,170	2,745	5,165	3,593	12,591	20,173	2,890	5,466	257
50	14,657	15,446	2,714	7,235	3,942	11,934	19,973	3,084	5,798	330
51	17,047	19,813	3,292	7,273	4,421	13,444	21,891	2,905	5,523	330
52	10,720	10,850	1,828	5,570	4,341	14,704	22,411	3,387	6,717	374
53	14,634	19,156	3,206	6,841	3,729	11,809	20,194	2,700	5,812	328
54	8,347	19,861	3,412	4,341	4,149	16,223	26,944	3,806	7,862	270
55	15,033	18,614	3,436	7,413	4,353	15,165	22,143	2,981	6,607	305

	legbmcg1	trubmcg1	andbmcg1	gynbmcg1	tottpf1	totrpf1	tottg1	totfg1	totlg1	totffm1
1	1,134	988	59	325	52.5	51.0	97,464	51,214	46,250	49,224
2	942	861	64	286	38.2	36.8	67,071	25,629	41,442	44,087
3	1,046	784	52	303	49.7	48.2	81,065	40,329	40,736	43,380
4	710	680	48	209	40.6	39.2	58,629	23,807	34,822	36,897
5	681	642	42	196	39.9	38.4	52,223	20,834	31,389	33,455
6	921	717	52	254	30.3	29.2	62,944	19,088	43,856	46,343
7	866	836	48	237	41.3	40.0	74,451	30,780	43,671	46,191
8	954	701	44	254	39.3	38.1	73,762	28,955	44,806	47,120
9	759	507	42	192	42.2	41.0	53,917	22,729	31,188	32,700
10	1,243	933	51	326	52.5	50.9	97,805	51,324	46,481	49,444
11	1,085	672	49	264	46.6	45.4	98,812	45,999	52,813	55,243
12	1,246	1,046	65	345	49.1	47.5	94,713	46,470	48,242	51,443
13	776	605	38	217	42.8	41.5	70,589	30,190	40,399	42,542
14	1,127	1,165	81	315	49.1	47.1	80,238	39,406	40,832	44,235
15	1,003	726	52	261	43.0	41.5	74,137	31,867	42,270	44,833
16	659	475	33	177	45.4	43.9	58,874	26,717	32,158	34,075
17	694	504	49	176	34.3	33.0	54,354	18,646	35,707	37,785
18	878	574	41	197	42.3	41.2	78,987	33,436	45,551	47,770
19	1,083	796	46	317	48.5	46.9	76,469	37,111	39,359	42,036
20	981	817	56	268	48.6	47.0	72,811	35,397	37,414	39,982
21	1,049	1,025	60	298	44.7	43.1	77,253	34,521	42,731	45,622
22	655	567	40	167	43.4	42.0	54,008	23,417	30,591	32,391
23	904	707	42	278	54.7	53.1	76,783	41,971	34,812	37,140
24	911	625	44	227	40.5	39.0	60,312	24,432	35,880	38,152
25	895	856	58	236	38.8	37.2	59,838	23,194	36,644	39,237
26	1,012	792	45	264	44.5	43.1	74,281	33,070	41,211	43,702
27	907	858	57	246	48.5	46.8	71,535	34,687	36,849	39,487
28	1,056	620	44	277	46.7	45.5	99,368	46,404	52,964	55,485
29	910	556	38	221	51.5	50.3	91,634	47,160	44,474	46,671
30	899	609	37	230	44.8	43.4	68,767	30,782	37,984	40,209
31	821	819	44	233	41.4	39.8	62,642	25,905	36,737	39,241
32	811	663	47	224	41.8	40.4	63,649	26,624	37,025	39,348
33	815	540	37	207	37.9	36.8	63,349	24,024	39,325	41,300
34	1,087	908	57	289	56.7	55.2	103,283	58,612	44,672	47,623
35	698	513	37	197	28.5	27.5	49,375	14,065	35,310	37,167
36	941	844	55	261	57.2	55.6	85,538	48,955	36,583	39,139
37	834	678	55	234	41.6	40.1	66,361	27,575	38,786	41,143
38	895	676	45	92	40.3	39.1	73,087	29,474	43,614	45,919
39	1,113	817	65	256	31.9	30.3	54,473	17,356	37,117	39,946
40	793	728	34	233	41.0	39.8	74,592	30,558	44,035	46,306
41	1,047	794	72	278	48.6	46.7	67,889	32,995	34,894	37,663
42	707	508	42	192	27.7	26.8	53,718	14,866	38,852	40,683
43	1,178	876	47	321	48.2	46.9	99,135	47,801	51,333	54,214
44	812	731	44	236	42.6	40.9	58,865	25,069	33,796	36,209
45	749	647	43	222	34.1	32.7	53,095	18,114	34,982	37,263
46	797	579	43	212	37.7	36.4	59,203	22,331	36,872	38,965
47	1,065	856	56	299	49.5	47.8	77,381	38,318	39,063	41,776
48	825	528	36	205	44.3	43.0	68,060	30,166	37,894	39,984
49	876	798	70	232	42.9	41.4	68,215	29,265	38,950	41,387
50	1,029	727	50	258	47.0	45.4	72,935	34,292	38,644	41,254
51	1,185	655	38	277	49.1	47.6	83,882	41,226	42,656	45,334
52	1,119	809	55	292	35.6	34.2	68,949	24,542	44,408	47,242
53	1,044	851	64	276	49.6	47.9	76,325	37,860	38,465	41,170
54	945	684	39	259	38.4	37.4	82,267	31,631	50,636	52,955
55	973	624	42	245	45.6	44.3	82,009	37,398	44,611	47,000

	totbmcg1	armtpf2	legtpf2	trutpf2	andtpf2	gyntpf2	armrpf2	legrpf2	trurpf2	andrpf2
1	2,975	51.9	60.3	52.4	55.7	56.1	50.3	58.6	51.5	55.4
2	2,645	29.1	40.9	38.2	41.2	46.0	27.9	39.3	37.3	40.7
3	2,644	40.5	53.5	49.0	53.0	54.1	28.9	51.6	48.2	52.6
4	2,075	39.0	41.1	39.7	42.9	47.1	37.7	39.5	39.0	42.4
5	2,066	30.5	37.3	40.7	44.1	42.4	29.1	35.9	39.8	43.6
6	2,487	20.8	31.5	19.7	17.6	36.1	19.7	30.1	19.3	17.4
7	2,519	38.4	40.0	40.3	45.3	45.0	36.9	38.6	39.5	45.0
8	2,314	34.3	37.0	44.3	48.8	43.0	33.0	35.6	43.6	48.5
9	1,512	38.2	43.1	40.6	46.5	48.9	36.8	41.5	40.0	46.0
10	2,963	45.4	53.7	48.4	51.2	50.2	43.8	51.9	47.7	51.0
11	2,429	39.0	52.7	43.5	44.6	52.4	37.6	50.9	42.8	44.4
12	3,201	43.3	55.0	47.6	50.0	53.5	41.5	53.2	46.5	49.6
13	2,143	39.8	41.9	44.8	49.1	47.4	38.4	40.4	44.1	48.8
14	3,402	46.3	57.2	44.2	42.9	55.7	44.5	55.1	43.0	42.4
15	2,563	31.9	50.7	47.6	54.1	54.1	30.4	48.8	46.6	53.7
16	1,917	44.5	48.0	48.3	54.5	53.3	42.9	46.4	47.4	54.1
17	2,078	38.0	40.8	37.1	35.3	46.4	36.3	39.2	36.4	34.9
18	2,218	46.3	43.4	39.0	43.3	43.4	45.0	42.0	38.4	43.0
19	2,678	39.9	52.9	43.7	51.2	53.2	38.3	50.9	42.8	50.9
20	2,568	41.6	52.7	46.4	49.8	55.4	40.0	50.8	45.5	49.4
21	2,890	40.8	45.7	48.9	54.9	50.2	39.3	44.1	48.0	54.5
22	1,801	37.4	43.6	45.5	47.0	51.5	35.7	41.9	44.6	46.6
23	2,328	.	.	.	.	.	.	.	.	.
24	2,272	36.8	45.6	37.4	40.4	46.9	35.1	43.8	36.7	40.0
25	2,593	44.4	42.3	40.9	42.1	45.5	42.5	40.3	39.8	41.7
26	2,492	39.2	48.6	43.5	48.3	50.8	37.5	46.8	42.8	48.0
27	2,638	42.1	52.9	50.8	21.9	58.6	40.2	51.0	49.5	51.3
28	2,521	46.3	49.4	47.2	53.3	52.2	44.7	47.8	46.6	53.0
29	2,197	48.2	54.6	51.5	58.0	56.1	46.6	52.9	50.9	57.7
30	2,225	46.2	47.9	46.8	53.5	51.9	44.3	46.0	46.0	53.2
31	2,504	31.6	44.6	41.0	42.3	50.1	30.2	42.9	40.1	41.9
32	2,324	39.4	46.5	40.0	44.8	50.6	37.6	44.9	39.1	44.3
33	1,975	39.8	39.1	42.9	47.9	46.1	38.3	37.6	42.2	47.5
34	2,952	51.1	63.2	56.8	57.3	62.1	48.9	61.7	56.0	56.9
35	1,857	29.5	26.9	28.7	29.5	35.9	28.3	25.8	28.1	29.2
36	2,556	50.6	62.1	52.8	58.7	63.6	48.8	60.2	51.9	58.3
37	2,357	35.2	42.8	39.4	43.7	46.8	33.7	41.3	38.7	43.3
38	2,305	36.2	53.6	35.7	25.9	46.7	34.8	51.9	35.1	25.7
39	2,829	27.5	39.8	24.6	19.5	35.0	26.1	37.9	23.8	19.1
40	2,271	35.7	38.4	43.8	48.4	45.9	34.4	37.1	43.1	48.2
41	2,769	43.5	53.9	45.6	51.2	55.9	41.5	51.7	44.6	50.6
42	1,832	19.3	32.8	24.1	19.8	37.0	18.4	31.6	23.7	19.6
43	2,881	36.3	51.0	53.5	56.3	54.0	34.8	49.2	52.6	56.0
44	2,413	38.5	44.0	41.5	43.8	48.9	36.8	42.3	40.6	43.4
45	2,281	29.8	33.9	32.9	36.5	42.0	28.5	32.4	32.3	36.1
46	2,093	35.0	38.9	37.6	42.7	45.2	33.4	37.3	37.0	42.3
47	2,713	37.4	54.2	49.4	54.3	55.9	35.9	52.1	48.4	53.8
48	2,090	39.1	51.4	46.2	51.5	53.2	37.6	49.9	45.4	51.1
49	2,437	37.5	43.5	41.7	46.8	46.8	36.0	41.9	40.9	46.2
50	2,610	43.6	54.1	41.2	45.0	54.7	41.8	52.2	40.4	44.6
51	2,678	42.9	51.7	45.9	51.9	54.0	41.3	50.0	45.1	51.6
52	2,835	32.2	42.7	32.2	34.7	45.5	30.7	41.0	31.5	34.4
53	2,704	45.2	55.8	47.1	52.8	54.9	43.1	53.6	46.2	52.3
54	2,319	38.7	36.5	42.4	46.9	42.4	37.3	35.2	41.7	46.6
55	2,389	38.3	51.4	46.9	54.1	54.0	36.8	49.8	46.2	53.7

	gynrpf2	armtg2	legtg2	trutg2	andtg2	gyntg2	armfg2	legfg2	trufg2	andfg2
1	55.0	8,082	39,152	51,103	8,203	16,944	4,195	23,602	26,755	4,572
2	44.9	6,976	23,340	34,089	5,079	11,654	2,033	9,536	13,020	2,091
3	52.9	6,977	27,763	44,094	6,424	13,007	2,824	14,858	21,612	3,408
4	46.0	6,080	18,428	30,830	4,321	8,676	2,371	7,567	12,242	1,854
5	41.4	5,322	17,370	27,135	3,775	8,347	1,621	6,475	11,038	1,663
6	35.2	5,922	20,242	29,410	4,444	10,302	1,233	6,371	5,794	782
7	44.2	7,456	22,115	40,290	6,625	11,537	2,862	8,847	16,220	3,002
8	42.1	6,609	23,702	39,781	6,271	11,394	2,269	8,771	17,637	3,062
9	48.0	6,115	19,234	29,797	4,573	9,646	2,338	8,293	12,101	2,126
10	49.3	7,694	37,449	52,021	8,343	16,394	3,494	20,112	25,158	4,275
11	51.3	8,599	34,018	44,302	7,031	13,812	3,355	17,944	19,290	3,137
12	52.5	8,855	37,048	44,663	7,700	18,064	3,830	20,376	21,241	3,852
13	46.6	6,854	21,178	38,923	6,562	11,375	2,730	8,867	17,424	3,222
14	54.5	9,795	30,837	37,263	5,663	14,515	4,536	17,625	16,478	2,429
15	42.9	6,834	26,824	38,283	6,697	12,861	2,180	13,600	18,223	3,624
16	52.3	6,379	19,589	30,480	4,582	9,835	2,838	9,403	14,734	2,498
17	45.5	5,487	17,309	30,473	4,579	9,651	2,083	7,064	11,295	1,618
18	42.6	10,337	26,604	37,049	5,452	11,031	4,785	11,534	14,435	2,360
19	51.9	7,385	27,225	36,638	6,161	11,873	2,945	14,397	16,000	3,157
20	54.3	7,419	26,040	35,812	5,440	13,259	3,084	13,728	16,614	2,710
21	49.2	8,522	27,421	45,437	6,943	13,694	3,479	12,527	22,209	3,808
22	50.5	4,292	15,966	30,886	4,519	8,446	1,605	6,963	14,044	2,124
23	.	.	.	.	.	.	.	.	.	.
24	45.9	5,857	22,854	30,132	4,634	10,995	2,154	10,421	11,255	1,870
25	44.4	7,154	18,513	31,759	4,792	9,400	3,175	7,829	12,981	2,019
26	49.8	7,220	26,085	39,903	5,909	13,280	2,827	12,682	17,367	2,853
27	57.4	6,964	25,243	34,508	5,350	12,993	2,935	13,344	17,542	2,778
28	51.3	9,216	31,318	52,960	8,936	15,829	4,267	15,473	24,984	4,764
29	55.3	7,469	29,531	45,613	7,366	14,075	3,598	16,114	23,500	4,269
30	50.7	7,561	21,521	36,715	5,553	10,398	3,490	10,313	17,177	2,973
31	49.1	5,701	21,173	31,153	4,212	10,620	1,804	9,441	12,780	1,781
32	49.6	6,127	23,142	29,536	4,538	11,287	2,414	10,751	11,807	2,034
33	45.1	6,086	19,848	32,937	4,778	9,001	2,425	7,763	14,138	2,287
34	61.2	6,539	43,873	55,497	9,462	20,725	3,344	27,746	31,523	5,420
35	35.1	4,922	16,041	25,711	3,561	8,264	1,451	4,315	7,371	1,050
36	62.4	8,560	30,106	37,971	7,171	14,476	4,328	18,710	20,041	4,206
37	45.8	6,834	20,856	35,280	5,131	10,576	2,404	8,935	13,916	2,243
38	46.3	7,663	26,381	32,915	4,788	10,061	2,778	14,152	11,765	1,240
39	33.9	6,108	22,047	24,898	2,991	7,968	1,680	8,782	6,116	582
40	45.0	7,474	22,214	42,338	6,559	11,530	2,668	8,531	18,557	3,177
41	54.7	6,903	24,707	35,693	6,048	12,956	3,004	13,311	16,259	3,094
42	36.3	5,484	17,970	26,255	3,528	9,570	1,056	5,896	6,338	700
43	52.9	8,646	31,561	54,085	9,005	15,699	3,137	16,109	28,950	5,072
44	47.8	6,240	20,993	31,331	4,788	10,573	2,405	9,232	12,996	2,099
45	41.0	5,798	15,826	28,787	3,832	8,505	1,729	5,363	9,477	1,398
46	44.3	5,578	18,790	32,538	5,115	9,732	1,953	7,308	12,245	2,186
47	54.6	7,455	26,286	40,333	6,901	13,086	2,789	14,260	19,936	3,744
48	52.3	6,192	26,353	34,904	5,423	12,570	2,421	13,555	16,124	2,792
49	45.8	6,431	22,315	35,174	5,394	10,414	2,411	9,710	14,675	2,524
50	53.6	7,254	27,045	33,667	5,397	12,961	3,165	14,645	13,886	2,428
51	53.0	8,165	28,769	41,554	6,287	12,854	3,504	14,887	19,060	3,263
52	44.6	7,074	26,827	34,781	5,449	12,984	2,279	11,444	11,188	1,891
53	53.6	7,280	26,025	39,821	6,043	12,620	3,292	14,533	18,748	3,190
54	41.5	7,705	23,860	45,089	6,376	11,285	2,986	8,720	19,123	2,990
55	53.1	7,478	31,227	42,880	6,991	15,031	2,865	16,041	20,124	3,779

	gynfg2	armlg2	leglg2	trulg2	andlg2	gynlg2	armbmcg2	legbmcg2	trubmcg2	andbmcg2
1	9,502	3,887	15,551	24,348	3,631	7,443	263	1,138	806	56
2	5,366	4,943	13,804	21,068	2,988	6,288	312	941	822	59
3	7,037	4,154	12,905	22,482	3,017	5,970	290	1,029	723	49
4	4,088	3,708	10,861	18,587	2,467	4,588	207	713	587	49
5	3,537	3,701	10,895	16,097	2,112	4,810	242	671	614	39
6	3,718	4,689	13,871	23,616	3,662	6,584	339	901	657	52
7	5,197	4,594	13,268	24,070	3,622	6,340	295	832	794	49
8	4,896	4,340	14,931	22,144	3,209	6,498	261	926	651	43
9	4,720	3,778	10,941	17,696	2,447	4,926	238	758	492	44
10	8,231	4,200	17,337	26,864	4,068	8,163	283	1,286	711	38
11	7,236	5,243	16,074	25,012	3,894	6,576	314	1,230	753	43
12	9,656	5,025	16,672	23,422	3,847	8,408	369	1,246	1,046	65
13	5,396	4,124	12,311	21,499	3,340	5,979	250	761	602	37
14	8,078	5,259	13,211	20,786	3,234	6,437	404	1,139	1,055	70
15	6,956	4,653	13,224	20,059	3,073	5,906	337	1,063	817	55
16	5,239	3,542	10,186	15,746	2,084	4,596	228	667	580	37
17	4,475	3,404	10,245	19,178	2,961	5,176	249	692	574	53
18	4,784	5,552	15,071	22,614	3,093	6,247	305	864	532	34
19	6,319	4,440	12,828	20,638	3,004	5,554	305	1,086	755	44
20	7,344	4,335	12,311	19,198	2,731	5,915	296	983	718	49
21	6,874	5,043	14,894	23,227	3,135	6,821	323	1,006	824	50
22	4,348	2,687	9,003	16,842	2,395	4,098	205	647	584	44
23	.	.	.	.	.	.	.	.	.	.
24	5,154	3,704	12,434	18,877	2,764	5,840	277	915	571	41
25	4,279	3,979	10,684	18,778	2,772	5,121	320	893	854	52
26	6,747	4,392	13,403	22,537	3,057	6,533	313	1,010	677	40
27	7,610	4,029	11,899	16,966	2,572	5,383	345	927	919	66
28	8,256	4,950	15,845	27,976	4,172	7,573	327	1,068	672	51
29	7,894	3,871	13,417	22,113	3,097	6,181	259	953	598	31
30	5,395	4,071	11,208	19,538	2,580	5,003	313	908	595	39
31	5,324	3,897	11,732	18,373	2,431	5,297	265	817	735	41
32	5,710	3,713	12,392	17,730	2,505	5,577	301	814	665	49
33	4,148	3,661	12,086	18,799	2,491	4,853	246	822	528	34
34	12,863	3,195	16,127	23,974	4,042	7,862	299	1,109	823	61
35	2,970	3,471	11,726	18,341	2,511	5,294	213	690	522	35
36	9,202	4,231	11,396	17,931	2,965	5,274	304	974	647	45
37	4,948	4,430	11,921	21,365	2,888	5,628	294	804	644	51
38	4,697	4,886	12,229	21,149	3,548	5,364	327	907	642	43
39	2,789	4,428	13,265	18,782	2,409	5,179	335	1,121	832	60
40	5,288	4,806	13,684	23,781	3,381	6,242	279	773	686	35
41	7,238	3,899	11,396	19,434	2,953	5,719	344	1,060	728	67
42	3,542	4,427	12,074	19,917	2,828	6,028	254	687	500	41
43	8,478	5,509	15,452	25,135	3,933	7,221	365	1,197	956	50
44	5,170	3,834	11,761	18,335	2,690	5,403	302	835	716	44
45	3,576	4,069	10,464	19,310	2,434	4,929	267	739	589	37
46	4,401	3,624	11,483	20,294	2,929	5,331	263	798	585	47
47	7,312	4,665	12,026	20,397	3,156	5,774	308	1,091	852	58
48	6,684	3,771	12,798	18,780	2,631	5,886	250	804	590	42
49	4,876	4,020	12,604	20,498	2,871	5,538	266	880	728	70
50	7,085	4,088	12,401	19,781	2,969	5,876	326	1,013	708	50
51	6,947	4,661	13,882	22,494	3,025	5,907	328	1,035	663	40
52	5,913	4,795	15,384	23,593	3,558	7,070	354	1,112	783	56
53	6,923	3,988	11,492	21,073	2,853	5,697	351	1,070	790	57
54	4,783	4,720	15,140	25,966	3,386	6,501	307	919	724	43
55	8,119	4,614	15,186	22,756	3,211	6,912	310	989	691	50

	gynbmcg2	tottpf2	totrpf2	tottg2	totfg2	totlg2	totffm2	totbmcg2	armtpf3	legtpf3
1	322	54.3	52.9	102,498	55,707	46,791	49,586	2,794	49.4	58.5
2	287	37.0	35.7	68,363	25,325	43,038	45,642	2,604	27.3	40.0
3	289	48.7	47.3	82,750	40,318	42,431	44,987	2,556	41.2	54.7
4	207	38.9	37.6	59,157	22,993	36,164	38,137	1,973	39.6	42.1
5	198	37.1	35.7	53,678	19,904	33,774	35,819	2,044	30.5	39.4
6	246	23.5	22.6	59,266	13,914	45,352	47,753	2,401	19.3	31.1
7	223	38.9	37.6	73,798	28,689	45,109	47,535	2,426	38.8	40.3
8	246	39.9	38.7	73,968	29,476	44,492	46,743	2,251	33.1	38.8
9	192	41.2	40.1	55,476	22,829	32,647	34,150	1,503	40.1	44.3
10	313	49.2	47.9	101,230	49,848	51,382	54,176	2,795	47.1	56.3
11	288	45.8	44.5	90,705	41,546	49,159	51,911	2,752	37.5	48.6
12	345	49.1	47.5	94,713	46,470	48,242	51,443	3,201	45.0	61.9
13	217	42.1	40.9	70,964	29,876	41,088	43,205	2,118	42.2	41.9
14	307	48.5	46.6	81,830	39,697	42,133	45,433	3,300	45.8	58.0
15	290	46.0	44.4	75,921	37,908	41,013	43,731	2,718	32.8	49.9
16	188	46.3	44.8	60,151	27,846	32,304	34,289	1,984	44.2	47.8
17	176	37.2	35.9	56,997	21,204	35,793	37,928	2,135	36.0	42.3
18	200	40.4	39.4	78,371	31,696	46,674	48,843	2,168	44.4	42.9
19	310	45.7	44.2	74,901	34,251	40,650	43,278	2,627	39.8	51.0
20	261	46.9	45.4	73,354	34,408	38,947	41,411	2,465	40.4	51.5
21	279	45.9	44.5	85,387	39,169	46,218	48,834	2,616	41.0	47.1
22	170	43.0	41.6	54,264	23,330	30,934	32,741	1,807	35.0	43.8
23	.	.	.	.	.	.	.	.	52.1	58.2
24	228	39.4	38.0	62,429	24,569	37,860	40,082	2,222	38.3	45.6
25	237	40.7	39.1	60,925	24,806	36,119	38,693	2,574	43.4	42.8
26	257	44.0	42.6	76,532	33,655	42,877	45,294	2,417	39.5	47.7
27	273	49.4	47.5	70,580	34,842	35,738	38,452	2,714	39.1	52.6
28	275	46.8	45.6	97,488	45,649	51,839	54,428	2,589	46.6	49.3
29	213	51.1	49.8	86,857	44,358	42,498	44,775	2,277	46.6	54.4
30	234	45.9	44.4	69,501	31,874	37,627	39,849	2,222	46.1	47.3
31	224	40.1	38.6	61,833	24,820	37,013	39,402	2,389	34.1	44.7
32	227	41.1	39.6	62,821	25,792	37,030	39,367	2,337	40.1	47.8
33	197	40.2	39.0	62,516	25,130	37,385	39,358	1,973	41.1	38.6
34	299	57.9	56.5	110,368	63,897	46,471	49,268	2,797	51.2	63.2
35	196	27.2	26.3	50,287	13,698	36,589	38,437	1,847	27.4	27.2
36	272	55.0	53.4	80,135	44,080	36,055	38,494	2,439	55.1	62.3
37	235	38.9	37.6	66,987	26,070	40,917	43,200	2,284	36.6	42.6
38	81	41.7	40.4	71,060	29,607	41,453	43,750	2,297	31.8	45.5
39	251	30.4	29.0	56,882	17,301	39,581	42,439	2,858	29.8	42.7
40	231	40.1	39.0	76,535	30,675	45,860	48,050	2,190	36.5	37.8
41	275	47.1	45.4	70,975	33,456	37,519	40,243	2,723	46.3	53.0
42	194	25.9	25.0	53,297	13,795	39,502	41,310	1,808	16.4	31.5
43	336	50.0	48.5	98,442	49,233	49,209	52,265	3,056	38.8	50.5
44	242	40.9	39.4	62,044	25,398	36,646	39,076	2,430	38.0	46.1
45	211	31.8	30.6	54,250	17,251	36,999	39,181	2,183	31.6	34.4
46	213	36.7	35.5	60,224	22,115	38,109	40,196	2,086	41.2	40.5
47	303	48.8	47.2	77,541	37,856	39,686	42,406	2,721	39.8	53.4
48	217	46.3	44.9	71,134	32,901	38,232	40,383	2,151	35.8	48.7
49	237	40.9	39.5	67,374	27,549	39,825	42,204	2,379	36.7	42.3
50	258	45.4	43.8	71,751	32,584	39,167	41,738	2,571	43.7	53.0
51	252	46.5	45.2	82,357	38,332	44,025	46,541	2,516	41.8	54.8
52	289	35.3	34.0	72,335	25,565	46,770	49,551	2,781	33.3	42.6
53	286	48.9	47.2	76,863	37,581	39,282	41,960	2,679	43.8	54.4
54	243	39.1	38.0	81,429	31,840	49,589	51,986	2,397	38.4	36.8
55	254	46.8	45.5	85,239	39,879	45,360	47,828	2,468	37.6	50.9

	trutpf3	andtpf3	gyntpf3	armrpf3	legrpf3	trurpf3	andrpf3	gynrpf3	armtg3	legtg3
1	50.8	53.6	53.4	48.0	56.8	50.1	53.2	52.5	9,071	39,366
2	36.2	41.2	44.1	26.1	38.4	35.3	40.7	43.1	6,750	22,626
3	50.6	53.9	55.7	39.8	52.7	49.8	53.5	54.5	8,096	27,898
4	40.5	43.6	47.2	38.2	40.5	39.8	43.2	46.2	6,040	17,698
5	41.3	43.3	44.8	29.1	37.9	40.4	42.9	43.8	4,878	17,109
6	20.9	16.5	35.5	18.2	29.7	20.4	16.3	34.7	5,351	19,136
7	42.4	47.1	46.1	37.2	38.8	41.5	46.6	45.2	7,057	21,227
8	44.9	52.3	43.2	31.8	37.4	44.3	52.1	42.3	6,337	24,516
9	39.6	44.4	50.0	38.6	42.7	39.0	44.0	49.0	6,196	19,950
10	51.6	54.6	53.2	45.3	54.5	50.9	54.4	52.2	6,519	37,305
11	42.2	44.4	48.0	36.2	47.2	41.6	44.2	47.1	7,841	35,808
12	48.1	51.0	59.3	42.9	59.8	46.9	50.6	58.2	9,583	34,884
13	44.6	49.1	47.2	40.8	40.5	43.9	48.8	46.3	7,135	21,487
14	44.8	43.9	55.8	44.0	55.9	43.6	43.4	54.6	9,677	30,893
15	47.2	52.2	52.6	31.2	48.0	46.2	51.7	51.5	6,745	27,189
16	47.0	52.8	51.8	42.7	46.2	46.3	52.4	50.9	6,691	19,482
17	37.6	37.7	48.2	34.3	40.6	36.9	37.3	47.4	5,357	16,961
18	40.4	42.3	41.4	43.0	41.5	39.8	42.0	40.7	8,880	25,630
19	43.1	48.8	51.7	38.2	49.1	42.2	48.5	50.4	7,542	25,912
20	44.6	49.3	53.5	38.9	49.8	43.7	48.9	52.5	7,506	26,075
21	51.5	56.7	52.2	39.6	45.5	50.5	56.2	51.1	8,989	27,414
22	46.5	47.1	52.3	33.3	42.1	45.5	46.7	51.3	3,971	15,461
23	57.5	61.4	59.8	50.1	56.3	56.6	61.0	58.6	5,766	25,534
24	39.7	42.5	46.9	36.5	43.8	38.8	42.1	45.9	5,738	21,875
25	41.0	42.5	46.0	41.5	41.0	39.9	42.0	44.9	7,068	19,730
26	44.9	48.8	50.6	37.8	45.9	44.1	48.5	49.7	7,239	25,541
27	49.2	51.5	58.9	37.1	50.7	47.9	50.8	57.7	6,384	24,524
28	48.8	53.8	52.8	44.9	47.7	48.1	53.6	51.9	9,259	31,550
29	50.0	56.0	55.8	45.1	52.7	49.4	55.8	54.9	8,250	28,804
30	49.1	54.4	51.2	44.2	45.3	48.1	54.0	50.0	6,975	20,847
31	44.6	46.8	51.0	32.6	43.1	43.5	46.3	49.9	6,204	21,704
32	39.6	46.7	51.3	38.3	46.2	38.7	46.2	50.4	6,397	22,906
33	42.1	46.6	45.5	39.7	37.1	41.4	46.3	44.5	6,801	20,288
34	59.6	59.2	61.8	49.2	61.7	58.6	58.8	60.9	6,552	46,242
35	28.3	29.2	35.8	26.3	26.1	27.8	28.9	34.9	4,775	16,407
36	52.6	58.3	64.0	53.5	60.4	51.8	57.9	62.8	10,638	32,439
37	39.1	44.2	46.9	35.1	41.1	38.4	43.7	45.9	6,947	21,152
38	29.4	22.0	43.3	30.5	44.1	28.9	21.8	43.1	7,469	24,979
39	28.8	24.1	39.1	28.1	40.7	27.8	23.6	37.9	5,867	22,070
40	42.5	45.8	45.0	35.2	36.6	41.8	45.6	44.1	7,494	22,709
41	46.6	52.1	55.5	44.1	51.0	45.6	51.5	54.4	6,790	25,161
42	21.9	17.9	35.2	15.7	30.3	21.5	17.7	34.5	5,521	18,417
43	51.5	56.9	52.5	37.4	48.9	50.9	56.7	51.6	9,791	33,035
44	40.9	46.2	50.1	36.2	44.3	40.0	45.8	49.0	6,123	20,305
45	33.4	37.2	41.7	30.2	32.8	32.8	36.8	40.6	5,830	15,618
46	37.5	42.9	48.0	39.4	38.9	36.8	42.5	47.0	5,988	18,391
47	47.4	51.6	55.1	38.3	51.3	46.5	51.2	53.8	7,700	26,244
48	40.1	42.4	51.5	34.4	47.1	39.4	42.1	50.5	5,891	23,587
49	40.4	45.3	46.2	35.1	40.7	39.6	44.8	45.1	6,057	22,276
50	41.5	46.2	53.5	41.9	51.2	40.7	45.8	52.6	7,435	27,816
51	47.8	53.0	56.4	40.0	52.6	47.0	52.6	55.2	7,504	28,710
52	33.8	36.7	45.6	31.7	40.9	33.1	36.3	44.6	7,055	26,675
53	47.7	51.7	54.2	41.7	52.2	46.6	51.1	52.9	6,786	24,261
54	42.7	47.8	42.6	37.0	35.4	42.0	47.5	41.7	7,838	23,487
55	48.0	55.3	54.0	36.1	49.4	47.3	54.9	53.1	7,316	32,450

	trutg3	andtg3	gyntg3	armfg3	legfg3	trufg3	andfg3	gynfg3	armlg3	leglg3
1	52,062	8,586	17,159	4,482	23,011	26,456	4,601	9,164	4,589	16,356
2	32,575	4,942	10,990	1,841	9,042	11,782	2,038	4,849	4,909	13,584
3	43,116	6,269	12,962	3,336	15,255	21,819	3,379	7,219	4,760	12,643
4	32,457	4,570	8,967	2,392	7,452	13,144	1,994	4,234	3,648	10,246
5	27,629	3,749	8,160	1,486	6,742	11,407	1,625	3,660	3,392	10,366
6	30,023	4,537	10,009	1,034	5,950	6,275	747	3,555	4,317	13,186
7	39,200	6,340	10,928	2,734	8,565	16,627	2,984	5,039	4,322	12,662
8	43,300	7,087	12,157	2,097	9,501	19,451	3,707	5,247	4,240	15,014
9	29,516	4,451	9,549	2,481	8,844	11,680	1,977	4,773	3,714	11,106
10	53,915	9,004	16,863	3,069	21,017	27,834	4,919	8,973	3,450	16,287
11	47,245	7,689	14,694	2,942	17,414	19,936	3,418	7,049	4,899	18,394
12	43,926	7,500	17,229	4,315	21,596	21,124	3,826	10,212	5,268	13,288
13	38,896	6,680	11,539	3,010	9,006	17,353	3,279	5,443	4,125	12,481
14	38,070	5,840	14,504	4,431	17,910	17,047	2,562	8,088	5,246	12,982
15	38,963	6,602	13,283	2,213	13,555	18,377	3,444	6,992	4,532	13,634
16	30,459	4,477	9,872	2,956	9,305	14,328	2,365	5,114	3,735	10,176
17	29,398	4,454	9,089	1,930	7,175	11,059	1,679	4,385	3,428	9,786
18	39,158	5,418	10,497	3,943	11,003	15,809	2,293	4,349	4,936	14,627
19	35,749	5,752	11,804	3,000	13,223	15,393	2,810	6,101	4,542	12,690
20	36,363	5,599	13,427	3,030	13,441	16,202	2,762	7,178	4,475	12,635
21	44,851	6,912	13,611	3,689	12,920	23,091	3,916	7,101	5,300	14,494
22	30,047	4,555	8,219	1,389	6,776	13,975	2,145	4,300	2,582	8,685
23	45,514	8,059	13,457	3,007	14,850	26,168	4,945	8,042	2,760	10,684
24	29,095	4,387	10,437	2,198	9,976	11,537	1,864	4,893	3,540	11,899
25	32,260	4,916	9,575	3,069	8,454	13,218	2,089	4,400	3,998	11,276
26	41,107	5,923	13,146	2,863	12,171	18,448	2,891	6,655	4,377	13,369
27	34,570	5,277	12,591	2,498	12,901	17,017	2,717	7,421	3,886	11,623
28	53,363	9,261	15,827	4,310	15,539	26,021	4,986	8,357	4,949	16,012
29	44,644	7,336	13,925	3,844	15,677	22,324	4,111	7,768	4,406	13,127
30	36,027	5,527	10,189	3,217	9,855	17,673	3,006	5,219	3,758	10,992
31	31,401	4,258	10,651	2,117	9,703	14,015	1,994	5,429	4,087	12,001
32	30,809	4,911	11,440	2,564	10,952	12,187	2,292	5,871	3,833	11,953
33	32,838	4,520	9,322	2,795	7,840	13,823	2,108	4,243	4,006	12,448
34	53,413	8,917	20,954	3,354	29,242	31,844	5,280	12,948	3,198	17,000
35	24,683	3,285	8,022	1,311	4,466	6,996	959	2,869	3,464	11,940
36	37,122	6,882	15,043	5,858	20,208	19,531	4,012	9,622	4,780	12,232
37	33,431	4,724	10,515	2,543	9,017	13,064	2,087	4,930	4,404	12,134
38	31,993	4,607	8,965	2,378	11,376	9,407	1,014	3,883	5,091	13,603
39	24,147	2,989	7,922	1,747	9,417	6,954	721	3,100	4,120	12,653
40	43,351	6,632	11,405	2,732	8,594	18,406	3,040	5,128	4,762	14,114
41	43,460	5,938	12,888	3,145	13,344	16,051	3,093	7,155	3,644	11,816
42	25,834	3,679	9,391	904	5,792	5,661	658	3,303	4,617	12,624
43	55,937	9,144	16,380	3,802	16,690	28,830	5,205	8,607	5,988	16,345
44	31,781	5,245	10,526	2,324	9,354	12,987	2,423	5,271	3,799	10,951
45	28,182	4,058	8,255	1,842	5,369	9,424	1,509	3,438	3,988	10,249
46	32,227	5,067	9,830	2,469	7,450	12,076	2,172	4,714	3,518	10,941
47	39,745	6,790	12,972	3,068	14,020	18,846	3,504	7,144	4,632	12,224
48	31,549	4,569	11,161	2,112	11,494	12,638	1,939	5,746	3,779	12,093
49	35,022	5,318	10,462	2,220	9,419	14,165	2,409	4,833	3,836	12,857
50	34,780	5,654	13,310	3,250	14,739	14,429	2,611	7,123	4,185	13,077
51	42,647	6,238	12,565	3,138	15,734	20,380	3,304	7,091	4,366	12,975
52	36,072	5,532	13,094	2,350	11,361	12,199	2,031	5,969	4,705	15,314
53	36,913	5,567	11,646	2,974	13,208	17,610	2,878	6,310	3,812	11,053
54	44,841	6,477	11,348	3,012	8,631	19,147	3,095	4,840	4,827	14,855
55	43,998	7,268	15,001	2,748	16,522	21,140	4,019	8,102	4,568	15,928

	trulg3	andlg3	gynlg3	armbmcg3	legbmcg3	trubmcg3	andbmcg3	gynbmcg3	tottpf3	totrpf3
1	25,606	3,985	7,994	265	1,121	791	57	304	52.6	51.2
2	20,794	2,904	6,141	312	915	791	63	267	35.4	34.1
3	21,297	2,890	5,743	293	1,045	727	49	291	49.9	48.4
4	19,313	2,577	4,733	218	685	593	48	203	39.7	38.4
5	16,223	2,124	4,501	232	663	606	37	197	38.1	36.8
6	23,748	3,790	6,454	335	894	695	60	241	23.6	22.7
7	22,574	3,357	5,890	297	839	850	56	231	40.2	38.9
8	23,850	3,380	6,911	253	920	606	35	233	40.8	39.7
9	17,837	2,474	4,776	241	764	456	40	184	41.3	40.3
10	26,081	4,086	7,891	259	1,281	735	44	320	52.1	50.7
11	27,309	4,271	7,645	280	1,089	696	48	264	43.4	42.3
12	22,802	3,673	7,017	470	1,224	1,128	70	332	52.0	50.1
13	21,543	3,401	6,096	249	753	591	37	209	42.3	41.1
14	21,023	3,279	6,416	389	1,127	1,055	67	298	48.9	47.0
15	20,586	3,158	6,291	347	1,030	833	60	284	45.6	44.0
16	16,131	2,112	4,758	234	639	512	35	181	45.4	44.0
17	18,338	2,776	4,704	268	696	570	48	171	37.7	36.3
18	23,348	3,125	6,148	295	858	581	48	188	40.6	39.4
19	20,357	2,942	5,702	314	1,002	756	45	296	44.5	43.0
20	20,160	2,837	6,249	282	941	677	51	247	45.4	44.0
21	21,760	2,996	6,510	337	1,010	890	52	292	47.7	46.2
22	16,072	2,410	3,920	206	635	634	41	167	43.4	41.9
23	19,346	3,114	5,415	237	861	710	48	265	56.2	54.6
24	17,557	2,524	5,544	275	905	613	42	227	40.6	39.1
25	19,043	2,828	5,175	320	910	827	57	233	40.8	39.2
26	22,659	3,033	6,491	337	953	685	42	248	44.2	42.9
27	17,553	2,560	5,170	342	927	931	67	271	48.2	46.4
28	27,342	4,275	7,471	332	1,046	689	46	275	47.7	46.5
29	22,320	3,225	6,158	274	930	592	36	224	50.0	48.7
30	18,354	2,521	4,971	307	885	688	44	241	46.9	45.4
31	17,387	2,264	5,222	287	787	827	48	227	42.2	40.6
32	18,622	2,619	5,568	295	805	650	49	219	41.3	39.9
33	19,015	2,412	5,080	246	823	527	36	204	39.7	38.5
34	21,569	3,637	8,006	262	1,170	912	68	314	59.5	58.0
35	17,688	2,326	5,153	204	691	510	37	192	26.9	25.9
36	17,591	2,870	5,421	319	1,008	616	47	283	55.7	54.1
37	20,367	2,637	5,585	295	782	632	54	228	38.8	37.6
38	22,587	3,593	5,082	320	794	605	45	38	35.0	33.9
39	17,194	2,268	4,822	339	1,092	851	62	248	33.7	32.1
40	24,945	3,592	6,277	265	757	644	33	215	39.2	38.2
41	18,409	2,845	5,733	348	1,008	739	64	258	47.7	45.9
42	20,173	3,021	6,089	254	687	476	41	192	24.1	23.3
43	27,108	3,939	7,773	371	1,127	680	39	289	48.8	47.5
44	18,794	2,822	5,255	298	809	658	40	231	41.2	39.7
45	18,758	2,549	4,816	279	739	580	42	218	32.5	31.2
46	20,152	2,895	5,116	273	783	547	45	204	37.7	36.5
47	20,899	3,285	5,828	314	1,068	771	56	301	47.7	45.1
48	18,911	2,630	5,415	255	824	507	41	207	41.7	40.4
49	20,857	2,909	5,629	265	865	724	65	243	39.8	38.4
50	20,351	3,043	6,188	329	956	658	46	242	45.1	43.6
51	22,267	2,934	5,474	341	1,196	712	40	292	48.7	47.1
52	23,873	3,502	7,125	355	1,088	813	57	284	36.2	34.8
53	19,303	2,688	5,336	340	1,035	869	62	273	48.5	46.7
54	25,694	3,382	6,508	308	921	713	44	246	39.4	38.3
55	22,858	3,248	6,899	306	977	664	50	255	47.1	45.9

	tottg3	totfg3	totlg3	totffm3	totbmcg3	totbmd1	totperc1	totalt1	l1l41	l1l4bmc1
1	104,852	55,118	49,734	52,495	2,761	1.239	110	1.4	1.272	61.9
2	65,881	23,352	42,530	45,041	2,511	1.199	107	0.9	1.334	82.0
3	83,273	41,541	41,732	44,318	2,586	1.151	102	0.3	1.094	55.0
4	59,974	23,785	36,189	38,135	1,946	0.981	87	-1.8	1.177	62.0
5	53,480	20,398	33,081	35,091	2,010	1.043	93	-1.0	1.107	58.2
6	58,401	13,807	44,594	47,020	2,426	1.049	93	-0.9	1.038	62.9
7	71,400	28,717	42,682	45,175	2,493	1.173	104	0.6	1.160	67.3
8	77,951	31,812	46,138	48,314	2,176	1.060	94	-0.8	1.044	51.0
9	55,671	23,008	32,663	34,125	1,462	0.896	80	-2.9	0.918	55.7
10	101,609	52,977	48,632	51,428	2,796	1.217	108	1.2	1.178	62.0
11	94,764	41,167	53,597	56,115	2,518	1.124	100	0.0	1.203	63.8
12	92,561	48,099	44,463	47,860	3,397	1.378	122	3.2	1.325	80.7
13	71,445	30,205	41,241	43,332	2,091	1.067	95	-0.7	0.972	46.8
14	82,684	40,434	42,250	45,523	3,273	1.241	110	1.4	1.391	82.5
15	76,848	35,012	41,836	44,547	2,711	1.245	110	1.5	1.337	73.4
16	60,416	27,433	32,983	34,869	1,886	1.111	90	-0.2	1.029	47.6
17	55,548	20,942	34,606	36,756	2,150	1.221	107	1.0	1.091	55.5
18	78,291	31,752	46,539	48,741	2,202	1.125	100	0.0	1.068	52.9
19	72,946	32,477	40,470	43,022	2,552	1.204	107	1.0	1.359	67.3
20	74,034	33,585	40,449	42,808	2,359	1.175	104	0.6	1.169	62.8
21	85,216	40,652	44,564	47,271	2,707	1.119	100	-0.1	1.097	66.4
22	52,658	22,862	29,796	31,648	1,852	1.027	91	-1.2	1.232	57.7
23	79,999	44,930	35,069	37,358	2,289	1.142	102	0.2	1.193	57.4
24	60,277	24,455	35,822	38,068	2,246	1.078	96	-0.6	1.067	60.5
25	62,680	25,564	37,116	39,695	2,579	1.150	102	0.3	1.209	65.9
26	77,524	34,297	43,228	45,638	2,410	1.130	100	0.1	1.017	53.7
27	69,311	33,403	35,908	38,636	2,728	1.095	97	-0.4	1.273	64.7
28	98,130	46,813	51,317	53,901	2,584	1.211	108	1.1	1.188	62.8
29	85,831	42,934	42,897	45,166	2,269	1.051	94	-0.9	0.974	50.3
30	67,120	31,496	35,624	37,908	2,284	1.150	102	0.3	1.130	51.7
31	63,241	26,691	36,549	39,038	2,489	1.106	98	-0.2	1.006	54.5
32	64,176	26,533	37,643	39,973	2,330	1.165	104	0.5	1.250	63.4
33	63,563	25,250	38,313	40,300	1,987	1.030	92	-1.2	0.949	46.9
34	110,401	65,697	44,704	47,619	2,915	1.278	113	1.9	1.319	78.0
35	49,457	13,305	36,151	37,981	1,830	1.061	94	-0.8	0.931	49.7
36	83,650	46,619	37,031	39,501	2,470	1.146	102	0.3	1.097	52.2
37	65,451	25,416	40,035	42,270	2,235	1.067	95	-0.7	1.163	67.9
38	68,656	23,999	44,658	46,791	2,133	0.990	88	-1.7	0.973	57.7
39	55,908	18,834	37,074	39,925	2,851	1.248	111	1.5	.	.
40	78,258	30,653	47,606	49,695	2,089	1.096	97	-0.4	1.045	52.6
41	70,090	33,405	36,685	39,385	2,700	1.180	105	0.7	1.206	77.6
42	53,363	12,842	40,521	42,290	1,769	0.947	84	-2.2	0.829	47.9
43	103,308	50,377	52,932	55,650	2,718	1.247	111	1.5	1.199	74.7
44	61,625	25,396	36,229	38,562	2,333	1.186	105	0.8	1.134	55.4
45	53,372	17,324	36,048	38,225	2,177	1.198	107	0.9	1.106	53.2
46	59,916	22,607	37,309	39,363	2,054	1.122	100	0.0	1.198	59.1
47	77,193	36,795	40,399	43,010	2,611	1.208	102	1.0	1.413	72.6
48	64,667	26,988	37,678	39,768	2,090	1.087	97	-0.5	0.983	50.3
49	66,654	26,525	40,128	42,487	2,359	1.111	99	-0.2	1.456	84.8
50	73,843	33,266	40,576	43,036	2,460	1.089	97	-0.5	1.047	58.2
51	82,772	40,281	42,491	45,236	2,745	1.168	104	0.5	1.087	64.8
52	73,457	26,596	46,887	49,675	2,788	1.209	107	1.0	1.240	76.6
53	71,741	34,790	36,951	39,657	2,706	1.184	105	0.7	1.268	72.1
54	80,485	31,712	48,772	51,144	2,372	1.150	102	0.3	1.092	68.6
55	87,545	41,262	46,283	48,706	2,423	1.137	101	0.2	1.103	61.8

	l1l4p1	l1l4t1	l2l41	l2l4bmc1	l2l4p1	l2l4t1	lneck1	lnekbmc1	lneckp1	lneckt1
1	108	0.8	1.360	49.7	113	1.3	0.955	5.0	92	-0.6
2	113	1.3	1.343	65.1	112	1.2	0.992	4.9	96	-0.3
3	93	-0.1	1.114	44.7	95	-0.5	0.909	4.2	88	-0.9
4	100	0.0	1.235	50.1	103	0.3	0.847	3.8	82	-1.4
5	94	-0.6	1.117	47.5	93	-0.7	0.703	3.4	68	-2.4
6	88	-1.2	1.091	51.0	91	-0.9	0.901	5.0	87	-1.0
7	98	-0.2	1.178	53.5	98	-0.2	0.903	4.1	87	-1.0
8	88	-1.1	1.088	42.2	91	-0.9	0.825	4.3	79	-1.5
9	78	-2.2	0.940	45.8	78	-2.2	0.840	3.8	81	-1.4
10	100	0.0	1.219	50.2	102	0.2	1.063	5.0	102	0.2
11	102	0.2	1.284	52.2	107	0.7	0.888	4.1	86	1.1
12	112	1.2	1.355	66.1	113	1.3	1.098	5.4	106	0.4
13	82	-1.7	0.994	37.5	83	-1.7	0.839	3.9	81	-1.4
14	118	1.8	1.390	66.5	116	1.6	0.844	5.1	81	-1.4
15	113	1.3	1.353	59.4	113	1.3	1.018	4.7	98	-0.1
16	87	-1.3	1.064	38.5	89	-1.1	0.812	3.4	78	-1.6
17	92	-0.8	1.115	45.4	92	-0.8	0.794	3.3	77	-1.8
18	91	-0.9	1.107	42.4	92	-0.8	0.868	4.2	84	-1.2
19	115	1.5	1.320	52.0	110	1.0	1.118	4.9	108	0.6
20	99	-0.1	1.196	50.7	100	0.0	0.971	4.5	94	-0.5
21	93	-0.7	1.115	50.8	93	-0.7	0.896	4.4	86	-1.0
22	104	0.4	1.311	48.0	109	0.9	0.726	2.9	70	-2.2
23	101	0.1	1.242	46.5	104	0.4	0.892	4.1	86	-1.1
24	90	-0.9	1.070	47.0	89	-1.1	0.790	3.6	76	-1.8
25	102	0.2	1.248	54.2	104	0.4	0.949	4.6	91	-0.6
26	86	-1.4	1.048	43.1	87	-1.3	0.868	4.2	84	-1.2
27	108	0.8	1.339	51.3	112	1.2	1.070	5.2	103	0.2
28	101	0.1	1.180	48.5	98	-0.2	0.957	4.9	92	-0.6
29	83	-1.7	1.017	41.3	85	-1.5	0.827	4.1	80	-1.5
30	96	-0.4	1.164	41.6	97	-0.3	1.009	4.5	97	-0.2
31	85	-1.5	1.009	43.9	84	-1.6	0.866	4.3	83	-1.2
32	106	0.6	1.269	50.0	106	0.6	0.989	4.3	95	-0.4
33	80	-1.9	0.985	38.9	82	-1.8	0.837	3.8	81	-1.4
34	112	1.2	1.333	62.6	111	1.1	0.927	4.6	89	-0.8
35	99	-2.1	0.943	39.1	79	-2.1	0.796	3.5	77	-1.7
36	93	0.7	1.093	38.8	91	-0.9	0.830	3.7	80	-1.5
37	99	-0.1	1.181	53.9	98	-0.2	0.736	3.6	71	-2.2
38	82	-1.7	1.008	47.0	84	-1.6	.	.	.	.
39	.	.	1.170	48.4	.	.	1.146	5.8	110	0.8
40	89	-1.1	1.089	43.4	91	-0.9	0.856	3.8	82	-1.3
41	102	0.2	1.228	63.5	102	0.2	0.907	4.5	87	-0.9
42	70	-2.9	0.850	38.7	71	-2.9	0.659	3.1	63	-2.7
43	102	0.2	1.223	60.9	102	0.2	0.908	4.7	87	-0.9
44	96	-0.4	1.174	44.6	98	-0.2	0.938	4.9	90	-0.7
45	94	-0.6	1.138	43.2	95	-0.5	1.006	4.7	97	-0.2
46	102	0.1	1.230	47.5	103	0.3	0.868	4.0	84	-1.2
47	120	1.9	1.468	59.1	122	2.2	1.059	5.0	102	0.1
48	83	-1.6	0.974	38.7	81	-1.9	0.824	4.0	79	-1.5
49	123	2.3	1.508	70.7	126	2.6	0.812	3.7	78	-1.6
50	89	-1.1	1.075	46.4	90	-1.0	0.835	4.3	80	-1.5
51	72	-0.8	1.109	54.7	92	-0.8	0.892	4.2	86	-1.0
52	105	0.5	1.271	61.2	106	0.6	1.052	5.4	101	0.1
53	107	0.7	1.335	59.0	101	1.1	1.063	5.1	102	0.2
54	93	-0.7	1.072	51.7	89	-1.1	0.940	4.1	91	-0.7
55	93	-0.6	1.100	48.6	92	-0.8	0.902	4.5	87	-1.0

	lward1	lwardbc1	lwardp1	lwardt1	ltro1	ltrobmc1	ltrop1	ltrot1	lthip1	lthipbc1
1	0.701	2.1	77	-1.6	0.725	10.4	85	-1.1	0.939	31.5
2	0.803	2.2	88	-0.8	0.928	12.0	109	0.7	1.152	35.9
3	0.687	1.6	76	-1.7	0.825	12.7	97	-0.2	0.964	32.4
4	0.533	1.2	59	-2.9	0.615	7.3	72	-2.0	0.821	24.6
5	0.581	1.5	64	-2.5	0.650	7.4	76	-1.7	0.788	23.6
6	0.630	2.1	69	-2.2	0.795	13.2	93	-0.5	0.937	35.0
7	0.745	1.7	82	-1.3	0.777	9.2	91	-0.6	0.976	29.0
8	0.655	2.0	92	-2.0	0.676	11.1	79	-1.5	0.854	30.9
9	0.674	1.6	74	-1.8	0.628	7.6	74	-1.9	0.808	24.2
10	0.896	2.2	98	-0.2	0.975	11.9	115	1.1	1.133	35.5
11	0.739	1.7	81	-1.3	0.825	10.7	97	-0.2	0.961	30.9
12	0.940	2.5	103	0.2	1.084	14.6	122	2.0	1.236	40.2
13	0.571	1.4	63	-2.0	0.757	9.9	85	-0.8	0.916	28.0
14	0.642	2.6	71	-2.1	0.694	9.9	82	-1.4	0.855	30.1
15	0.759	1.8	83	-1.2	0.856	12.9	101	0.0	1.080	35.6
16	0.673	1.3	74	-1.8	0.683	6.7	80	-1.5	0.917	24.2
17	0.619	1.2	68	-2.2	0.614	5.7	77	-2.1	0.823	21.3
18	0.614	1.6	68	-2.3	0.792	10.3	93	-0.5	0.975	30.8
19	0.889	1.9	98	-0.2	0.940	14.6	111	0.8	1.212	39.9
20	0.774	1.9	85	-1.0	0.855	12.1	101	0.0	1.023	32.9
21	0.792	2.2	87	-0.9	0.781	10.4	92	-0.6	1.006	32.7
22	0.621	1.1	68	-2.2	0.700	7.2	82	-1.3	0.850	23.0
23	0.703	1.7	77	-1.6	0.719	8.7	84	-1.1	0.917	27.5
24	0.519	1.2	57	-3.0	0.698	9.3	82	-1.3	0.849	26.5
25	0.802	2.1	88	-0.8	0.810	9.3	95	-0.4	0.976	29.2
26	0.742	1.9	82	-1.3	0.761	8.8	90	-0.8	0.942	28.6
27	0.659	1.8	72	-1.9	0.796	12.4	94	-0.5	0.973	33.7
28	0.717	2.1	79	-1.5	0.803	11.7	94	-0.4	0.974	33.5
29	0.606	1.7	67	-2.3	0.780	12.4	92	-0.6	0.909	31.4
30	0.855	1.9	94	-0.4	0.839	10.6	99	-0.1	1.067	31.9
31	0.718	2.0	79	-1.5	0.805	9.8	95	-0.4	0.996	29.8
32	0.807	1.7	89	-0.8	0.768	9.5	90	-0.7	0.964	28.8
33	0.624	1.5	69	-2.2	0.719	9.2	85	-1.1	0.874	27.0
34	0.713	2.0	78	-1.5	0.831	11.3	98	-0.2	0.999	32.5
35	0.583	1.3	64	-2.5	0.681	7.8	80	-1.5	0.862	25.1
36	0.631	1.4	69	-2.1	0.643	7.4	76	-1.8	0.853	25.5
37	0.535	1.4	59	-2.9	0.698	9.3	82	-1.3	0.871	28.0
38	.	.	.	.	.	.	.	.	.	.
39	1.011	2.9	111	0.8	0.884	12.5	104	0.3	1.135	37.5
40	0.655	1.4	72	-2.0	0.792	10.5	93	-0.5	0.954	30.6
41	0.689	1.9	76	-1.7	0.866	11.5	102	0.1	0.998	32.2
42	0.509	1.3	56	-3.1	0.634	7.7	75	-1.9	0.752	23.0
43	0.662	1.9	73	-1.9	0.775	10.9	91	-0.7	1.004	33.9
44	0.803	2.4	88	-0.8	0.866	10.2	102	0.1	1.062	31.8
45	0.875	2.1	96	-0.3	0.767	9.7	90	-0.7	1.037	30.7
46	0.642	1.5	71	-2.1	0.717	7.5	84	-1.2	0.917	26.4
47	0.925	2.3	102	0.1	0.955	13.7	112	0.9	1.147	37.7
48	0.658	1.7	72	-1.9	0.645	7.7	76	-1.8	0.841	25.6
49	0.519	1.2	57	-3.0	0.693	8.6	81	-1.4	0.865	26.6
50	0.670	2.0	94	-1.8	0.667	10.7	78	-1.6	0.843	29.7
51	0.647	1.6	71	-2.0	0.696	7.8	82	-1.3	0.877	26.9
52	0.822	2.4	90	-0.7	0.825	12.0	97	-0.2	1.010	34.9
53	0.996	2.5	109	0.7	0.924	12.4	109	0.6	1.103	35.4
54	0.728	1.6	80	-1.4	0.845	10.6	99	-0.1	1.033	31.5
55	0.751	2.1	83	-1.2	0.780	10.4	92	-0.6	0.953	30.8

	lthipp1	lthipt1	rneck1	rnekbmc1	rneckp1	rneckt1	rward1	rwardbc1	rwardp1	rwardt1
1	93	-0.5	0.904	4.4	87	-1.0	0.699	1.8	77	-1.6
2	114	1.1	1.033	5.0	100	0.0	0.863	2.3	95	-0.4
3	96	-0.3	0.893	4.2	86	-1.0	0.658	1.6	72	-1.9
4	82	-1.5	0.847	4.0	82	-1.4	0.606	1.5	67	-2.3
5	78	-1.7	0.738	3.5	71	-2.2	0.624	1.6	69	-2.2
6	93	-0.6	0.897	4.9	86	-1.0	0.668	2.3	73	-1.9
7	97	-0.3	0.971	4.3	94	-0.5	0.752	1.7	83	-1.2
8	85	-1.2	0.805	4.0	78	-1.7	0.634	1.7	70	-2.1
9	80	-1.6	0.853	3.9	82	-1.3	0.712	1.7	78	-1.5
10	112	1.0	1.043	4.9	100	0.0	0.800	1.9	88	-0.8
11	95	-0.4	0.829	3.8	80	-1.5	0.668	1.6	73	-1.9
12	123	1.8	1.055	5.6	102	0.1	0.906	2.8	100	0.0
13	91	-0.7	0.872	4.0	84	-1.2	0.561	1.3	62	2.7
14	85	-1.2	0.899	5.4	81	-1.0	0.643	2.5	71	-2.1
15	107	0.6	0.977	5.0	94	-0.4	0.762	2.2	84	-1.1
16	91	-0.7	0.838	3.4	81	-1.4	0.675	1.2	74	-1.8
17	82	-1.5	0.777	3.3	75	-1.9	0.632	1.3	69	-2.1
18	97	-0.3	0.859	4.0	83	-1.3	0.612	1.5	67	-2.3
19	120	1.6	1.138	5.0	110	0.7	0.907	2.0	100	0.0
20	102	0.1	0.897	4.3	86	-1.0	0.712	1.8	78	-1.5
21	100	0.0	0.929	4.7	90	-0.8	0.753	2.1	83	-1.2
22	84	-1.3	0.779	3.0	75	-1.9	0.664	1.1	73	-1.9
23	91	-0.7	0.925	4.3	89	-0.8	0.743	1.8	82	-1.3
24	84	-1.3	0.772	3.5	74	-1.9	0.466	1.1	51	-3.4
25	97	-0.3	0.878	4.3	85	-1.1	0.811	2.2	89	-0.8
26	93	-0.5	0.808	4.4	78	-1.7	0.681	2.2	75	-1.8
27	97	-0.3	0.991	4.6	95	-0.3	0.631	1.5	69	-2.1
28	97	-0.3	0.967	5.1	93	-0.5	0.719	2.2	79	-1.5
29	90	-0.8	0.852	4.2	82	-1.3	0.643	1.7	71	-2.1
30	106	0.5	1.076	4.9	104	0.3	0.906	2.1	100	0.0
31	99	-0.1	0.826	3.9	80	-1.5	0.644	1.6	71	-2.0
32	96	-0.3	0.925	4.1	89	-0.8	0.783	1.7	86	-1.0
33	87	-1.1	0.895	4.3	86	-1.0	0.632	1.6	69	-2.2
34	99	-0.1	0.967	4.8	93	-0.5	0.770	2.1	85	-1.1
35	86	-1.2	0.822	3.6	79	-1.6	0.608	1.3	67	-2.3
36	85	-1.2	0.831	3.7	80	-1.5	0.638	1.4	70	-2.2
37	86	-1.1	0.696	3.5	67	-2.5	0.504	1.4	55	-3.1
38	.	.	.	.	.	.	.	.	.	.
39	113	1.0	1.122	5.3	108	0.6	0.957	2.4	105	0.4
40	95	-0.4	0.923	4.2	89	-0.8	0.723	1.7	79	-1.4
41	99	-0.1	0.931	4.5	90	-0.8	0.668	1.8	73	-1.9
42	75	-2.0	0.688	3.2	66	-2.5	0.466	1.1	51	-3.4
43	100	0.0	0.890	4.5	86	-1.1	0.647	1.8	71	-2.0
44	105	0.4	0.957	4.8	92	-0.6	0.783	2.2	86	-1.0
45	103	0.2	1.000	4.6	96	-0.3	0.840	2.0	92	-0.3
46	91	-0.7	0.897	4.0	81	-1.0	0.711	1.6	78	-1.5
47	114	1.1	1.014	5.1	98	-0.2	0.869	2.4	95	-0.3
48	83	-1.3	0.806	3.8	78	-1.7	0.634	1.6	70	-2.1
49	86	-1.1	0.769	3.6	74	-1.9	0.530	1.3	58	-2.9
50	84	-1.3	0.886	4.5	85	-1.1	0.641	1.8	70	-2.1
51	87	-1.0	0.854	5.9	82	-1.3	0.681	3.6	75	-1.8
52	100	0.0	1.092	5.7	105	0.4	0.906	2.7	100	0.0
53	109	0.3	1.013	4.8	98	-0.2	0.912	2.3	100	0.0
54	103	0.2	1.028	4.5	99	-0.1	0.809	1.7	89	-0.8
55	95	-0.4	0.946	4.8	91	-0.7	0.790	2.2	87	-0.9

	rtro1	rtrobmc1	rtrop1	rtrot1	rthip1	rthipbc1	rthipp1	rthipt1	radbmd1	radbmc1
1	0.767	11.5	90	-0.7	0.953	32.3	95	-0.4	0.923	2.0
2	0.925	12.5	109	0.6	1.142	35.8	113	1.1	0.776	2.2
3	0.746	10.1	88	-0.9	0.915	29.5	91	-0.7	0.865	2.1
4	0.594	6.8	70	-2.2	0.817	24.4	81	-1.5	0.564	1.4
5	0.653	7.4	77	-1.7	0.807	23.6	80	-1.6	0.684	1.8
6	0.741	12.0	87	-1.0	0.905	33.2	90	-0.8	0.779	2.2
7	0.818	9.4	95	-0.3	1.041	30.5	103	0.3	0.920	2.1
8	0.674	10.9	79	-1.5	0.830	29.9	82	-1.4	0.842	1.9
9	0.695	7.8	82	-1.4	0.899	26.1	89	-0.9	0.716	1.6
10	0.858	9.3	101	0.1	1.019	31.2	101	0.1	0.920	2.3
11	0.824	10.7	97	-0.2	0.942	31.1	93	-0.5	0.901	2.2
12	0.998	14.3	117	1.3	1.199	40.1	119	1.5	0.905	2.5
13	0.723	10.0	85	-1.1	0.893	27.9	98	-0.9	0.626	1.7
14	0.733	9.6	86	-1.0	0.888	30.6	88	-1.0	0.811	2.6
15	0.887	13.2	104	0.3	1.109	36.6	110	0.8	0.841	2.3
16	0.707	7.6	83	-1.2	0.913	24.6	91	-0.8	0.778	2.2
17	0.645	5.9	76	-1.8	0.839	22.0	83	-1.3	0.967	2.3
18	0.730	9.2	86	-1.1	0.934	29.3	93	-0.6	0.896	2.1
19	0.937	15.5	110	0.7	1.183	39.3	117	1.4	0.834	2.1
20	0.776	9.5	91	-0.6	0.969	30.1	96	-0.3	0.918	2.1
21	0.774	10.8	91	-0.7	0.976	32.7	97	-0.3	0.938	2.3
22	0.680	6.9	80	-1.5	0.847	22.6	84	-1.3	0.742	1.7
23	0.780	9.4	92	-0.6	0.948	29.0	94	-0.5	0.865	1.9
24	0.683	9.7	80	-1.5	0.812	26.0	81	-1.6	0.683	1.8
25	0.823	9.3	97	-0.2	0.950	28.9	94	-0.5	0.881	2.1
26	0.751	8.1	88	-0.9	0.884	27.6	88	-1.0	0.817	1.8
27	0.812	11.7	95	-0.3	0.959	32.1	95	-0.4	0.748	2.1
28	0.791	11.6	93	-0.5	0.950	32.9	94	-0.5	0.852	2.0
29	0.725	10.1	85	-1.1	0.888	28.9	88	-1.0	0.695	1.8
30	0.845	9.6	99	-0.1	1.076	31.6	107	0.5	0.935	2.1
31	0.738	8.4	87	-1.0	0.947	27.6	94	-0.5	0.714	1.6
32	0.721	8.2	85	-1.1	0.931	27.5	92	-0.6	0.918	2.1
33	0.720	9.3	85	-1.1	0.910	28.3	90	-0.8	0.700	1.8
34	0.855	11.7	101	0.0	1.030	33.7	102	0.2	0.902	2.3
35	0.732	9.0	86	-1.0	0.903	26.9	90	-0.8	0.717	1.4
36	0.643	7.6	76	-1.8	0.837	25.2	83	-1.4	0.910	2.0
37	0.731	9.5	82	-1.0	0.879	27.9	87	-1.0	0.801	1.9
38	.	.	.	.	.	.	.	.	0.783	2.1
39	0.866	11.9	102	0.1	1.100	35.8	109	0.7	0.751	2.0
40	0.769	9.0	90	-0.7	0.954	30.1	95	-0.4	0.704	1.6
41	0.832	11.1	98	-0.2	0.992	31.5	98	-0.1	0.897	2.1
42	0.613	8.0	72	-2.1	0.766	23.7	76	-1.9	0.766	2.0
43	0.743	10.2	87	-0.9	0.969	32.2	96	-0.3	0.863	2.1
44	0.897	10.0	105	0.4	1.077	32.0	107	0.5	0.915	2.0
45	0.738	8.7	87	-1.0	1.028	29.9	102	0.2	0.818	1.9
46	0.710	6.4	83	-1.2	0.942	25.6	93	-0.5	0.738	1.7
47	0.930	14.2	109	0.7	1.124	38.0	112	0.9	0.925	2.3
48	0.615	7.5	72	-2.1	0.817	25.2	81	-1.5	0.748	1.8
49	0.713	9.1	84	-1.2	0.845	25.8	84	-1.3	0.775	1.8
50	0.620	9.4	73	-2.0	0.834	28.9	83	-1.4	0.853	2.4
51	0.651	7.2	77	-1.7	0.881	28.3	82	-1.0	0.799	2.2
52	0.840	12.7	99	-0.1	1.061	37.6	105	0.4	0.978	2.4
53	0.843	9.3	99	-1.0	1.012	31.3	100	0.0	0.883	2.2
54	0.932	12.8	110	0.7	1.115	35.5	111	0.9	0.834	1.8
55	0.747	10.0	88	-0.9	0.953	31.0	95	-0.4	0.860	2.1

	radp1	radt1	totbmd2	totperc2	totalt2	l1l42	l1l4bmc2	l1l4p2	l1l4t2	l2l42
1	104	0.4	1.278	114	1.9	1.316	63.6	112	1.1	1.432
2	87	-1.3	1.211	108	1.1	1.269	78.1	108	0.7	1.272
3	97	-0.3	1.182	105	0.7	1.099	54.8	93	-0.7	1.143
4	65	-3.9	0.993	88	-1.7	1.165	61.5	98	-0.2	1.233
5	77	-2.3	1.057	94	-0.8	1.105	57.8	94	-0.6	1.116
6	88	-1.2	1.045	96	-0.6	1.012	61.5	88	-1.2	1.062
7	104	0.4	1.179	105	0.7	1.131	65.5	96	-0.4	1.144
8	95	-0.5	1.055	94	-0.9	1.030	50.1	87	-1.3	1.063
9	81	-1.9	0.889	79	-3.0	0.879	53.2	74	-2.5	0.899
10	104	0.4	1.206	107	1.0	1.097	55.7	93	-0.7	1.157
11	101	0.1	1.129	100	0.0	1.222	63.6	104	0.3	1.294
12	102	0.2	1.355	120	2.9	1.392	86.7	118	1.8	1.438
13	71	-2.9	1.063	94	-0.8	0.922	43.9	78	-2.1	0.938
14	91	-0.9	1.296	115	2.1	1.386	81.7	117	1.7	1.380
15	95	-0.5	1.216	108	1.1	1.363	76.5	115	1.5	1.367
16	88	-1.2	1.083	98	-0.3	0.997	44.7	86	-1.4	1.011
17	109	0.9	1.211	108	1.1	1.089	56.2	92	-0.8	1.100
18	100	0.1	1.114	99	-0.1	1.087	54.1	92	-0.8	1.113
19	94	-0.6	1.205	107	1.0	1.365	67.6	116	1.5	1.344
20	103	0.3	1.155	103	0.4	1.174	62.6	99	-0.1	1.208
21	106	0.6	1.125	100	0.0	1.125	68.0	95	-0.5	1.151
22	84	-1.6	1.029	91	-1.2	1.228	58.5	104	0.4	1.307
23	97	-0.3	.	.	.	.	.	.	.	.
24	77	-2.3	1.085	96	-0.5	1.038	59.1	88	-1.2	1.040
25	99	-0.1	1.150	102	0.3	1.187	65.3	101	0.1	1.232
26	92	-0.8	1.174	104	0.6	1.051	55.8	89	-1.1	1.086
27	84	-1.6	1.125	100	0.0	1.273	65.9	108	0.8	1.348
28	96	-0.4	1.202	107	1.0	1.215	77.3	103	0.3	1.236
29	78	-2.2	1.063	94	-0.8	1.001	52.4	85	-1.5	1.035
30	105	0.5	1.154	103	0.4	1.104	47.1	94	-0.6	1.125
31	80	-2.0	1.103	98	-0.3	0.995	55.0	84	-1.5	1.003
32	103	0.3	1.166	104	0.5	1.245	63.6	105	0.5	1.261
33	79	-2.1	1.023	91	-1.3	0.962	48.0	82	-1.8	1.005
34	102	0.2	1.274	113	1.9	1.320	58.9	112	1.2	1.332
35	81	-1.9	1.048	95	-0.7	0.941	50.1	75	-2.0	0.964
36	103	0.3	1.182	102	0.3	1.108	59.5	88	-1.2	1.117
37	90	-1.0	1.062	98	-0.8	1.132	65.3	96	-0.4	1.155
38	88	-1.2	0.992	85	-2.2	0.976	42.1	85	-1.5	1.016
39	85	-1.5	1.231	109	1.3	.	.	.	.	.
40	79	-2.1	1.109	99	-0.2	1.001	51.5	85	-1.5	1.036
41	101	0.1	1.234	107	0.9	1.239	80.5	106	0.6	1.262
42	82	-1.4	0.943	84	-2.2	0.826	47.6	69	-3.0	0.848
43	97	-0.3	1.282	114	2.0	1.264	103.0	103	0.3	1.214
44	103	0.3	1.195	.	.	1.113	52.9	.	.	1.164
45	92	-0.8	1.189	106	0.8	1.080	50.4	92	-0.8	1.117
46	83	-1.7	1.121	101	0.1	1.223	60.5	101	0.1	1.274
47	108	0.8	1.232	110	1.3	1.378	70.4	117	1.7	1.427
48	84	-1.6	1.088	97	-0.5	1.024	53.2	87	-1.3	1.024
49	87	-1.3	1.119	99	-0.1	1.478	86.5	125	2.5	1.525
50	96	-0.4	1.101	98	-0.3	1.031	58.1	87	-1.2	1.050
51	90	-1.0	1.176	105	0.6	1.147	68.5	97	-0.3	1.166
52	110	1.0	1.200	108	1.1	1.231	76.5	107	0.7	1.273
53	99	-0.1	1.180	105	0.7	1.289	72.5	109	0.9	1.351
54	94	-0.6	1.130	100	0.1	1.075	63.6	91	-0.9	1.069
55	97	-0.3	1.151	102	0.3	1.100	58.5	93	-0.7	1.126

	l2l4bmc2	l2l4p2	l2l4t2	lneck2	lnekbmc2	lneckp2	lneckt2	lward2	lwardbc2	lwardp2
1	51.9	119	1.9	0.929	4.8	89	-0.8	0.671	2.0	74
2	61.7	106	0.6	1.014	4.9	98	-0.2	0.812	2.1	89
3	44.2	95	-0.5	0.905	4.1	87	-1.0	0.664	1.5	73
4	50.2	101	0.1	0.841	3.9	81	-1.4	0.548	1.3	61
5	47.1	93	-0.7	0.721	3.4	69	-2.3	0.612	1.5	67
6	49.7	91	-0.9	0.894	4.9	87	-1.0	0.617	2.1	69
7	51.7	95	-0.5	0.916	4.0	88	-0.9	0.709	1.5	78
8	41.0	89	-1.1	0.806	4.2	78	-1.7	0.651	1.9	72
9	43.6	75	-2.5	0.828	3.8	80	-1.5	0.656	1.5	72
10	46.4	96	-0.4	1.034	5.0	100	0.0	0.869	2.3	96
11	51.8	108	0.8	0.906	4.3	87	-1.0	0.709	1.7	78
12	72.1	120	2.0	1.105	5.4	106	0.5	0.944	2.5	104
13	35.3	78	-2.2	0.845	3.9	81	-1.4	0.566	1.3	62
14	65.4	115	1.5	0.828	5.0	80	-1.5	0.611	2.5	67
15	60.8	114	1.4	1.006	4.7	97	-0.2	0.741	1.8	81
16	35.3	86	-1.4	0.796	3.4	76	-1.8	0.665	1.3	68
17	27.7	92	-0.8	0.768	3.3	74	-1.9	0.608	1.2	67
18	43.1	93	-0.7	0.838	4.0	81	-1.4	0.558	1.4	61
19	52.7	112	1.2	1.118	4.9	108	0.6	0.881	1.9	97
20	50.5	101	0.1	0.951	4.3	92	-0.6	0.744	1.7	82
21	51.9	96	-0.4	0.883	4.4	85	-1.1	0.778	2.1	85
22	48.6	109	0.9	0.720	3.0	69	-2.3	0.614	1.2	67
23	.	.	.	.	.	.	.	.	.	.
24	45.8	87	-1.3	0.781	3.5	75	-1.8	0.499	1.1	55
25	54.2	103	0.3	0.948	4.7	91	-0.6	0.784	2.1	86
26	45.0	91	-0.9	0.830	4.1	80	-1.5	0.708	1.9	78
27	52.1	112	1.2	1.081	5.4	104	0.3	0.676	1.9	74
28	60.8	103	0.3	0.938	4.8	90	-0.7	0.709	2.0	78
29	42.5	86	-1.4	0.797	4.0	77	-1.7	0.571	1.6	63
30	41.7	94	-0.6	1.028	4.7	99	-0.1	0.882	2.1	97
31	44.6	84	-1.6	0.887	4.3	85	-1.1	0.719	1.9	79
32	39.7	105	0.5	1.014	4.4	98	-0.2	0.812	1.7	89
33	40.2	84	-1.6	0.818	3.7	79	-1.6	0.611	1.4	67
34	62.3	111	1.1	0.946	4.7	91	-0.7	0.674	1.8	74
35	39.8	79	-2.1	0.769	3.5	77	-1.8	0.594	1.3	62
36	46.1	91	-0.9	0.849	3.7	81	-1.4	0.671	1.4	72
37	51.9	96	-0.4	0.723	3.5	70	-2.3	0.507	1.4	56
38	30.7	86	-1.4	.	.	.	.	.	.	.
39	.	.	.	1.105	5.6	106	0.5	0.954	2.7	105
40	42.1	86	-1.4	0.835	3.7	80	-1.5	0.652	1.4	72
41	66.1	107	0.7	0.907	4.5	87	-1.0	0.693	1.9	76
42	38.6	70	-3.0	0.667	3.1	65	2.6	0.507	1.2	59
43	52.3	101	0.1	0.999	4.8	96	-0.3	0.668	1.7	73
44	42.8	.	.	0.955	5.0	.	.	0.828	2.5	.
45	40.9	93	-0.7	0.999	4.6	96	-0.3	0.847	2.0	93
46	48.9	101	0.1	0.866	4.0	85	-1.2	0.629	1.5	72
47	57.3	119	1.9	1.060	5.0	102	0.2	0.907	2.3	100
48	41.4	85	-1.5	0.835	4.0	80	-1.5	0.658	1.7	72
49	72.2	127	2.7	0.831	3.8	80	-1.5	0.532	1.2	59
50	46.3	88	-1.2	0.837	4.2	81	-1.4	0.654	1.9	72
51	57.6	97	-0.3	0.878	4.5	85	-1.2	0.679	2.0	75
52	61.8	109	0.9	1.055	5.5	98	-0.1	0.809	2.4	87
53	57.9	113	1.3	1.049	5.0	101	0.1	0.982	2.5	108
54	48.8	89	-1.1	0.958	4.1	92	-0.6	0.724	1.5	80
55	46.6	94	-0.6	0.912	4.6	88	-0.9	0.730	2.1	80

	lwardt2	ltro2	ltrobmc2	ltrop2	ltrot2	lthip2	lthipbc2	lthipp2	lthipt2	rneck2
1	-1.8	0.742	10.6	87	-0.9	0.952	31.8	94	-0.4	0.918
2	-0.8	0.947	12.2	111	0.8	1.155	35.8	115	1.2	1.042
3	-1.9	0.807	12.3	95	-0.4	0.950	31.9	94	-0.5	0.926
4	-2.7	0.609	7.0	74	-1.9	0.828	24.6	84	-1.3	0.865
5	-2.3	0.677	7.8	80	-1.5	0.812	24.5	81	1.6	0.754
6	-2.2	0.758	12.3	90	-0.7	0.915	33.7	92	-0.7	0.888
7	-1.5	0.771	8.7	91	-0.7	0.974	28.4	97	-0.3	0.944
8	-2.0	0.684	11.1	80	-1.5	0.856	30.8	85	-1.2	0.780
9	-2.0	0.615	7.3	72	-2.0	0.791	23.5	79	-1.7	0.854
10	-0.3	0.961	11.4	113	1.0	1.124	35.4	112	0.9	1.031
11	-1.5	0.826	10.0	97	-0.2	0.979	30.9	97	-0.2	0.871
12	0.3	1.095	15.5	129	2.1	1.246	41.1	124	1.9	1.060
13	-2.6	0.767	10.3	90	-0.7	0.932	28.5	93	-0.6	0.878
14	-2.3	0.677	9.3	80	-1.5	0.834	29.2	83	-1.4	0.894
15	-1.3	0.860	12.7	101	0.1	1.083	35.5	108	0.6	0.972
16	-2.2	0.681	6.7	84	-1.2	0.910	24.1	91	-0.7	0.833
17	-2.3	0.617	5.6	73	-2.0	0.817	21.2	81	-1.5	0.782
18	-2.7	0.795	9.8	93	-0.5	0.986	30.7	98	-0.2	0.800
19	-0.2	0.919	14.3	100	0.6	1.194	39.5	128	1.5	1.152
20	-1.3	0.837	11.1	98	-0.1	1.013	31.8	101	0.0	0.874
21	-1.0	0.773	10.4	91	-0.5	0.991	32.4	98	-0.1	0.904
22	-2.3	0.694	7.2	82	-1.4	0.839	22.8	83	-1.3	0.755
23	.	.	.	.	.	.	.	.	.	.
24	-3.2	0.705	10.0	83	-1.3	0.847	27.0	84	-1.3	0.755
25	-1.0	0.799	9.4	94	-0.5	0.961	29.1	95	-0.4	0.878
26	-1.6	0.753	8.7	88	-0.9	0.932	28.6	92	-0.6	0.796
27	-1.8	0.822	12.8	97	-0.2	0.998	34.5	99	-0.1	1.015
28	-1.5	0.796	11.3	94	-0.5	0.976	33.5	97	-0.3	0.962
29	-2.6	0.770	12.1	90	-0.7	0.897	30.8	89	-0.9	0.837
30	-0.2	0.868	11.6	102	0.2	1.084	33.3	108	0.6	1.088
31	-1.5	0.801	9.3	94	-0.4	1.004	29.6	100	0.0	0.860
32	-0.8	0.763	9.0	90	-0.8	0.974	28.8	97	-0.3	0.930
33	-2.3	0.725	9.3	85	-1.1	0.865	26.9	86	-1.1	0.923
34	-1.8	0.833	11.5	98	-0.2	0.999	32.7	99	-0.1	0.982
35	-2.7	0.675	7.6	78	-1.6	0.861	25.0	84	-1.3	0.813
36	-2.0	0.671	7.9	79	-1.6	0.886	26.5	82	-1.1	0.839
37	-3.1	0.704	9.5	83	-1.3	0.869	28.0	86	-1.1	0.714
38	.	.	.	.	.	.	.	.	.	.
39	0.3	0.917	13.2	108	0.6	1.142	37.9	113	1.1	1.081
40	-2.0	0.799	10.3	94	-0.4	0.964	30.9	96	-0.3	0.908
41	-1.7	0.895	12.2	108	0.3	1.012	33.1	100	0.0	0.954
42	-2.9	0.641	7.9	73	-2.0	0.766	23.5	72	-1.9	0.683
43	-1.9	0.786	12.0	92	-0.6	1.023	35.0	101	0.1	0.881
44	.	0.882	10.0	.	.	1.073	32.2	.	.	0.969
45	-0.5	0.760	9.1	95	-0.8	1.036	30.2	103	0.2	0.987
46	-2.0	0.718	7.5	84	-1.2	0.916	26.4	91	-0.7	0.888
47	0.0	0.944	13.7	111	0.8	1.146	37.8	114	1.1	1.022
48	-1.9	0.632	7.9	74	-1.9	0.831	25.8	82	-1.4	0.825
49	-2.9	0.704	8.9	83	-1.3	0.875	27.0	87	-1.1	0.744
50	-2.0	0.696	10.9	82	-1.3	0.864	30.4	86	-1.1	0.865
51	-1.8	0.695	7.3	82	-1.4	0.886	27.0	88	-1.0	0.826
52	-0.9	0.792	11.4	97	-0.2	0.999	34.6	100	0.0	1.079
53	0.6	0.898	11.8	106	0.4	1.093	34.9	108	0.7	1.034
54	-1.4	0.851	10.5	100	0.0	1.039	31.5	103	0.2	1.036
55	-1.4	0.771	10.8	91	-0.7	0.942	31.3	93	-0.5	0.954

	rnekbmc2	rneckp2	rneckt2	rward2	rwardbc2	rwardp2	rwardt2	rtro2	rtrobmc2	rtrop2
1	4.4	88	-0.9	0.691	1.8	76	-1.7	0.775	11.6	91
2	5.0	100	0.0	0.873	2.2	96	-0.3	0.926	11.6	109
3	4.4	89	-0.8	0.683	1.7	75	-1.7	0.776	11.0	91
4	4.0	82	-1.3	0.605	1.4	68	-2.3	0.613	7.2	76
5	3.5	73	-2.0	0.618	1.5	68	-2.2	0.716	8.6	84
6	4.9	87	-1.0	0.656	2.2	73	-1.9	0.736	12.1	86
7	4.3	91	-0.7	0.751	1.7	82	-1.2	0.812	9.8	95
8	3.9	75	-1.9	0.616	1.7	68	-2.3	0.646	10.0	76
9	3.9	82	-1.3	0.694	1.6	76	-1.7	0.699	7.6	82
10	5.0	99	0.0	0.779	2.0	96	-1.0	0.857	8.7	101
11	3.9	84	-1.2	0.674	1.5	74	-1.8	0.824	10.4	97
12	5.6	102	0.2	0.886	2.7	97	-0.2	1.010	14.5	119
13	4.1	85	-1.2	0.562	1.3	62	-2.7	0.718	9.6	84
14	5.5	86	-1.0	0.624	2.6	69	-2.2	0.734	9.2	86
15	4.9	94	-0.5	0.748	2.1	82	-1.2	0.893	13.5	105
16	3.4	80	-1.5	0.684	1.3	71	-2.0	0.696	7.8	83
17	3.3	75	-1.8	0.623	1.2	68	-2.2	0.650	6.1	76
18	3.8	77	-1.7	0.604	1.6	66	-2.4	0.735	8.8	86
19	5.1	111	0.8	0.889	1.9	98	-0.2	0.896	14.2	105
20	4.2	84	-1.2	0.673	1.7	74	-1.8	0.772	9.5	91
21	4.6	87	-1.0	0.733	2.1	81	-1.4	0.755	10.6	89
22	2.9	73	-2.0	0.646	1.1	71	-2.0	0.663	6.7	78
23	.	.	.	.	.	.	.	.	.	.
24	3.4	73	-2.0	0.478	1.1	53	-3.3	0.699	9.8	82
25	4.3	85	-1.1	0.791	2.1	87	-0.9	0.817	8.8	96
26	4.2	77	-1.7	0.702	2.1	77	-1.6	0.772	9.3	91
27	4.9	98	-0.2	0.661	1.7	73	-1.9	0.833	12.5	98
28	5.0	93	-0.5	0.703	2.1	77	-1.6	0.783	11.9	92
29	4.3	81	-1.4	0.632	1.8	69	-2.1	0.695	9.6	82
30	4.9	105	0.4	0.928	2.1	102	0.1	0.874	10.3	103
31	4.0	83	-1.3	0.649	1.6	71	-2.0	0.728	8.2	86
32	4.1	90	-0.8	0.784	1.7	86	-1.0	0.749	9.4	88
33	4.4	89	-0.8	0.619	1.5	68	-2.2	0.715	9.8	85
34	4.9	95	-0.4	0.746	2.0	82	-1.3	0.831	12.0	98
35	3.6	96	-1.8	0.606	1.3	64	-2.5	0.728	8.9	84
36	3.7	81	-1.4	0.646	1.4	67	-2.2	0.648	7.6	73
37	3.6	69	-2.3	0.513	1.4	56	-3.1	0.748	10.0	88
38	.	.	.	.	.	.	.	.	.	.
39	5.2	104	0.3	0.925	2.4	102	0.1	0.889	12.7	104
40	4.1	87	-0.9	0.724	1.7	80	-1.4	0.767	9.3	90
41	4.7	95	-0.6	0.694	1.9	73	-1.9	0.869	11.7	100
42	3.2	66	-2.5	0.458	1.1	50	-3.5	0.611	7.9	71
43	4.8	85	-1.1	0.687	2.3	76	-1.7	0.755	10.8	89
44	4.9	.	.	0.804	2.2	.	.	0.891	9.6	.
45	4.5	95	-0.4	0.820	1.9	90	-0.7	0.718	7.8	84
46	4.0	85	-1.1	0.689	1.5	76	-1.1	0.733	6.9	83
47	5.1	98	-0.1	0.852	2.3	91	-0.4	0.918	14.0	108
48	4.0	80	-1.5	0.654	1.7	72	-2.0	0.608	7.4	72
49	3.4	72	-2.1	0.485	1.1	53	-3.3	0.690	8.5	81
50	4.4	83	-1.2	0.619	1.7	68	-2.2	0.672	10.2	79
51	5.0	80	-1.5	0.678	2.7	74	-1.8	0.666	6.9	78
52	5.7	102	0.1	0.893	2.7	95	-0.3	0.837	12.7	100
53	4.9	100	0.0	0.953	2.3	105	0.3	0.866	10.0	102
54	4.5	100	0.0	0.783	1.6	86	-1.0	0.912	12.0	107
55	4.8	92	-0.6	0.787	2.2	87	-0.9	0.758	10.0	89

	rtrot2	rthip2	rthipbc2	rthipp2	rthipt2	radbmd2	radbmc2	radp2	radt2
1	-0.7	0.967	32.7	96	-0.3	0.902	2.0	102	0.1
2	0.7	1.154	35.5	115	1.2	0.735	2.1	83	-1.7
3	-0.6	0.942	30.7	93	-0.5	0.878	2.1	99	-0.1
4	-1.8	0.835	25.1	84	-1.2	0.600	1.4	65	-3.5
5	-1.2	0.834	25.0	81	-1.6	0.706	1.8	83	-1.4
6	-1.1	0.894	33.1	89	-0.9	0.756	2.2	86	-1.4
7	-0.3	1.022	30.7	101	0.1	0.883	2.1	100	0.0
8	-1.8	0.806	28.8	80	-1.6	0.845	1.9	95	-0.5
9	-1.3	0.903	25.8	90	-0.8	0.636	1.6	72	-2.8
10	0.1	1.027	31.4	102	0.2	0.917	2.2	103	0.3
11	-0.2	0.957	30.9	95	-0.4	0.829	2.2	93	-0.7
12	1.4	1.219	40.8	121	1.7	0.894	2.6	101	0.1
13	-1.2	0.894	27.7	89	-0.9	0.636	1.7	72	-2.8
14	-1.0	0.889	30.3	88	-0.9	0.786	2.6	81	-1.3
15	0.4	1.113	36.8	110	0.8	0.826	2.3	93	-0.7
16	-1.3	0.903	24.8	89	-0.8	0.816	2.2	93	-0.7
17	-1.7	0.839	21.9	83	-1.3	1.009	2.4	114	1.4
18	-1.0	0.929	28.8	92	-0.6	0.836	2.0	94	-0.6
19	0.4	1.173	38.5	116	1.3	0.839	2.0	95	-0.5
20	-0.7	0.952	29.7	94	-0.4	0.880	2.0	99	-0.1
21	-0.8	0.955	32.0	95	-0.4	0.984	2.5	111	1.1
22	-1.6	0.834	22.3	83	-1.4	0.750	1.6	85	-1.5
23	.	.	.	.	.	.	.	.	.
24	-1.3	0.826	26.5	82	-1.4	0.674	1.7	76	-2.4
25	-0.3	0.944	28.3	94	-0.5	0.872	2.1	98	-0.2
26	-0.7	0.891	28.9	88	-0.9	0.812	1.9	91	-0.9
27	-0.2	0.977	33.4	97	-0.2	0.753	2.2	85	-1.5
28	-0.6	0.946	32.8	94	-0.5	0.832	2.0	94	-0.6
29	-1.4	0.862	28.2	85	-1.2	0.683	1.8	77	-2.3
30	0.2	1.099	32.0	109	0.7	0.972	2.0	110	1.0
31	-1.1	0.948	27.6	94	-0.5	0.769	1.6	87	-1.3
32	-0.9	0.940	28.6	93	-0.5	0.898	2.1	101	0.1
33	-1.2	0.901	28.6	89	-0.8	0.671	1.7	76	-2.4
34	-0.2	1.010	33.6	100	0.0	0.906	2.3	102	0.2
35	1.2	0.895	26.6	88	-1.0	0.703	1.4	78	-2.2
36	-2.0	0.849	25.4	82	-1.4	0.893	2.0	103	0.3
37	-0.9	0.895	28.7	89	-0.9	0.807	1.9	91	-0.9
38	.	.	.	.	.	0.781	2.0	87	-1.3
39	0.3	1.101	36.5	109	0.7	0.791	2.2	89	-1.1
40	-0.7	0.946	30.3	94	-0.5	0.714	1.6	80	-2.0
41	0.0	1.016	32.7	100	0.0	0.911	2.1	103	0.3
42	-2.2	0.767	23.7	76	-1.9	0.713	1.9	80	-2.0
43	-0.8	0.982	33.7	97	-0.2	0.889	2.1	100	0.0
44	.	1.078	32.1	.	.	0.887	2.1	.	.
45	-1.2	1.020	29.0	101	0.1	0.771	1.8	87	1.3
46	-1.3	0.959	26.4	93	-0.5	0.740	1.7	80	-2.0
47	0.6	1.118	37.6	111	0.9	0.899	2.3	101	0.1
48	-2.1	0.815	25.2	81	-1.5	0.769	1.8	87	-1.3
49	-1.4	0.833	25.2	83	-1.4	0.742	1.9	84	-1.6
50	-1.6	0.858	29.8	85	-1.2	0.851	2.3	96	-0.4
51	-1.6	0.877	27.2	87	-1.0	0.811	2.2	91	-0.9
52	0.0	1.046	37.3	105	0.4	0.914	2.3	105	0.5
53	0.1	1.032	31.9	102	0.2	0.848	2.1	96	-0.4
54	0.5	1.106	34.8	110	0.8	0.849	1.8	96	-0.4
55	-0.8	0.961	31.5	95	-0.4	0.863	2.1	97	-0.3

	totbmd3	totperc3	totalt3	l1l43	l1l4bmc3	l1l4p3	l1l4t3	l2l43	l2l4bmc3	l2l4p3
1	1.261	112	1.7	1.311	63.5	111	1.1	1.407	51.1	117
2	1.208	107	1.0	1.305	80.5	111	1.0	1.324	64.3	110
3	1.163	103	0.5	1.093	55.5	93	-0.7	1.140	45.0	95
4	0.984	87	-1.8	1.160	61.4	98	-0.2	1.195	48.6	100
5	1.049	93	-0.9	1.096	57.3	93	-0.7	1.114	46.9	93
6	1.048	93	-1.0	1.028	62.8	87	-1.3	1.081	51.1	90
7	1.175	104	0.6	1.155	67.9	98	-0.2	1.168	53.9	97
8	1.073	95	-0.7	1.002	49.3	85	-1.5	1.036	40.2	86
9	0.899	80	-2.8	0.877	52.9	74	-2.5	0.903	43.8	75
10	1.196	106	0.9	1.124	59.3	95	-0.5	1.183	49.8	99
11	1.114	99	-0.1	1.205	63.0	102	0.2	1.270	51.3	106
12	1.391	124	3.3	1.371	84.6	116	1.6	1.414	70.0	118
13	1.062	94	-0.8	0.966	46.5	82	-1.8	0.991	37.6	83
14	1.294	115	2.1	1.379	82.0	117	1.7	1.376	65.9	115
15	1.227	109	1.3	1.349	74.6	114	1.4	1.359	60.3	113
16	1.086	96	-0.5	1.021	45.7	87	-1.3	1.038	36.3	86
17	1.232	110	1.3	1.098	56.7	93	-0.7	1.123	46.1	94
18	1.098	98	-0.3	1.091	54.1	92	-0.7	1.143	43.8	95
19	1.197	106	0.9	1.326	65.2	112	1.2	1.313	51.2	109
20	1.137	101	0.2	1.137	60.4	96	-0.4	1.167	48.8	97
21	1.119	99	-0.1	1.128	67.7	96	-0.4	1.152	51.6	96
22	1.006	89	-1.5	1.216	58.1	103	0.3	1.286	48.0	107
23	1.157	103	0.4	1.213	58.3	103	0.3	1.246	46.6	104
24	1.071	95	-0.7	1.010	57.6	86	-1.4	1.017	44.8	85
25	1.156	103	0.4	1.215	65.5	103	0.3	1.246	53.3	104
26	1.145	102	0.3	1.025	55.0	87	-1.3	1.075	45.3	90
27	1.120	100	-0.1	1.278	66.5	108	0.8	1.342	52.6	112
28	1.209	107	1.0	1.199	75.0	102	0.2	1.240	60.2	103
29	1.062	94	-0.8	0.999	52.7	85	-1.5	1.029	42.7	86
30	1.138	101	0.2	1.069	34.0	91	-0.8	1.157	43.7	96
31	1.101	98	-0.3	1.000	54.6	85	-1.5	1.022	45.1	85
32	1.166	104	0.5	1.233	63.1	105	0.4	1.246	49.4	104
33	1.030	92	-1.2	0.961	47.8	81	-1.8	0.987	39.0	82
34	1.243	111	1.5	1.341	79.6	114	1.3	1.369	64.6	114
35	1.052	93	-0.9	0.933	48.9	79	-2.1	0.962	38.9	80
36	1.187	105	0.8	.	.	.	.	1.071	44.4	89
37	1.046	93	-1.0	1.146	66.1	97	-0.3	1.176	52.8	98
38	0.982	87	-1.8	0.986	58.9	84	-1.6	1.026	48.3	85
39	1.228	109	1.3	.	.	.	.	.	.	.
40	1.050	93	-0.9	0.991	49.2	84	-1.6	0.982	37.7	82
41	1.195	106	0.9	1.238	80.5	105	0.5	1.255	65.8	105
42	0.953	85	-2.1	0.823	47.2	70	-3.0	0.850	38.3	71
43	1.286	114	2.0	1.246	78.7	106	0.6	1.261	62.9	105
44	1.198	107	0.9	1.131	55.2	96	-0.4	1.161	44.3	97
45	1.190	106	0.8	1.079	51.2	91	-0.8	1.115	41.7	93
46	1.134	101	0.1	1.096	49.5	93	-0.7	1.161	40.4	97
47	1.250	111	1.6	1.356	69.8	115	1.5	1.391	56.3	116
48	1.097	98	-0.3	1.001	51.6	85	-1.5	1.004	40.1	84
49	1.098	98	-0.3	1.392	81.8	118	1.8	1.431	67.5	119
50	1.093	97	-0.4	1.028	58.0	87	-1.3	1.052	46.4	88
51	1.163	103	0.5	1.123	68.0	95	-0.5	1.147	57.5	96
52	1.206	107	1.0	1.263	77.5	107	0.7	1.292	62.5	108
53	1.158	103	0.4	1.281	73.0	109	0.8	1.346	58.6	112
54	1.129	100	0.1	1.084	65.8	92	-0.8	1.086	52.0	90
55	1.131	101	0.1	1.103	61.8	93	-0.6	1.093	48.4	91

	l2l4t3	lneck3	lnekbmc3	lneckp3	lneckt3	lward3	lwardbc3	lwardp3	lwardt3	ltro3
1	1.7	0.938	4.8	90	-0.7	0.697	2.0	77	-1.6	0.745
2	1.0	1.000	4.9	96	-0.3	0.819	2.2	90	-0.7	0.949
3	-0.5	0.906	4.2	87	-0.9	0.676	1.6	74	-1.8	0.801
4	0.0	0.856	3.9	82	-1.3	0.553	1.3	61	-2.7	0.633
5	-0.7	0.708	3.3	68	-2.4	0.599	1.5	66	-2.4	0.661
6	-1.0	0.895	4.9	86	-1.0	0.616	2.1	68	-2.3	0.726
7	-0.3	0.921	4.1	89	-0.8	0.714	1.5	78	-1.5	0.775
8	-1.4	0.793	4.2	76	-1.8	0.642	2.0	71	-2.1	0.668
9	-2.5	0.825	3.8	80	-1.5	0.685	1.6	75	-1.7	0.625
10	-0.1	1.064	5.2	103	0.2	0.894	2.3	98	-0.1	0.964
11	0.6	0.885	4.1	85	-1.1	0.699	1.7	77	-1.6	0.805
12	1.8	1.095	5.4	105	0.4	0.940	2.5	103	0.2	1.090
13	-1.7	0.856	4.0	82	-1.3	0.558	1.3	61	-2.7	0.748
14	1.5	0.826	5.0	80	-1.5	0.637	2.6	70	-2.1	0.680
15	1.3	0.980	4.7	94	-0.4	0.735	1.9	81	-1.3	0.852
16	-1.4	0.796	3.4	77	-1.7	0.663	1.3	73	-1.9	0.683
17	-0.6	0.769	3.2	74	-1.9	0.615	1.2	68	-2.3	0.619
18	-0.5	0.840	4.1	81	-1.4	0.591	1.6	65	-2.5	0.787
19	0.9	1.130	4.9	109	0.7	0.876	1.8	96	-0.3	0.928
20	-0.3	0.959	4.4	92	-0.6	0.726	1.7	80	-1.4	0.841
21	-0.4	0.871	4.4	84	-1.2	0.758	2.1	83	-1.2	0.780
22	0.7	0.719	2.9	69	-2.3	0.602	1.1	66	-2.4	0.673
23	0.4	0.882	4.2	85	-1.1	0.685	1.7	75	-1.7	0.702
24	-1.5	0.791	3.6	76	-1.8	0.526	1.2	58	-3.0	0.708
25	0.4	0.921	4.6	89	-0.8	0.795	2.2	87	-0.9	0.804
26	-1.0	0.852	4.2	82	-1.3	0.745	2.0	82	-1.3	0.793
27	1.2	1.100	5.5	106	0.4	0.677	1.9	74	-1.8	0.810
28	0.3	0.942	4.8	91	-0.7	0.694	2.0	76	-1.7	0.793
29	-1.4	0.810	4.1	78	-1.6	0.599	1.7	66	-2.4	0.765
30	-0.4	1.033	4.7	99	0.0	0.868	2.0	95	-0.3	0.851
31	-1.5	0.856	4.4	82	-1.3	0.742	2.2	82	-1.3	0.835
32	0.4	0.977	4.3	94	-0.4	0.784	1.7	86	-1.0	0.749
33	-1.8	0.828	3.7	80	-1.5	0.607	1.4	67	-2.3	0.721
34	1.4	0.926	4.8	89	-0.8	0.729	2.1	80	-1.4	0.833
35	-2.0	0.782	3.4	75	-1.8	0.577	1.2	63	-2.6	0.675
36	-1.1	0.857	3.7	83	-1.3	0.641	1.3	70	-2.1	0.660
37	-0.2	0.732	3.6	71	-2.2	0.512	1.4	56	-3.1	0.694
38	-1.5	.	.	.	.	.	.	.	.	.
39	.	1.112	5.7	107	0.5	0.962	2.8	106	0.4	0.913
40	-1.8	0.846	3.8	81	-1.4	0.621	1.4	68	-2.2	0.798
41	0.5	0.911	4.5	88	-0.9	0.688	1.9	76	-1.7	0.893
42	-2.9	0.686	3.2	66	-2.5	0.531	1.3	58	-2.9	0.640
43	0.5	0.984	4.9	95	-0.4	0.689	1.9	76	-1.7	0.807
44	-0.3	0.951	5.0	92	-0.6	0.817	2.5	90	-0.7	0.861
45	-0.7	0.991	4.6	96	-0.3	0.851	2.0	94	-0.5	0.774
46	-0.3	0.844	3.9	81	-1.4	0.640	1.5	70	-2.1	0.704
47	1.6	1.031	4.8	99	0.0	0.878	2.1	97	-0.2	0.917
48	-1.6	0.844	4.0	81	-1.4	0.675	1.7	74	-1.8	0.582
49	1.9	0.833	3.8	80	-1.5	0.529	1.2	58	-2.9	0.678
50	-1.2	0.840	4.3	81	-1.4	0.666	1.9	73	-1.9	0.686
51	-0.4	0.904	4.2	87	-1.0	0.653	1.6	72	-2.0	0.688
52	0.8	1.035	5.3	100	0.0	0.807	2.4	89	-0.8	0.828
53	1.2	1.036	4.9	100	0.0	0.937	2.3	103	0.2	0.888
54	-1.0	0.939	4.1	90	-0.7	0.733	1.6	81	-1.4	0.838
55	-0.9	0.871	4.4	84	-1.2	0.718	2.0	79	-1.5	0.754

	ltrobmc3	ltrop3	ltrot3	lthip3	lthipbc3	lthipp3	lthipt3	rneck3	rnekbmc3	rneckp3	rneckt3	rward3
1	10.8	88	-0.9	0.950	32	94	-0.5	0.922	4.4	89	-0.8	0.706
2	12.5	112	0.9	1.167	36.4	116	1.3	1.037	4.9	100	0	0.842
3	11.7	94	-0.4	0.945	31.5	94	-0.5	0.915	4.3	88	-0.9	0.654
4	7.6	74	-1.9	0.841	25.4	83	-1.3	0.829	3.9	80	-1.5	0.609
5	7.8	78	-1.7	0.804	24.4	80	-1.6	0.765	3.5	74	-2	0.618
6	12.5	85	-1.1	0.894	33.6	89	-0.9	0.903	5	87	-1	0.664
7	8.5	91	-0.7	0.987	28.6	98	-0.2	0.944	4.2	91	-0.7	0.755
8	10.8	79	-1.6	0.840	30.2	83	-1.3	0.793	4	76	-1.8	0.617
9	7.4	74	-2.0	0.799	23.9	79	-1.7	0.844	3.8	81	-1.4	0.677
10	11.8	113	1.0	1.131	35.9	112	1	1	4.9	96	-0.3	0.813
11	9.8	95	-0.4	0.959	30.2	95	-0.4	0.857	3.8	83	-1.3	0.662
12	16.0	128	2.1	1.238	41.6	123	1.8	1.054	5.6	102	0.1	0.874
13	9.6	88	-0.9	0.914	27.7	91	-0.7	0.888	4.1	86	-1.1	0.575
14	9.3	80	-1.5	0.839	29.3	83	-1.3	0.908	5.4	87	-0.9	0.644
15	12.2	100	0.0	1.085	35.4	108	0.6	0.957	5	92	-0.6	0.746
16	6.7	80	-1.5	0.909	24	90	-0.8	0.819	3.4	79	-1.6	0.657
17	5.5	73	-2.0	0.815	21	81	-1.5	0.774	3.3	75	-1.9	0.637
18	10.2	93	-0.5	0.969	30.8	96	-0.3	0.85	4.1	82	-1.4	0.623
19	15.0	109	0.7	1.195	39.6	119	1.5	1.132	5.1	109	0.7	0.878
20	11.2	99	-0.1	1.015	32	101	0.1	0.899	4.3	87	-1	0.694
21	11.0	92	-0.6	0.987	32.8	98	-0.2	0.9	4.6	87	-1	0.708
22	6.9	79	-1.5	0.821	22.2	82	-1.5	0.762	2.9	73	-0.2	0.642
23	8.4	83	-1.3	0.902	27.2	90	-0.8	0.92	4.2	89	-0.8	0.725
24	9.5	83	-1.2	0.854	26.7	85	-1.2	0.761	3.4	73	-2	0.491
25	9.3	94	-0.4	0.963	29.2	96	-0.4	0.859	4.2	83	-1.3	0.801
26	9.6	93	-0.5	0.957	29.8	95	-0.4	0.79	4.2	76	-1.8	0.678
27	13.1	95	-0.4	0.991	34.8	98	-0.1	1.013	4.8	98	-0.2	0.652
28	11.7	93	-0.5	0.963	33.1	96	-0.4	0.978	5.1	94	-0.4	0.691
29	11.8	90	-0.7	0.892	30.2	89	-0.9	0.858	4.3	83	-1.3	0.642
30	10.6	100	0.0	1.081	32.2	107	0.6	1.068	4.9	103	0.2	0.914
31	10.7	98	-0.1	1.012	31.1	100	0	0.849	4.1	82	-1.4	0.657
32	9.2	88	-0.9	0.943	28.4	94	-0.5	0.919	4.1	89	-0.9	0.767
33	8.9	85	-1.1	0.874	26.9	87	-1.1	0.872	4.2	84	-1.2	0.624
34	11.3	98	-0.2	1.000	32.9	99	-0.1	0.973	4.9	94	-0.5	0.781
35	7.8	79	-1.5	0.852	24.8	85	-1.2	0.809	3.4	75	-1.8	0.6
36	7.8	78	-1.7	0.876	26.3	87	-1	0.836	3.7	81	-1.5	0.608
37	9.1	82	-1.4	0.863	27.6	86	-1.1	0.701	3.5	68	-2.4	0.506
38	.	.	.	.	.	.	.	.	.	.	.	.
39	13.3	107	0.5	1.135	37.9	113	1	1.096	5.3	106	0.4	0.954
40	10.5	94	-0.5	0.954	30.9	95	-0.4	0.906	4	87	-1	0.678
41	12.1	105	0.4	1.013	33	101	0	0.906	4.5	87	-0.9	0.677
42	8.1	75	-1.8	0.773	23.7	77	-1.9	0.673	3.1	65	-2.6	0.45
43	12.0	95	-0.4	1.044	35.8	104	0.3	0.846	4.3	82	-1.4	0.675
44	10.0	101	0.1	1.055	32	105	0.4	0.952	4.9	92	-0.6	0.815
45	9.8	91	-0.7	1.041	30.9	103	0.3	0.989	4.6	95	-0.4	0.827
46	7.0	83	-1.3	0.912	25.7	91	-0.8	0.884	4	85	-1.1	0.698
47	13.3	108	0.6	1.120	36.8	111	0.9	1.008	4.9	99	0	0.83
48	6.7	68	-2.3	0.810	24.5	80	-1.6	0.816	4	79	-1.6	0.626
49	8.4	80	-1.5	0.857	26.2	85	-1.2	0.746	3.4	72	-2.1	0.506
50	11.2	81	-1.4	0.858	30.5	85	-1.2	0.877	4.5	84	-1.2	0.639
51	7.9	81	-1.4	0.880	27.3	87	-1	0.844	4.9	81	-1.4	0.67
52	12.0	97	-0.2	1.013	35.2	101	0	1.046	5.5	101	0.1	0.864
53	11.9	104	0.3	1.078	34.4	107	0.6	1.017	4.7	98	-0.1	0.941
54	10.6	98	-0.1	1.019	31	101	0.1	1.028	4.5	99	-0.1	0.79
55	10.3	89	-0.8	0.925	30.3	92	-0.7	0.931	4.8	90	-0.8	0.789

	rwardbc3	rwardp3	rwardt3	rtro3	rtrobmc3	rtrop3	rtrot3	rthip3	rthipbc3	rthipp3	rthipt3	radbmd3
1	1.8	78	-1.6	0.771	11.3	91	-0.7	0.962	32.4	95	-0.4	0.941
2	2.1	93	-0.5	0.933	12.5	110	0.7	1.155	35.9	115	1.2	0.776
3	1.6	72	-2	0.746	10.5	88	-0.9	0.915	29.7	91	-0.7	0.864
4	1.5	67	-2.3	0.602	7.1	71	-2.2	0.819	24.9	81	-1.5	0.584
5	1.5	68	-2.2	0.71	8.4	83	-1.2	0.839	25	83	-1.3	0.705
6	2.2	73	-1.9	0.708	11.8	83	-1.2	0.881	32.6	87	-1	0.765
7	1.7	83	-1.2	0.825	9.9	97	-0.2	1.04	30.7	103	0.3	0.915
8	1.7	68	-2.3	0.664	10.6	78	-1.6	0.827	29.6	82	-1.4	0.859
9	1.5	74	-1.8	0.691	7.6	81	-1.4	0.896	25.6	89	-0.9	0.664
10	2.1	89	-0.7	0.859	9.3	101	0.1	1.022	31.5	101	0.1	0.897
11	1.5	73	-1.9	0.801	9.9	94	-0.4	0.94	29.8	93	-0.5	0.853
12	2.7	96	-0.3	1.008	14.3	118	1.4	1.21	40.5	120	1.6	0.936
13	1.4	63	-2.6	0.712	8.9	84	-1.2	0.899	27.3	89	-0.9	0.653
14	2.5	71	-2	0.716	9.4	84	-1.2	0.887	30.5	88	-1	0.813
15	2.2	82	-1.3	0.885	13.8	104	0.3	1.097	37.1	109	0.7	0.825
16	1.3	72	-1.9	0.709	8.1	83	-1.2	0.893	24.7	89	-0.9	0.809
17	1.3	70	-2.1	0.658	6.1	77	-1.7	0.839	22.1	83	-1.3	0.994
18	1.6	68	-2.2	0.736	9.1	87	-1	0.94	29.4	93	-0.5	0.892
19	2	96	-0.2	0.89	14.4	105	0.3	1.149	38.3	114	1.1	0.819
20	1.8	76	-1.7	0.784	10.1	92	-0.6	0.961	30.4	95	-0.4	0.926
21	2.1	78	-1.6	0.754	10.4	89	-0.8	0.954	31.8	95	-0.4	0.964
22	1	71	-2.1	0.646	6.6	76	-1.8	0.821	21.8	81	-1.5	0.732
23	1.7	80	-1.4	0.761	9.2	89	-0.8	0.935	28.4	93	-0.6	0.908
24	1.1	54	-3.2	0.692	10.2	81	-1.4	0.816	26.5	81	-1.5	0.705
25	2.2	88	-0.8	0.818	9.1	96	-0.3	0.938	28.3	93	-0.6	0.921
26	2.1	74	-1.8	0.764	8.8	90	-0.8	0.888	28.3	88	-0.9	0.831
27	1.6	72	-2	0.801	11.4	94	-0.4	0.964	32.3	96	-0.3	0.762
28	2.1	76	-1.7	0.766	11.5	90	-0.7	0.933	32.3	93	-0.6	0.868
29	1.7	71	-2.1	0.726	10.3	85	-1.1	0.883	28.8	88	-1	0.708
30	2.1	100	0	0.863	10.3	101	0.1	1.09	32	108	0.7	0.977
31	1.7	72	-1.9	0.762	9.3	90	-0.8	0.956	28.7	95	-0.4	0.745
32	1.7	84	-1.1	0.72	8.5	85	-1.1	0.921	27.5	91	-0.7	0.883
33	1.6	69	-2.2	0.708	8.9	83	-1.2	0.896	27.9	89	-0.9	0.69
34	2.2	86	-1	0.861	11.7	101	0.1	1.033	34	103	0.2	0.913
35	1.3	66	-2.4	0.725	9	85	-1.1	0.892	26.8	89	-0.9	0.693
36	1.3	67	-2.3	0.623	7	73	-2	0.835	24.6	83	-1.4	0.915
37	1.4	56	-3.1	0.736	10	86	-1	0.881	28.3	87	-1	0.765
38	.	.	.	.	.	.	.	.	.	.	.	0.732
39	2.5	105	0.3	0.87	12.3	102	0.2	1.09	35.9	108	0.7	0.704
40	1.5	75	-1.8	0.757	8.9	89	-0.8	0.936	29.6	93	-0.6	0.704
41	1.9	74	-1.8	0.849	10.7	100	0	1.006	31.3	100	0	0.92
42	1.1	49	-3.5	0.6	7.6	70	-2.2	0.763	23.3	76	-1.9	0.707
43	2	74	-1.8	0.758	10	89	-0.8	0.983	32.8	98	-0.2	0.881
44	2.4	90	-0.7	0.896	9.3	105	0.4	1.075	32	107	0.5	0.941
45	2	91	-0.6	0.735	8.9	86	-1	1.026	30	102	0.1	0.779
46	1.6	77	-1.6	0.701	6.2	82	-1.3	0.938	25.4	93	-0.6	0.704
47	2.2	91	-0.6	0.861	12.4	101	0.1	1.089	35.8	108	0.6	0.921
48	1.6	69	-2.2	0.596	7.3	70	-2.2	0.8	24.8	79	-1.7	0.771
49	1.2	56	-3.1	0.686	8.4	81	-1.4	0.833	25.1	83	-1.4	0.762
50	1.8	70	-2.1	0.622	9.2	73	-2	0.832	28.7	83	-1.4	0.877
51	2.5	74	-1.8	0.655	6.8	77	-1.7	0.869	26.9	86	-1.1	0.812
52	2.6	95	-0.4	0.838	12.5	98	-0.1	1.039	36.9	103	0.2	0.965
53	2.2	103	0.2	0.841	9.5	99	-0.1	1.011	31	100	0	0.887
54	1.7	87	-0.9	0.887	11.9	104	0.3	1.09	34.5	108	0.7	0.804
55	2.3	87	-0.9	0.762	10.4	90	-0.8	0.958	31.6	95	-0.4	0.84

	radbmc3	radp3	radt3	bap1	bap2	bap3	pchbpmid	pchbppos	CTX1	CTX2	CTX3	pchctxmd
1	2.1	106	0.6	33.906	33.702	33.293	-0.6	-1.81	0.96	0.76	0.63	-20.94
2	2.3	87	-1.3	56.222	51.86	60.12	-7.76	6.93	1.69	0.86	1.05	-49.47
3	2.1	97	-0.3	25.936	25.726	30.93	-0.81	19.26	0.15	0.66	1.01	341.61
4	1.4	66	-3.4	47.32	47.667	59.585	0.73	25.92	1.05	1.21	1.31	15.6
5	1.8	79	-2.1	49.002	54.754	49.446	11.74	0.91	0.89	0.72	1.12	-18.95
6	2.2	86	-1.4	36.096	38.223	36.857	5.89	2.11	0.92	0.67	0.64	-27.06
7	2.2	103	0.3	25.305	25.673	21.481	1.45	-15.11	0.43	0.4	0.37	-6.12
8	2	97	-0.3	31.639	36.991	39.797	16.92	25.78	1.09	1.22	1.29	12.14
9	1.7	75	-2.5	47.316	46.855	37.195	-0.97	-21.39	0.55	0.68	0.78	22.91
10	2.2	101	0.1	31.69	36.073	52.247	13.83	64.87	0.68	0.7	0.58	2.49
11	2.2	96	-0.4	31.486	26.949	26.745	-14.41	-15.06	0.26	0.3	0.36	13.79
12	2.6	106	0.6	47.636	42.584	37.558	-10.61	-21.16	0.36	0.43	0.41	18.51
13	1.7	74	-2.6	32.013	27.444	29.308	-14.27	-8.45	0.43	0.48	0.64	12.06
14	2.6	92	-0.8	57.693	35.193	34.678	-39	-39.89	0.38	0.62	0.61	62.73
15	2.3	93	-0.7	92.742	85.986	91.546	-7.28	-1.29	0.54	0.49	0.59	-8.6
16	2.2	91	-0.9	41.926	42.738	42.68	1.94	1.8	0.53	0.33	0.35	-37.62
17	2.4	112	1.2	107.523	94.698	86.641	-11.93	-19.42	0.82	0.47	0.63	-42.25
18	2.1	101	0.1	46.181	52.109	41.174	12.84	-10.84	0.6	0.45	0.59	-24.87
19	2	92	-0.8	49.349	51.191	63.101	3.73	27.87	0.72	0.9	0.88	24.58
20	2	104	0.4	39.887	44.825	44.124	12.38	10.62	0.98	0.88	0.7	-9.93
21	2.4	109	0.9	29.308	26.692	34.503	-8.93	17.73	0.74	0.67	0.76	-9.04
22	1.6	83	-1.7	37.268	38.64	40.774	3.68	9.41	0.69	0.7	0.75	1.73
23	1.8	102	0.2	37.566	.	41.041	.	9.25	0.53	.	0.48	.
24	1.8	79	-2.1	28.326	32.454	27.408	14.57	-3.24	0.7	0.25	0.41	-63.6
25	2.1	104	0.4	38.776	34.493	34.289	-11.05	-11.57	1.17	0.62	0.82	-46.7
26	1.9	94	-0.6	42.248	64.049	49.125	51.6	16.28	0.8	0.51	0.59	-36.16
27	2.3	86	-1.4	28.137	29.826	27.374	6	-2.71	0.51	0.64	0.36	25.59
28	2.1	98	-0.2	34.616	51.115	50.561	47.66	46.06	0.32	0.44	0.73	35.29
29	1.8	80	-2	55.951	53.778	49.069	-3.88	-12.3	0.86	0.5	0.56	-41.83
30	2.1	110	1	39.686	53.556	39.631	34.95	-0.14	0.4	0.3	0.54	-24.5
31	1.6	84	-1.6	46.063	40.365	40.596	-12.37	-11.87	0.69	0.52	0.76	-25.47
32	2.1	99	-0.1	39.269	31.245	31.932	-20.43	-18.68	0.76	0.82	0.38	7.86
33	1.7	78	-2.2	34.792	33.934	36.281	-2.47	4.28	0.16	0.67	1.1	325.48
34	2.4	103	0.3	24.165	24.546	20.097	1.58	-16.83	0.36	0.2	0.51	-43.58
35	1.5	78	-2.2	24.355	29.379	36.248	20.63	48.83	0.4	0.46	0.55	14.43
36	2.1	103	0.3	42.443	36.198	32.473	-14.71	-23.49	0.63	0.46	0.35	-27.11
37	1.9	86	-1.4	41.292	40.639	37.363	-1.58	-9.52	0.53	0.5	0.44	-5.08
38	2	82	-1.8	41.191	51.811	45.037	25.78	9.34	0.63	0.78	0.96	24.09
39	2	79	-2.1	22.55	21.534	21.856	-4.51	-3.08	0.48	0.28	0.47	-42.02
40	1.6	79	-2.1	73.787	74.367	66.55	0.79	-9.81	1.06	1.41	1.33	32.67
41	2.2	104	0.4	51.012	45.932	48.29	-9.96	-5.34	0.6	0.5	0.49	-17.38
42	1.9	80	-2	29.957	30.977	29.244	3.4	-2.38	0.97	1.07	1.02	10.96
43	2.1	99	-0.1	26.183	26.336	32.2	0.58	22.98	0.38	0.32	0.55	-16.89
44	2	106	0.6	41.993	38.828	41.023	-7.54	-2.31	0.5	0.45	0.45	-10.71
45	1.9	88	-1.2	30.008	34.646	34.391	15.46	14.61	0.64	0.71	0.52	10.28
46	1.6	79	-2.1	42.255	44.118	49.125	4.41	16.26	0.22	0.32	0.34	42.86
47	2.4	113	1.3	44.722	44.612	72.688	-0.25	62.53	0.49	0.46	0.45	-6.56
48	1.9	87	-1.3	43.406	42.912	40.123	-1.14	-7.56	0.57	0.55	0.58	-2.64
49	1.8	86	-1.4	53.5	67.291	49.069	25.78	-8.28	0.32	0.32	0.44	0.63
50	2.4	99	-0.1	44.502	50.174	49.235	12.75	10.64	0.5	0.52	0.38	3.82
51	2.3	92	-0.8	36.052	39.845	36.396	10.52	0.95	0.41	0.49	0.47	17.63
52	2.4	109	0.9	29.758	35.708	41.058	19.99	37.97	0.67	0.66	0.64	-1.48
53	2.2	100	0	39.788	24.697	26.601	-37.93	-33.14	0.42	0.49	0.55	18.18
54	1.8	91	-0.9	44.076	42.738	39.327	-3.04	-10.77	0.55	0.63	0.67	14.86
55	2.2	95	-0.5	27.506	24.673	31.768	-10.3	15.49	0.75	0.65	0.86	-13.85

	pchctxpo	acbappst	acCTXpst	Zbap1	Zbap2	Zbap3	ZCTX1	ZCTX2	ZCTX3	zratpre	zratmid	zratpost
1	-34.17	-0.61	-0.33	-0.42498	-0.46415	-0.59417	1.18108	0.66494	-0.07014	-0.36	-0.7	8.47
2	-37.94	3.9	-0.64	1.03354	0.73618	1.27058	3.77138	1.05277	1.54729	0.27	0.7	0.82
3	576.51	4.99	0.86	-0.94588	-0.9914	-0.75842	-1.68878	0.25691	1.38477	0.56	-3.86	-0.55
4	25.07	12.27	0.26	0.45172	0.459	1.23339	1.48186	2.47887	2.54174	0.3	0.19	0.49
5	25.11	0.44	0.22	0.56166	0.92749	0.52863	0.94045	0.5195	1.80267	0.6	1.79	0.29
6	-30.41	0.76	-0.28	-0.28185	-0.16529	-0.34643	1.05368	0.32155	-0.02758	-0.27	-0.51	12.56
7	-12.47	-3.82	-0.05	-0.98712	-0.9949	-1.41522	-0.71211	-0.78943	-1.0762	1.39	1.26	1.32
8	18.4	8.16	0.2	-0.57315	-0.24673	-0.14207	1.63049	2.5233	2.46435	-0.35	-0.1	-0.06
9	40.91	-10.12	0.23	0.45146	0.40533	-0.32294	-0.26977	0.32963	0.48319	-1.67	1.23	-0.67
10	-15.06	20.56	-0.1	-0.56981	-0.30741	0.72333	0.20441	0.43063	-0.26748	-2.79	-0.71	-2.7
11	38.7	-4.74	0.1	-0.58315	-0.91055	-1.04932	-1.29245	-1.2015	-1.1149	0.45	0.76	0.94
12	13.54	-10.08	0.05	0.47238	0.12299	-0.29771	-0.93504	-0.66823	-0.92529	-0.51	-0.18	0.32
13	48.49	-2.71	0.21	-0.5487	-0.87783	-0.87117	-0.69088	-0.45008	-0.03919	0.79	1.95	22.23
14	61.15	-23.02	0.23	1.12968	-0.36558	-0.4979	-0.86781	0.10339	-0.13979	-1.3	-3.54	3.56
15	10.09	-1.2	0.05	3.42039	2.99207	3.45501	-0.32285	-0.42584	-0.23653	-10.59	-7.03	-14.61
16	-34.4	0.75	-0.18	0.09919	0.13317	0.05832	-0.34409	-1.06819	-1.17294	-0.29	-0.12	-0.05
17	-23.57	-20.88	-0.19	4.38644	3.56797	3.11406	0.68213	-0.49048	-0.09336	6.43	-7.27	-33.36
18	-1.5	-5.01	-0.01	0.37728	0.75264	-0.04636	-0.09638	-0.58339	-0.23266	-3.91	-1.29	0.2
19	22.5	13.75	0.16	0.58434	0.69196	1.47779	0.3318	1.22245	0.89722	1.76	0.57	1.65
20	-28.66	4.24	-0.28	-0.03408	0.27113	0.1587	1.24123	1.15377	0.18137	-0.03	0.23	0.87
21	2.7	5.2	0.02	-0.7255	-0.92754	-0.51006	0.40611	0.32155	0.42902	-1.79	-2.88	-1.19
22	8.82	3.51	0.06	-0.20525	-0.13772	-0.07416	0.23272	0.44275	0.39806	-0.88	-0.31	-0.19
23	-9.96	3.48	-0.05	-0.18577	.	-0.0556	-0.33347	.	-0.66217	0.56	.	0.08
24	-41.44	-0.92	-0.29	-0.78968	-0.54665	-1.00324	0.24333	-1.37926	-0.94077	-3.25	0.4	1.07
25	-29.7	-4.49	-0.35	-0.10669	-0.41186	-0.52494	1.9065	0.10743	0.65345	-0.06	-3.83	-0.8
26	-26.06	6.88	-0.21	0.12023	1.54193	0.50632	0.62197	-0.33292	-0.22105	0.19	-4.63	-2.29
27	-28.54	-0.76	-0.15	-0.80203	-0.72037	-1.0056	-0.4184	0.17611	-1.11103	1.92	-4.09	0.91
28	125.39	15.95	0.41	-0.37858	0.68693	0.60613	-1.07305	-0.63591	0.30132	0.35	-1.08	2.01
29	-34.99	-6.88	-0.3	1.01583	0.86297	0.50242	0.83783	-0.37332	-0.34487	1.21	-2.31	-1.46
30	33.75	-0.06	0.14	-0.04721	0.84829	-0.15361	-0.80057	-1.1813	-0.44548	0.06	-0.72	0.34
31	9.26	-5.47	0.06	0.36957	-0.02369	-0.08654	0.22918	-0.3208	0.4058	1.61	0.07	-0.21
32	-49.67	-7.34	-0.38	-0.07447	-0.62657	-0.68877	0.48396	0.9235	-1.02977	-0.15	-0.68	0.67
33	599.36	1.49	0.94	-0.36707	-0.44881	-0.38647	-1.66047	0.29731	1.73302	0.22	-1.51	-0.22
34	42.74	-4.07	0.15	-1.06163	-1.0694	-1.51143	-0.9492	-1.5853	-0.53835	1.12	0.67	2.81
35	36.32	11.89	0.15	-1.04921	-0.74992	-0.38877	-0.7935	-0.543	-0.39518	1.32	1.38	0.98
36	-44.98	-9.97	-0.28	0.13298	-0.29915	-0.65117	0.0027	-0.55512	-1.18068	49.21	0.54	0.55
37	-17.7	-3.93	-0.09	0.05775	-0.00558	-0.31126	-0.33701	-0.36524	-0.82469	-0.17	0.02	0.38
38	51.35	3.85	0.32	0.05115	0.73294	0.22216	0.01686	0.7619	1.17969	3.03	0.96	0.19
39	-1.05	-0.69	-0.01	-1.16718	-1.26851	-1.38916	-0.53164	-1.28634	-0.69312	2.2	0.99	2
40	24.95	-7.24	0.27	2.18154	2.224	1.71753	1.54202	3.29089	2.61913	1.41	0.68	0.66
41	-18.71	-2.72	-0.11	0.69302	0.34431	0.44827	-0.07869	-0.38544	-0.61574	-8.81	-0.89	-0.73
42	5.69	-0.71	0.06	-0.68308	-0.64428	-0.87562	1.20585	1.93348	1.43894	-0.57	-0.33	-0.61
43	44.06	6.02	0.17	-0.92974	-0.95107	-0.67014	-0.87489	-1.12878	-0.40292	1.06	0.84	1.66
44	-11.11	-0.97	-0.06	0.10357	-0.12529	-0.05686	-0.43255	-0.58339	-0.78212	-0.24	0.21	0.07
45	-18.85	4.38	-0.12	-0.67974	-0.40174	-0.51785	0.05578	0.45891	-0.49965	-12.19	-0.88	1.04
46	53.57	6.87	0.12	0.12069	0.2244	0.50632	-1.42338	-1.10858	-1.18455	-0.08	-0.2	-0.43
47	-8.4	27.97	-0.04	0.28193	0.25705	2.14418	-0.48917	-0.55916	-0.78599	-0.58	-0.46	-2.73
48	1.41	-3.28	0.01	0.19592	0.14468	-0.11941	-0.20608	-0.16728	-0.28683	-0.95	-0.86	0.42
49	36.56	-4.43	0.12	0.85563	1.75624	0.50242	-1.08367	-1.1005	-0.82469	-0.79	-1.6	-0.61
50	-24.35	4.73	-0.12	0.26755	0.62473	0.51396	-0.45732	-0.31676	-1.06072	-0.59	-1.97	-0.48
51	13.04	0.34	0.05	-0.28472	-0.05807	-0.37848	-0.75103	-0.43392	-0.70473	0.38	0.13	0.54
52	-4.6	11.3	-0.03	-0.69608	-0.33154	-0.05442	0.16902	0.28115	-0.02758	-4.12	-1.18	1.97
53	31.1	-13.19	0.13	-0.04055	-1.05942	-1.05933	-0.73688	-0.40564	-0.39518	0.06	2.61	2.68
54	21.01	-4.75	0.12	0.2397	0.13317	-0.17474	-0.2627	0.15995	0.06916	-0.91	0.83	-2.53
55	14.91	4.26	0.11	-0.84327	-1.06101	-0.70017	0.4415	0.21247	0.8237	-1.91	-4.99	-0.85

	ratpre	ratmid	ratpost	pcratpt	pctotbmd	pcl14bmd	pcl24bmd	pclnkbmd	pclwdbmd	pcltrbmd	pclthbmd	pcrnkbmd
1	35.32	44.4	52.68	49.15	3.21	3.45	5.29	-2.76	-4.34	2.4	1.41	1.57
2	33.23	60.65	57.26	72.32	0.95	-4.87	-5.29	2.27	1.18	1.98	0.26	0.92
3	174.07	39.1	30.68	-82.37	2.69	0.46	2.6	-0.44	-3.35	-2.18	-1.45	3.7
4	45.28	39.46	45.59	0.68	1.24	-0.97	-0.2	-0.65	2.87	-0.95	0.83	2.12
5	54.93	75.73	44.31	-19.35	1.36	-0.21	-0.11	2.49	5.4	4.02	2.99	2.09
6	39.06	56.71	57.32	46.73	-0.38	-2.54	-2.58	-0.79	-2.05	-4.65	-2.36	-0.99
7	59.54	64.34	57.74	-3.02	0.47	-2.56	-2.88	1.38	-4.83	-0.73	-0.19	-2.85
8	29.11	30.35	30.92	6.24	-0.46	-1.33	-2.28	-2.24	-0.55	1.2	0.3	-3.04
9	86.03	69.31	47.99	-44.21	-0.8	-4.28	-4.41	-1.39	-2.76	-2.01	-2.1	0.14
10	46.33	51.46	89.93	94.1	-0.97	-6.86	-5.12	-2.73	-3	-1.44	-0.86	-1.1
11	120.64	90.74	73.88	-38.76	0.41	1.58	0.83	2.04	-4.03	0.01	1.8	5.06
12	131.59	99.26	91.38	-30.56	-1.67	5.06	6.13	0.64	0.43	1.01	0.81	0.47
13	74.28	56.82	45.79	-38.35	-0.34	-5.16	-5.66	0.68	-0.77	1.28	1.75	0.69
14	151.43	56.76	56.48	-62.7	4.47	-0.4	-0.75	-1.84	-4.85	-2.49	-2.38	-0.61
15	173.35	175.84	155.43	-10.34	-2.31	1.97	1.07	-1.17	-2.43	0.42	0.27	-0.56
16	79.26	129.51	123	55.19	-2.49	-3.1	-5.01	-1.91	-1.14	-0.29	-0.76	-0.51
17	131.29	200.21	138.4	5.42	-0.82	-0.18	-1.35	-3.27	-1.78	0.49	-0.73	0.64
18	77.1	115.8	69.79	-9.48	-0.98	1.78	0.54	-3.46	-9.12	0.38	1.13	-6.87
19	68.54	57.07	71.54	4.38	0.08	0.44	1.82	0	-0.9	-2.23	-1.49	1.23
20	40.83	50.94	63.31	55.06	-1.75	0.42	0.99	-2.12	-3.79	-2.09	-1.02	-2.63
21	39.55	39.6	45.34	14.63	0.48	2.57	3.23	-1.35	-1.83	-1.08	-1.49	-2.64
22	53.86	54.89	54.15	0.54	0.15	-0.32	-0.28	-0.81	-1.09	-0.82	-1.26	-3.13
23	70.61	.	85.68	21.34	.	.	.	.	.	.	.	.
24	40.76	128.28	67.34	65.23	0.65	-2.72	-2.8	-1.14	-3.85	1	-0.24	-2.2
25	33.28	55.54	41.87	25.79	0	-1.82	-1.28	-0.11	-2.24	-1.36	-1.54	0
26	52.68	125.1	82.84	57.26	3.89	3.34	3.63	-4.38	-4.58	-1.05	-1.06	-1.49
27	55.39	46.75	75.41	36.15	2.74	0	0.67	1.03	2.58	3.27	2.57	2.42
28	107.17	116.97	69.45	-35.19	-0.74	2.27	4.75	-1.99	-1.12	-0.87	0.21	-0.52
29	64.83	107.13	87.47	34.91	1.14	2.77	1.77	-3.63	-5.78	-1.28	-1.32	-1.76
30	99.22	177.34	74.08	-25.34	0.35	-2.3	-3.35	1.88	3.16	3.46	1.59	1.12
31	66.66	78.38	53.77	-19.34	-0.27	-1.09	-0.59	2.42	0.14	-0.5	0.8	4.12
32	51.47	37.96	83.16	61.57	0.09	-0.4	-0.63	2.53	0.62	-0.65	1.04	0.54
33	221.61	50.8	33.04	-85.09	-0.68	1.37	2.03	-2.27	-2.08	0.83	-1.03	3.13
34	67.5	121.51	39.33	-41.74	-0.31	0.08	-0.08	2.05	-5.47	0.24	0	1.55
35	60.58	63.87	66.15	9.18	-1.23	1.07	2.23	-3.39	1.89	-0.88	-0.12	-1.09
36	67.69	79.21	94.12	39.05	3.14	1	2.2	2.29	6.34	4.35	3.87	0.96
37	77.76	80.63	85.5	9.95	-0.47	-2.67	-2.2	-1.77	-5.23	0.86	-0.23	2.59
38	65.28	66.17	47.16	-27.76	0.2	0.31	0.79	.	.	.	.	.
39	47.37	78.02	46.4	-2.05	-1.36	.	.	-3.58	-5.64	3.73	0.62	-3.65
40	69.48	52.78	50.15	-27.82	1.19	-4.21	-4.87	-2.45	-0.46	0.88	1.05	-1.63
41	84.46	92.05	98.35	16.45	4.58	2.74	2.77	0	0.58	3.35	1.4	2.47
42	30.98	28.87	28.61	-7.63	-0.42	-0.36	-0.24	1.21	-0.47	1.1	1.86	-0.73
43	69.08	83.61	58.97	-14.63	2.81	5.42	-0.74	10.02	0.91	1.42	1.89	-1.01
44	83.32	86.28	91.57	9.9	0.76	-1.85	-0.85	1.81	3.11	1.85	1.04	1.25
45	46.74	48.94	66.01	41.22	-0.75	-2.35	-1.85	-0.7	-3.2	-0.91	-0.1	-1.3
46	188.64	137.87	142.81	-24.3	-0.09	2.09	3.58	-0.23	-2.02	0.14	-0.11	-1
47	91.64	97.83	162.61	77.44	1.99	-2.48	-2.79	0.09	-1.95	-1.15	-0.09	0.79
48	76.42	77.6	69.66	-8.85	0.09	4.17	5.13	1.33	0	-2.02	-1.19	2.36
49	167.19	208.98	112.29	-32.84	0.72	1.51	1.13	2.34	2.5	1.59	1.16	-3.25
50	89.54	97.24	130.94	46.24	1.1	-1.53	-2.33	0.24	-2.39	4.35	2.49	-2.37
51	87.08	81.82	77.77	-10.69	0.68	5.52	5.14	-1.57	4.95	-0.14	1.03	-3.28
52	44.15	53.78	63.85	44.62	-0.74	-0.73	0.16	0.29	-1.58	-4	-1.09	-1.19
53	95.19	49.99	48.54	-49	-0.34	1.66	1.2	-1.32	-1.41	-2.81	-0.91	2.07
54	79.85	67.41	58.87	-26.27	-1.74	-1.56	-0.28	1.91	-0.55	0.71	0.58	0.78
55	36.63	38.13	36.81	0.51	1.23	-0.27	2.36	1.11	-2.8	-1.15	-1.15	0.85

	pcrwdbmd	pcrtrbmd	pcrthbmd	pctotbpt	pcl14bpt	pcl24bpt	pclnkbpt	pclwdbpt	pcltrbpt	pclthbpt	pcrnkbpt	pcrwdbpt
1	-1.23	1.1	1.38	1.8	3.06	3.47	-1.79	-0.61	2.82	1.19	2.01	0.94
2	1.06	0.09	1.04	0.72	-2.17	-1.43	0.82	2	2.25	1.26	0.39	-2.49
3	3.8	4.02	2.95	1.04	-0.09	2.33	-0.33	-1.6	-2.91	-1.97	2.46	-0.61
4	-0.22	3.12	2.21	0.29	-1.41	-3.26	1.11	3.78	2.9	2.39	-2.17	0.51
5	-0.93	9.68	3.3	0.55	-1.03	-0.3	0.68	3.17	1.63	2.01	3.61	-0.97
6	-1.81	-0.65	-1.22	-0.11	-0.99	-0.87	-0.68	-2.19	-8.68	-4.58	0.63	-0.62
7	-0.24	-0.72	-1.86	0.13	-0.46	-0.87	1.99	-4.2	-0.24	1.14	-2.82	0.34
8	-2.89	-4.25	-2.83	1.24	-4	-4.75	-3.82	-1.92	-1.11	-1.6	-1.46	-2.74
9	-2.57	0.61	0.41	0.35	-4.5	-3.95	-1.74	1.58	-0.47	-1.15	-1.03	-4.98
10	-2.68	-0.16	0.78	-1.76	-4.57	-2.99	0.1	-0.23	-1.17	-0.21	-4.08	1.62
11	1.02	0.01	1.62	-0.92	0.18	-1.07	-0.28	-5.37	-2.48	-0.26	3.37	-0.83
12	-2.21	1.2	1.67	0.94	3.47	4.35	-0.27	0	0.55	0.16	-0.09	-3.53
13	0.1	-0.72	0.06	-0.43	-0.65	-0.35	1.99	-2.2	-1.25	-0.26	1.89	2.46
14	-2.97	0.22	0.12	4.3	-0.9	-1.03	-2.09	-0.82	-2.02	-1.84	0.98	0.21
15	-1.85	0.68	0.39	-1.42	0.92	0.48	-3.72	-3.22	-0.52	0.46	-2.1	-2.11
16	1.3	-1.5	-1.09	-2.26	-0.78	-2.45	-1.95	-1.45	-0.04	-0.86	-2.24	-2.63
17	-1.42	0.78	0	0.9	0.64	0.72	-3.15	-0.65	0.81	-0.97	-0.39	0.79
18	-1.29	0.68	-0.54	-2.4	2.15	3.25	-3.23	-3.75	-0.63	-0.62	-1.05	1.81
19	-1.98	-4.38	-0.85	-0.58	-2.43	-0.53	1.07	-1.46	-1.28	-1.4	-0.53	-3.2
20	-5.57	-0.6	-1.72	-3.24	-2.71	-2.42	-1.28	-6.16	-1.66	-0.82	0.19	-2.58
21	-2.67	-2.42	-2.12	-0.03	2.84	3.32	-2.74	-4.32	-0.19	-1.91	-3.12	-6.04
22	-2.67	-2.47	-1.56	-2.09	-1.29	-1.88	-0.95	-3.02	-3.82	-3.38	-2.23	-3.28
23	.	.	.	1.31	1.68	0.32	-1.12	-2.56	-2.36	-1.64	-0.54	-2.42
24	2.58	2.34	1.72	-0.65	-5.34	-4.95	0.13	1.35	1.43	0.59	-1.42	5.36
25	-2.47	-0.73	-0.63	0.52	0.5	-0.16	-2.95	-0.87	-0.74	-1.33	-2.16	-1.23
26	3.08	2.8	0.79	1.33	0.79	2.58	-1.84	0.4	4.2	1.59	-2.23	-0.44
27	4.75	2.59	1.88	2.28	0.39	0.22	2.8	2.73	1.76	1.85	2.22	3.33
28	-2.23	-1.01	-0.42	-0.17	0.93	5.08	-1.57	-3.21	-1.25	-1.13	1.14	-3.89
29	-1.71	-4.14	-2.93	1.05	2.57	1.18	-2.06	-1.16	-1.92	-1.87	0.7	-0.16
30	2.43	3.43	2.14	-1.04	-5.4	-0.6	2.38	1.52	1.43	1.31	-0.74	0.88
31	0.78	-1.36	0.11	-0.45	-0.6	1.29	-1.15	3.34	3.73	1.61	2.78	2.02
32	0.13	3.88	0.97	0.09	-1.36	-1.81	-1.21	-2.85	-2.47	-2.18	-0.65	-2.04
33	-2.06	-0.69	-0.99	0	1.26	0.2	-1.08	-2.72	0.28	0	-2.57	-1.27
34	-3.12	-2.81	-1.94	-2.74	1.67	2.7	-0.11	2.24	0.24	0.1	0.62	1.43
35	-0.33	-0.55	-0.89	-0.85	0.21	2.01	-1.76	-1.03	-0.88	-1.16	-1.58	-1.32
36	1.25	0.78	1.43	3.58	.	-2.01	3.25	1.58	2.64	2.7	0.6	-4.7
37	1.79	2.33	1.82	-1.97	-1.46	-0.42	-0.54	-4.3	-0.57	-0.92	0.72	0.4
38	.	.	.	-0.81	1.34	1.79	.	.	.	.	.	.
39	-3.34	2.66	0.09	-1.6	.	.	-2.97	-4.85	3.28	0	-2.32	-0.31
40	0.14	-0.26	-0.84	-4.2	-5.17	-9.83	-1.17	-5.19	0.76	0	-1.84	-6.22
41	3.89	4.45	2.42	1.27	2.65	2.2	0.44	-0.15	3.12	1.5	-2.69	1.35
42	-1.79	-0.38	0.13	0.63	-0.72	0	4.1	4.32	0.95	2.79	-2.18	-3.43
43	6.18	1.62	1.34	3.13	3.92	3.11	8.37	4.08	4.13	3.98	-4.94	4.33
44	2.68	-0.67	0.09	1.01	-0.26	-1.11	1.39	1.74	-0.58	-0.66	-0.52	4.09
45	-2.38	-2.71	-0.78	-0.67	-2.44	-2.02	-1.49	-2.74	0.91	0.39	-1.1	-1.55
46	-3.09	3.24	1.8	1.07	-8.51	-5.61	-2.76	-0.31	-1.81	-0.55	-1.45	-1.83
47	-1.96	-1.29	-0.53	3.48	-4.03	-5.25	-2.64	-5.08	-3.98	-2.35	-0.59	-4.49
48	3.15	-1.14	-0.24	0.92	1.83	3.08	2.43	2.58	-9.77	-3.69	1.24	-1.26
49	-8.49	-3.23	-1.42	-1.17	-4.4	-5.11	2.59	1.93	-2.16	-0.92	-2.99	-4.53
50	-3.43	8.39	2.88	0.37	-1.81	-2.14	0.6	-0.6	2.85	1.78	-1.02	-0.31
51	-0.44	2.3	-0.45	-0.43	3.31	3.43	1.35	0.93	-1.15	0.34	-1.17	-1.62
52	-1.43	-0.36	-1.41	-0.25	1.85	1.65	-1.62	-1.82	0.36	0.3	-4.21	-4.64
53	4.5	2.73	1.98	-2.2	1.03	0.82	-2.54	-5.92	-3.9	-2.27	0.39	3.18
54	-3.21	-2.15	-0.81	-1.83	-0.73	1.31	-0.11	0.69	-0.83	-1.36	0	-2.35
55	-0.38	1.47	0.84	-0.53	0	-0.64	-3.44	-4.39	-3.33	-2.94	-1.59	-0.13

	pcrtrbpt	pcrthbpt	actotbmd	acl14bmd	acl24bmd	aclnkbmd	aclwdbmd	acltrbmd	aclthbmd	acrnkbmd	acrwdbmd	acrtrbmd
1	0.54	0.9	0.04	0.04	0.07	-0.03	-0.03	0.02	0.01	0.01	-0.01	0.01
2	0.85	1.1	0.01	-0.06	-0.07	0.02	0.01	0.02	0	0.01	0.01	0
3	0	0	0.03	0.01	0.03	0	-0.02	-0.02	-0.01	0.03	0.03	0.03
4	1.3	0.27	0.01	-0.01	0	-0.01	0.02	-0.01	0.01	0.02	0	0.02
5	8.69	3.98	0.01	0	0	0.02	0.03	0.03	0.02	0.02	-0.01	0.06
6	-4.49	-2.68	0	-0.03	-0.03	-0.01	-0.01	-0.04	-0.02	-0.01	-0.01	0
7	0.87	-0.1	0.01	-0.03	-0.03	0.01	-0.04	-0.01	0	-0.03	0	-0.01
8	-1.53	-0.33	0	-0.01	-0.02	-0.02	0	0.01	0	-0.02	-0.02	-0.03
9	-0.59	-0.32	-0.01	-0.04	-0.04	-0.01	-0.02	-0.01	-0.02	0	-0.02	0
10	0.13	0.29	-0.01	-0.08	-0.06	-0.03	-0.03	-0.01	-0.01	-0.01	-0.02	0
11	-2.82	-0.17	0	0.02	0.01	0.02	-0.03	0	0.02	0.04	0.01	0
12	1	0.92	-0.02	0.07	0.08	0.01	0	0.01	0.01	0.01	-0.02	0.01
13	-1.53	0.62	0	-0.05	-0.06	0.01	0	0.01	0.02	0.01	0	-0.01
14	-2.29	-0.06	0.06	-0.01	-0.01	-0.02	-0.03	-0.02	-0.02	-0.01	-0.02	0
15	-0.23	-1.06	-0.03	0.03	0.01	-0.01	-0.02	0	0	-0.01	-0.01	0.01
16	0.28	-2.19	-0.03	-0.03	-0.05	-0.02	-0.01	0	-0.01	0	0.01	-0.01
17	2.02	0	-0.01	0	-0.02	-0.03	-0.01	0	-0.01	0.01	-0.01	0.01
18	0.82	0.64	-0.01	0.02	0.01	-0.03	-0.06	0	0.01	-0.06	-0.01	0.01
19	-5.02	-2.87	0	0.01	0.02	0	-0.01	-0.02	-0.02	0.01	-0.02	-0.04
20	0.99	-0.79	-0.02	0	0.01	-0.02	-0.03	-0.02	-0.01	-0.02	-0.04	0
21	-2.57	-2.24	0.01	0.03	0.04	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02
22	-4.97	-3.1	0	0	0	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02	-0.02
23	-2.44	-1.37	.	.	.	.	.	.	.	.	.	.
24	1.32	0.49	0.01	-0.03	-0.03	-0.01	-0.02	0.01	0	-0.02	0.01	0.02
25	-0.61	-1.26	0	-0.02	-0.02	0	-0.02	-0.01	-0.02	0	-0.02	-0.01
26	1.73	0.45	0.04	0.03	0.04	-0.04	-0.03	-0.01	-0.01	-0.01	0.02	0.02
27	-1.35	0.52	0.03	0	0.01	0.01	0.02	0.03	0.03	0.02	0.03	0.02
28	-3.16	-1.79	-0.01	0.03	0.06	-0.02	-0.01	-0.01	0	-0.01	-0.02	-0.01
29	0.14	-0.56	0.01	0.03	0.02	-0.03	-0.04	-0.01	-0.01	-0.02	-0.01	-0.03
30	2.13	1.3	0	-0.03	-0.04	0.02	0.03	0.03	0.02	0.01	0.02	0.03
31	3.25	0.95	0	-0.01	-0.01	0.02	0	0	0.01	0.03	0.01	-0.01
32	-0.14	-1.07	0	-0.01	-0.01	0.03	0.01	-0.01	0.01	0.01	0	0.03
33	-1.67	-1.54	-0.01	0.01	0.02	-0.02	-0.01	0.01	-0.01	0.03	-0.01	-0.01
34	0.7	0.29	0	0	0	0.02	-0.04	0	0	0.02	-0.02	-0.02
35	-0.96	-1.22	-0.01	0.01	0.02	-0.03	0.01	-0.01	0	-0.01	0	0
36	-3.11	-0.24	0.04	0.01	0.02	0.02	0.04	0.03	0.03	0.01	0.01	0.01
37	0.68	0.23	-0.01	-0.03	-0.03	-0.01	-0.03	0.01	0	0.02	0.01	0.02
38	.	.	0	0	0.01	.	.	.	.	.	.	.
39	0.46	-0.91	-0.02	.	.	-0.04	-0.06	0.03	0.01	-0.04	-0.03	0.02
40	-1.56	-1.89	0.01	-0.04	-0.05	-0.02	0	0.01	0.01	-0.02	0	0
41	2.04	1.41	0.05	0.03	0.03	0	0	0.03	0.01	0.02	0.03	0.04
42	-2.12	-0.39	0	0	0	.	0.16	-0.13	-0.11	0.08	0.22	-0.16
43	2.02	1.44	0.04	0.07	-0.01	0.09	0.01	0.01	0.02	-0.01	0.04	0.01
44	-0.11	-0.19	0.01	-0.02	-0.01	0.02	0.03	0.02	0.01	0.01	0.02	-0.01
45	-0.41	-0.19	-0.01	-0.03	-0.02	-0.01	-0.03	-0.01	0	-0.01	-0.02	-0.02
46	-1.27	-0.42	0	0.03	0.04	0	-0.01	0	0	-0.01	-0.02	0.02
47	-7.42	-3.11	0.02	-0.04	-0.04	0	-0.02	-0.01	0	0.01	-0.02	-0.01
48	-3.09	-2.08	0	0.04	0.05	0.01	0	-0.01	-0.01	0.02	0.02	-0.01
49	-3.79	-1.42	0.01	0.02	0.02	0.02	0.01	0.01	0.01	-0.03	-0.05	-0.02
50	0.32	-0.24	0.01	-0.02	-0.03	0	-0.02	0.03	0.02	-0.02	-0.02	0.05
51	0.61	-1.36	0.01	0.06	0.06	-0.01	0.03	0	0.01	-0.03	0	0.02
52	-0.24	-2.07	-0.01	-0.01	0	0	-0.01	-0.03	-0.01	-0.01	-0.01	0
53	-0.24	-0.1	0	0.02	0.02	-0.01	-0.01	-0.03	-0.01	0.02	0.04	0.02
54	-4.83	-2.24	-0.02	-0.02	0	0.02	0	0.01	0.01	0.01	-0.03	-0.02
55	2.01	0.52	0.01	0	0.03	0.01	-0.02	-0.01	-0.01	0.01	0	0.01

	acrthbmd	actotbpt	acl14bpt	acl24bpt	aclnkbpt	aclwdbpt	acltrbpt	aclthbpt	acrnkbpt	acrwdbpt	acrtrbpt	acrthbpt
1	0.01	0.02	0.04	0.05	-0.02	0	0.02	0.01	0.02	0.01	0	0.01
2	0.01	0.01	-0.03	-0.02	0.01	0.02	0.02	0.01	0	-0.02	0.01	0.01
3	0.03	0.01	0	0.03	0	-0.01	-0.02	-0.02	0.02	0	0	0
4	0.02	0	-0.02	-0.04	0.01	0.02	0.02	0.02	-0.02	0	0.01	0
5	0.03	0.01	-0.01	0	0	0.02	0.01	0.02	0.03	-0.01	0.06	0.03
6	-0.01	0	-0.01	-0.01	-0.01	-0.01	-0.07	-0.04	0.01	0	-0.03	-0.02
7	-0.02	0	-0.01	-0.01	0.02	-0.03	0	0.01	-0.03	0	0.01	0
8	-0.02	0.01	-0.04	-0.05	-0.03	-0.01	-0.01	-0.01	-0.01	-0.02	-0.01	0
9	0	0	-0.04	-0.04	-0.01	0.01	0	-0.01	-0.01	-0.04	0	0
10	0.01	-0.02	-0.05	-0.04	0	0	-0.01	0	-0.04	0.01	0	0
11	0.02	-0.01	0	-0.01	0	-0.04	-0.02	0	0.03	-0.01	-0.02	0
12	0.02	0.01	0.05	0.06	0	0	0.01	0	0	-0.03	0.01	0.01
13	0	0	-0.01	0	0.02	-0.01	-0.01	0	0.02	0.01	-0.01	0.01
14	0	0.05	-0.01	-0.01	-0.02	-0.01	-0.01	-0.02	0.01	0	-0.02	0
15	0	-0.02	0.01	0.01	-0.04	-0.02	0	0	-0.02	-0.02	0	-0.01
16	-0.01	-0.03	-0.01	-0.03	-0.02	-0.01	0	-0.01	-0.02	-0.02	0	-0.02
17	0	0.01	0.01	0.01	-0.03	0	0.01	-0.01	0	0.01	0.01	0
18	-0.01	-0.03	0.02	0.04	-0.03	-0.02	-0.01	-0.01	-0.01	0.01	0.01	0.01
19	-0.01	-0.01	-0.03	-0.01	0.01	-0.01	-0.01	-0.02	-0.01	-0.03	-0.05	-0.03
20	-0.02	-0.04	-0.03	-0.03	-0.01	-0.05	-0.01	-0.01	0	-0.02	0.01	-0.01
21	-0.02	0	0.03	0.04	-0.02	-0.03	0	-0.02	-0.03	-0.05	-0.02	-0.02
22	-0.01	-0.02	-0.02	-0.02	-0.01	-0.02	-0.03	-0.03	-0.02	-0.02	-0.03	-0.03
23	.	0.02	0.02	0	-0.01	-0.02	-0.02	-0.02	-0.01	-0.02	-0.02	-0.01
24	0.01	-0.01	-0.06	-0.05	0	0.01	0.01	0.01	-0.01	0.03	0.01	0
25	-0.01	0.01	0.01	0	-0.03	-0.01	-0.01	-0.01	-0.02	-0.01	-0.01	-0.01
26	0.01	0.02	0.01	0.03	-0.02	0	0.03	0.02	-0.02	0	0.01	0
27	0.02	0.03	0.01	0	0.03	0.02	0.01	0.02	0.02	0.02	-0.01	0.01
28	0	0	0.01	0.06	-0.02	-0.02	-0.01	-0.01	0.01	-0.03	-0.03	-0.02
29	-0.03	0.01	0.03	0.01	-0.02	-0.01	-0.02	-0.02	0.01	0	0	-0.01
30	0.02	-0.01	-0.06	-0.01	0.02	0.01	0.01	0.01	-0.01	0.01	0.02	0.01
31	0	-0.01	-0.01	0.01	-0.01	0.02	0.03	0.02	0.02	0.01	0.02	0.01
32	0.01	0	-0.02	-0.02	-0.01	-0.02	-0.02	-0.02	-0.01	-0.02	0	-0.01
33	-0.01	0	0.01	0	-0.01	-0.02	0	0	-0.02	-0.01	-0.01	-0.01
34	-0.02	-0.04	0.02	0.04	0	0.02	0	0	0.01	0.01	0.01	0
35	-0.01	-0.01	0	0.02	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01
36	0.01	0.04	.	-0.02	0.03	0.01	0.02	0.02	0.01	-0.03	-0.02	0
37	0.02	-0.02	-0.02	-0.01	0	-0.02	0	-0.01	0.01	0	0.01	0
38	.	-0.01	0.01	0.02	.	.	.	.	.	.	.	.
39	0	-0.02	.	.	-0.03	-0.05	0.03	0	-0.03	0	0	-0.01
40	-0.01	-0.05	-0.05	-0.11	-0.01	-0.03	0.01	0	-0.02	-0.05	-0.01	-0.02
41	0.02	0.02	0.03	0.03	0	0	0.03	0.02	-0.03	0.01	0.02	0.01
42	-0.16	0.01	-0.01	0	0.03	0.02	0.01	0.02	-0.02	-0.02	-0.01	0
43	0.01	0.04	0.05	0.04	0.08	0.03	0.03	0.04	-0.04	0.03	0.02	0.01
44	0	0.01	0	-0.01	0.01	0.01	-0.01	-0.01	-0.01	0.03	0	0
45	-0.01	-0.01	-0.03	-0.02	-0.02	-0.02	0.01	0	-0.01	-0.01	0	0
46	0.02	0.01	-0.1	-0.07	-0.02	0	-0.01	-0.01	-0.01	-0.01	-0.01	0
47	-0.01	0.04	-0.06	-0.08	-0.03	-0.05	-0.04	-0.03	-0.01	-0.04	-0.07	-0.04
48	0	0.01	0.02	0.03	0.02	0.02	-0.06	-0.03	0.01	-0.01	-0.02	-0.02
49	-0.01	-0.01	-0.06	-0.08	0.02	0.01	-0.02	-0.01	-0.02	-0.02	-0.03	-0.01
50	0.02	0	-0.02	-0.02	0.01	0	0.02	0.02	-0.01	0	0	0
51	0	-0.01	0.04	0.04	0.01	0.01	-0.01	0	-0.01	-0.01	0	-0.01
52	-0.02	0	0.02	0.02	-0.02	-0.02	0	0	-0.05	-0.04	0	-0.02
53	0.02	-0.03	0.01	0.01	-0.03	-0.06	-0.04	-0.03	0	0.03	0	0
54	-0.01	-0.02	-0.01	0.01	0	0.01	-0.01	-0.01	0	-0.02	-0.05	-0.03
55	0.01	-0.01	0	-0.01	-0.03	-0.03	-0.03	-0.03	-0.02	0	0.02	0.01

	pctotcmd	pcl14cmd	pcl24cmd	pclnkcmd	pclwdcmd	pcltrcmd	pclthcmd	pcrnkcmd	pcrwdcmd	pcrtrcmd	pcrthcmd	pctotcpt
1	-6.06	2.71	4.45	-3.71	-6.12	1.75	1.21	1.76	-0.81	0.49	1.37	-7.18
2	-1.53	-4.81	-5.26	0.75	-1.76	1.72	-0.21	-0.73	-2.2	-7.17	-0.96	-5.05
3	-3.33	-0.29	-1.12	-2.38	-6.25	-3.15	-1.54	4.76	6.25	8.91	4.07	-2.19
4	-4.91	-0.81	0.19	2.05	8.63	-4.64	-0.24	0.57	-3.31	5.21	2.62	-6.23
5	-1.06	-0.7	-0.8	0.35	1.11	5.62	3.55	-0.64	-6.16	16.05	5.84	-2.72
6	-3.47	-2.26	-2.55	-1.27	-3.08	-6.51	-3.46	-0.98	-1.82	1.05	-0.33	-2.46
7	-3.71	-2.76	-3.27	-1.45	-10.25	-4.78	-2.02	-0.92	3.81	3.78	0.61	-1.05
8	-2.71	-1.7	-2.87	-3.95	-3.96	-0.05	-0.37	-3.46	-3.63	-8.38	-3.82	-5.96
9	-0.58	-4.44	-4.83	-1.28	-2.57	-3.73	-2.81	-1.02	-4.68	-3.22	-1.18	-3.28
10	-5.68	-10.09	-7.57	0	2.6	-3.91	-0.29	1.4	2.35	-6.12	0.46	-5.64
11	13.28	-0.38	-0.85	4.14	-0.03	-6.39	-0.2	2.5	-3.8	-3.1	-0.46	3.65
12	-0.01	7.4	9.14	0.19	-0.44	6.49	2.22	-0.09	-3.35	1.37	1.91	6.12
13	-1.17	-6.12	-5.89	-0.65	-3.44	3.75	1.83	2.29	3.33	-3.73	-0.87	-2.42
14	-3.01	-1.07	-1.66	-1.5	-4.23	-5.74	-3.04	3.01	4.17	-3.98	-0.95	-3.8
15	6.05	4.19	2.37	-0.33	-0.46	-1.88	-0.19	-1.02	-3.24	2.09	0.67	5.77
16	3.51	-6.16	-8.17	-1.56	-0.5	0.41	-0.6	1.28	5.04	2.08	0.77	-1.62
17	2.75	1.27	-39	-0.48	0.17	-1.77	-0.67	-1.17	-7.41	2.56	-0.66	3.47
18	-2.25	2.27	1.52	-3.76	-9.75	-4.89	-0.42	-4.97	2.72	-4.69	-1.51	-0.74
19	-1.89	0.48	1.46	0.26	-0.37	-2.11	-1.01	1.1	-2.31	-8.51	-1.92	-4.7
20	-4.02	-0.37	-0.44	-3.82	-7.11	-8.66	-3.3	-2.22	-4.74	-0.23	-1.31	-8.13
21	-9.47	2.38	2.13	-1.14	-1.51	0.29	-1.17	-2.68	-2.73	-1.85	-2.13	-6.34
22	0.34	1.38	1.15	2.06	6.1	0.05	-0.84	-3.07	1.36	-3.09	-1.33	2.84
23	.	.	.	.	.	.	.	.	.	.	.	-1.69
24	-2.21	-2.27	-2.52	-1.8	-6.22	7.08	1.99	-2.27	4.66	0.83	1.98	-1.16
25	-0.74	-0.84	-0.05	2.8	1.55	1.09	-0.45	-0.44	-3.63	-5.63	-1.98	-0.54
26	-3	3.89	4.52	-2.81	-1.56	-1.43	-0.2	-4.97	-4.17	13.99	4.39	-3.28
27	2.89	1.85	1.56	3.07	8.26	3.03	2.45	6.52	13.33	6.84	4.05	3.42
28	2.7	23.09	25.36	-1.9	-3.89	-3.41	0.02	-1.71	-5.02	2.65	-0.4	2.5
29	3.64	4.2	3	-3.29	-4.99	-2.59	-1.81	2.43	3.69	-5.1	-2.52	3.28
30	-0.14	-8.98	0.32	4.82	11.94	9.61	4.24	-0.2	0.14	6.94	1.13	2.65
31	-4.6	0.91	1.61	0.16	-3.21	-4.73	-0.63	1.76	-1.3	-2.82	0.18	-0.6
32	0.57	0.25	-20.68	2.97	1.74	-5.71	0.02	0.34	0.06	14.09	3.93	0.27
33	-0.14	2.25	3.26	-3.13	-3.79	1.34	-0.38	2.26	-3.65	5.06	1	0.59
34	-5.24	-24.51	-0.53	1.89	-8.12	2.13	0.54	2.94	-3.47	2.26	-0.41	-1.24
35	-0.51	0.87	1.83	-1.88	5.23	-3.57	-0.47	-0.3	1.45	-1.08	-1.28	-1.45
36	-4.58	13.91	18.76	-0.11	1.46	6.51	3.74	0.03	-0.49	-0.73	0.58	-3.37
37	-3.11	-3.92	-3.71	-1.12	-3.77	1.77	0.02	1.51	-0.49	5.48	2.82	-5.17
38	-0.37	-27.07	-34.59	.	.	.	.	.	.	.	.	-7.47
39	1.02	.	.	-3.71	-6.05	5.35	1.14	-2.09	-0.34	6.51	1.89	0.77
40	-3.58	-1.99	-2.8	-2.09	0.28	-1.31	0.8	-1.43	0.72	4.19	0.47	-8.03
41	-1.65	3.75	3.94	0.49	1.45	5.94	2.79	3.53	5.92	4.94	3.77	-2.49
42	-1.3	-0.61	-0.26	0.48	-2.15	2.41	2.32	-1.33	-4.26	-1.85	-0.28	-3.42
43	6.09	37.8	-14.05	3.11	-12.05	10.54	3.35	7.19	26.37	5.79	4.51	-5.64
44	0.73	-4.55	-3.98	2.37	4.3	-2.03	1.16	1.14	2.37	-4.87	0.48	-3.31
45	-4.33	-5.37	-5.43	-1.64	-5.01	-6.39	-1.66	-2.16	-4.09	-11.05	-3.02	-4.57
46	-0.29	2.5	3.11	0.83	0.27	-0.13	-0.14	-1.59	-4.35	7.72	3.16	-1.84
47	0.29	-3.04	-2.97	1.27	0.26	-0.22	0.29	-0.06	-3.66	-1.04	-1.01	-3.75
48	2.88	5.83	6.91	0.9	-0.76	2.63	0.49	2.91	4.36	-1.05	-0.2	-0.02
49	-2.37	1.98	2.15	2.34	2.82	3.83	1.72	-3.99	-9.91	-5.85	-2.45	-3.2
50	-1.52	-0.24	-0.41	-2.36	-7.26	2.48	2.16	-2.83	-4.33	9.46	2.95	-5.76
51	-6.05	5.7	5.29	6.59	23.32	-6.4	0.4	-15	-23.03	-4.71	-3.98	2.5
52	-1.88	-0.15	0.98	2.59	2.99	-5.47	-0.87	-0.4	0.04	0.17	-0.72	-1.64
53	-0.94	0.48	-1.84	-0.95	-0.56	-5.29	-1.53	0.37	0.95	8.05	1.73	0.06
54	3.34	-7.18	-5.62	0.1	-4.04	-1.11	-0.08	-0.25	-5.01	-5.89	-2.14	2.27
55	3.32	-5.33	-4.1	3.02	0.97	3.45	1.46	0.67	-0.62	0.24	1.7	1.42

	pcl14cpt	pcl24cpt	pclnkcpt	pclwdcpt	pcltrcpt	pclthcpt	pcrnkcpt	pcrwdcpt	pcrtrcpt	pcrthcpt	actotcmd	acl14cmd
1	2.51	2.83	-3.61	-5.51	4.12	1.74	1.09	-0.02	-1.9	0.43	-180.23	1.68
2	-1.87	-1.27	0.11	1.31	3.98	1.51	-2.86	-8.18	-0.01	0.23	-40.53	-3.94
3	0.98	0.67	0	0	-7.87	-2.78	2.38	0	3.96	0.68	-88	-0.16
4	-0.92	-3.05	3.36	10.58	3.47	3.09	-1.57	1.9	3.73	1.91	-101.87	-0.5
5	-1.48	-1.27	-1.56	2.43	5.4	3.24	-0.08	-3.88	13.42	5.72	-22	-0.41
6	-0.14	0.25	-1.89	-2.31	-5.17	-3.89	1.14	-2.37	-1.55	-1.81	-86.34	-1.42
7	0.86	0.83	0.84	-10.72	-7.13	-1.37	-3.35	1.64	5.33	0.58	-93.44	-1.86
8	-3.35	-4.75	-3.22	-0.7	-2.94	-2.25	-0.19	-2.61	-3.09	-1.07	-62.62	-0.87
9	-4.99	-4.34	-0.6	2.98	-2.84	-1.12	-2.58	-9.33	-3.05	-2.1	-8.84	-2.47
10	-4.31	-0.86	3.44	3.36	-0.75	1.21	0.37	7.78	0.17	0.93	-168.32	-6.25
11	-1.26	-1.77	0.44	-2.08	-8.11	-2.35	0.07	-3.55	-7.87	-4.09	322.72	-0.24
12	4.79	5.95	0.41	-0.12	9.93	3.55	0.56	-3.71	-0.19	1.11	-0.4	5.98
13	-0.58	0.27	1.63	-6.74	-3.08	-0.94	2.93	7.45	-11	-2.13	-25.18	-2.86
14	-0.67	-0.84	-1.53	0.58	-5.95	-2.7	0.68	-1.61	-2.41	-0.16	-102.54	-0.88
15	1.6	1.53	-0.33	5.07	-5.74	-0.47	1	1.37	4.36	1.49	155	3.07
16	-4.08	-5.65	-0.71	-2.23	0.14	-0.83	0.71	6.94	6.59	0.49	67.27	-2.93
17	2.17	1.52	-3.5	0.17	-3.53	-1.61	-1.17	0.31	2.56	0.25	57.13	0.71
18	2.31	3.19	-1.2	2.63	-1.34	-0.14	1.31	5.96	-1.26	0.43	-50.02	1.2
19	-3.11	-1.48	-0.39	-5.76	2.47	-0.72	1.88	2.56	-7.26	-2.51	-50.61	0.32
20	-3.87	-3.75	-2.68	-8.6	-7.56	-2.65	-0.07	-1.03	6.05	0.97	-103.15	-0.23
21	1.92	1.63	-0.79	-2.74	5.68	0.2	-2.24	-2.23	-4.01	-2.68	-273.79	1.58
22	0.69	-0.1	-1.34	-2.74	-4.12	-3.45	-3.07	-7.85	-4.54	-3.55	6.19	0.8
23	1.6	0.32	1.28	0.71	-3.18	-1.24	-2.28	-4.6	-2.4	-2.05	.	.
24	-4.75	-4.64	1.01	2.3	1.72	0.86	-2.27	4.66	4.95	1.98	-50.28	-1.38
25	-0.53	-1.71	0.61	6.38	0.01	-0.11	-2.76	0.96	-2.41	-1.98	-19.09	-0.55
26	2.38	5.18	0.05	3.73	8.86	4.16	-4.24	-5.79	8.06	2.38	-74.82	2.09
27	2.78	2.53	4.98	8.26	5.45	3.34	4.35	6.67	-2.56	0.62	76.17	1.2
28	19.43	24.12	-1.9	-3.89	0.01	-1.17	0.26	-5.02	-0.8	-1.92	68	14.5
29	4.8	3.48	-0.87	0.95	-5.01	-3.72	2.43	-2.07	1.82	-0.44	80	2.11
30	-34.3	5.13	4.82	6.61	0.16	0.8	-0.2	0.14	6.94	1.13	-3.09	-4.65
31	0.18	2.75	2.49	12.07	9.61	4.41	4.3	4.87	10.22	4.17	-115.12	0.5
32	-0.54	-1.29	0.63	1.74	-3.61	-1.36	0.34	0.06	3.17	-0.07	13.33	0.16
33	1.83	0.17	-3.39	-3.51	-3.18	-0.54	-1.32	0.82	-4.39	-1.54	-2.67	1.06
34	2.02	3.14	4.05	7.2	0.36	1.16	2.94	6.18	-0.3	0.77	-154.53	-19.13
35	-1.58	-0.48	-3.33	-4.99	-0.55	-1.27	-6.23	-0.91	0.5	-0.45	-9.52	0.43
36	.	14.34	0.68	-5.32	5.72	3.1	-0.62	-8.58	-8.47	-2.42	-117.06	7.26
37	-2.69	-2.11	0.64	-0.28	-2.51	-1.48	-0.31	-1.89	5.53	1.36	-73.32	-2.66
38	2.09	2.86	.	.	.	.	.	.	.	.	-8.56	-15.62
39	.	.	-1.66	-2.64	6.23	1.11	-0.09	5.17	3.27	0.25	28.89	.
40	-6.38	-13.03	0.32	-1.82	0.22	0.85	-4.72	-9.58	-0.77	-1.69	-81.33	-1.05
41	3.69	3.55	0.63	2.04	4.85	2.44	-0.62	8.14	-3.98	-0.55	-45.56	2.91
42	-1.53	-1.11	3.06	3.5	5	3.19	-4.41	-4.26	-5.58	-1.84	-23.85	-0.29
43	5.29	3.37	5.26	-1.71	10.54	5.71	-3.97	9.89	-2.05	1.72	175.47	28.25
44	-0.38	-0.62	2.92	4.47	-1.57	0.59	1.96	9.39	-7.44	0.01	17.52	-2.52
45	-3.83	-3.48	-2.02	-5.53	0.79	0.64	-0.73	-0.25	1.88	0.46	-98.71	-2.86
46	-16.18	-14.88	-1.64	0.74	-6.6	-2.74	-0.55	0.76	-3.44	-0.84	-6.09	1.48
47	-3.8	-4.75	-3.52	-7.45	-3.05	-2.36	-3.18	-8.56	-12.47	-5.7	7.8	-2.21
48	2.57	3.53	0.48	-0.23	-13.11	-4.42	3.92	-0.31	-2.9	-1.65	60.27	2.93
49	-3.56	-4.47	2.26	-0.33	-2.47	-1.36	-4.52	-4.84	-7.28	-2.74	-57.8	1.68
50	-0.39	-0.09	-0.67	-4.9	4.95	2.55	0.33	-1.37	-1.63	-0.81	-39.7	-0.14
51	4.97	5.11	-0.47	-0.5	1.07	1.51	-16.38	-29.78	-5.88	-5.09	-162.03	3.69
52	1.19	2.1	-1.19	1.1	-0.09	0.95	-3.49	-5.21	-1.74	-1.77	-53.22	-0.12
53	1.22	-0.69	-3.07	-7.93	-4.41	-2.85	-2.93	-5.09	2.64	-1.11	-25.55	0.34
54	-4.03	0.53	-0.65	2.63	0.15	-1.68	0.69	0.18	-7	-2.85	77.55	-4.92
55	-0.03	-0.46	-2.14	-3.43	-1.42	-1.71	0.36	2.45	3.95	1.94	79.29	-3.3

	acl24cmd	aclnkcmd	aclwdcmd	acltrcmd	aclthcmd	acrnkcmd	acrwdcmd	acrtrcmd	acrthcmd	actotcpt	acl14cpt	acl24cpt
1	2.21	-0.18	-0.13	0.18	0.38	0.08	-0.01	0.06	0.44	-213.65	1.55	1.41
2	-3.42	0.04	-0.04	0.21	-0.08	-0.04	-0.05	-0.9	-0.34	-133.68	-1.54	-0.83
3	-0.5	-0.1	-0.1	-0.4	-0.5	0.2	0.1	0.9	1.2	-58	0.54	0.3
4	0.09	0.08	0.1	-0.34	-0.06	0.02	-0.05	0.36	0.64	-129.31	-0.57	-1.53
5	-0.38	0.01	0.02	0.42	0.84	-0.02	-0.1	1.19	1.38	-56.2	-0.86	-0.61
6	-1.3	-0.06	-0.07	-0.86	-1.21	-0.05	-0.04	0.13	-0.11	-61.06	-0.09	0.13
7	-1.75	-0.06	-0.17	-0.44	-0.59	-0.04	0.06	0.35	0.19	-26.46	0.58	0.44
8	-1.21	-0.17	-0.08	-0.01	-0.11	-0.14	-0.06	-0.92	-1.14	-137.91	-1.71	-2.01
9	-2.21	-0.05	-0.04	-0.28	-0.68	-0.04	-0.08	-0.25	-0.31	-49.59	-2.78	-1.99
10	-3.8	0	0.06	-0.46	-0.1	0.07	0.05	-0.57	0.14	-167.09	-2.67	-0.43
11	-0.45	0.17	0	-0.68	-0.06	0.1	-0.06	-0.33	-0.14	88.6	-0.8	-0.92
12	6.04	0.01	-0.01	0.94	0.89	-0.01	-0.09	0.2	0.77	196	3.86	3.93
13	-2.21	-0.03	-0.05	0.37	0.51	0.09	0.04	-0.37	-0.24	-51.93	-0.27	0.1
14	-1.11	-0.08	-0.11	-0.57	-0.91	0.16	0.11	-0.38	-0.29	-129.46	-0.55	-0.56
15	1.41	-0.02	-0.01	-0.24	-0.07	-0.05	-0.07	0.28	0.25	148	1.17	0.91
16	-3.14	-0.05	-0.01	0.03	-0.14	0.04	0.06	0.16	0.19	-30.97	-1.94	-2.17
17	-17.71	-0.02	0	-0.1	-0.14	-0.04	-0.1	0.15	-0.15	72.13	1.21	0.69
18	0.64	-0.16	-0.15	-0.51	-0.13	-0.2	0.04	-0.43	-0.44	-16.42	1.22	1.35
19	0.76	0.01	-0.01	-0.31	-0.4	0.06	-0.05	-1.32	-0.75	-125.9	-2.09	-0.77
20	-0.22	-0.17	-0.13	-1.05	-1.08	-0.1	-0.09	-0.02	-0.39	-208.74	-2.43	-1.9
21	1.08	-0.05	-0.03	0.03	-0.38	-0.13	-0.06	-0.2	-0.7	-183.26	1.27	0.83
22	0.55	0.06	0.07	0	-0.19	-0.09	0.01	-0.21	-0.3	51.19	0.4	-0.05
23	.	.	.	.	.	.	.	.	.	-39.24	0.92	0.15
24	-1.18	-0.06	-0.07	0.66	0.53	-0.08	0.05	0.08	0.51	-26.28	-2.88	-2.18
25	-0.03	0.13	0.03	0.1	-0.13	-0.02	-0.08	-0.53	-0.57	-14.09	-0.35	-0.93
26	1.95	-0.12	-0.03	-0.13	-0.06	-0.22	-0.09	1.14	1.21	-81.63	1.28	2.23
27	0.8	0.16	0.15	0.38	0.83	0.3	0.2	0.8	1.3	90.17	1.8	1.3
28	12.3	-0.09	-0.08	-0.4	0.01	-0.09	-0.11	0.31	-0.13	63	12.2	11.7
29	1.24	-0.14	-0.08	-0.32	-0.57	0.1	0.06	-0.52	-0.73	72	2.41	1.44
30	0.13	0.22	0.22	1.02	1.35	-0.01	0	0.67	0.36	58.91	-17.75	2.13
31	0.71	0.01	-0.06	-0.46	-0.19	0.07	-0.02	-0.24	0.05	-15.12	0.1	1.21
32	-10.35	0.13	0.03	-0.55	0.01	0.01	0	1.16	1.08	6.33	-0.34	-0.65
33	1.27	-0.12	-0.06	0.12	-0.1	0.1	-0.06	0.47	0.28	11.75	0.86	0.07
34	-0.33	0.09	-0.16	0.24	0.18	0.14	-0.07	0.27	-0.14	-36.53	1.57	1.97
35	0.72	-0.07	0.07	-0.28	-0.12	-0.01	0.02	-0.1	-0.34	-26.86	-0.78	-0.19
36	7.29	0	0.02	0.48	0.95	0	-0.01	-0.06	0.15	-86.03	.	5.57
37	-2	-0.04	-0.05	0.17	0.01	0.05	-0.01	0.52	0.79	-121.96	-1.83	-1.14
38	-16.24	.	.	.	.	.	.	.	.	-172.24	1.2	1.35
39	.	-0.22	-0.17	0.67	0.43	-0.11	-0.01	0.78	0.68	21.91	.	.
40	-1.21	-0.08	0	-0.14	0.25	-0.06	0.01	0.38	0.14	-182.5	-3.35	-5.65
41	2.5	0.02	0.03	0.69	0.9	0.16	0.1	0.55	1.19	-69.01	2.86	2.25
42	-0.1	.	1.87	-6.49	-15.02	20.29	2.07	-6.92	-15.82	-62.72	-0.73	-0.43
43	-8.55	0.15	-0.23	1.14	1.13	0.32	0.48	0.59	1.45	-162.61	3.95	2.05
44	-1.77	0.12	0.1	-0.21	0.37	0.06	0.05	-0.49	0.15	-79.88	-0.21	-0.28
45	-2.35	-0.08	-0.11	-0.62	-0.51	-0.1	-0.08	-0.97	-0.9	-104.36	-2.04	-1.51
46	1.48	0.03	0	-0.01	-0.04	-0.06	-0.07	0.5	0.81	-38.58	-9.56	-7.06
47	-1.76	0.06	0.01	-0.03	0.11	0	-0.09	-0.15	-0.38	-101.71	-2.76	-2.81
48	2.68	0.04	-0.01	0.2	0.13	0.11	0.07	-0.08	-0.05	-0.46	1.3	1.37
49	1.52	0.09	0.03	0.33	0.46	-0.14	-0.13	-0.53	-0.63	-78.02	-3.02	-3.16
50	-0.19	-0.1	-0.15	0.27	0.64	-0.13	-0.08	0.89	0.85	-150.29	-0.23	-0.04
51	2.89	0.28	0.38	-0.5	0.11	-0.88	-0.82	-0.34	-1.13	66.83	3.22	2.8
52	0.6	0.14	0.07	-0.66	-0.3	-0.02	0	0.02	-0.27	-46.57	0.91	1.29
53	-1.09	-0.05	-0.01	-0.66	-0.54	0.02	0.02	0.75	0.54	1.64	0.88	-0.41
54	-2.91	0	-0.06	-0.12	-0.03	-0.01	-0.09	-0.75	-0.76	52.72	-2.76	0.28
55	-1.99	0.14	0.02	0.36	0.45	0.03	-0.01	0.02	0.53	33.97	-0.02	-0.22

	aclnkcpt	aclwdcpt	acltrcpt	aclthcpt	acrnkcpt	acrwdcpt	acrtrcpt	acrthcpt	pcradbmd	pcradbpt	acradbmd	acradbpt
1	-0.18	-0.12	0.43	0.55	0.05	0	-0.22	0.14	-2.28	1.95	-0.021	0.018
2	0.01	0.03	0.48	0.54	-0.14	-0.19	0	0.08	-5.28	0	-0.041	0
3	0	0	-1	-0.9	0.1	0	0.4	0.2	1.5	-0.12	0.013	-0.001
4	0.13	0.12	0.25	0.76	-0.06	0.03	0.26	0.47	6.38	3.55	0.036	0.02
5	-0.05	0.04	0.4	0.76	0	-0.06	0.99	1.35	3.22	3.07	0.022	0.021
6	-0.09	-0.05	-0.68	-1.36	0.06	-0.05	-0.19	-0.6	-2.95	-1.8	-0.023	-0.014
7	0.03	-0.18	-0.65	-0.4	-0.15	0.03	0.5	0.18	-4.02	-0.54	-0.037	-0.005
8	-0.14	-0.01	-0.33	-0.7	-0.01	-0.05	-0.34	-0.32	0.36	2.02	0.003	0.017
9	-0.02	0.05	-0.22	-0.27	-0.1	-0.15	-0.24	-0.55	-11.17	-7.26	-0.08	-0.052
10	0.17	0.07	-0.09	0.43	0.02	0.15	0.02	0.29	-0.33	-2.5	-0.003	-0.023
11	0.02	-0.04	-0.86	-0.73	0	-0.06	-0.85	-1.27	-7.99	-5.33	-0.072	-0.048
12	0.02	0	1.45	1.43	0.03	-0.1	-0.03	0.44	-1.22	3.43	-0.011	0.031
13	0.06	-0.09	-0.3	-0.26	0.12	0.1	-1.1	-0.6	1.6	4.31	0.01	0.027
14	-0.08	0.02	-0.59	-0.81	0.04	-0.04	-0.23	-0.05	-3.08	0.25	-0.025	0.002
15	-0.02	0.09	-0.74	-0.17	0.05	0.03	0.58	0.55	-1.78	-1.9	-0.015	-0.016
16	-0.02	-0.03	0.01	-0.2	0.02	0.08	0.5	0.12	4.88	3.98	0.038	0.031
17	-0.12	0	-0.2	-0.34	-0.04	0	0.15	0.06	4.34	2.79	0.042	0.027
18	-0.05	0.04	-0.14	-0.04	0.05	0.09	-0.12	0.13	-6.7	-0.45	-0.06	-0.004
19	-0.02	-0.11	0.36	-0.29	0.09	0.05	-1.13	-0.99	0.6	-1.8	0.005	-0.015
20	-0.12	-0.16	-0.92	-0.87	0	-0.02	0.58	0.29	-4.14	0.87	-0.038	0.008
21	-0.04	-0.06	0.59	0.07	-0.11	-0.05	-0.43	-0.88	4.9	2.77	0.046	0.026
22	-0.04	-0.03	-0.3	-0.79	-0.09	-0.09	-0.31	-0.8	1.08	-1.35	0.008	-0.01
23	0.05	0.01	-0.28	-0.34	-0.1	-0.08	-0.23	-0.59	.	4.97	.	0.043
24	0.04	0.03	0.16	0.23	-0.08	0.05	0.48	0.51	-1.32	3.22	-0.009	0.022
25	0.03	0.13	0	-0.03	-0.12	0.02	-0.23	-0.57	-1.02	4.54	-0.009	0.04
26	0	0.07	0.78	1.19	-0.19	-0.13	0.66	0.66	-0.61	1.71	-0.005	0.014
27	0.26	0.15	0.68	1.13	0.2	0.1	-0.3	0.2	0.67	1.87	0.005	0.014
28	-0.09	-0.08	0	-0.39	0.01	-0.11	-0.09	-0.63	-2.35	1.88	-0.02	0.016
29	-0.04	0.02	-0.62	-1.17	0.1	-0.04	0.18	-0.13	-1.73	1.87	-0.012	0.013
30	0.22	0.12	0.02	0.25	-0.01	0	0.67	0.36	3.96	4.49	0.037	0.042
31	0.11	0.24	0.94	1.31	0.17	0.08	0.86	1.15	7.7	4.34	0.055	0.031
32	0.03	0.03	-0.35	-0.39	0.01	0	0.26	-0.02	-2.18	-3.81	-0.02	-0.035
33	-0.13	-0.05	-0.29	-0.15	-0.06	0.01	-0.41	-0.44	-4.14	-1.43	-0.029	-0.01
34	0.19	0.14	0.04	0.38	0.14	0.13	-0.04	0.26	0.44	1.22	0.004	0.011
35	-0.12	-0.06	-0.04	-0.32	-0.23	-0.01	0.05	-0.12	-1.95	-3.35	-0.014	-0.024
36	0.03	-0.07	0.42	0.79	-0.02	-0.12	-0.65	-0.61	-1.87	0.55	-0.017	0.005
37	0.02	0	-0.23	-0.42	-0.01	-0.03	0.52	0.38	0.75	-4.49	0.006	-0.036
38	.	.	.	.	.	.	.	.	-0.26	-6.51	-0.002	-0.051
39	-0.1	-0.08	0.78	0.42	-0.01	0.12	0.39	0.09	5.33	-6.26	0.04	-0.047
40	0.01	-0.03	0.02	0.26	-0.2	-0.16	-0.07	-0.51	1.42	0	0.01	0
41	0.03	0.04	0.56	0.79	-0.03	0.14	-0.44	-0.17	1.56	2.56	0.014	0.023
42	0.1	0.04	0.39	0.73	-0.14	-0.05	-0.45	-0.44	-6.92	-7.7	-0.053	-0.059
43	0.25	-0.03	1.14	1.93	-0.18	0.18	-0.21	0.55	3.01	2.09	0.026	0.018
44	0.14	0.11	-0.16	0.19	0.09	0.21	-0.75	0	-3.06	2.84	-0.028	0.026
45	-0.1	-0.12	0.08	0.2	-0.03	-0.01	0.16	0.14	-5.75	-4.77	-0.047	-0.039
46	-0.07	0.01	-0.5	-0.72	-0.02	0.01	-0.22	-0.22	0.27	-4.61	0.002	-0.034
47	-0.18	-0.17	-0.42	-0.89	-0.16	-0.21	-1.77	-2.16	-2.81	-0.43	-0.026	-0.004
48	0.02	0	-1.01	-1.13	0.15	-0.01	-0.22	-0.42	2.81	3.07	0.021	0.023
49	0.08	0	-0.21	-0.36	-0.16	-0.06	-0.66	-0.71	-4.26	-1.68	-0.033	-0.013
50	-0.03	-0.1	0.53	0.76	0.02	-0.03	-0.15	-0.24	-0.23	2.81	-0.002	0.024
51	-0.02	-0.01	0.08	0.41	-0.96	-1.06	-0.43	-1.44	1.5	1.63	0.012	0.013
52	-0.06	0.03	-0.01	0.33	-0.2	-0.14	-0.22	-0.66	-6.54	-1.33	-0.064	-0.013
53	-0.16	-0.2	-0.55	-1.01	-0.14	-0.12	0.24	-0.35	-3.96	0.45	-0.035	0.004
54	-0.03	0.04	0.02	-0.53	0.03	0	-0.9	-1.01	1.8	-3.6	0.015	-0.03
55	-0.1	-0.07	-0.15	-0.53	0.02	0.06	0.4	0.6	0.35	-2.33	0.003	-0.02

	pcradcmd	pcradcpt	acradcmd	acradcpt	lpw1tl	lrw1tl	spw1tl	lgpw1tl	habw1tl	hadw1tl	hew1tl	hfw1tl
1	0	5	0	0.1	2045.45	2687.5	1982.95	4909.09	4090.91	5113.64	5375	7159.09
2	-4.55	4.55	-0.1	0.1	2659.09	2556.82	1892.05	7363.64	5113.64	6136.36	4602.27	11250
3	0	0	0	0	1534.09	2556.82	1278.41	6545.45	5625	8181.82	8181.82	11250
4	0	0	0	0	1954.55	3329.55	829.55	1227.27	3238.64	4602.27	3522.73	4602.27
5	0	0	0	0	1363.64	1363.64	1022.73	3818.18	2613.64	2500	2386.36	4772.73
6	0	0	0	0	2301.14	2147.73	1886.36	3272.73	3988.64	4602.27	4528.41	6136.36
7	0	4.76	0	0.1	2093.75	2122.16	1764.2	4400	6443.18	6840.91	5312.5	7727.27
8	0	5.26	0	0.1	1619.32	2215.91	1349.43	4000	3068.18	4090.91	3750	6647.73
9	0	6.25	0	0.1	1193.18	4176.14	809.66	11045.45	2556.82	1704.55	681.82	1704.55
10	-4.35	-4.35	-0.1	-0.1	1636.36	1727.27	880.68	4363.64	8522.73	2045.45	2454.55	3409.09
11	0	0	0	0	363.64	363.64	363.64	581.82	727.27	727.27	727.27	727.27
12	4	4	0.1	0.1	113.64	170.45	113.64	363.64	454.55	454.55	454.55	454.55
13	0	0	0	0	1022.73	1022.73	750	2181.82	2045.45	2215.91	1704.55	1818.18
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	340.91	340.91	454.55	545.45	1590.91	1590.91	1704.55	1704.55
16	0	0	0	0	681.82	340.91	511.36	1090.91	0	0	0	0
17	4.35	4.35	0.1	0.1	0	0	0	0	0	0	0	0
18	-4.76	0	-0.1	0	0	0	0	0	0	0	0	0
19	-4.76	-4.76	-0.1	-0.1	0	0	0	0	0	0	0	0
20	-4.76	-4.76	-0.1	-0.1	0	0	0	0	0	0	0	0
21	8.7	4.35	0.2	0.1	0	0	0	0	0	0	0	0
22	-5.88	-5.88	-0.1	-0.1	0	0	0	0	0	0	0	0
23	.	-5.26	.	-0.1	.	.	.	.	.	.	.	.
24	-5.56	0	-0.1	0	.	.	.	.	.	.	.	.
25	0	0	0	0	.	.	.	.	.	.	.	.
26	5.56	5.56	0.1	0.1	.	.	.	.	.	.	.	.
27	4.76	9.52	0.1	0.2	.	.	.	.	.	.	.	.
28	0	5	0	0.1	.	.	.	.	.	.	.	.
29	0	0	0	0	.	.	.	.	.	.	.	.
30	-4.76	0	-0.1	0	.	.	.	.	.	.	.	.
31	0	0	0	0	.	.	.	.	.	.	.	.
32	0	0	0	0	.	.	.	.	.	.	.	.
33	-5.56	-5.56	-0.1	-0.1	.	.	.	.	.	.	.	.
34	0	4.35	0	0.1	.	.	.	.	.	.	.	.
35	0	7.14	0	0.1	1636.36	2045.45	1227.27	5890.91	1363.64	2181.82	3818.18	4363.64
36	0	5	0	0.1	1636.36	2454.55	2454.55	7200	2727.27	3272.73	6000	3272.73
37	0	0	0	0	2045.45	2045.45	2250	3600	3000	3545.45	4090.91	3000
38	-4.76	-4.76	-0.1	-0.1	2454.55	2250	2454.55	4581.82	2181.82	3818.18	3272.73	2727.27
39	10	0	0.2	0	2045.45	2250	1636.36	3600	2181.82	2727.27	4636.36	2727.27
40	0	0	0	0	2250	2454.55	2454.55	9163.64	3818.18	4909.09	6545.45	3818.18
41	0	4.76	0	0.1	2454.55	2863.64	1431.82	6218.18	3000	4363.64	2727.27	6000
42	-5	-5	-0.1	-0.1	1534.09	1840.91	2454.55	5890.91	2454.55	2727.27	3818.18	2727.27
43	0	0	0	0	2454.55	3272.73	2454.55	6545.45	2727.27	2727.27	2727.27	4909.09
44	5	0	0.1	0	2454.55	3272.73	2045.45	8509.09	3000	4090.91	6000	2727.27
45	-5.26	0	-0.1	0	2045.45	1636.36	1840.91	4581.82	1909.09	3000	2727.27	2727.27
46	0	-5.88	0	-0.1	1840.91	2454.55	2250	4581.82	1636.36	2727.27	4363.64	2727.27
47	0	4.35	0	0.1	2863.64	3068.18	2863.64	6872.73	3818.18	4909.09	6818.18	4090.91
48	0	5.56	0	0.1	2454.55	2659.09	2250	7200	3818.18	3818.18	6000	3272.73
49	5.56	0	0.1	0	2045.45	2454.55	1636.36	4581.82	3818.18	4363.64	7090.91	3818.18
50	-4.17	0	-0.1	0	0	0	0	0	0	0	0	0
51	0	4.55	0	0.1	2659.09	2629.55	2454.55	5890.91	4090.91	4800	5022.73	3909.09
52	-4.17	0	-0.1	0	2454.55	3272.73	2454.55	8509.09	4636.36	5181.82	7909.09	4363.64
53	-4.55	0	-0.1	0	2454.55	2454.55	2250	7200	3272.73	3545.45	6000	3272.73
54	0	0	0	0	2454.55	2454.55	2454.55	5890.91	2727.27	3818.18	5181.82	4090.91
55	0	4.76	0	0.1	0	0	0	0	0	0	0	0

	lpw2tl	lrw2tl	spw2tl	lgpw2tl	habw2tl	hadw2tl	hew2tl	hfw2tl	lpw3tl	lrw3tl	spw3tl	lgpw3tl
1	1676.14	1696.02	1227.27	3272.73	2727.27	3409.09	3409.09	5113.64	3068.18	2812.5	2045.45	4909.09
2	2468.75	2812.5	1943.18	7363.64	5625	6647.73	4602.27	11250	2531.25	2781.25	1968.75	4909.09
3	1022.73	2045.45	1022.73	4363.64	3750	5454.55	6477.27	8181.82	1022.73	2045.45	1022.73	4363.64
4	2045.45	2045.45	1022.73	0	3068.18	4602.27	3068.18	4602.27	2045.45	2045.45	1022.73	0
5	2045.45	2045.45	1534.09	5090.91	4602.27	4488.64	3579.55	7159.09	2045.45	2045.45	1534.09	5727.27
6	2198.86	2198.86	1909.09	2454.55	4602.27	4602.27	4602.27	6136.36	2301.14	2198.86	2000	3409.09
7	2281.25	2301.14	2096.59	4500	6363.64	6443.18	5500	8693.18	2656.25	2301.14	2250	4400
8	1278.41	1534.09	1022.73	2727.27	2045.45	2727.27	2727.27	4431.82	1789.77	2556.82	1863.64	4909.09
9	1772.73	1772.73	1153.41	3545.45	0	0	1704.55	2727.27	1193.18	1193.18	653.41	2181.82
10	2113.64	2073.86	1840.91	5000	3693.18	4500	2772.73	3295.45	784.09	852.27	636.36	2000
11	2301.14	2812.5	2301.14	3681.82	4602.27	6136.36	5625	8181.82	2301.14	2812.5	2301.14	3681.82
12	727.27	1227.27	572.73	2425.45	1181.82	2000	1890.91	3490.91	2386.36	2352.27	2062.5	6872.73
13	681.82	681.82	437.5	1090.91	1363.64	1534.09	1193.18	2045.45	2045.45	2045.45	1690.34	3272.73
14	2556.82	2556.82	1068.18	6136.36	4090.91	6647.73	5625	10227.27	1534.09	1534.09	1534.09	5727.27
15	2059.66	2792.61	1508.52	4550	4034.09	5062.5	4545.45	6681.82	2562.5	2693.18	2019.89	5259.09
16	681.82	596.59	511.36	1090.91	1193.18	1534.09	1363.64	2045.45	2045.45	1789.77	1534.09	3272.73
17	0	0	0	0	0	0	0	0	852.27	1363.64	1022.73	3545.45
18	0	0	0	0	0	0	0	0	1363.64	1704.55	1363.64	1363.64
19	0	0	0	0	0	0	0	0	1534.09	1718.75	1252.84	3238.64
20	340.91	113.64	340.91	409.09	738.64	852.27	284.09	284.09	2556.82	2556.82	1840.91	4909.09
21	0	0	0	0	0	0	0	0	1590.91	1988.64	2187.5	4454.55
22	0	0	0	0	0	0	0	0	181.82	204.55	295.45	581.82
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1527.27	1909.09	1145.45	5498.18	1227.27	1963.64	3436.36	3927.27	1272.73	1590.91	872.73	4581.82
36	1527.27	2290.91	2290.91	6720	2454.55	2945.45	5400	2945.45	1272.73	1909.09	1745.45	5600
37	1909.09	1909.09	2100	3360	2700	3190.91	3681.82	2700	1590.91	1590.91	1600	2800
38	2290.91	2100	2290.91	4276.36	1963.64	3436.36	2945.45	2454.55	1909.09	1750	1745.45	3563.64
39	1909.09	2100	1527.27	3360	1963.64	2454.55	4172.73	2454.55	1590.91	1750	1163.64	2800
40	2100	2290.91	2290.91	8552.73	3436.36	4418.18	5890.91	3436.36	1750	1909.09	1745.45	7127.27
41	2290.91	2672.73	1336.36	5803.64	2700	3927.27	2454.55	5400	1909.09	2227.27	1018.18	4836.36
42	1431.82	1718.18	2290.91	5498.18	2209.09	2454.55	3436.36	2454.55	1193.18	1431.82	1745.45	4581.82
43	2290.91	3054.55	2290.91	6109.09	2454.55	2454.55	2454.55	4418.18	1909.09	2545.45	1745.45	5090.91
44	2290.91	3054.55	1909.09	7941.82	2700	3681.82	5400	2454.55	1909.09	2545.45	1454.55	6618.18
45	1909.09	1527.27	1718.18	4276.36	1718.18	2700	2454.55	2454.55	1590.91	1272.73	1309.09	3563.64
46	1718.18	2290.91	2100	4276.36	1472.73	2454.55	3927.27	2454.55	1431.82	1909.09	1600	3563.64
47	2672.73	2863.64	2672.73	6414.55	3436.36	4418.18	6136.36	3681.82	2227.27	2386.36	2036.36	5345.45
48	2290.91	2481.82	2100	6720	3436.36	3436.36	5400	2945.45	1909.09	2068.18	1600	5600
49	1909.09	2290.91	1527.27	4276.36	3436.36	3927.27	6381.82	3436.36	1590.91	1909.09	1163.64	3563.64
50	0	0	0	0	0	0	0	0	1272.73	1431.82	1454.55	4581.82
51	2481.82	2481.82	2290.91	5498.18	2454.55	2945.45	3190.91	2454.55	2068.18	2068.18	1745.45	4581.82
52	2290.91	3054.55	2290.91	7941.82	4172.73	4663.64	7118.18	3927.27	1909.09	2545.45	1745.45	6618.18
53	2290.91	2290.91	2100	6720	2945.45	3190.91	5400	2945.45	1909.09	1909.09	1600	5600
54	2290.91	2290.91	2290.91	5498.18	2454.55	3436.36	4663.64	3681.82	1909.09	1909.09	1745.45	4581.82
55	0	0	0	0	0	0	0	0	0	0	0	0

	habw3tl	hadw3tl	hew3tl	hfw3tl	lpw4tl	lrw4tl	spw4tl	lgpw4tl	habw4tl	hadw4tl	hew4tl	hfw4tl
1	4090.91	5113.64	5625	7670.45	2965.91	2556.82	2301.14	4909.09	4090.91	5113.64	3750	5113.64
2	5113.64	6136.36	4602.27	11250	1718.75	1875	1303.98	4363.64	3409.09	4090.91	3068.18	7500
3	3750	5454.55	6477.27	8181.82	1534.09	3068.18	1534.09	6545.45	5625	8181.82	9715.91	12272.73
4	3068.18	4602.27	3068.18	4602.27	1363.64	1363.64	681.82	0	1022.73	1022.73	681.82	1022.73
5	4602.27	4602.27	3579.55	7159.09	2045.45	2045.45	1022.73	5727.27	4602.27	4602.27	3579.55	7159.09
6	4602.27	4602.27	3068.18	4090.91	1534.09	1534.09	1363.64	2454.55	2965.91	3068.18	3068.18	4090.91
7	7000	7000	5625	8693.18	1875	1534.09	1534.09	3000	4056.82	4772.73	3750	5795.45
8	3068.18	4090.91	4090.91	6647.73	1590.91	2272.73	1818.18	3818.18	2727.27	3636.36	3636.36	5909.09
9	0	0	2215.91	3221.59	1954.55	2045.45	1278.41	3681.82	0	0	3136.36	7215.91
10	1704.55	2045.45	1363.64	1704.55	1534.09	1619.32	954.55	2590.91	2556.82	3613.64	2590.91	3409.09
11	4602.27	6136.36	5625	8181.82	2301.14	1875	1534.09	3681.82	4602.27	6136.36	5625	8181.82
12	3465.91	8693.18	4090.91	8522.73	920.45	1227.27	795.45	4336.36	1318.18	3573.86	1568.18	4500
13	4090.91	4602.27	3579.55	6136.36	1363.64	1363.64	1193.18	2181.82	2727.27	3068.18	2386.36	4090.91
14	4090.91	6647.73	5284.09	10227.27	1704.55	1704.55	1363.64	3818.18	2727.27	4090.91	3409.09	6818.18
15	4545.45	4687.5	4943.18	7000	1531.25	1977.27	1431.82	3427.27	3068.18	1937.5	3181.82	4772.73
16	3579.55	4602.27	4090.91	6136.36	681.82	596.59	511.36	1090.91	1193.18	1534.09	1363.64	2045.45
17	2272.73	1704.55	2272.73	4829.55	1534.09	2045.45	1534.09	5318.18	3636.36	2727.27	4090.91	7727.27
18	2727.27	4090.91	1704.55	1590.91	2045.45	2556.82	2045.45	4500	4090.91	5454.55	3409.09	4772.73
19	2272.73	3125	3977.27	5681.82	1534.09	1656.25	1227.27	3238.64	2272.73	3125	4772.73	5681.82
20	5113.64	6647.73	5113.64	7159.09	0	0	0	0	0	0	0	0
21	2045.45	2045.45	2045.45	2045.45	1704.55	1704.55	1534.09	3272.73	4318.18	4090.91	3750	4488.64
22	272.73	272.73	386.36	340.91	102.27	136.36	136.36	218.18	443.18	443.18	136.36	136.36
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1136.36	1672.73	3181.82	3636.36	1636.36	2045.45	1145.45	5890.91	1363.64	2036.36	3818.18	4363.64
36	2272.73	2509.09	5000	2727.27	1636.36	2454.55	2290.91	7200	2727.27	3054.55	6000	3272.73
37	2500	2718.18	3409.09	2500	2045.45	2045.45	2100	3600	3000	3309.09	4090.91	3000
38	1818.18	2927.27	2727.27	2272.73	2454.55	2250	2290.91	4581.82	2181.82	3563.64	3272.73	2727.27
39	1818.18	2090.91	3863.64	2272.73	2045.45	2250	1527.27	3600	2181.82	2545.45	4636.36	2727.27
40	3181.82	3763.64	5454.55	3181.82	2250	2454.55	2290.91	9163.64	3818.18	4581.82	6545.45	3818.18
41	2500	3345.45	2272.73	5000	2454.55	2863.64	1336.36	6218.18	3000	4072.73	2727.27	6000
42	2045.45	2090.91	3181.82	2272.73	1534.09	1840.91	2290.91	5890.91	2454.55	2545.45	3818.18	2727.27
43	2272.73	2090.91	2272.73	4090.91	2454.55	3272.73	2290.91	6545.45	2727.27	2545.45	2727.27	4909.09
44	2500	3136.36	5000	2272.73	2454.55	3272.73	1909.09	8509.09	3000	3818.18	6000	2727.27
45	1590.91	2300	2272.73	2272.73	2045.45	1636.36	1718.18	4581.82	1909.09	2800	2727.27	2727.27
46	1363.64	2090.91	3636.36	2272.73	1840.91	2454.55	2100	4581.82	1636.36	2545.45	4363.64	2727.27
47	3181.82	3763.64	5681.82	3409.09	2863.64	3068.18	2672.73	6872.73	3818.18	4581.82	6818.18	4090.91
48	3181.82	2927.27	5000	2727.27	2454.55	2659.09	2100	7200	3818.18	3563.64	6000	3272.73
49	3181.82	3345.45	5909.09	3181.82	2045.45	2454.55	1527.27	4581.82	3818.18	4072.73	7090.91	3818.18
50	3181.82	2509.09	4090.91	2727.27	1636.36	1840.91	1909.09	5890.91	3818.18	3054.55	4909.09	3272.73
51	2272.73	2509.09	2954.55	2272.73	2659.09	2659.09	2290.91	5890.91	2727.27	3054.55	3545.45	2727.27
52	3863.64	3972.73	6590.91	3636.36	2454.55	3272.73	2290.91	8509.09	4636.36	4836.36	7909.09	4363.64
53	2727.27	2718.18	5000	2727.27	2454.55	2454.55	2100	7200	3272.73	3309.09	6000	3272.73
54	2272.73	2927.27	4318.18	3409.09	2454.55	2454.55	2290.91	5890.91	2727.27	3563.64	5181.82	4090.91
55	0	0	0	0	2659.09	2863.64	2625	7527.27	2727.27	4072.73	6545.45	4636.36

	lpw5tl	lrw5tl	spw5tl	lgpw5tl	habw5tl	hadw5tl	hew5tl	hfw5tl	lpw6tl	lrw6tl	spw6tl	lgpw6tl
1	2386.36	2187.5	1789.77	3818.18	3181.82	3977.27	4375	5965.91	3068.18	3068.18	2556.82	5318.18
2	1187.5	1250	946.02	2909.09	2272.73	2727.27	2045.45	5000	2593.75	2931.82	2159.09	6954.55
3	1022.73	2045.45	1022.73	4363.64	3750	5454.55	6477.27	8181.82	1534.09	3579.55	1534.09	6954.55
4	681.82	681.82	340.91	1227.27	340.91	511.36	1022.73	1534.09	1363.64	1363.64	659.09	1636.36
5	1363.64	1363.64	1022.73	3818.18	3068.18	3068.18	2386.36	4772.73	2045.45	2301.14	2045.45	6545.45
6	2301.14	1789.77	1590.91	2863.64	3579.55	3579.55	3579.55	4772.73	2812.5	2301.14	1954.55	4909.09
7	1875	1534.09	1303.98	3000	4772.73	4772.73	3750	5795.45	2659.09	2727.27	2187.5	5200
8	1392.05	1988.64	1590.91	3818.18	2386.36	3181.82	3181.82	5170.45	1363.64	2045.45	838.07	3000
9	1363.64	1534.09	278.41	2118.18	0	0	2102.27	3579.55	1363.64	1318.18	886.36	2454.55
10	1494.32	1437.5	1011.36	3272.73	2397.73	3727.27	2318.18	3409.09	1329.55	1261.36	1022.73	1095.45
11	0	937.5	0	1227.27	0	2045.45	1875	2727.27	2301.14	1875	2198.86	2454.55
12	1295.45	852.27	1312.5	4909.09	3181.82	5795.45	4090.91	5681.82	2522.73	2250	2218.75	4090.91
13	2045.45	2045.45	1789.77	3272.73	4090.91	4602.27	3579.55	6136.36	1363.64	1363.64	1272.73	2181.82
14	2556.82	2556.82	2045.45	5727.27	4090.91	6136.36	5113.64	10227.27	852.27	1704.55	1363.64	3818.18
15	2656.25	3000	1764.2	5081.82	5113.64	4250	5113.64	7159.09	0	0	0	0
16	2045.45	1789.77	1534.09	3272.73	3579.55	4602.27	4090.91	6136.36	1363.64	2215.91	1363.64	2181.82
17	1534.09	2045.45	1022.73	5318.18	2727.27	2045.45	3636.36	7727.27	511.36	681.82	511.36	1772.73
18	3068.18	2812.5	2045.45	4500	4090.91	6136.36	4545.45	5568.18	2045.45	1875	1636.36	0
19	2301.14	2531.25	1917.61	4857.95	4090.91	5625	6363.64	9090.91	1534.09	2812.5	1363.64	3409.09
20	0	0	0	0	0	0	0	0	2556.82	2556.82	1931.82	4909.09
21	2727.27	2812.5	2215.91	4500	6250	6420.45	5795.45	7159.09	2812.5	2755.68	2250	4500
22	1221.59	965.91	704.55	1977.27	2744.32	2113.64	2215.91	3068.18	426.14	323.86	318.18	818.18
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1163.64	1454.55	872.73	4189.09	1000	1600	2800	3200	1840.91	2454.55	1527.27	7854.55
36	0	0	0	0	0	0	0	0	2863.64	2863.64	2481.82	8509.09
37	1454.55	1454.55	1600	2560	2200	2600	3000	2200	2863.64	2454.55	2100	2045.45
38	1745.45	1600	1745.45	3258.18	1600	2800	2400	2000	3068.18	2863.64	2290.91	5367.27
39	1454.55	1600	1163.64	2560	1600	2000	3400	2000	2454.55	2659.09	1527.27	4581.82
40	1600	1745.45	1745.45	6516.36	2800	3600	4800	2800	3068.18	2863.64	2290.91	10472.73
41	2454.55	2454.55	2100	7200	3272.73	3309.09	6000	3272.73	2863.64	3068.18	1909.09	7200
42	1090.91	1309.09	1745.45	4189.09	1800	2000	2800	2000	1534.09	1840.91	1909.09	7527.27
43	1745.45	2327.27	1745.45	4654.55	2000	2000	2000	3600	3272.73	3477.27	2672.73	7200
44	0	0	0	0	0	0	0	0	2454.55	3272.73	1909.09	8509.09
45	1454.55	1163.64	1309.09	3258.18	1400	2200	2000	2000	2454.55	2045.45	1909.09	7527.27
46	1309.09	1745.45	1600	3258.18	1200	2000	3200	2000	2045.45	2045.45	2100	7527.27
47	2659.09	2659.09	2290.91	5890.91	2727.27	3054.55	3545.45	2727.27	2863.64	3068.18	2672.73	6872.73
48	2454.55	2454.55	2100	7200	3272.73	3309.09	6000	3272.73	2454.55	2659.09	2100	7200
49	1454.55	1745.45	1163.64	3258.18	2800	3200	5200	2800	2045.45	2454.55	1527.27	4581.82
50	1163.64	1309.09	1454.55	4189.09	2800	2400	3600	2400	1636.36	1840.91	1909.09	5890.91
51	2659.09	2659.09	2290.91	5890.91	2727.27	3054.55	3545.45	2727.27	2659.09	2659.09	2290.91	5890.91
52	2454.55	2454.55	2100	7200	3272.73	3309.09	6000	3272.73	2454.55	3272.73	2290.91	8509.09
53	0	0	0	0	0	0	0	0	2659.09	2454.55	2290.91	7527.27
54	2659.09	2659.09	2290.91	5890.91	2727.27	3054.55	3545.45	2727.27	2863.64	2659.09	2481.82	5890.91
55	1654.55	1781.82	1750	4683.64	1636.36	2618.18	3927.27	2781.82	2659.09	2863.64	2672.73	7527.27

	habw6tl	hadw6tl	hew6tl	hfw6tl	lpw7tl	lrw7tl	spw7tl	lgpw7tl	habw7tl	hadw7tl	hew7tl	hfw7tl
1	5113.64	6647.73	6136.36	8693.18	3068.18	3068.18	2556.82	5318.18	3977.27	5170.45	4772.73	6761.36
2	5454.55	6363.64	5000	10454.55	2812.5	3068.18	2272.73	6954.55	4772.73	5568.18	4375	9147.73
3	7159.09	8181.82	10227.27	12272.73	1534.09	3579.55	1534.09	6954.55	7159.09	8181.82	10227.27	12272.73
4	1931.82	3068.18	1363.64	2045.45	1363.64	1363.64	582.39	3272.73	1363.64	1818.18	1818.18	3068.18
5	6136.36	5454.55	5113.64	9204.55	2045.45	2301.14	2045.45	6545.45	4090.91	4090.91	3409.09	6136.36
6	5289.77	6159.09	4602.27	6647.73	2727.27	2301.14	2000	0	3579.55	3579.55	4375	5170.45
7	7159.09	7159.09	6647.73	10227.27	2897.73	3000	2414.77	5318.18	5568.18	5568.18	5170.45	7954.55
8	2727.27	3409.09	3750	5113.64	2045.45	3068.18	2224.43	4500	3636.36	4545.45	5000	6818.18
9	0	0	2386.36	4568.18	1977.27	2000	1125	4309.09	0	0	2863.64	6556.82
10	1227.27	4085.23	2250	5625	0	0	0	0	0	0	0	0
11	4090.91	5454.55	3750	5454.55	3068.18	3068.18	2357.95	4090.91	3977.27	5170.45	5170.45	6363.64
12	4318.18	7727.27	3409.09	7102.27	3068.18	3034.09	2687.5	0	3806.82	6761.36	4772.73	9943.18
13	2727.27	3068.18	2386.36	4090.91	1534.09	1704.55	1272.73	2727.27	2556.82	3409.09	2272.73	4545.45
14	1363.64	2045.45	3409.09	6818.18	295.45	0	0	0	0	0	0	0
15	0	0	0	0	2156.25	2727.27	1534.09	4136.36	3125	3750	3409.09	4772.73
16	2386.36	4602.27	2727.27	4090.91	1818.18	1818.18	1590.91	3636.36	3409.09	3409.09	3409.09	5795.45
17	1363.64	1022.73	1363.64	2897.73	1534.09	2045.45	1193.18	5318.18	3977.27	3579.55	3181.82	6761.36
18	2727.27	2727.27	3409.09	4772.73	2556.82	3323.86	2556.82	5318.18	2727.27	4431.82	3409.09	6818.18
19	2500	3181.82	3181.82	4545.45	3068.18	2593.75	2130.68	5625	5625	7159.09	6136.36	10227.27
20	5113.64	6647.73	5113.64	7159.09	1704.55	1704.55	1534.09	3272.73	2272.73	2954.55	2840.91	3977.27
21	7102.27	6761.36	7840.91	8522.73	937.5	937.5	767.05	1500	1590.91	1477.27	1250	1704.55
22	1193.18	1022.73	681.82	681.82	1278.41	1397.73	840.91	2454.55	2147.73	2727.27	1590.91	3181.82
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	3272.73	3309.09	5454.55	4909.09	1718.18	2290.91	1527.27	7330.91	2945.45	3190.91	4909.09	4418.18
36	3545.45	4072.73	7090.91	4090.91	2672.73	2672.73	2481.82	7941.82	3190.91	3927.27	6381.82	3681.82
37	3272.73	3818.18	6000	3545.45	2672.73	2290.91	2100	1909.09	2945.45	3681.82	5400	3190.91
38	2727.27	4581.82	5454.55	3818.18	2863.64	2672.73	2290.91	5009.45	2454.55	4418.18	4909.09	3436.36
39	3818.18	4072.73	7636.36	3818.18	2290.91	2481.82	1527.27	4276.36	3436.36	3927.27	6872.73	3436.36
40	4909.09	5854.55	10090.91	4636.36	2863.64	2672.73	2290.91	9774.55	4418.18	5645.45	9081.82	4172.73
41	3272.73	4327.27	7090.91	3818.18	2672.73	2863.64	1909.09	6720	2945.45	4172.73	6381.82	3436.36
42	3272.73	5345.45	7636.36	4909.09	1431.82	1718.18	1909.09	7025.45	2945.45	5154.55	6872.73	4418.18
43	4909.09	5854.55	9272.73	6000	3054.55	3245.45	2672.73	6720	4418.18	5645.45	8345.45	5400
44	3000	3818.18	6000	2727.27	2290.91	2672.73	1909.09	7025.45	3681.82	4663.64	5645.45	4418.18
45	3545.45	3818.18	6000	3818.18	2290.91	1909.09	1909.09	7025.45	3190.91	3681.82	5400	3436.36
46	2727.27	3309.09	6545.45	3272.73	1909.09	1909.09	2100	7025.45	2454.55	3190.91	5890.91	2945.45
47	3818.18	4581.82	6818.18	4090.91	2672.73	3245.45	2672.73	7025.45	3436.36	4418.18	7609.09	4172.73
48	3818.18	3563.64	6000	3272.73	2481.82	2672.73	2290.91	7636.36	4909.09	4909.09	6381.82	3436.36
49	3818.18	4072.73	7090.91	3818.18	2290.91	2481.82	1527.27	5192.73	4172.73	4663.64	6627.27	3927.27
50	3818.18	3054.55	4909.09	3272.73	1718.18	2290.91	2100	5803.64	4418.18	4172.73	5154.55	3681.82
51	2727.27	3054.55	3545.45	2727.27	2863.64	3054.55	2290.91	6720	3436.36	5154.55	6872.73	3436.36
52	4636.36	4836.36	7909.09	4363.64	2672.73	3054.55	2863.64	7941.82	5154.55	4909.09	7118.18	5154.55
53	3272.73	3563.64	7090.91	3818.18	2481.82	2290.91	2290.91	7025.45	2945.45	3436.36	6381.82	3436.36
54	2727.27	3563.64	5181.82	4090.91	2672.73	2481.82	2481.82	5498.18	2454.55	3436.36	4663.64	3681.82
55	2727.27	4072.73	6545.45	4636.36	2672.73	3054.55	3054.55	7636.36	3927.27	4418.18	6627.27	5890.91

	lpw8tl	lrw8tl	spw8tl	lgpw8tl	habw8tl	hadw8tl	hew8tl	hfw8tl	lpw9tl	lrw9tl	spw9tl	lgpw9tl
1	2045.45	2045.45	1704.55	3545.45	2272.73	2954.55	2727.27	3863.64	3068.18	3068.18	2556.82	5318.18
2	937.5	954.55	767.05	2318.18	1363.64	1590.91	1250	2613.64	1843.75	2045.45	1477.27	4636.36
3	1534.09	3579.55	1534.09	6954.55	4772.73	5454.55	6818.18	8181.82	1534.09	3579.55	1534.09	6954.55
4	2045.45	2045.45	994.32	4909.09	2045.45	2727.27	2727.27	4431.82	2045.45	2045.45	1093.75	4909.09
5	1363.64	1534.09	1363.64	4363.64	2727.27	2727.27	2272.73	4090.91	2045.45	2301.14	2045.45	6545.45
6	2812.5	2301.14	2000	2590.91	3068.18	3068.18	3750	4431.82	2812.5	2301.14	2045.45	3545.45
7	2045.45	2045.45	1704.55	3545.45	3181.82	3181.82	2954.55	4545.45	2045.45	2045.45	1704.55	3545.45
8	2045.45	3068.18	2019.89	4500	2727.27	3409.09	3750	5113.64	2045.45	2556.82	2139.2	4500
9	1215.91	1312.5	0	2300	0	0	1511.36	3204.55	2045.45	2028.41	1431.82	4090.91
10	2397.73	2284.09	1357.95	0	3750	5454.55	3636.36	5340.91	1230.11	1465.91	869.32	0
11	3068.18	3068.18	2386.36	4090.91	3409.09	4431.82	4431.82	5454.55	3068.18	3068.18	2556.82	4090.91
12	3068.18	3068.18	2812.5	7363.64	3409.09	5795.45	4090.91	8522.73	818.18	647.73	718.75	2454.55
13	767.05	852.27	681.82	1363.64	1022.73	1363.64	909.09	1818.18	2301.14	2556.82	2022.73	4090.91
14	2556.82	2556.82	2045.45	5727.27	2727.27	5454.55	4090.91	8181.82	2556.82	2556.82	2045.45	5727.27
15	2693.18	2562.5	2187.5	5345.45	3340.91	4693.18	4090.91	6477.27	2965.91	2406.25	2130.68	5727.27
16	1818.18	1818.18	1590.91	3636.36	3409.09	3409.09	3409.09	5795.45	1818.18	1818.18	1590.91	3636.36
17	1022.73	1363.64	1193.18	3545.45	2272.73	2045.45	1818.18	3863.64	1534.09	2045.45	1789.77	5318.18
18	2556.82	3323.86	2556.82	5318.18	3409.09	4431.82	3409.09	6818.18	2556.82	3323.86	2556.82	5318.18
19	2045.45	1750	1505.68	3750	2500	3181.82	2954.55	4545.45	2045.45	1843.75	1420.45	3750
20	3068.18	2812.5	2244.32	8590.91	3750	4431.82	4659.09	6477.27	2954.55	2812.5	2130.68	8590.91
21	2073.86	2045.45	1704.55	3545.45	2954.55	3409.09	2954.55	4090.91	3153.41	3068.18	2556.82	5318.18
22	1278.41	1500	1022.73	2454.55	2227.27	2045.45	1363.64	2727.27	852.27	937.5	465.91	1636.36
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1840.91	2454.55	1527.27	7854.55	3272.73	3309.09	5454.55	4909.09	1840.91	2454.55	1527.27	7854.55
36	2863.64	2863.64	2481.82	8509.09	3545.45	4072.73	7090.91	4090.91	2863.64	2863.64	2481.82	8509.09
37	2863.64	2454.55	2100	2045.45	3272.73	3818.18	6000	3545.45	2863.64	2454.55	2100	2045.45
38	3068.18	2863.64	2290.91	5367.27	2727.27	4581.82	5454.55	3818.18	3068.18	2863.64	2290.91	5367.27
39	2454.55	2659.09	1527.27	4581.82	3818.18	4072.73	7636.36	3818.18	2454.55	2659.09	1527.27	4581.82
40	3068.18	2863.64	2290.91	10472.73	4909.09	5854.55	10090.91	4636.36	3068.18	2863.64	2290.91	10472.73
41	2863.64	3068.18	1909.09	7200	3272.73	4327.27	7090.91	3818.18	2863.64	3068.18	1909.09	7200
42	1534.09	1840.91	1909.09	7527.27	3272.73	5345.45	7636.36	4909.09	1534.09	1840.91	1909.09	7527.27
43	3272.73	3477.27	2672.73	7200	4909.09	5854.55	9272.73	6000	3272.73	3477.27	2672.73	7200
44	2454.55	2863.64	1909.09	7527.27	4090.91	4836.36	6272.73	4909.09	2454.55	2863.64	1909.09	7527.27
45	2454.55	2045.45	1909.09	7527.27	3545.45	3818.18	6000	3818.18	2454.55	2045.45	1909.09	7527.27
46	2045.45	2045.45	2100	7527.27	2727.27	3309.09	6545.45	3272.73	2045.45	2045.45	2100	7527.27
47	2863.64	3477.27	2672.73	7527.27	3818.18	4581.82	8454.55	4636.36	2863.64	3477.27	2672.73	7527.27
48	2659.09	2863.64	2290.91	8181.82	5454.55	5090.91	7090.91	3818.18	2659.09	2863.64	2290.91	8181.82
49	2454.55	2659.09	1527.27	5563.64	4636.36	4836.36	7363.64	4363.64	2454.55	2659.09	1527.27	5563.64
50	1840.91	2454.55	2100	6218.18	4909.09	4327.27	5727.27	4090.91	1840.91	2454.55	2100	6218.18
51	3068.18	3272.73	2290.91	7200	3818.18	5345.45	7636.36	3818.18	3068.18	3272.73	2290.91	7200
52	2863.64	3272.73	2863.64	8509.09	5727.27	5090.91	7909.09	5727.27	2863.64	3272.73	2863.64	8509.09
53	2659.09	2454.55	2290.91	7527.27	3272.73	3563.64	7090.91	3818.18	2659.09	2454.55	2290.91	7527.27
54	2863.64	2659.09	2481.82	5890.91	2727.27	3563.64	5181.82	4090.91	2863.64	2659.09	2481.82	5890.91
55	2863.64	3272.73	3054.55	8181.82	4363.64	4581.82	7363.64	6545.45	2863.64	3272.73	3054.55	8181.82

	habw9tl	hadw9tl	hew9tl	hfw9tl	lpw10tl	lrw10tl	spw10tl	lgpw10tl	habw10tl	hadw10tl	hew10tl	hfw10tl
1	3409.09	4431.82	4090.91	5795.45	2386.36	2386.36	1988.64	4136.36	2840.91	3693.18	3409.09	4829.55
2	2727.27	3181.82	2500	5227.27	2125	2386.36	1789.77	5409.09	3409.09	3977.27	3125	6534.09
3	4772.73	5454.55	6818.18	8181.82	0	0	0	0	0	0	0	0
4	2045.45	2727.27	2727.27	4431.82	1590.91	1590.91	980.11	3818.18	1704.55	2272.73	2272.73	3693.18
5	4090.91	4090.91	3409.09	6136.36	1363.64	1363.64	1363.64	4363.64	2727.27	2727.27	2272.73	4090.91
6	3068.18	3068.18	3750	4431.82	1875	1534.09	2045.45	3272.73	3068.18	3068.18	3750	4431.82
7	3181.82	3181.82	2954.55	4545.45	2045.45	2045.45	1704.55	3545.45	3181.82	3181.82	2954.55	4545.45
8	2727.27	3409.09	3750	5113.64	1590.91	3068.18	1789.77	4500	2272.73	2840.91	3750	5113.64
9	0	0	2386.36	5909.09	1568.18	1250	1039.77	3363.64	0	0	1931.82	3250
10	2136.36	3636.36	2727.27	3863.64	1457.39	1505.68	795.45	0	2159.09	3636.36	2659.09	3863.64
11	3409.09	4431.82	4431.82	5454.55	2045.45	2045.45	1704.55	2727.27	2272.73	2954.55	2954.55	3636.36
12	1136.36	1931.82	1363.64	2840.91	2181.82	2068.18	715.91	3409.09	1363.64	2272.73	3181.82	5681.82
13	3068.18	4090.91	2727.27	5454.55	1534.09	1704.55	1363.64	2727.27	2045.45	2727.27	1818.18	3636.36
14	2727.27	5454.55	4090.91	8181.82	0	0	0	0	0	0	0	0
15	3886.36	4693.18	4090.91	6477.27	1159.09	1500	1022.73	3818.18	1840.91	2386.36	2045.45	3238.64
16	3409.09	3409.09	3409.09	5795.45	1363.64	1363.64	1193.18	2727.27	2272.73	2840.91	2272.73	3863.64
17	3409.09	3068.18	2727.27	5795.45	1022.73	1363.64	1193.18	3545.45	2272.73	1022.73	1818.18	3863.64
18	3409.09	4431.82	3409.09	6818.18	1704.55	2215.91	1704.55	3545.45	1818.18	2954.55	2272.73	4545.45
19	2500	3181.82	2954.55	4545.45	3068.18	2687.5	1448.86	3625	2500	3181.82	2954.55	4545.45
20	3750	4431.82	5113.64	6477.27	2045.45	1875	1534.09	5727.27	2500	2954.55	3409.09	4318.18
21	4090.91	5000	4431.82	6363.64	2386.36	2386.36	1988.64	4136.36	3522.73	4261.36	3693.18	5397.73
22	1590.91	1363.64	1136.36	1590.91	568.18	1022.73	454.55	1909.09	397.73	340.91	909.09	1363.64
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	3272.73	3309.09	5454.55	4909.09	1840.91	2454.55	1527.27	7854.55	3272.73	3309.09	5454.55	4909.09
36	3545.45	4072.73	7090.91	4090.91	2863.64	2863.64	2481.82	8509.09	3545.45	4072.73	7090.91	4090.91
37	3272.73	3818.18	6000	3545.45	2863.64	2454.55	2100	2045.45	3272.73	3818.18	6000	3545.45
38	2727.27	4581.82	5454.55	3818.18	3068.18	2863.64	2290.91	5367.27	2727.27	4581.82	5454.55	3818.18
39	3818.18	4072.73	7636.36	3818.18	2454.55	2659.09	1527.27	4581.82	3818.18	4072.73	7636.36	3818.18
40	4909.09	5854.55	10090.91	4636.36	3068.18	2863.64	2290.91	10472.73	4909.09	5854.55	10090.91	4636.36
41	3272.73	4327.27	7090.91	3818.18	2863.64	3068.18	1909.09	7200	3272.73	4327.27	7090.91	3818.18
42	3272.73	5345.45	7636.36	4909.09	1534.09	1840.91	1909.09	7527.27	3272.73	5345.45	7636.36	4909.09
43	4909.09	5854.55	9272.73	6000	3272.73	3477.27	2672.73	7200	4909.09	5854.55	9272.73	6000
44	4090.91	4836.36	6272.73	4909.09	2454.55	2863.64	1909.09	7527.27	4090.91	4836.36	6272.73	4909.09
45	3545.45	3818.18	6000	3818.18	2454.55	2045.45	1909.09	7527.27	3545.45	3818.18	6000	3818.18
46	2727.27	3309.09	6545.45	3272.73	2045.45	2045.45	2100	7527.27	2727.27	3309.09	6545.45	3272.73
47	3818.18	4581.82	8454.55	4636.36	2863.64	3477.27	2672.73	7527.27	3818.18	4581.82	8454.55	4636.36
48	5454.55	5090.91	7090.91	3818.18	2659.09	2863.64	2290.91	8181.82	5454.55	5090.91	7090.91	3818.18
49	4636.36	4836.36	7363.64	4363.64	2454.55	2659.09	1527.27	5563.64	4636.36	4836.36	7363.64	4363.64
50	4909.09	4327.27	5727.27	4090.91	1840.91	2454.55	2100	6218.18	4909.09	4327.27	5727.27	4090.91
51	3818.18	5345.45	7636.36	3818.18	3068.18	3272.73	2290.91	7200	3818.18	5345.45	7636.36	3818.18
52	5727.27	5090.91	7909.09	5727.27	2863.64	3272.73	2863.64	8509.09	5727.27	5090.91	7909.09	5727.27
53	3272.73	3563.64	7090.91	3818.18	2659.09	2454.55	2290.91	7527.27	3272.73	3563.64	7090.91	3818.18
54	2727.27	3563.64	5181.82	4090.91	2863.64	2659.09	2481.82	5890.91	2727.27	3563.64	5181.82	4090.91
55	4363.64	4581.82	7363.64	6545.45	2863.64	3272.73	3054.55	8181.82	4363.64	4581.82	7363.64	6545.45

	lpw11tl	lrw11tl	spw11tl	lgpw11tl	habw11tl	hadw11tl	hew11tl	hfw11tl	lpw12tl	lrw12tl	spw12tl	lgpw12tl
1	1022.73	1022.73	1022.73	2045.45	1250	1818.18	1590.91	2500	3068.18	3068.18	3068.18	6136.36
2	1843.75	2045.45	1562.5	2318.18	2954.55	3636.36	2727.27	5227.27	1875	2045.45	1477.27	4636.36
3	1022.73	2215.91	1022.73	4909.09	3636.36	3863.64	4772.73	5681.82	1022.73	2215.91	1022.73	4909.09
4	1363.64	1363.64	562.5	3818.18	1590.91	2045.45	2500	3636.36	1363.64	1392.05	903.41	3818.18
5	681.82	1789.77	1363.64	5090.91	2500	2727.27	2727.27	4318.18	1363.64	2301.14	2045.45	6545.45
6	2045.45	1704.55	1420.45	2454.55	2045.45	2045.45	2954.55	3863.64	3068.18	2556.82	2443.18	3272.73
7	3068.18	3068.18	2556.82	5727.27	4772.73	5113.64	4431.82	8181.82	3068.18	3068.18	2556.82	5727.27
8	1534.09	1306.82	1355.11	2545.45	2500	2500	2386.36	3238.64	2301.14	2812.5	2301.14	5727.27
9	681.82	681.82	511.36	1363.64	0	0	909.09	12250	0	2045.45	1534.09	4136.36
10	818.18	988.64	369.32	0	1477.27	2045.45	1704.55	2386.36	1653.41	1625	130.68	3500
11	2045.45	2215.91	1704.55	3272.73	2727.27	3636.36	3181.82	4318.18	3068.18	3323.86	2556.82	4909.09
12	3681.82	3323.86	3068.18	6136.36	4090.91	6818.18	4772.73	8522.73	3681.82	3323.86	3068.18	6136.36
13	1704.55	1843.75	1482.95	3818.18	2500	2954.55	2500	4545.45	1704.55	1875	1534.09	3818.18
14	0	0	0	0	0	0	0	0	1022.73	1022.73	1022.73	4363.64
15	1977.27	1840.91	1187.5	4090.91	2727.27	3636.36	2954.55	4545.45	1977.27	1602.27	1468.75	4090.91
16	1704.55	1534.09	1363.64	4363.64	2500	2500	2727.27	4545.45	2556.82	2301.14	2045.45	6545.45
17	1193.18	1534.09	1193.18	3272.73	2727.27	2272.73	2045.45	3863.64	1789.77	2045.45	1534.09	4909.09
18	1704.55	2215.91	1704.55	3272.73	2272.73	2954.55	2500	4772.73	2556.82	3323.86	2556.82	4909.09
19	2045.45	1534.09	1534.09	3750	2500	3181.82	3863.64	5681.82	3068.18	2301.14	2329.55	5625
20	2045.45	1022.73	1363.64	5454.55	2954.55	3636.36	3636.36	5000	1363.64	1363.64	1022.73	6545.45
21	2045.45	2045.45	1875	3272.73	3636.36	4090.91	3636.36	5454.55	3068.18	3068.18	2642.05	4909.09
22	920.45	1107.95	698.86	2181.82	1590.91	1704.55	1136.36	2272.73	1022.73	1022.73	732.95	2181.82
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1600	1890.91	1163.64	5120	3272.73	3309.09	5454.55	4909.09	2100	2481.82	1527.27	6720
36	2036.36	2036.36	1745.45	5585.45	3545.45	4072.73	7090.91	4090.91	2672.73	2672.73	2290.91	7330.91
37	2181.82	1745.45	1745.45	1745.45	3272.73	3818.18	6000	3545.45	2863.64	2290.91	2290.91	2290.91
38	2472.73	2036.36	2036.36	3956.36	2727.27	4581.82	5454.55	3818.18	3245.45	2672.73	2672.73	5192.73
39	1890.91	2036.36	1163.64	3258.18	3818.18	4072.73	7636.36	3818.18	2481.82	2672.73	1527.27	4276.36
40	2181.82	2036.36	1745.45	7447.27	4909.09	5854.55	10090.91	4636.36	2863.64	2672.73	2290.91	9774.55
41	2036.36	2327.27	1454.55	5352.73	3272.73	4327.27	7090.91	3818.18	2672.73	3054.55	1909.09	7025.45
42	1090.91	1090.91	2036.36	5352.73	3272.73	5345.45	7636.36	4909.09	1431.82	1431.82	2672.73	7025.45
43	2618.18	2763.64	2036.36	5585.45	4909.09	5854.55	9272.73	6000	3436.36	3627.27	2672.73	7330.91
44	1745.45	2036.36	1454.55	6050.91	4090.91	4836.36	6272.73	4909.09	2290.91	2672.73	1909.09	7941.82
45	1745.45	1890.91	1454.55	5585.45	3545.45	3818.18	6000	3818.18	2290.91	2481.82	1909.09	7330.91
46	1745.45	1745.45	1600	5352.73	2727.27	3309.09	6545.45	3272.73	2290.91	2290.91	2100	7025.45
47	2181.82	2618.18	2181.82	5585.45	3818.18	4581.82	8454.55	4636.36	2863.64	3436.36	2863.64	7330.91
48	2036.36	2181.82	1890.91	6050.91	5454.55	5090.91	7090.91	3818.18	2672.73	2863.64	2481.82	7941.82
49	2036.36	2181.82	1454.55	5352.73	4636.36	4836.36	7363.64	4363.64	2672.73	2863.64	1909.09	7025.45
50	1454.55	1745.45	1745.45	4421.82	4909.09	4327.27	5727.27	4090.91	1909.09	2290.91	2290.91	5803.64
51	2327.27	2472.73	2036.36	5120	3818.18	5345.45	7636.36	3818.18	3054.55	3245.45	2672.73	6720
52	2327.27	2618.18	2327.27	6516.36	5727.27	5090.91	7909.09	5727.27	3054.55	3436.36	3054.55	8552.73
53	2036.36	2036.36	1890.91	6749.09	3272.73	3563.64	7090.91	3818.18	2672.73	2672.73	2481.82	8858.18
54	2181.82	2036.36	1890.91	4189.09	2727.27	3563.64	5181.82	4090.91	2863.64	2672.73	2481.82	5498.18
55	2036.36	2036.36	2036.36	5090.91	4363.64	4581.82	7363.64	6545.45	3054.55	3054.55	3054.55	7636.36

	habw12tl	hadw12tl	hew12tl	hfw12tl	lpw13tl	lrw13tl	spw13tl	lgpw13tl	habw13tl	hadw13tl
1	3750	5454.55	4772.73	7500	3068.18	3068.18	3068.18	6136.36	3750	5454.55
2	2954.55	3636.36	2727.27	5227.27	2187.5	3068.18	1818.18	6954.55	3693.18	4545.45
3	3636.36	3863.64	4772.73	5681.82	1022.73	2215.91	1022.73	4909.09	3636.36	3863.64
4	2386.36	3068.18	3750	5454.55	2045.45	2045.45	1295.45	5727.27	2386.36	3068.18
5	3750	4090.91	4090.91	6477.27	1363.64	2301.14	2045.45	6545.45	3750	4090.91
6	3068.18	3068.18	4431.82	5795.45	3068.18	2556.82	2556.82	3681.82	3068.18	3068.18
7	4772.73	5113.64	4431.82	8181.82	0	0	0	0	0	0
8	3409.09	3750	4772.73	6477.27	1534.09	2045.45	1534.09	3818.18	2272.73	2500
9	0	0	2818.18	6392.05	1363.64	1363.64	1409.09	2863.64	0	0
10	4431.82	6136.36	4073.86	6460.23	127.84	0	0	3772.73	4284.09	6136.36
11	4090.91	5454.55	4772.73	6477.27	3068.18	3323.86	2500	4636.36	4090.91	5454.55
12	4090.91	6818.18	4772.73	8522.73	3681.82	3323.86	3068.18	6136.36	4090.91	6818.18
13	2500	2954.55	2500	4545.45	2556.82	2812.5	2301.14	5727.27	3750	4431.82
14	2272.73	4090.91	3181.82	5454.55	1534.09	1534.09	1534.09	6545.45	3409.09	6136.36
15	2727.27	3636.36	2954.55	4545.45	2897.73	2931.82	2218.75	6136.36	3750	5454.55
16	3750	3750	4090.91	6818.18	1704.55	1534.09	1363.64	4363.64	2500	2500
17	6136.36	5113.64	4602.27	8693.18	1193.18	1534.09	1193.18	3272.73	2727.27	2272.73
18	3409.09	4431.82	3750	7159.09	1704.55	2215.91	1704.55	3272.73	2272.73	2954.55
19	3750	4772.73	5795.45	8522.73	2045.45	1534.09	1647.73	3750	2500	3181.82
20	4318.18	5000	5454.55	7500	0	0	0	0	0	0
21	5454.55	6136.36	5454.55	8181.82	2045.45	2045.45	1704.55	3272.73	3636.36	4090.91
22	1590.91	1931.82	1136.36	2272.73	511.36	539.77	494.32	1090.91	795.45	909.09
23	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.
35	3190.91	3436.36	5154.55	4418.18	2250	2659.09	1636.36	7200	3545.45	3818.18
36	3190.91	3927.27	6381.82	3681.82	2863.64	2863.64	2454.55	7854.55	3545.45	4363.64
37	3681.82	4172.73	6136.36	3190.91	3068.18	2454.55	2454.55	2454.55	4090.91	4636.36
38	2945.45	4663.64	6381.82	3436.36	3477.27	2863.64	2863.64	5563.64	3272.73	5181.82
39	3681.82	4418.18	6872.73	4172.73	2659.09	2863.64	1636.36	4581.82	4090.91	4909.09
40	4418.18	5645.45	9081.82	4172.73	3068.18	2863.64	2454.55	10472.73	4909.09	6272.73
41	3190.91	4663.64	6381.82	3681.82	2863.64	3272.73	2045.45	7527.27	3545.45	5181.82
42	3681.82	4663.64	6381.82	4418.18	1534.09	1534.09	2863.64	7527.27	4090.91	5181.82
43	4909.09	6136.36	8836.36	5154.55	3681.82	3886.36	2863.64	7854.55	5454.55	6818.18
44	3681.82	4663.64	5400	4418.18	2454.55	2863.64	2045.45	8509.09	4090.91	5181.82
45	3190.91	4172.73	5645.45	4418.18	2454.55	2659.09	2045.45	7854.55	3545.45	4636.36
46	2945.45	3681.82	6627.27	3190.91	2454.55	2454.55	2250	7527.27	3272.73	4090.91
47	3681.82	5400	7609.09	4172.73	3068.18	3681.82	3068.18	7854.55	4090.91	6000
48	4909.09	4909.09	7363.64	4418.18	2863.64	3068.18	2659.09	8509.09	5454.55	5454.55
49	4172.73	4909.09	7609.09	4418.18	2863.64	3068.18	2045.45	7527.27	4636.36	5454.55
50	4663.64	4418.18	6136.36	3681.82	2045.45	2454.55	2454.55	6218.18	5181.82	4909.09
51	3927.27	5400	7854.55	4418.18	3272.73	3477.27	2863.64	7200	4363.64	6000
52	5400	5154.55	7118.18	5400	3272.73	3681.82	3272.73	9163.64	6000	5727.27
53	3190.91	4418.18	7118.18	3927.27	2863.64	2863.64	2659.09	9490.91	3545.45	4909.09
54	3436.36	4418.18	5890.91	3927.27	3068.18	2863.64	2659.09	5890.91	3818.18	4909.09
55	3927.27	4909.09	6627.27	5890.91	3272.73	3272.73	3272.73	8181.82	4363.64	5454.55

	hew13tl	hfw13tl	lpw14tl	lrw14tl	spw14tl	lgpw14tl	habw14tl	hadw14tl	hew14tl	hfw14tl
1	4772.73	7500	3068.18	3068.18	3068.18	6136.36	3750	5454.55	4772.73	7500
2	4090.91	7840.91	937.5	340.91	823.86	772.73	1477.27	1818.18	681.82	1306.82
3	4772.73	5681.82	1534.09	3323.86	1534.09	7363.64	5454.55	5795.45	7159.09	8522.73
4	3750	5454.55	2045.45	2045.45	1534.09	5727.27	2386.36	3068.18	3750	5454.55
5	4090.91	6477.27	1363.64	2301.14	2045.45	6545.45	3750	4090.91	4090.91	6477.27
6	4431.82	5795.45	3068.18	2556.82	2556.82	4909.09	3409.09	4090.91	4431.82	5795.45
7	0	0	0	0	0	0	0	0	0	0
8	3181.82	4318.18	1534.09	2045.45	1355.11	3818.18	2272.73	2500	3181.82	4318.18
9	1931.82	4431.82	454.55	0	0	1500	0	0	2000	3920.45
10	5113.64	7159.09	1136.36	0	0	2318.18	1818.18	3636.36	3295.45	4659.09
11	4772.73	6477.27	3068.18	3323.86	2556.82	4090.91	4090.91	5454.55	4772.73	6477.27
12	4772.73	8522.73	2250	2142.05	1806.82	4090.91	2727.27	4545.45	3181.82	5681.82
13	3750	6818.18	2556.82	2812.5	2301.14	5727.27	3750	4431.82	3750	6818.18
14	4772.73	8181.82	1022.73	1022.73	1022.73	4363.64	2272.73	4090.91	1590.91	2727.27
15	4431.82	6818.18	1840.91	2045.45	1593.75	4090.91	2727.27	3636.36	2954.55	4545.45
16	2727.27	4545.45	2556.82	2301.14	2045.45	6545.45	3750	3750	4090.91	6818.18
17	2045.45	3863.64	1789.77	2301.14	1789.77	4909.09	4090.91	3409.09	3068.18	5795.45
18	2500	4772.73	2556.82	3323.86	2556.82	4909.09	3409.09	4431.82	3750	7159.09
19	3863.64	5681.82	3068.18	2301.14	2500	5625	3125	4772.73	5795.45	8522.73
20	0	0	2556.82	2613.64	1534.09	7363.64	4090.91	5227.27	4772.73	6818.18
21	3636.36	5454.55	3068.18	3068.18	2812.5	4909.09	5454.55	6136.36	5454.55	8181.82
22	568.18	1136.36	1534.09	1534.09	1448.86	3272.73	2613.64	2727.27	1704.55	3409.09
23	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.
35	5727.27	4909.09	2250	2659.09	1636.36	7200	3545.45	3818.18	5727.27	4909.09
36	7090.91	4090.91	2863.64	2863.64	2454.55	7854.55	3545.45	4363.64	7090.91	4090.91
37	6818.18	3545.45	3068.18	2454.55	2454.55	2454.55	4090.91	4636.36	6818.18	3545.45
38	7090.91	3818.18	3477.27	2863.64	2863.64	5563.64	3272.73	5181.82	7090.91	3818.18
39	7636.36	4636.36	2659.09	2863.64	1636.36	4581.82	4090.91	4909.09	7636.36	4636.36
40	10090.91	4636.36	3068.18	2863.64	2454.55	10472.73	4909.09	6272.73	10090.91	4636.36
41	7090.91	4090.91	2863.64	3272.73	2045.45	7527.27	3545.45	5181.82	7090.91	4090.91
42	7090.91	4909.09	1534.09	1534.09	2863.64	7527.27	4090.91	5181.82	7090.91	4909.09
43	9818.18	5727.27	3681.82	3886.36	2863.64	7854.55	5454.55	6818.18	9818.18	5727.27
44	6000	4909.09	2454.55	2863.64	2045.45	8509.09	4090.91	5181.82	6000	4909.09
45	6272.73	4909.09	2454.55	2659.09	2045.45	7854.55	3545.45	4636.36	6272.73	4909.09
46	7363.64	3545.45	2454.55	2454.55	2250	7527.27	3272.73	4090.91	7363.64	3545.45
47	8454.55	4636.36	3068.18	3681.82	3068.18	7854.55	4090.91	6000	8454.55	4636.36
48	8181.82	4909.09	2863.64	3068.18	2659.09	8509.09	5454.55	5454.55	8181.82	4909.09
49	8454.55	4909.09	2863.64	3068.18	2045.45	7527.27	4636.36	5454.55	8454.55	4909.09
50	6818.18	4090.91	2045.45	2454.55	2454.55	6218.18	5181.82	4909.09	6818.18	4090.91
51	8727.27	4909.09	3272.73	3477.27	2863.64	7200	4363.64	6000	8727.27	4909.09
52	7909.09	6000	3272.73	3681.82	3272.73	9163.64	6000	5727.27	7909.09	6000
53	7909.09	4363.64	2863.64	2863.64	2659.09	9490.91	3545.45	4909.09	7909.09	4363.64
54	6545.45	4363.64	3068.18	2863.64	2659.09	5890.91	3818.18	4909.09	6545.45	4363.64
55	7363.64	6545.45	3272.73	3272.73	3272.73	8181.82	4363.64	5454.55	7363.64	6545.45

	lpw15tl	lrw15tl	spw15tl	lgpw15tl	habw15tl	hadw15tl	hew15tl	hfw15tl	lat1rm1	loro1rm1	sp1rm1	lp1rm1
1	2159.09	2329.55	2159.09	4500	2954.55	4204.55	3806.82	5795.45	42.6	39.8	34.1	72.7
2	0	0	0	0	0	0	0	0	45.5	45.5	34.1	109.1
3	0	1159.09	0	2509.09	0	0	2454.55	2909.09	22.7	45.5	22.7	90.9
4	909.09	909.09	681.82	2545.45	1193.18	1534.09	1875	2727.27	28.4	28.4	17	54.5
5	1363.64	1505.68	1306.82	4500	2386.36	2556.82	2443.18	4034.09	28.4	28.4	22.7	81.8
6	2045.45	1704.55	1704.55	3272.73	2727.27	2727.27	2954.55	3863.64	34.1	34.1	28.4	54.5
7	0	0	0	0	0	0	0	0	39.8	34.1	34.1	63.6
8	0	0	0	0	0	0	0	0	25.6	36.9	31.3	72.7
9	0	0	0	0	0	0	0	0	28.4	28.4	19.9	54.5
10	0	0	0	0	0	0	0	0	42.6	39.8	28.4	100
11	0	0	0	0	0	0	0	0	34.1	39.8	34.1	54.5
12	3681.82	3323.86	3068.18	6136.36	4090.91	6818.18	4772.73	8522.73	45.5	45.5	39.8	104.6
13	1647.73	10022.73	1477.27	3545.45	3579.55	4204.55	2272.73	4090.91	28.4	31.3	25.6	50
14	0	0	0	0	0	0	0	0	36.9	36.9	28.4	86.4
15	1329.55	1363.64	1062.5	2727.27	2045.45	2727.27	2215.91	3409.09	39.8	45.5	34.1	77.3
16	795.45	710.23	625	1818.18	1022.73	1079.55	1193.18	1818.18	31.3	25.6	22.7	50
17	0	852.27	0	1636.36	0	0	0	0	22.7	28.4	22.7	63.6
18	0	1107.95	0	1636.36	0	0	1250	2386.36	31.3	39.8	28.4	63.6
19	2045.45	1534.09	852.27	3750	1250	3181.82	0	0	34.1	39.8	34.1	109.1
20	340.91	340.91	511.36	909.09	738.64	909.09	909.09	1250	36.9	36.9	34.1	72.7
21	1392.05	1363.64	1193.18	2181.82	28181.82	3806.82	2727.27	4090.91	39.8	39.8	34.1	63.6
22	511.36	1193.18	511.36	2181.82	795.45	909.09	568.18	1136.36	19.9	22.7	17	36.4
23	.	.	.	.	.	.	.	.	22.7	31.3	34.1	50
24	.	.	.	.	.	.	.	.	34.1	31.3	22.7	81.8
25	.	.	.	.	.	.	.	.	25.6	31.3	19.9	72.7
26	.	.	.	.	.	.	.	.	45.5	45.5	36.9	136.4
27	.	.	.	.	.	.	.	.	22.7	28.4	17.1	72.7
28	.	.	.	.	.	.	.	.	28.4	25.6	25.6	72.7
29	.	.	.	.	.	.	.	.	42.6	28.4	28.4	100
30	.	.	.	.	.	.	.	.	31.3	34.1	31.3	72.7
31	.	.	.	.	.	.	.	.	36.9	36.9	39.8	72.7
32	.	.	.	.	.	.	.	.	28.4	36.9	31.3	59.1
33	.	.	.	.	.	.	.	.	28.4	34.1	28.4	72.7
34	.	.	.	.	.	.	.	.	45.5	39.8	34.1	109.1
35	1500	1772.73	1090.91	4800	2363.64	2545.45	3818.18	3272.73	22.7	28.4	17	81.8
36	1909.09	1909.09	1636.36	5236.36	2363.64	2909.09	4727.27	2727.27	22.7	34.1	34.1	100
37	2045.45	1636.36	1636.36	1636.36	2727.27	3090.91	4545.45	2363.64	28.4	28.4	31.3	50
38	2318.18	1909.09	1909.09	3709.09	2181.82	3454.55	4727.27	2545.45	34.1	31.3	34.1	63.6
39	1772.73	1909.09	1090.91	3054.55	2727.27	3272.73	5090.91	3090.91	28.4	31.3	22.7	50
40	2045.45	1909.09	1636.36	6981.82	3272.73	4181.82	6727.27	3090.91	31.3	34.1	34.1	127.3
41	1909.09	2181.82	1363.64	5018.18	2363.64	3454.55	4727.27	2727.27	34.1	39.8	19.9	86.4
42	1022.73	1022.73	1909.09	5018.18	2727.27	3454.55	4727.27	3272.73	28.4	34.1	34.1	81.8
43	2454.55	2590.91	1909.09	5236.36	3636.36	4545.45	6545.45	3818.18	34.1	45.5	34.1	90.9
44	1636.36	1909.09	1363.64	5672.73	2727.27	3454.55	4000	3272.73	34.1	45.5	28.4	118.2
45	1636.36	1772.73	1363.64	5236.36	2363.64	3090.91	4181.82	3272.73	28.4	22.7	25.6	63.6
46	1636.36	1636.36	1500	5018.18	2181.82	2727.27	4909.09	2363.64	25.6	34.1	31.3	63.6
47	2045.45	2454.55	2045.45	5236.36	2727.27	4000	5636.36	3090.91	39.8	42.6	39.8	95.5
48	1909.09	2045.45	1772.73	5672.73	3636.36	3636.36	5454.55	3272.73	34.1	36.9	31.3	100
49	1909.09	2045.45	1363.64	5018.18	3090.91	3636.36	5636.36	3272.73	28.4	34.1	22.7	63.6
50	1363.64	1636.36	1636.36	4145.45	3454.55	3272.73	4545.45	2727.27	22.7	25.6	28.4	81.8
51	2181.82	2318.18	1909.09	4800	2909.09	4000	5818.18	3272.73	14.2	12.9	10.3	24.8
52	2181.82	2454.55	2181.82	6109.09	4000	3818.18	5272.73	4000	34.1	45.5	34.1	118.2
53	1909.09	1909.09	1772.73	6327.27	2363.64	3272.73	5272.73	2909.09	34.1	34.1	31.3	100
54	2045.45	1909.09	1772.73	3927.27	2545.45	3272.73	4363.64	2909.09	34.1	34.1	34.1	81.8
55	2181.82	2181.82	2181.82	5454.55	2909.09	3636.36	4909.09	4363.64	36.9	39.8	39.8	104.5

	habd1rm 1	hadd1rm 1	hext1rm 1	hflx1rm 1	lat1rm 2	loro1rm 2	sp1rm 2	lp1rm 2	habd1rm 2	hadd1rm 2	hext1rm 2	hflx1rm 2
1	31.3	36.9	54	39.8	45.5	45.5	36.9	77.3	36.9	48.3	62.5	45.5
2	39.8	45.5	79.5	34.1	39.8	45.5	36.9	100	42.6	51.1	82.4	39.8
3	39.8	56.8	85.2	68.2	22.7	51.1	22.7	100	51.1	65.3	88.1	73.9
4	22.7	34.1	34.1	22.7	28.4	28.4	19.9	68.2	22.7	28.4	48.3	28.4
5	34.1	34.1	51.1	25.6	31.3	34.1	31.3	95.5	42.6	42.6	65.3	36.9
6	34.1	34.1	45.5	34.1	39.8	34.1	31.3	68.2	34.1	34.1	48.3	39.8
7	51.1	51.1	62.5	39.8	42.6	42.6	36.9	77.3	51.1	51.1	73.9	48.3
8	22.7	31.3	48.3	28.4	31.3	42.6	34.1	63.6	28.4	36.9	54	39.8
9	34.1	17	34.1	22.7	28.4	34.1	25.6	54.5	34.1	17	45.5	25.6
10	36.9	48.3	34.1	34.1	45.5	42.6	36.9	109.1	48.3	56.8	62.5	45.5
11	34.1	45.5	56.8	39.8	42.6	45.5	36.9	59.1	36.9	48.3	59.7	48.3
12	36.9	62.5	90.9	45.5	45.5	45.5	39.8	104.6	36.9	62.5	90.9	45.5
13	28.4	34.1	42.6	25.6	34.1	36.9	31.3	59.1	34.1	42.6	56.8	31.3
14	31.3	48.3	73.9	39.8	0	0	0	86.4	34.1	62.5	85.2	42.6
15	36.9	39.8	51.1	36.9	42.6	39.8	36.9	81.8	42.6	51.1	68.2	45.5
16	25.6	34.1	45.5	31.3	31.3	31.3	25.6	59.1	36.9	36.9	62.5	36.9
17	28.4	22.7	51.1	31.3	22.7	28.4	25.6	72.7	36.9	31.3	62.5	28.4
18	31.3	45.5	51.1	36.9	36.9	48.3	34.1	72.7	36.9	48.3	73.9	36.9
19	28.4	39.8	73.9	51.1	42.6	39.8	36.9	127.3	39.8	51.1	73.9	45.5
20	36.9	48.3	51.1	36.9	42.6	39.8	34.1	118.2	39.8	48.3	68.2	51.1
21	51.1	45.5	51.1	39.8	45.5	42.6	36.9	72.7	45.5	54	68.2	45.5
22	25.6	22.7	31.3	17	19.9	22.7	17	36.4	25.6	22.7	31.3	17
23	31.3	51.1	45.5	22.7	.	.	.	.	.	.	.	.
24	51.1	39.8	76.7	51.1	.	.	.	.	.	.	.	.
25	14.2	31.3	48.3	17.1	.	.	.	.	.	.	.	.
26	34.1	45.5	76.7	59.7	.	.	.	.	.	.	.	.
27	22.7	25.6	45.5	36.9	.	.	.	.	.	.	.	.
28	31.3	28.4	51.1	39.8	.	.	.	.	.	.	.	.
29	28.4	34.1	51.1	17.1	.	.	.	.	.	.	.	.
30	25.6	45.5	90.9	39.8	.	.	.	.	.	.	.	.
31	34.1	34.1	45.5	51.1	.	.	.	.	.	.	.	.
32	39.8	45.5	45.5	28.4	.	.	.	.	.	.	.	.
33	28.4	39.8	48.3	34.1	.	.	.	.	.	.	.	.
34	31.3	51.1	56.8	34.1	.	.	.	.	.	.	.	.
35	14.2	22.7	39.8	45.5	.	.	.	.	.	.	.	.
36	28.4	34.1	62.5	34.1	.	.	.	.	.	.	.	.
37	31.3	36.9	42.6	31.3	.	.	.	.	.	.	.	.
38	22.7	39.8	34.1	28.4	.	.	.	.	.	.	.	.
39	22.7	28.4	48.3	28.4	.	.	.	.	.	.	.	.
40	39.8	51.1	68.2	39.8	.	.	.	.	.	.	.	.
41	31.3	45.5	62.5	28.4	.	.	.	.	.	.	.	.
42	25.6	28.4	39.8	28.4	.	.	.	.	.	.	.	.
43	28.4	28.4	28.4	51.1	.	.	.	.	.	.	.	.
44	31.3	42.6	62.5	28.4	.	.	.	.	.	.	.	.
45	19.9	31.3	28.4	28.4	.	.	.	.	.	.	.	.
46	17	28.4	45.5	28.4	.	.	.	.	.	.	.	.
47	39.8	51.1	71	42.6	.	.	.	.	.	.	.	.
48	39.8	39.8	62.5	34.1	.	.	.	.	.	.	.	.
49	39.8	45.5	73.9	39.8	.	.	.	.	.	.	.	.
50	39.8	34.1	51.1	34.1	.	.	.	.	.	.	.	.
51	12.9	18.1	11.6	25.8	14.2	15.5	12.9	28.9	18.1	22	27.1	15.5
52	48.3	54	82.4	45.5	.	.	.	.	.	.	.	.
53	34.1	36.9	62.5	34.1	.	.	.	.	.	.	.	.
54	28.4	39.8	54	42.6	.	.	.	.	.	.	.	.
55	28.4	45.5	68.2	48.3	.	.	.	.	.	.	.	.

	lat1rm 3	loro1rm 3	sp1rm 3	lp1rm 3	habd1rm 3	hadd1rm 3	hext1rm 3	hflx1rm 3	lat1rm 4	loro1rm 4	sp1rm 4	lp1rm 4
1	45.5	45.5	45.5	86.4	39.8	56.8	79.5	51.1	48.3	45.5	45.5	95.5
2	39.8	45.5	36.9	100	48.3	59.7	82.4	42.6	42.6	48.3	36.9	113.6
3	22.7	48.3	22.7	104.5	56.8	62.5	90.9	76.7	22.7	48.3	22.7	95.5
4	31.3	28.4	22.7	81.8	25.6	34.1	59.7	39.8	28.4	28.4	19.9	81.8
5	31.3	34.1	31.3	95.5	39.8	42.6	68.2	45.5	31.3	34.1	31.3	95.5
6	42.6	36.9	36.9	68.2	45.5	51.1	62.5	48.3	45.5	39.8	36.9	81.8
7	42.6	45.5	36.9	81.8	51.1	54	85.2	48.3	45.5	45.5	42.6	100
8	34.1	45.5	34.1	81.8	36.9	39.8	68.2	51.1	34.1	48.3	34.1	86.4
9	28.4	34.1	28.4	63.6	34.1	17	54	31.3	34.1	34.1	28.4	63.6
10	45.5	45.5	19.9	109.1	48.3	65.3	76.7	54	45.5	45.5	19.9	104.5
11	42.6	48.3	36.9	68.2	45.5	56.8	68.2	51.1	45.5	45.5	34.1	72.7
12	54	48.3	42.6	90.9	48.3	71	93.8	54	51.1	48.3	42.6	86.4
13	36.9	39.8	34.1	81.8	39.8	48.3	71	39.8	36.9	39.8	28.4	90.9
14	0	0	0	90.9	36.9	68.2	88.1	51.1	22.7	22.7	22.7	100
15	42.6	42.6	39.8	86.4	45.5	56.8	71	48.3	48.3	45.5	39.8	90.9
16	36.9	34.1	31.3	90.9	39.8	39.8	71	45.5	39.8	36.9	31.3	86.4
17	25.6	34.1	25.6	68.2	42.6	36.9	62.5	34.1	31.3	34.1	25.6	77.3
18	34.1	48.3	36.9	63.6	36.9	48.3	76.7	39.8	39.8	42.6	34.1	68.2
19	42.6	34.1	36.9	127.3	39.8	51.1	88.1	59.7	45.5	39.8	36.9	131.8
20	42.6	45.5	28.4	113.6	48.3	56.8	79.5	56.8	42.6	45.5	31.3	113.6
21	45.5	42.6	39.8	72.7	56.8	65.3	85.2	56.8	48.3	48.3	42.6	81.8
22	22.7	25.6	22.7	45.5	25.6	28.4	36.9	19.9	28.4	28.4	25.6	59.1
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	36.9	28.4	25.6	86.4
25	.	.	.	.	.	.	.	.	28.4	31.3	17.1	72.7
26	.	.	.	.	.	.	.	.	45.5	42.6	34.1	127.3
27	.	.	.	.	.	.	.	.	19.9	25.6	19.9	72.7
28	.	.	.	.	.	.	.	.	25.6	22.7	22.7	77.3
29	.	.	.	.	.	.	.	.	34.1	25.6	25.6	90.9
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	36.9	31.3	34.1	63.6
32	.	.	.	.	.	.	.	.	28.4	34.1	31.3	63.6
33	.	.	.	.	.	.	.	.	28.4	31.3	25.6	77.3
34	.	.	.	.	.	.	.	.	39.8	42.6	31.3	113.6
35	.	.	.	.	.	.	.	.	31.3	36.9	22.7	104.5
36	.	.	.	.	.	.	.	.	39.8	42.6	34.1	104.5
37	.	.	.	.	.	.	.	.	45.5	36.9	36.9	50
38	.	.	.	.	.	.	.	.	48.3	42.6	36.9	86.4
39	.	.	.	.	.	.	.	.	39.8	39.8	25.6	68.2
40	.	.	.	.	.	.	.	.	45.5	48.3	42.6	159.1
41	.	.	.	.	.	.	.	.	42.6	48.3	28.4	104.5
42	.	.	.	.	.	.	.	.	28.4	34.1	34.1	109.1
43	.	.	.	.	.	.	.	.	54	59.7	42.6	113.6
44	.	.	.	.	.	.	.	.	36.9	42.6	31.3	131.8
45	.	.	.	.	.	.	.	.	36.9	36.9	28.4	118.2
46	.	.	.	.	.	.	.	.	34.1	34.1	25.6	63.6
47	.	.	.	.	.	.	.	.	45.5	51.1	45.5	122.7
48	.	.	.	.	.	.	.	.	42.6	45.5	34.1	118.2
49	.	.	.	.	.	.	.	.	42.6	45.5	28.4	95.5
50	.	.	.	.	.	.	.	.	28.4	36.9	28.4	86.4
51	15.5	15.5	12.9	35.1	18.1	20.7	27.1	15.5	20.7	22	18.1	45.5
52	.	.	.	.	.	.	.	.	48.3	51.1	48.3	131.8
53	.	.	.	.	.	.	.	.	45.5	42.6	36.9	122.7
54	.	.	.	.	.	.	.	.	45.5	48.3	39.8	81.8
55	.	.	.	.	.	.	.	.	48.3	48.3	45.5	118.2

	habd1rm4	hadd1rm4	hext1rm4	hflx1rm4	lat1rm7	loro1rm7	sp1rm7	lp1rm7	habd1rm7	hadd1rm7	hext1rm7	hflx1rm7
1	45.5	62.5	79.5	54	53.98	51.14	48.3	104.55	53.98	71.02	93.75	59.66
2	51.1	65.3	82.4	59.7	42.61	51.14	45.45	122.73	62.5	68.18	96.59	62.5
3	59.7	68.2	96.6	76.7	22.73	51.14	22.73	127.27	71.02	85.23	105.11	79.55
4	28.4	34.1	59.7	36.9	36.93	34.09	22.73	109.09	36.93	45.45	65.34	42.61
5	45.5	48.3	79.5	51.1	36.93	36.93	34.09	118.18	51.14	56.82	85.23	73.86
6	48.3	54	73.9	59.7	45.45	39.77	36.93	90.91	68.18	68.18	93.75	79.55
7	56.8	54	82.4	54	51.14	48.3	39.77	113.64	65.34	71.02	85.23	65.34
8	36.9	42.6	71	54	42.61	42.61	39.77	100	51.14	59.66	85.23	65.34
9	.	.	56.8	36.9	28.41	28.41	22.73	63.64	.	.	68.18	48.3
10	48.3	65.3	85.2	68.2	45.45	45.45	19.89	104.55	48.3	65.34	85.23	68.18
11	39.8	59.7	71	51.1	56.82	53.98	42.61	72.7	53.98	76.7	79.55	59.66
12	45.5	73.9	90.9	51.1	53.98	48.3	45.45	86.4	56.82	73.86	113.64	53.98
13	34.1	45.5	85.2	48.3	39.77	48.3	36.93	109.09	45.45	62.5	93.75	65.34
14	36.9	71	88.1	54	22.73	22.73	22.73	127.27	36.9	71	157.16	73.86
15	48.3	56.8	79.5	54	48.3	48.3	42.61	100	53.98	71.02	96.59	65.34
16	48.3	45.5	79.5	48.3	42.61	39.77	34.09	90.91	51.14	62.5	85.23	62.5
17	39.8	36.9	62.5	36.9	31.25	34.09	28.41	81.82	48.3	45.45	73.86	53.98
18	39.8	51.1	76.7	48.3	42.61	56.82	42.61	86.36	45.45	59.66	73.86	51.14
19	42.6	62.5	93.8	59.7	48.3	42.61	45.45	150	56.82	68.18	107.95	88.07
20	51.1	51.1	88.1	56.8	48.3	53.98	36.93	118.18	59.66	62.5	90.91	73.86
21	65.3	76.7	102.3	56.8	53.98	56.82	45.45	109.09	68.18	90.91	116.48	76.7
22	28.4	31.3	42.6	25.6	31.25	31.25	28.41	68.18	34.09	39.77	65.34	36.93
23	.	.	.	.	25.57	31.25	31.25	63.64	34.09	39.77	28.41	25.57
24	48.3	42.6	76.7	48.3	34.09	34.09	25.57	90.91	39.77	45.45	45.45	51.14
25	19.9	25.6	48.3	17.1	31.25	25.57	22.73	109.09	22.73	36.93	22.73	19.89
26	39.8	54	85.2	59.7	45.45	42.61	34.09	109.09	34.09	51.14	51.14	62.5
27	25.6	25.6	34.1	48.3	28.41	25.57	31.25	72.73	28.41	25.57	28.41	39.77
28	31.3	31.3	48.3	34.1	34.09	39.77	34.09	100	34.09	45.45	36.93	42.61
29	28.4	31.3	45.5	22.7	34.09	28.41	34.09	81.82	19.89	34.09	17.05	19.89
30	.	.	.	.	34.09	39.77	36.93	90.91	34.09	45.45	39.77	42.61
31	31.3	28.4	36.9	48.3	34.09	34.09	39.77	72.73	34.09	34.09	39.77	51.14
32	39.8	45.5	42.6	28.4	34.09	34.09	25.57	63.64	34.09	34.09	34.09	34.09
33	31.3	36.9	45.5	36.9	34.09	34.09	31.25	72.73	22.73	28.41	36.93	39.77
34	31.3	48.3	51.1	39.8	45.45	39.77	34.09	100	39.77	56.82	34.09	45.45
35	39.8	45.5	71	59.7	39.77	42.61	31.25	127.27	39.77	48.3	71.02	65.34
36	48.3	59.7	79.5	45.5	42.61	45.45	36.93	113.64	68.18	73.86	113.64	71.02
37	45.5	51.1	73.9	42.6	51.14	42.61	39.77	50	53.98	59.66	85.23	53.98
38	34.1	51.1	68.2	39.8	45.45	53.98	36.93	81.82	45.45	62.5	79.55	45.45
39	42.6	51.1	82.4	51.1	36.93	39.77	28.41	81.82	51.14	65.34	85.23	59.66
40	68.2	71	108	51.1	53.98	56.82	48.3	163.64	79.55	93.75	158.67	79.55
41	39.8	56.8	73.9	56.8	45.45	53.98	31.25	100	48.3	73.86	90.91	79.55
42	51.1	71	73.9	54	28.4	34.1	45.45	104.55	53.98	73.86	79.55	59.66
43	59.7	71	73.9	71	56.82	62.5	42.61	109.09	62.5	85.23	163.67	79.55
44	45.5	54	68.2	59.7	45.45	51.14	36.93	136.36	62.5	68.18	79.55	73.86
45	36.9	48.3	85.2	54	39.77	42.61	31.25	127.27	45.45	62.5	85.23	65.34
46	39.8	51.1	79.5	45.5	39.77	36.93	34.09	118.18	42.61	56.82	102.27	68.18
47	48.3	65.3	99.4	54	53.98	62.5	48.3	140.91	62.5	68.18	113.64	71.02
48	71	65.3	85.2	56.8	45.45	48.3	39.77	122.73	76.7	73.86	113.64	73.86
49	51.1	62.5	90.9	56.8	45.45	39.77	31.25	113.64	51.14	65.34	113.64	73.86
50	62.5	65.3	85.2	48.3	34.09	36.93	36.93	95.45	71.02	79.55	113.64	62.5
51	20.7	28.4	23.2	41.3	51.14	51.14	39.77	104.55	62.5	62.5	102.27	56.82
52	71	68.2	93.8	68.2	51.14	62.5	51.14	118.18	88.07	82.39	113.64	90.91
53	36.9	56.8	88.1	54	48.3	45.45	36.93	127.27	56.82	71.02	102.27	85.23
54	39.8	51.1	82.4	48.3	48.3	45.45	42.61	90.91	59.66	68.18	90.91	59.66
55	48.3	59.7	82.4	79.5	53.98	51.14	51.14	122.73	73.86	71.02	107.95	82.39

	pchlatmd	pchlormd	pchspmd	pchlpmd	pchabdmd	pchaddmd	pchextmd	pchflxmd	pchlatpt	pchlorpt	pchsppt	pchlppt
1	13.33	14.29	33.33	31.25	45.45	69.23	47.37	35.71	26.67	28.58	41.68	43.76
2	-6.25	6.25	8.33	4.17	28.57	43.75	3.57	75	-6.26	12.51	33.32	12.5
3	0	6.25	0	5	50	20	13.33	12.5	0	12.51	0	40
4	0	0	16.67	50	25	0	75	62.5	29.99	20	33.35	100
5	10	20	37.5	16.67	33.33	41.67	55.56	100	29.99	29.99	50	44.44
6	33.33	16.67	30	50	41.67	58.33	62.5	75	33.33	16.67	30	66.67
7	14.29	33.33	25	57.14	11.11	5.56	31.82	35.71	28.58	41.68	16.66	78.58
8	33.33	30.77	9.09	18.75	62.5	36.36	47.06	90	66.65	15.37	27.26	37.5
9	20	20	42.86	16.67	.	.	66.67	62.5	0	0	14.3	16.67
10	6.67	14.29	-30	4.55	30.77	35.29	150	100	6.67	14.29	-30	4.55
11	33.33	14.29	0	33.33	16.67	31.25	25	28.57	66.67	35.72	24.99	33.28
12	12.52	6.27	7.14	-17.4	23.07	18.18	0	12.52	18.77	6.27	14.28	-17.36
13	30	27.27	11.11	81.82	20	33.33	100	88.89	39.99	54.56	44.44	118.18
14	-38.46	-38.46	-20	15.79	18.18	47.06	19.23	35.71	-38.46	-38.46	-20	47.37
15	21.43	0	16.67	17.65	30.77	42.86	55.56	46.15	21.44	6.26	24.99	29.41
16	27.27	44.44	37.5	72.73	88.89	33.33	75	54.55	36.35	55.54	50	81.82
17	37.48	19.99	12.49	21.42	39.99	62.47	22.21	18.18	37.48	19.99	24.99	28.57
18	27.26	7.14	19.99	7.13	27.26	12.52	49.98	30.79	36.35	42.87	49.98	35.7
19	33.32	0	8.33	20.84	49.98	57.15	26.93	16.66	41.68	7.14	33.32	37.5
20	15.38	23.08	-8.33	56.25	38.46	5.88	72.22	53.85	30.78	46.16	8.33	62.5
21	21.43	21.43	25	28.57	27.78	68.75	100	42.86	35.72	42.86	33.32	71.43
22	42.86	25	50	62.5	11.11	37.5	36.36	50	57.14	37.5	66.67	87.5
23	.	.	.	.	.	.	.	.	12.64	0	-8.33	27.27
24	8.33	-9.09	12.49	5.55	-5.55	7.14	0	-5.55	-0.03	9.09	12.49	11.14
25	11.11	0	-14.28	0	40.07	-18.18	0	0	22.07	-18.18	14.28	50.06
26	0	-6.25	-7.69	-6.67	16.66	18.77	11.12	0	-0.1	-6.25	-7.69	-20.02
27	-12.49	-10	16.66	0	12.49	0	-24.99	30.79	25.15	-10	83.28	0.04
28	-10	-11.11	-11.11	6.24	0	10	-5.55	-14.28	20.04	55.53	33.32	37.55
29	-20	-10	-10	-9.09	0	-8.33	-11.13	33.31	-19.97	0	19.99	-18.18
30	.	.	.	.	.	.	.	.	8.92	16.66	18.18	25.05
31	0	-15.38	-14.28	-12.5	-8.33	-16.66	-18.75	-5.55	-7.61	-7.69	0	0.04
32	0	-7.69	0	7.7	0	0	-6.25	0	20.04	-7.69	-18.18	7.68
33	0	-8.33	-10	6.24	10	-7.14	-5.9	8.33	20.04	0	10	0.04
34	-12.5	7.14	-8.33	4.17	0	-5.55	-10	16.66	-0.1	0	0	-8.34
35	37.89	29.93	33.53	27.75	180.28	100.44	78.39	31.21	75.2	50.04	83.82	55.59
36	75.33	24.93	0	4.5	70.07	75.07	27.2	33.43	87.71	33.28	8.3	13.64
37	60.21	29.93	17.89	0	45.37	38.48	73.47	36.1	80.07	50.04	27.06	0
38	41.64	36.1	8.21	35.85	50.22	28.39	100	40.14	33.28	72.46	8.3	28.65
39	40.14	27.16	12.78	36.4	87.67	79.93	70.6	79.93	30.04	27.06	25.15	63.64
40	45.37	41.64	24.93	24.98	71.36	38.94	58.36	28.39	72.46	66.63	41.64	28.55
41	24.93	21.36	42.71	20.95	27.16	24.84	18.24	100	33.28	35.63	57.04	15.74
42	0	0	0	33.37	99.61	150	85.68	90.14	0	0	33.28	27.81
43	58.36	31.21	24.93	24.97	110.21	150	160.21	38.94	66.63	37.36	24.96	20.01
44	8.21	-6.37	10.21	11.51	45.37	26.76	9.12	110.21	33.28	12.4	30.04	15.36
45	29.93	62.56	10.94	85.85	85.43	54.31	200	90.14	40.04	87.71	22.07	100.11
46	33.2	0	-18.21	0	134.12	79.93	74.73	60.21	55.35	8.3	8.91	85.82
47	14.32	19.95	14.32	28.48	21.36	27.79	40	26.76	35.63	46.71	21.36	47.55
48	24.93	23.31	8.95	18.2	78.39	64.07	36.32	66.57	33.28	30.89	27.06	22.73
49	50	33.43	25.11	50.16	28.39	37.36	23	42.71	60.04	16.63	37.67	78.68
50	25.11	44.14	0	5.62	57.04	91.5	66.73	41.64	50.18	44.26	30.04	16.69
51	45.77	70.54	75.73	83.47	60.47	56.91	100	60.08	260.14	296.43	286.12	321.57
52	41.64	12.31	41.64	11.51	47	26.3	13.83	49.89	49.97	37.36	49.97	-0.02
53	33.43	24.93	17.89	22.7	8.21	53.93	40.96	58.36	41.64	33.28	17.99	27.27
54	33.43	41.64	16.72	0	40.14	28.39	52.59	13.38	41.64	33.28	24.96	11.14
55	30.89	21.36	14.32	13.11	70.07	31.21	20.82	64.6	46.29	28.49	28.49	17.44

	pchabdpt	pchaddpt	pchextpt	pchflxpt	abslatmd	abslormd	absspmd	abslpmd	absabdmd	absaddmd	absextmd	absflxmd
1	72.74	92.3	73.68	50	5.68	5.68	11.36	22.73	14.2	25.57	25.57	14.2
2	57.14	50	21.43	83.33	-2.84	2.84	2.84	4.55	11.36	19.89	2.84	25.57
3	78.56	50	23.33	16.67	0	2.84	0	4.55	19.89	11.36	11.36	8.52
4	62.49	33.32	91.66	87.48	0	0	2.84	27.27	5.68	0	25.57	14.2
5	50.01	66.67	66.67	188.87	2.84	5.68	8.52	13.64	11.36	14.2	28.41	25.57
6	99.99	99.99	106.25	133.35	11.36	5.68	8.52	27.27	14.2	19.89	28.41	25.57
7	27.78	38.88	36.37	64.28	5.68	11.36	8.52	36.36	5.68	2.84	19.89	14.2
8	125.02	90.91	76.48	130	8.52	11.36	2.84	13.64	14.2	11.36	22.73	25.57
9	.	.	99.99	112.52	5.68	5.68	8.52	9.09	.	.	22.73	14.2
10	30.77	35.29	150	100	2.84	5.68	-8.52	4.55	11.36	17.05	51.14	34.09
11	58.34	68.74	40.01	50	11.36	5.68	0	18.18	5.68	14.2	14.2	11.36
12	53.86	18.18	25	18.77	5.69	2.85	2.84	-18.19	8.52	11.36	0	5.69
13	59.98	83.33	120	155.55	8.52	8.52	2.84	40.91	5.68	11.36	42.61	22.73
14	18.08	47.01	112.77	85.71	-14.2	-14.2	-5.68	13.64	5.68	22.73	14.2	14.2
15	46.16	78.56	88.89	76.92	8.52	0	5.68	13.64	11.36	17.05	28.41	17.05
16	100.01	83.33	87.51	100	8.52	11.36	8.52	36.36	22.73	11.36	34.09	17.05
17	70.01	99.96	44.43	72.74	8.52	5.68	2.84	13.63	11.36	14.2	11.36	5.68
18	45.44	31.27	44.43	38.48	8.52	2.84	5.68	4.54	8.52	5.69	25.56	11.37
19	100	71.44	46.15	72.21	11.36	0	2.84	22.73	14.2	22.73	19.89	8.52
20	61.54	29.41	77.78	99.99	5.68	8.52	-2.84	40.91	14.2	2.84	36.93	19.89
21	33.33	100	127.78	92.85	8.52	8.52	8.52	18.18	14.2	31.25	51.14	17.05
22	33.33	74.99	109.09	116.66	8.52	5.68	8.52	22.73	2.84	8.52	11.36	8.52
23	9.09	-22.23	-37.49	12.64	.	.	.	.	.	.	.	.
24	-22.23	14.28	-40.74	0.07	2.84	-2.84	2.84	4.54	-2.84	2.84	0	-2.84
25	60.07	18.18	-52.94	16.29	2.84	0	-2.84	0	5.69	-5.68	0	0
26	0	12.52	-33.32	4.69	0	-2.84	-2.84	-9.09	5.68	8.53	8.53	0
27	24.99	0	-37.49	7.79	-2.84	-2.84	2.84	0	2.84	0	-11.36	11.37
28	9.09	59.98	-27.79	7.07	-2.84	-2.84	-2.84	4.54	0	2.84	-2.84	-5.68
29	-29.99	0	-66.66	16.29	-8.52	-2.84	-2.84	-9.09	0	-2.84	-5.69	5.68
30	33.32	0	-56.25	7.07	.	.	.	.	.	.	.	.
31	0	0	-12.5	0.07	0	-5.68	-5.68	-9.09	-2.84	-5.68	-8.52	-2.84
32	-14.28	-24.99	-24.99	20.04	0	-2.84	0	4.55	0	0	-2.84	0
33	-19.99	-28.56	-23.54	16.64	0	-2.84	-2.84	4.54	2.84	-2.84	-2.85	2.84
34	27.26	11.11	-40	33.3	-5.68	2.84	-2.84	4.55	0	-2.84	-5.68	5.68
35	180.07	112.78	78.44	43.6	8.6	8.5	5.7	22.7	25.6	22.8	31.2	14.2
36	140.07	116.6	81.82	108.27	17.1	8.5	0	4.5	19.9	25.6	17	11.4
37	72.46	61.68	100.07	72.46	17.1	8.5	5.6	0	14.2	14.2	31.3	11.3
38	100.22	57.04	133.28	60.04	14.2	11.3	2.8	22.8	11.4	11.3	34.1	11.4
39	125.29	130.07	76.46	110.07	11.4	8.5	2.9	18.2	19.9	22.7	34.1	22.7
40	99.87	83.46	132.65	99.87	14.2	14.2	8.5	31.8	28.4	19.9	39.8	11.3
41	54.31	62.33	45.46	180.11	8.5	8.5	8.5	18.1	8.5	11.3	11.4	28.4
42	110.86	160.07	99.87	110.07	0	0	0	27.3	25.5	42.6	34.1	25.6
43	120.07	200.11	476.3	55.68	19.9	14.2	8.5	22.7	31.3	42.6	45.5	19.9
44	99.68	60.05	27.28	160.07	2.8	-2.9	2.9	13.6	14.2	11.4	5.7	31.3
45	128.39	99.68	200.11	130.07	8.5	14.2	2.8	54.6	17	17	56.8	25.6
46	150.65	100.07	124.77	140.07	8.5	0	-5.7	0	22.8	22.7	34	17.1
47	57.04	33.42	60.06	66.71	5.7	8.5	5.7	27.2	8.5	14.2	28.4	11.4
48	92.71	85.58	81.82	116.6	8.5	8.6	2.8	18.2	31.2	25.5	22.7	22.7
49	28.49	43.6	53.78	85.58	14.2	11.4	5.7	31.9	11.3	17	17	17
50	78.44	133.28	122.39	83.28	5.7	11.3	0	4.6	22.7	31.2	34.1	14.2
51	384.5	245.3	781.64	120.23	6.5	9.1	7.8	20.7	7.8	10.3	11.6	15.5
52	82.34	52.57	37.91	99.8	14.2	5.6	14.2	13.6	22.7	14.2	11.4	22.7
53	66.63	92.47	63.63	149.94	11.4	8.5	5.6	22.7	2.8	19.9	25.6	19.9
54	110.07	71.31	68.35	40.05	11.4	14.2	5.7	0	11.4	11.3	28.4	5.7
55	160.07	56.09	58.28	70.58	11.4	8.5	5.7	13.7	19.9	14.2	14.2	31.2

	abslatpt	abslorpt	abssppt	abslppt	absabdpt	absaddpt	absextpt	absflxpt	LPW 17TL	LRW 17TL	SPW 17TL	LGPW 17TL
1	11.37	11.37	14.21	31.82	22.73	34.09	39.77	19.89	2215.91	2045.45	1943.18	4363.64
2	-2.84	5.69	11.36	13.64	22.73	22.73	17.04	28.41	2045.45	2215.91	1477.27	5454.55
3	0	5.69	0	36.36	31.25	28.41	19.88	11.37	1022.73	2215.91	1022.73	4363.64
4	8.52	5.68	5.68	54.54	14.2	11.36	31.25	19.88	1363.64	1363.64	852.27	3818.18
5	8.52	8.52	11.36	36.36	17.05	22.73	34.09	48.29	1363.64	1534.09	1363.64	4363.64
6	11.36	5.68	8.52	36.36	34.09	34.09	48.3	45.46	2045.45	1875	1704.55	3818.18
7	11.37	14.21	5.68	50	14.2	19.88	22.73	25.57	2045.45	2045.45	1943.18	4636.36
8	17.04	5.68	8.52	27.27	28.41	28.41	36.93	36.93	1534.09	2045.45	1534.09	3818.18
9	0	0	2.84	9.09	.	.	34.09	25.57	1457.39	1448.86	735.8	3000
10	2.84	5.68	-8.52	4.55	11.36	17.05	51.14	34.09	0	0	0	1181.82
11	22.73	14.21	8.52	18.15	19.89	31.25	22.73	19.89	2045.45	2045.45	1534.09	2363.64
12	8.53	2.85	5.68	-18.15	19.89	11.36	22.73	8.53	1232.95	849.43	954.55	2727.27
13	11.36	17.05	11.36	59.09	17.04	28.41	51.14	39.77	1704.55	1875	1363.64	4363.64
14	-14.2	-14.2	-5.68	40.91	5.65	22.7	83.3	34.09	1022.73	1022.73	1022.73	4363.64
15	8.53	2.85	8.52	22.73	17.05	31.25	45.45	28.41	1920.45	1943.18	1312.5	4363.64
16	11.36	14.2	11.36	40.91	25.57	28.41	39.78	31.25	1875	1704.55	1363.64	4090.91
17	8.52	5.68	5.68	18.18	19.89	22.72	22.72	22.73	681.82	767.05	596.59	1772.73
18	11.36	17.05	14.2	22.72	14.2	14.21	22.72	14.21	937.5	1022.73	767.05	1636.36
19	14.21	2.84	11.36	40.91	28.41	28.41	34.09	36.93	1875	1590.91	1647.73	5454.55
20	11.37	17.05	2.84	45.45	22.73	14.2	39.77	36.93	1875	1875	1363.64	4909.09
21	14.21	17.05	11.36	45.45	17.04	45.46	65.34	36.93	0	0	0	0
22	11.36	8.52	11.36	31.82	8.52	17.04	34.09	19.88	0	0	0	0
23	2.84	0	-2.84	13.64	2.84	-11.37	-17.04	2.84	.	.	.	.
24	0	2.84	2.84	9.09	-11.37	5.68	-31.25	0	.	.	.	.
25	5.68	-5.68	2.84	36.36	8.53	5.68	-25.57	2.84	.	.	.	.
26	0	-2.84	-2.84	-27.27	0	5.69	-25.56	2.84	.	.	.	.
27	5.68	-2.84	14.2	0	5.68	0	-17.04	2.84	.	.	.	.
28	5.68	14.2	8.52	27.27	2.84	17.04	-14.21	2.84	.	.	.	.
29	-8.52	0	5.68	-18.18	-8.52	0	-34.09	2.84	.	.	.	.
30	2.84	5.68	5.68	18.18	8.52	0	-51.14	2.84	.	.	.	.
31	-2.84	-2.84	0	0	0	0	-5.68	0	.	.	.	.
32	5.68	-2.84	-5.68	4.55	-5.68	-11.36	-11.36	5.68	.	.	.	.
33	5.68	0	2.84	0	-5.68	-11.36	-11.37	5.68	.	.	.	.
34	0	0	0	-9.09	8.52	5.68	-22.73	11.36	.	.	.	.
35	17.07	14.21	14.25	45.47	25.57	25.6	31.22	19.84	2250	2659.09	1636.36	7527.27
36	19.91	11.35	2.83	13.64	39.78	39.76	51.14	36.92	1875	1295.45	1278.41	4909.09
37	22.74	14.21	8.47	0	22.68	22.76	42.63	22.68	1909.09	1704.55	1136.36	1911.27
38	11.35	22.68	2.83	18.22	22.75	22.7	45.45	17.05	3477.27	3068.18	2659.09	6218.18
39	8.53	8.47	5.71	31.82	28.44	36.94	36.93	31.26	2863.64	2863.64	1840.91	4909.09
40	22.68	22.72	14.2	36.34	39.75	42.65	90.47	39.75	2181.82	2318.18	1977.27	7636.36
41	11.35	14.18	11.35	13.6	17	28.36	28.41	51.15	2045.45	2318.18	886.36	5018.18
42	0	0	11.35	22.75	28.38	45.46	39.75	31.26	1534.09	1534.09	2454.55	7854.55
43	22.72	17	8.51	18.19	34.1	56.83	135.27	28.45	3886.36	4295.45	3068.18	8181.82
44	11.35	5.64	8.53	18.16	31.2	25.58	17.05	45.46	653.41	681.82	681.82	3136.36
45	11.37	19.91	5.65	63.67	25.55	31.2	56.83	36.94	2659.09	2659.09	2045.45	8509.09
46	14.17	2.83	2.79	54.58	25.61	28.42	56.77	39.78	767.05	767.05	596.59	1500
47	14.18	19.9	8.5	45.41	22.7	17.08	42.64	28.42	2045.45	2386.36	2045.45	5727.27
48	11.35	11.4	8.47	22.73	36.9	34.06	51.14	39.76	2045.45	2045.45	1534.09	5454.55
49	17.05	5.67	8.55	50.04	11.34	19.84	39.74	34.06	3068.18	3272.73	2045.45	6872.73
50	11.39	11.33	8.53	13.65	31.22	45.45	62.54	28.4	2045.45	2659.09	2045.45	6218.18
51	36.94	38.24	29.47	79.75	49.6	44.4	90.67	31.02	0	0	0	0
52	17.04	17	17.04	-0.02	39.77	28.39	31.24	45.41	2215.91	2386.36	3323.86	6272.73
53	14.2	11.35	5.63	27.27	22.72	34.12	39.77	51.13	2045.45	1704.55	1704.55	5727.27
54	14.2	11.35	8.51	9.11	31.26	28.38	36.91	17.06	0	0	0	0
55	17.08	11.34	11.34	18.23	45.46	25.52	39.75	34.09	2215.91	2215.91	2045.45	5454.55

	HABW 17T	HADW 17T	HEW 17TL	HFW 17TL	LPW 18TL	LRW 18TL	SPW 18TL	LGPW 18T	HABW 18T	HADW 18T	HEW 18TL	HFW 18TL
1	2727.27	3863.64	5000	3409.09	3323.86	3068.18	3068.18	6545.45	4090.91	5795.45	7500	5113.64
2	3181.82	4090.91	5113.64	3409.09	3068.18	3323.86	2471.59	8181.82	1590.91	0	5795.45	4772.73
3	3636.36	4318.18	6136.36	4772.73	1534.09	3323.86	1534.09	6545.45	5454.55	6477.27	9204.55	7159.09
4	1818.18	2045.45	3636.36	2272.73	2045.45	2045.45	1278.41	5727.27	2727.27	3068.18	5454.55	3409.09
5	2727.27	2954.55	5000	3181.82	2045.45	2301.14	2045.45	6545.45	4090.91	4431.82	7500	4772.73
6	2954.55	3409.09	4545.45	3636.36	2045.45	1875	1704.55	3818.18	2954.55	3409.09	4545.45	3636.36
7	3636.36	3409.09	5227.27	3409.09	2045.45	1875	1840.91	4481.82	3636.36	3409.09	5227.27	3409.09
8	2272.73	2500	2159.09	3181.82	767.05	1022.73	681.82	1909.09	1136.36	1250	2159.09	1590.91
9	0	0	3636.36	2272.73	2045.45	1875	1630.68	4272.73	0	0	5454.55	3409.09
10	1477.27	2045.45	2045.45	1738.64	0	0	0	2090.91	2954.55	3681.82	4909.09	4102.27
11	2500	3636.36	4545.45	3181.82	3068.18	3068.18	2301.14	0	3750	5454.55	6818.18	4772.73
12	1403.41	4204.55	5909.09	2130.68	1321.02	1071.02	852.27	1745.45	2363.64	3863.64	5909.09	2642.05
13	2045.45	2954.55	5454.55	2954.55	2556.82	2812.5	2045.45	6545.45	3068.18	4090.91	8181.82	4431.82
14	2272.73	4318.18	5454.55	3181.82	1534.09	1534.09	1534.09	6545.45	3409.09	6477.27	8181.82	4772.73
15	2585.23	3636.36	5000	3409.09	2991.48	3068.18	2125	6545.45	4284.09	5454.55	7500	5113.64
16	2954.55	2727.27	5000	2954.55	2812.5	2556.82	2045.45	6136.36	4431.82	4090.91	7500	4431.82
17	1250	1136.36	1931.82	1136.36	2045.45	2301.14	1789.77	5318.18	3750	3409.09	5795.45	3409.09
18	1250	1590.91	2386.36	1477.27	2812.5	3068.18	2301.14	4909.09	3750	4772.73	7159.09	4431.82
19	2727.27	3863.64	5909.09	3636.36	2045.45	1875	1619.32	5454.55	2727.27	3767.05	5909.09	3636.36
20	2954.55	3181.82	5454.55	3409.09	1022.73	1022.73	681.82	2727.27	1590.91	1590.91	2727.27	1818.18
21	0	0	0	0	1022.73	852.27	795.45	1363.64	1363.64	1363.64	3181.82	1818.18
22	0	0	0	0	1022.73	1022.73	1022.73	2136.36	1363.64	1477.27	1136.36	681.82
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	3818.18	4363.64	6818.18	5727.27	2250	2659.09	1636.36	7527.27	3818.18	4363.64	6818.18	5727.27
36	2954.55	3636.36	5000	2727.27	1875	1977.27	1363.64	4909.09	2954.55	3636.36	5000	2727.27
37	2727.27	3181.82	4545.45	2727.27	2795.45	2556.82	2159.09	3272.73	4090.91	4772.73	6818.18	4090.91
38	3272.73	4909.09	6545.45	3818.18	3477.27	3068.18	2659.09	6218.18	3272.73	4909.09	6545.45	3818.18
39	4090.91	4909.09	7909.09	4909.09	1909.09	1909.09	1227.27	3272.73	2727.27	3272.73	5272.73	3272.73
40	4363.64	4545.45	6909.09	3272.73	4909.09	3539.77	2488.64	0	6818.18	6818.18	0	0
41	2545.45	3636.36	4727.27	3636.36	2045.45	2215.91	454.55	4909.09	2500	3636.36	4545.45	3636.36
42	4909.09	6818.18	7090.91	5181.82	1534.09	1534.09	2454.55	7854.55	4909.09	6818.18	7090.91	5181.82
43	5727.27	6818.18	10909.09	7090.91	3886.36	4295.45	3068.18	8181.82	5727.27	6818.18	10909.09	7090.91
44	1363.64	1704.55	2159.09	1818.18	1704.55	1977.27	1363.64	6272.73	2727.27	3409.09	4318.18	3636.36
45	3545.45	4636.36	8181.82	5181.82	2659.09	2659.09	2045.45	8509.09	3545.45	4636.36	8181.82	5181.82
46	1250	1590.91	2500	1363.64	2301.14	2301.14	1789.77	4500	3750	4772.73	7500	4090.91
47	2954.55	4090.91	6363.64	3409.09	3068.18	3579.55	3068.18	8590.91	4431.82	6136.36	9545.45	5113.64
48	4545.45	2045.45	5454.55	3636.36	3068.18	3068.18	2301.14	7272.73	6818.18	6136.36	8181.82	5454.55
49	4909.09	6000	8727.27	5454.55	3068.18	3272.73	2045.45	6872.73	4909.09	6000	8727.27	5454.55
50	6000	6272.73	8181.82	4636.36	2045.45	2659.09	2045.45	6218.18	6000	6272.73	8181.82	4636.36
51	0	0	0	0	2272.73	2272.73	1818.18	4363.64	3409.09	4772.73	3409.09	2272.73
52	2272.73	2159.09	5909.09	4318.18	3323.86	3579.55	3323.86	9409.09	6818.18	6477.27	8863.64	6477.27
53	2272.73	3636.36	5454.55	3409.09	852.27	767.05	0	8590.91	3409.09	5454.55	8181.82	5113.64
54	0	0	0	0	3068.18	2863.64	2812.5	5409.09	3750	4772.73	7840.91	4431.82
55	2954.55	3636.36	5227.27	5000	2215.91	2215.91	2045.45	5727.27	2954.55	0	5227.27	5000

	LPW 19TL	LRW 19TL	SPW 19TL	LGPW 19T	HABW 19T	HADW 19T	HEW 19TL	HFW 19TL	LPW 20TL	LRW 20TL	SPW 20TL	LGPW 20TL
1	3323.86	3068.18	3068.18	6545.45	4090.91	5795.45	7500	5113.64	3323.86	3068.18	3068.18	6545.45
2	0	0	0	0	0	0	0	0	2045.45	1875	1647.73	5454.55
3	1534.09	3323.86	1534.09	6545.45	5454.55	6477.27	9204.55	7159.09	1534.09	3323.86	1534.09	6545.45
4	2045.45	2045.45	1278.41	5727.27	2727.27	3068.18	5454.55	3409.09	2045.45	2045.45	1278.41	5727.27
5	2045.45	2301.14	2045.45	6545.45	4090.91	4431.82	7500	4772.73	2045.45	2301.14	2045.45	6545.45
6	1022.73	937.5	852.27	1909.09	1477.27	1704.55	2272.73	1818.18	3068.18	2812.5	2556.82	5727.27
7	0	0	0	0	0	0	0	0	3068.18	3000	2795.45	6954.55
8	1619.32	2045.45	1534.09	3818.18	2272.73	2500	4318.18	3181.82	1534.09	2045.45	1534.09	3818.18
9	1363.64	1363.64	1051.14	2772.73	0	0	3818.18	1727.27	2045.45	1250	1840.91	4000
10	0	0	0	2227.27	3693.18	5318.18	7363.64	4750	0	130.68	0	2272.73
11	3068.18	3068.18	1534.09	0	3750	5454.55	6818.18	4772.73	3068.18	3068.18	2301.14	0
12	3068.18	1306.82	1397.73	1818.18	3545.45	6477.27	8863.64	4857.95	0	0	0	0
13	2556.82	2812.5	2045.45	6545.45	3068.18	4090.91	8181.82	4431.82	2556.82	2812.5	2045.45	6545.45
14	1022.73	1022.73	1022.73	4363.64	2272.73	4318.18	5454.55	3181.82	0	0	0	0
15	1661.93	1943.18	1593.75	4290.91	2954.55	1818.18	2500	3409.09	2068.18	2045.45	1500	4363.64
16	2812.5	2556.82	2045.45	6136.36	4431.82	4090.91	7500	4431.82	2812.5	2556.82	2045.45	6136.36
17	681.82	767.05	596.59	1772.73	1250	1136.36	1931.82	1136.36	1818.18	2301.14	1789.77	5318.18
18	2812.5	3068.18	2301.14	4909.09	3750	4772.73	7159.09	4431.82	937.5	1022.73	767.05	1636.36
19	3034.09	2812.5	2471.59	8181.82	3750	5454.55	8181.82	5454.55	2812.5	2556.82	2528.41	6954.55
20	0	0	0	0	0	0	0	0	0	0	0	0
21	3068.18	3068.18	2556.82	4909.09	5454.55	5909.09	9318.18	5454.55	3323.86	3323.86	0	5727.27
22	511.36	511.36	511.36	1090.91	681.82	681.82	909.09	681.82	1534.09	1534.09	1534.09	3363.64
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2250	2659.09	1636.36	7527.27	3818.18	4363.64	6818.18	5727.27	1500	1772.73	1090.91	5018.18
36	2812.5	3000	2301.14	7363.64	4431.82	5454.55	7500	4090.91	2812.5	3068.18	2224.43	7363.64
37	2045.45	1704.55	1590.91	1911.27	2727.27	3181.82	4545.45	2727.27	0	0	0	0
38	3477.27	3068.18	2659.09	6218.18	3272.73	4909.09	6545.45	3818.18	2318.18	2045.45	1772.73	4145.45
39	2863.64	2545.45	1677.27	4581.82	4090.91	4909.09	7381.82	4909.09	2863.64	2863.64	1840.91	4909.09
40	4909.09	3176.14	3000	0	6136.36	6818.18	0	0	4909.09	3323.86	2897.73	0
41	3068.18	3323.86	2045.45	7363.64	3750	5454.55	6818.18	5454.55	0	0	0	0
42	1534.09	1534.09	2454.55	7854.55	4909.09	6818.18	7090.91	5181.82	1022.73	1022.73	1636.36	5236.36
43	3886.36	4295.45	3068.18	8181.82	5727.27	6818.18	10909.09	7090.91	2590.91	2863.64	2045.45	5454.55
44	2556.82	2812.5	2045.45	9409.09	4431.82	5113.64	6477.27	5454.55	2556.82	3068.18	2556.82	9409.09
45	2659.09	2659.09	2045.45	8509.09	3545.45	4636.36	8181.82	5181.82	1772.73	1772.73	1363.64	5672.73
46	2301.14	2301.14	1789.77	5318.18	3750	4772.73	7500	4090.91	1534.09	1534.09	1193.18	3000
47	3068.18	3579.55	3068.18	8590.91	4431.82	6136.36	9545.45	5113.64	3068.18	3579.55	3068.18	8590.91
48	3068.18	3068.18	2301.14	5727.27	6818.18	6136.36	8181.82	5454.55	3068.18	3068.18	2301.14	6954.55
49	3068.18	3272.73	2045.45	6872.73	4909.09	6000	8727.27	5454.55	2045.45	2181.82	1363.64	4581.82
50	2045.45	2659.09	2045.45	6218.18	6000	6272.73	8181.82	4636.36	1363.64	1772.73	1363.64	4145.45
51	2045.45	1704.55	1340.91	2181.82	2272.73	3181.82	2613.64	1704.55	2045.45	1875	1318.18	4363.64
52	3323.86	3579.55	3323.86	9409.09	6818.18	6477.27	8863.64	6477.27	1107.95	1193.18	1107.95	3136.36
53	852.27	852.27	2556.82	8590.91	3409.09	5454.55	8181.82	5113.64	2556.82	3068.18	2556.82	8590.91
54	3068.18	3323.86	2556.82	3054.55	3750	4772.73	7840.91	4431.82	3068.18	2750	2812.5	5727.27
55	2215.91	2215.91	2045.45	5454.55	2954.55	3636.36	5227.27	5000	2215.91	2215.91	2045.45	5454.55

	HABW 20T	HADW 20T	HEW 20TL	HFW 20TL	LPW 21TL	LRW 21TL	SPW 21TL	LGPW 21T	HABW 21T	HADW 21T	HEW 21TL	HFW 21TL
1	4090.91	5795.45	7500	5113.64	3323.86	3068.18	3068.18	6545.45	4090.91	5795.45	7500	5113.64
2	1363.64	1818.18	5000	3636.36	0	0	0	0	0	0	0	0
3	5454.55	6477.27	9204.55	7159.09	1022.73	2215.91	1022.73	4363.64	3636.36	4318.18	6136.36	4772.73
4	2727.27	3068.18	5454.55	3409.09	2045.45	2045.45	1278.41	5727.27	2727.27	3068.18	5454.55	3409.09
5	4090.91	4431.82	7500	4772.73	2045.45	2301.14	2045.45	6545.45	4090.91	4431.82	7500	4772.73
6	4431.82	5113.64	6818.18	5454.55	2301.14	2812.5	1704.55	4090.91	4431.82	5113.64	6818.18	5454.55
7	5454.55	5113.64	7840.91	5113.64	3068.18	3068.18	2931.82	6800	5454.55	5113.64	7840.91	5113.64
8	2272.73	2500	4318.18	3181.82	2301.14	2386.36	1534.09	5727.27	3409.09	3750	6477.27	4772.73
9	0	0	6727.27	3238.64	2017.05	2045.45	1534.09	4045.45	0	0	6363.64	3522.73
10	2659.09	4181.82	5454.55	4318.18	0	0	0	2409.09	3693.18	6136.36	8181.82	6477.27
11	3750	5454.55	6818.18	4772.73	2045.45	2045.45	1534.09	0	2500	3636.36	4545.45	3181.82
12	0	0	0	0	0	0	0	0	0	0	0	0
13	3068.18	4090.91	8181.82	4431.82	2556.82	2812.5	2045.45	6545.45	3068.18	4090.91	8181.82	4431.82
14	0	0	0	0	511.36	511.36	511.36	2181.82	1136.36	2159.09	2727.27	1590.91
15	2585.23	3636.36	5000	3409.09	1920.45	2045.45	1531.25	4363.64	2954.55	3636.36	5000	3409.09
16	4431.82	4090.91	7500	4431.82	2812.5	2556.82	2045.45	6136.36	4431.82	4090.91	7500	4431.82
17	3750	3409.09	5795.45	3409.09	2045.45	2301.14	1789.77	5318.18	3750	3409.09	5795.45	3409.09
18	1250	1590.91	2386.36	1477.27	0	0	0	4909.09	3750	4772.73	7159.09	4431.82
19	4090.91	5795.45	8863.64	5454.55	2045.45	1437.5	1704.55	6272.73	2727.27	3863.64	5909.09	3636.36
20	0	0	0	0	1704.55	1789.77	1107.95	4636.36	2727.27	2500	5000	3181.82
21	6136.36	6818.18	9545.45	5454.55	3323.86	3323.86	0	5727.27	6136.36	6818.18	9545.45	5454.55
22	2045.45	2727.27	2954.55	2045.45	0	0	0	0	0	0	0	0
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2545.45	2909.09	4545.45	3818.18	2150	2481.82	1490.91	7025.45	3818.18	4072.73	6363.64	5345.45
36	4431.82	5454.55	7500	4090.91	937.5	1022.73	767.05	2454.55	1477.27	1909.09	2500	1363.64
37	0	0	0	0	0	0	0	0	0	0	0	0
38	2181.82	3272.73	4363.64	2545.45	3322.73	2863.64	2422.73	5803.64	3272.73	4581.82	6109.09	3563.64
39	4090.91	4909.09	7909.09	4909.09	1909.09	1909.09	1227.27	3272.73	2727.27	3272.73	5272.73	3272.73
40	6136.36	6818.18	0	0	4909.09	3323.86	3000	0	6136.36	6818.18	0	0
41	0	0	0	0	2045.45	2215.91	1363.64	4909.09	2500	3636.36	4545.45	3636.36
42	3272.73	4545.45	4727.27	3454.55	1465.91	1431.82	2236.36	7330.91	4909.09	6363.64	6618.18	4836.36
43	3818.18	4545.45	7272.73	4727.27	3713.64	4009.09	2795.45	7636.36	5727.27	6363.64	10181.82	6618.18
44	4090.91	5113.64	6477.27	5454.55	1704.55	2045.45	1534.09	6272.73	2727.27	3409.09	4318.18	3636.36
45	2363.64	3090.91	5454.55	3454.55	2540.91	2481.82	1863.64	7941.82	3545.45	4327.27	7636.36	4836.36
46	2500	3181.82	5000	2727.27	2301.14	2301.14	1789.77	4500	3750	4772.73	7500	4090.91
47	4431.82	6136.36	9545.45	5113.64	3323.86	3579.55	7159.09	8590.91	4431.82	6136.36	9545.45	5113.64
48	6818.18	6136.36	8181.82	5454.55	3068.18	3068.18	2301.14	8181.82	6818.18	6136.36	8181.82	5454.55
49	3272.73	4000	5818.18	3636.36	2931.82	3054.55	1863.64	6414.55	4909.09	5600	8145.45	5090.91
50	4000	4181.82	5454.55	3090.91	1954.55	2481.82	1863.64	5803.64	6000	5854.55	7636.36	4327.27
51	2272.73	3181.82	3636.36	2272.73	1977.27	1875	1363.64	4363.64	2272.73	3181.82	3863.64	2500
52	2272.73	2159.09	2954.55	2159.09	2215.91	2386.36	2215.91	6272.73	4545.45	4545.45	5909.09	4318.18
53	3409.09	5454.55	8181.82	5113.64	1022.73	1022.73	738.64	2863.64	1136.36	1818.18	2727.27	1704.55
54	3750	4772.73	7840.91	4431.82	1022.73	1107.95	937.5	1909.09	1250	1590.91	2613.64	1477.27
55	2954.55	3636.36	5227.27	5000	2215.91	2215.91	2215.91	5727.27	3181.82	3863.64	5000	5000

	LPW 22TL	LRW 22TL	SPW 22TL	LGPW 22T	HABW 22T	HADW 22T	HEW 22TL	HFW 22TL	LPW 23TL	LRW 23TL	SPW 23TL	LGPW 23TL
1	2215.91	2045.45	2045.45	4363.64	2727.27	3863.64	5000	3409.09	0	0	0	0
2	1704.55	2045.45	1431.82	4363.64	2954.55	3636.36	4772.73	3409.09	2045.45	2215.91	1704.55	5454.55
3	1534.09	3323.86	1534.09	6545.45	5454.55	6477.27	9204.55	7159.09	1022.73	2215.91	1022.73	4363.64
4	2045.45	2045.45	1278.41	5727.27	2727.27	3068.18	5454.55	3409.09	1363.64	1363.64	852.27	3818.18
5	1363.64	1534.09	1363.64	4363.64	2727.27	2954.55	5000	3181.82	1534.09	2301.14	1562.5	5000
6	2045.45	2215.91	1534.09	5727.27	4431.82	5113.64	6818.18	5454.55	1789.77	1789.77	1534.09	5727.27
7	2045.45	2045.45	2045.45	4636.36	3636.36	3409.09	5227.27	3409.09	2045.45	2045.45	2045.45	4636.36
8	1329.55	2045.45	767.05	3818.18	2272.73	2500	4318.18	3181.82	767.05	1022.73	715.91	1909.09
9	1363.64	1363.64	852.27	2772.73	0	0	4090.91	2272.73	1392.05	1392.05	1005.68	2863.64
10	0	0	0	2181.82	2954.55	4090.91	5454.55	4318.18	0	0	0	1272.73
11	3068.18	3068.18	2301.14	0	3750	5454.55	6818.18	4772.73	2045.45	2045.45	1534.09	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	2556.82	2812.5	2045.45	6545.45	3068.18	4090.91	8181.82	4431.82	1704.55	1875	1363.64	4363.64
14	1022.73	1022.73	1022.73	4363.64	2272.73	4318.18	5454.55	3181.82	0	0	0	0
15	1920.45	2045.45	1593.75	4363.64	2954.55	3636.36	5000	3409.09	1957.39	2045.45	1718.75	4363.64
16	1875	1704.55	1840.91	4090.91	2954.55	2727.27	5000	2954.55	1875	1704.55	1363.64	4090.91
17	681.82	767.05	596.59	1772.73	1250	1136.36	1931.82	1136.36	1136.36	1534.09	1392.05	3545.45
18	1875	2045.45	1534.09	3272.73	2500	3181.82	4772.73	2954.55	1875	2045.45	1534.09	1636.36
19	2045.45	1875	1704.55	4636.36	2727.27	4000	5909.09	3863.64	2045.45	1875	1676.14	6000
20	1931.82	1909.09	1363.64	5181.82	3181.82	3181.82	5454.55	3636.36	1022.73	1193.18	681.82	2727.27
21	3068.18	3323.86	3068.18	5727.27	6136.36	6818.18	9545.45	5454.55	2318.18	2215.91	2045.45	3818.18
22	1022.73	1022.73	1022.73	2181.82	1363.64	1363.64	1818.18	1590.91	2045.45	2045.45	1789.77	4090.91
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2250	2659.09	1636.36	7527.27	3818.18	4363.64	6818.18	5727.27	1500	1772.73	1090.91	5018.18
36	0	0	0	0	0	0	0	0	0	0	0	2509.09
37	1704.55	1363.64	937.5	1911.27	2727.27	3181.82	4545.45	2727.27	2045.45	1704.55	625	1911.27
38	3477.27	3068.18	2659.09	6218.18	3272.73	4909.09	6545.45	3818.18	2318.18	2045.45	1772.73	4145.45
39	2863.64	2545.45	1677.27	4581.82	4090.91	4909.09	7381.82	4909.09	2863.64	2863.64	1840.91	4909.09
40	4909.09	3323.86	3068.18	0	6136.36	6818.18	0	0	3272.73	2215.91	2045.45	0
41	3068.18	3323.86	454.55	4909.09	3750	5454.55	6818.18	5454.55	1022.73	1107.95	0	0
42	1534.09	1534.09	2454.55	7854.55	4909.09	6818.18	7090.91	5181.82	1022.73	1022.73	1636.36	5236.36
43	3886.36	4295.45	3068.18	8181.82	5727.27	6818.18	10909.09	7090.91	2590.91	2863.64	2045.45	5454.55
44	0	0	0	0	0	0	0	0	852.27	852.27	767.05	3000
45	2659.09	2659.09	2045.45	8509.09	3545.45	4636.36	8181.82	5181.82	1772.73	1772.73	1363.64	5672.73
46	1534.09	1534.09	1193.18	3000	2500	3181.82	5000	2727.27	1534.09	1534.09	1193.18	3000
47	3068.18	3579.55	3068.18	8836.36	4772.73	6136.36	9545.45	5113.64	2045.45	2215.91	2386.36	6000
48	0	0	0	0	0	0	0	0	1840.91	2045.45	1534.09	5454.55
49	3068.18	3272.73	2045.45	6872.73	4909.09	6000	8727.27	5454.55	2045.45	2181.82	1363.64	4581.82
50	2045.45	2659.09	2045.45	6218.18	6000	6272.73	8181.82	4636.36	1363.64	1772.73	1363.64	4145.45
51	681.82	0	639.2	2181.82	1250	1704.55	1931.82	1250	2045.45	1875	1380.68	4636.36
52	3323.86	3835.23	2386.36	9409.09	4545.45	4545.45	8863.64	6477.27	2386.36	2556.82	2386.36	6000
53	3068.18	3068.18	2556.82	8590.91	3409.09	5454.55	8181.82	5113.64	2045.45	2045.45	1647.73	5727.27
54	2045.45	1704.55	1875	3818.18	2500	3181.82	5227.27	2954.55	2045.45	2215.91	1875	3818.18
55	1107.95	1107.95	1107.95	2727.27	1477.27	1931.82	2613.64	2500	2215.91	2215.91	2045.45	5727.27

	HABW23T	HADW23T	HEW23TL	HFW23TL	LPW24TL	LRW24TL	SPW24TL	LGPW24T	HABW24T	HADW24T	HEW24TL	HFW24TL
1	0	0	0	0	3323.86	3068.18	3068.18	6545.45	4431.82	5795.45	7840.91	5113.64
2	2727.27	5454.55	5227.27	3636.36	2812.5	3323.86	2471.59	7772.73	4772.73	5795.45	7500	4772.73
3	3636.36	4318.18	6136.36	4772.73	1022.73	2386.36	1022.73	4363.64	4090.91	5227.27	6363.64	4772.73
4	1818.18	2045.45	3636.36	2272.73	1363.64	1363.64	852.27	3818.18	1818.18	2272.73	3977.27	2272.73
5	3295.45	3579.55	6136.36	3863.64	2301.14	2301.14	2556.82	6954.55	4090.91	4772.73	7840.91	5454.55
6	2954.55	3409.09	4545.45	3636.36	2301.14	2045.45	1789.77	5318.18	4909.09	5454.55	6818.18	5795.45
7	3636.36	3409.09	5227.27	3409.09	3213.07	3323.86	3068.18	6954.55	5454.55	5454.55	7500	5454.55
8	0	0	0	0	1704.55	2045.45	482.95	4090.91	2727.27	2727.27	4090.91	3181.82
9	0	0	1818.18	1250	1363.64	1363.64	1022.73	3272.73	0	0	3636.36	2727.27
10	2954.55	4204.55	2727.27	1590.91	0	0	0	2181.82	3636.36	4090.91	5909.09	3579.55
11	2500	3636.36	4545.45	3181.82	3323.86	3323.86	2301.14	0	3750	5795.45	6818.18	5454.55
12	0	0	0	0	3886.36	3477.27	3068.18	6545.45	4636.36	6818.18	9000	5181.82
13	2045.45	2727.27	5454.55	4431.82	2812.5	3068.18	2556.82	6954.55	3750	4090.91	8181.82	5113.64
14	0	0	2727.27	1590.91	1022.73	1022.73	1022.73	5454.55	2727.27	4772.73	5454.55	3181.82
15	2954.55	3636.36	5000	3409.09	1994.32	2215.91	1812.5	4363.64	2954.55	3636.36	5454.55	3636.36
16	2954.55	2727.27	5000	2954.55	2812.5	2556.82	2045.45	6136.36	4090.91	4431.82	5454.55	4772.73
17	3125	2840.91	1931.82	1136.36	1363.64	1534.09	1363.64	3818.18	2727.27	2727.27	3863.64	2272.73
18	1250	1590.91	2386.36	1477.27	1704.55	2215.91	1534.09	3818.18	2727.27	3409.09	4772.73	3181.82
19	2727.27	3863.64	5909.09	3636.36	2045.45	1875	1812.5	5727.27	2727.27	4090.91	5909.09	3863.64
20	1590.91	1590.91	2727.27	1818.18	3068.18	3323.86	2045.45	8181.82	5454.55	5454.55	8522.73	5795.45
21	4090.91	4545.45	6363.64	3636.36	2386.36	2556.82	2045.45	4363.64	4090.91	5454.55	7272.73	4545.45
22	2727.27	2727.27	4090.91	2386.36	511.36	511.36	511.36	1090.91	681.82	681.82	1136.36	681.82
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2545.45	2909.09	4545.45	3818.18	2345.45	2481.82	1490.91	7941.82	3818.18	4072.73	6363.64	5600
36	0	0	0	0	2812.5	2812.5	2301.14	4363.64	4431.82	3636.36	5000	2727.27
37	1363.64	3181.82	4545.45	2727.27	3000	2556.82	2187.5	2866.91	4772.73	5113.64	7159.09	4090.91
38	2181.82	3272.73	4363.64	2545.45	3127.27	3436.36	2422.73	3970.91	4363.64	5090.91	6618.18	3563.64
39	4090.91	4909.09	7909.09	4909.09	2863.64	2545.45	1490.91	4887.27	4363.64	5454.55	6618.18	4909.09
40	4318.18	4545.45	0	0	5727.27	3750	3068.18	0	6477.27	8181.82	0	0
41	1250	1818.18	0	0	2045.45	3323.86	1363.64	7363.64	2727.27	3863.64	6818.18	5454.55
42	3272.73	4545.45	4727.27	3454.55	1465.91	1431.82	2609.09	6720	4909.09	6363.64	7127.27	5090.91
43	3818.18	4545.45	7272.73	4727.27	3518.18	4009.09	2795.45	7636.36	5727.27	6618.18	9672.73	6618.18
44	1477.27	1704.55	2045.45	1818.18	0	0	0	0	0	0	0	0
45	2363.64	3090.91	5454.55	3454.55	2540.91	2481.82	1863.64	7330.91	3818.18	4581.82	7636.36	5090.91
46	2500	3181.82	5000	2727.27	1534.09	1534.09	1363.64	4772.73	0	0	0	0
47	2954.55	4090.91	6363.64	3409.09	1193.18	1193.18	1022.73	3000	1704.55	2159.09	2727.27	1818.18
48	4545.45	4090.91	5454.55	3636.36	3068.18	3323.86	2812.5	8590.91	6818.18	6477.27	8863.64	6136.36
49	3272.73	4000	5818.18	3636.36	2931.82	3054.55	2050	5803.64	4909.09	5090.91	8145.45	5600
50	4000	4181.82	5454.55	3090.91	2150	2481.82	2050	5803.64	6272.73	6109.09	8145.45	4581.82
51	2727.27	3636.36	2045.45	1363.64	1022.73	1022.73	767.05	1454.55	1363.64	1704.55	1022.73	1363.64
52	4545.45	4545.45	5909.09	4318.18	3579.55	3835.23	3579.55	9409.09	6818.18	6818.18	8863.64	6818.18
53	2272.73	3636.36	5454.55	3409.09	3068.18	3068.18	2556.82	8590.91	4090.91	5454.55	8522.73	6477.27
54	2500	3181.82	5227.27	2954.55	3068.18	3102.27	2812.5	4836.36	4090.91	4772.73	8181.82	5113.64
55	2954.55	3863.64	5000	4545.45	2215.91	2215.91	2215.91	5454.55	2954.55	4090.91	5000	4318.18

	LPW25TL	LRW25TL	SPW25TL	LGPW25T	HABW25T	HADW25T	HEW25TL	HFW25TL	LPW26TL	LRW26TL	SPW26TL	LGPW26TL
1	3323.86	3068.18	3068.18	6545.45	4431.82	5795.45	7840.91	5113.64	3323.86	3068.18	3068.18	6545.45
2	2812.5	3323.86	2556.82	7772.73	4772.73	5795.45	7500	4772.73	2812.5	3323.86	2556.82	6909.09
3	1022.73	2386.36	1022.73	4363.64	4090.91	5227.27	6363.64	4772.73	1534.09	3579.55	1534.09	6545.45
4	681.82	681.82	426.14	1909.09	909.09	1136.36	1931.82	1136.36	2556.82	2045.45	1278.41	5727.27
5	2301.14	2301.14	2556.82	6954.55	4090.91	4772.73	7840.91	5454.55	2301.14	2301.14	2556.82	6954.55
6	2556.82	2301.14	2045.45	5318.18	5454.55	5454.55	6818.18	5795.45	1875	1875	1647.73	3545.45
7	3176.14	3323.86	3068.18	6954.55	5454.55	5454.55	7500	5454.55	3323.86	3323.86	3068.18	6954.55
8	2272.73	3068.18	2045.45	6136.36	4090.91	4090.91	6136.36	4772.73	2187.5	3068.18	2301.14	6136.36
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	1454.55	1590.91	2045.45	2954.55	2386.36	0	340.91	0	3000
11	3323.86	3323.86	2301.14	0	3750	5795.45	6818.18	5454.55	3323.86	3323.86	2301.14	0
12	0	0	0	0	0	0	0	0	1278.41	1107.95	1022.73	2181.82
13	2301.14	3068.18	2556.82	6954.55	3750	4090.91	8181.82	5113.64	2301.14	3068.18	2556.82	6954.55
14	1534.09	1534.09	1534.09	8181.82	4090.91	7159.09	8181.82	4772.73	1022.73	1022.73	1022.73	5454.55
15	3028.41	3323.86	2468.75	6545.45	4431.82	5454.55	8181.82	5454.55	1034.09	1107.95	750	2181.82
16	2812.5	2556.82	2045.45	6136.36	4090.91	4431.82	8181.82	4772.73	2812.5	2556.82	2045.45	6136.36
17	1363.64	1534.09	1363.64	3818.18	2727.27	2727.27	3863.64	2272.73	2045.45	2301.14	2045.45	5727.27
18	2556.82	3323.86	2301.14	5727.27	4090.91	5113.64	7159.09	4772.73	1704.55	1107.95	1534.09	3818.18
19	3068.18	2812.5	2593.75	9000	4090.91	6136.36	8181.82	5795.45	2045.45	1875	1875	5454.55
20	2982.95	2556.82	2045.45	8181.82	5454.55	5454.55	8522.73	5795.45	1704.55	2045.45	1448.86	5454.55
21	1193.18	1278.41	1022.73	2181.82	0	0	3727.27	2272.73	3579.55	3835.23	3068.18	6545.45
22	0	0	0	0	0	0	0	0	511.36	511.36	568.18	1090.91
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2454.55	2659.09	1636.36	8509.09	3818.18	4363.64	6818.18	6000	2454.55	2659.09	1636.36	8509.09
36	1875	1875	1022.73	4363.64	2954.55	3636.36	5000	2727.27	937.5	937.5	818.18	2181.82
37	2045.45	1704.55	1590.91	1911.27	3181.82	3409.09	4772.73	2727.27	3000	2556.82	2272.73	1911.27
38	3272.73	3681.82	2659.09	4254.55	4363.64	5454.55	7090.91	3818.18	3272.73	3681.82	2659.09	4254.55
39	2863.64	2863.64	1636.36	5236.36	4363.64	5454.55	7090.91	4909.09	1909.09	1909.09	1090.91	3490.91
40	3500	2556.82	2045.45	0	4318.18	5454.55	0	0	5663.64	3835.23	3068.18	0
41	2045.45	2454.55	750	5018.18	1454.55	2000	5090.91	4000	2045.45	2386.36	1363.64	4909.09
42	1534.09	1534.09	2863.64	7200	4909.09	6818.18	7636.36	5454.55	1534.09	1534.09	2863.64	7200
43	3681.82	4295.45	3068.18	8181.82	5727.27	7090.91	10363.64	7090.91	3681.82	4295.45	3068.18	8181.82
44	2301.14	2812.5	2045.45	8590.91	4090.91	4772.73	5795.45	5454.55	1704.55	1875	1363.64	6272.73
45	2659.09	2659.09	2045.45	7854.55	3818.18	4909.09	8181.82	5454.55	2659.09	2659.09	2045.45	7854.55
46	1534.09	1534.09	1278.41	4909.09	0	0	4545.45	2727.27	2301.14	2301.14	2045.45	7772.73
47	3579.55	3579.55	3579.55	9000	4772.73	6136.36	8181.82	5454.55	2386.36	2556.82	2386.36	6000
48	3068.18	3323.86	2687.5	8590.91	6477.27	6477.27	8863.64	6136.36	3068.18	3323.86	2750	8590.91
49	3068.18	3272.73	2250	6218.18	4909.09	5454.55	8727.27	6000	3068.18	3272.73	2250	6218.18
50	2250	2659.09	2250	6218.18	6272.73	6545.45	8727.27	4909.09	2250	2659.09	2250	6218.18
51	3068.18	2812.5	1917.61	4363.64	3750	5113.64	4545.45	4772.73	1022.73	937.5	664.77	2181.82
52	3579.55	3835.23	3323.86	9409.09	6818.18	7159.09	8863.64	6818.18	3579.55	3835.23	3579.55	9409.09
53	3068.18	0	1534.09	8590.91	4090.91	5454.55	8181.82	6477.27	3068.18	0	2301.14	8590.91
54	2045.45	2215.91	1875	3818.18	2727.27	3181.82	5454.55	3409.09	2045.45	1403.41	937.5	0
55	3323.86	3323.86	3323.86	9000	4431.82	6136.36	7500	6477.27	2215.91	2215.91	2215.91	5000

	HABW 26T	HADW 26T	HEW 26TL	HFW 26TL	LPW 27TL	LRW 27TL	SPW 27TL	LGPW 27T	HABW 27T	HADW 27T	HEW 27TL	HFW 27TL
1	4431.82	5795.45	7840.91	5113.64	2215.91	2045.45	2045.45	4363.64	2954.55	3863.64	5227.27	3409.09
2	3977.27	4829.55	6250	3977.27	1875	2215.91	1704.55	5181.82	3181.82	3863.64	5000	3181.82
3	6136.36	7840.91	9545.45	7159.09	1534.09	2386.36	.	4363.64	4090.91	5227.27	6363.64	4772.73
4	2727.27	3409.09	5795.45	3409.09	1363.64	1363.64	710.23	3818.18	909.09	1136.36	1818.18	909.09
5	4090.91	4772.73	7840.91	5454.55	1534.09	1704.55	1704.55	4636.36	2727.27	3409.09	5227.27	3863.64
6	3636.36	3636.36	4545.45	3863.64	2045.45	1875	1704.55	3545.45	3636.36	3636.36	4545.45	3863.64
7	5454.55	5454.55	7500	5454.55	1107.95	2215.91	1022.73	4636.36	3636.36	3636.36	5000	3636.36
8	4090.91	4090.91	6136.36	4772.73	1420.45	1704.55	0	3409.09	1363.64	1363.64	3068.18	2386.36
9	0	0	0	0	1789.77	1619.32	852.27	4227.27	0	0	3863.64	2954.55
10	3738.64	5522.73	7977.27	6443.18	0	0	0	1090.91	1113.64	1943.18	2954.55	2386.36
11	3750	5795.45	6818.18	5454.55	3323.86	2215.91	1534.09	0	2500	3863.64	6818.18	5454.55
12	1477.27	2272.73	2954.55	1704.55	681.82	0	579.55	800	0	0	0	0
13	3750	4090.91	8181.82	5113.64	2812.5	2045.45	1704.55	4636.36	2500	2727.27	5454.55	3409.09
14	2727.27	4772.73	5454.55	3181.82	1534.09	1534.09	1534.09	5454.55	2727.27	4772.73	5454.55	3181.82
15	1329.55	1818.18	1363.64	1727.27	2215.91	2068.18	1750	4363.64	2954.55	3636.36	8181.82	5454.55
16	4090.91	4431.82	5454.55	4772.73	1875	1704.55	1363.64	2045.45	4090.91	4431.82	5454.55	3181.82
17	4090.91	4090.91	5795.45	3409.09	1363.64	1534.09	681.82	3818.18	1363.64	1363.64	3863.64	2272.73
18	2727.27	3409.09	4772.73	3181.82	0	1107.95	0	1909.09	0	0	2386.36	1590.91
19	2727.27	4090.91	5909.09	3863.64	2045.45	1875	1875	6000	1363.64	2045.45	5909.09	3863.64
20	3636.36	3636.36	5681.82	3863.64	2045.45	2215.91	1363.64	5454.55	3636.36	3636.36	5681.82	3636.36
21	6136.36	8181.82	10909.09	6818.18	2386.36	2556.82	2045.45	4363.64	4318.18	5454.55	7272.73	4545.45
22	681.82	681.82	909.09	681.82	1022.73	1022.73	1107.95	2181.82	1818.18	1534.09	2045.45	1363.64
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	3818.18	4363.64	6818.18	6000	1636.36	1772.73	1090.91	5672.73	2545.45	2909.09	4545.45	4000
36	1545.45	1909.09	2500	1363.64	0	937.5	0	2181.82	0	0	2500	1363.64
37	4613.64	5113.64	7159.09	4090.91	1022.73	852.27	653.41	955.64	0	0	2386.36	1363.64
38	4363.64	5454.55	7090.91	3818.18	2181.82	2454.55	1772.73	2836.36	2909.09	3636.36	4727.27	2545.45
39	2909.09	3636.36	4727.27	3272.73	2863.64	2545.45	1490.91	4887.27	4363.64	5454.55	6618.18	4909.09
40	6477.27	8181.82	0	0	3818.18	2556.82	2181.82	0	4363.64	5454.55	0	0
41	2727.27	3863.64	5000	3863.64	1022.73	1193.18	0	2454.55	1363.64	1931.82	2500	1931.82
42	4909.09	6818.18	7636.36	5454.55	1022.73	1022.73	1909.09	4800	3272.73	4545.45	5090.91	3636.36
43	5727.27	7090.91	10363.64	7090.91	2454.55	2863.64	2045.45	5454.55	3818.18	4727.27	6909.09	4727.27
44	2954.55	3409.09	4318.18	3863.64	1704.55	2045.45	1534.09	6272.73	2727.27	3409.09	6477.27	5454.55
45	3818.18	4909.09	8181.82	5454.55	1772.73	1772.73	1363.64	5236.36	2545.45	3272.73	5454.55	3636.36
46	1250	1590.91	6818.18	3409.09	1534.09	1534.09	1363.64	5181.82	0	0	4545.45	2727.27
47	3409.09	4318.18	5454.55	3636.36	2215.91	2556.82	2045.45	6000	3409.09	4318.18	5454.55	3636.36
48	6477.27	6477.27	8863.64	6136.36	1772.73	2215.91	954.55	4636.36	1818.18	1590.91	4545.45	4090.91
49	4909.09	5454.55	8727.27	6000	2045.45	2181.82	1500	4145.45	3272.73	3636.36	5818.18	4000
50	6272.73	6545.45	8727.27	4909.09	1500	1772.73	1500	4145.45	4181.82	4363.64	5818.18	3272.73
51	1250	1704.55	2159.09	1250	0	937.5	0	2181.82	0	0	1079.55	1363.64
52	6818.18	6818.18	8863.64	6818.18	3579.55	3835.23	3579.55	9409.09	6818.18	6818.18	8863.64	7159.09
53	4090.91	5454.55	8522.73	6477.27	2045.45	0	1534.09	5727.27	2727.27	3636.36	5681.82	4318.18
54	2727.27	3181.82	5454.55	3409.09	1909.09	0	875	2545.45	1363.64	1590.91	2727.27	1704.55
55	2954.55	4090.91	5000	4318.18	1107.95	1107.95	1107.95	3272.73	1477.27	2045.45	2500	2159.09

	LPW 28TL	LRW 28TL	SPW 28TL	LGPW 28T	HABW 28T	HADW 28T	HEW 28TL	HFW 28TL	LPW 29TL	LRW 29TL	SPW 29TL	LGPW 29TL
1	3500	3323.86	3068.18	6545.45	4772.73	6477.27	8181.82	5454.55	3579.55	3323.86	3068.18	6545.45
2	2045.45	2215.91	1812.5	5181.82	3409.09	3863.64	5000	3181.82	2045.45	2215.91	1875	5181.82
3	1534.09	3579.55	1534.09	7363.64	6477.27	8181.82	9545.45	7159.09	1534.09	3579.55	1534.09	4909.09
4	2045.45	2045.45	1136.36	6727.27	3068.18	3409.09	5113.64	3409.09	2045.45	2301.14	1278.41	6954.55
5	2301.14	2556.82	2556.82	6954.55	4090.91	5113.64	7840.91	5795.45	2301.14	2556.82	2556.82	6954.55
6	3261.36	2045.45	2556.82	5727.27	5602.27	6136.36	7500	6818.18	3301.14	2022.73	2500	5727.27
7	2031.25	2215.91	2045.45	4636.36	3863.64	4318.18	5000	3636.36	0	0	0	0
8	2318.18	1704.55	454.55	5818.18	4090.91	4772.73	7500	5795.45	1022.73	1022.73	937.5	2181.82
9	0	0	0	0	0	0	0	0	2017.05	1875	1380.68	4409.09
10	0	0	0	0	0	0	0	0	0	0	0	2136.36
11	3835.23	3579.55	2897.73	0	4090.91	6818.18	6818.18	5454.55	3835.23	3579.55	3068.18	0
12	2471.59	0	1056.82	2181.82	2880.68	5909.09	8420.45	4090.91	1022.73	0	511.36	0
13	2812.5	3068.18	2556.82	7363.64	4090.91	4772.73	8181.82	5454.55	2812.5	3068.18	2556.82	7363.64
14	1534.09	1534.09	1534.09	8181.82	4090.91	7840.91	8522.73	5454.55	1534.09	1534.09	1534.09	8181.82
15	2215.91	1957.39	1704.55	3131.82	3181.82	4318.18	6136.36	3863.64	2105.11	2068.18	1840.91	4636.36
16	2812.5	2556.82	2045.45	6136.36	4090.91	5454.55	8181.82	4772.73	2812.5	2556.82	2045.45	6545.45
17	1363.64	1534.09	1363.64	3818.18	2727.27	2727.27	4545.45	2500	2045.45	2301.14	2045.45	5727.27
18	2556.82	3323.86	2812.5	5727.27	4090.91	5113.64	7159.09	4772.73	2556.82	3323.86	2812.5	5727.27
19	3068.18	3068.18	2812.5	9409.09	4090.91	6136.36	9204.55	6136.36	2045.45	2045.45	1875	6000
20	3238.64	3579.55	2556.82	8727.27	5454.55	5795.45	8522.73	6477.27	3323.86	3579.55	2301.14	8590.91
21	3835.23	3835.23	3068.18	6954.55	6477.27	8522.73	11250	7159.09	1278.41	1278.41	1107.95	2318.18
22	1107.95	1193.18	1107.95	2727.27	1363.64	1818.18	2727.27	1590.91	1789.77	1704.55	1789.77	4090.91
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2345.45	2481.82	1490.91	7941.82	3818.18	4072.73	6363.64	5600	2454.55	2659.09	1636.36	8509.09
36	1875	2045.45	1534.09	4363.64	2954.55	3636.36	5681.82	3409.09	937.5	1022.73	1534.09	2181.82
37	0	0	0	0	0	0	0	0	1704.55	1562.5	965.91	1818.18
38	3127.27	3627.27	2422.73	5498.18	4363.64	5090.91	6872.73	3818.18	3272.73	3886.36	2659.09	5890.91
39	2659.09	3068.18	1840.91	5563.64	4636.36	6000	7636.36	5454.55	2659.09	3068.18	1840.91	5563.64
40	5727.27	4090.91	2991.48	0	6818.18	8181.82	0	0	5727.27	4090.91	3261.36	0
41	2045.45	2386.36	1363.64	4909.09	2727.27	3863.64	5000	4545.45	2045.45	2386.36	681.82	4909.09
42	1465.91	1431.82	2795.45	7025.45	5181.82	6363.64	7127.27	5345.45	1534.09	1534.09	3068.18	7527.27
43	3713.64	4200	2795.45	6720	6000	7127.27	9672.73	6618.18	3886.36	4500	3068.18	7200
44	3068.18	3323.86	2045.45	9409.09	5113.64	5795.45	7159.09	5795.45	2045.45	1875	1534.09	6272.73
45	2540.91	2481.82	2236.36	7636.36	3818.18	5090.91	7636.36	5600	2659.09	2659.09	2454.55	8181.82
46	227.27	227.27	198.86	545.45	0	0	909.09	681.82	2301.14	2301.14	1917.61	7772.73
47	3579.55	4090.91	3579.55	9409.09	5454.55	6818.18	9545.45	6136.36	3579.55	4090.91	3579.55	9409.09
48	3068.18	3323.86	2812.5	8590.91	5113.64	6477.27	10227.27	6477.27	3068.18	3323.86	2812.5	2318.18
49	2931.82	3054.55	2050	6109.09	4909.09	5600	9163.64	6109.09	3068.18	3272.73	2250	6545.45
50	2345.45	2481.82	2236.36	6109.09	6545.45	6618.18	8909.09	4836.36	2454.55	2659.09	2454.55	6545.45
51	2045.45	1875	1363.64	4363.64	2272.73	3181.82	4318.18	2954.55	1022.73	937.5	681.82	2318.18
52	3579.55	4090.91	3579.55	8590.91	6818.18	7159.09	9545.45	8181.82	3579.55	4090.91	3579.55	8590.91
53	3068.18	0	2556.82	8590.91	4431.82	6477.27	9545.45	6818.18	2045.45	0	1647.73	5727.27
54	2045.45	1875	2045.45	1454.55	2727.27	3636.36	5909.09	3409.09	2045.45	1107.95	2045.45	1454.55
55	2386.36	2215.91	2386.36	5454.55	3636.36	4090.91	5681.82	4772.73	2386.36	2215.91	2386.36	5454.55

	HABW 29T	HADW 29T	HEW 29TL	HFW 29TL	LPW 30TL	LRW 30TL	SPW 30TL	LGPW 30T	HABW 30T	HADW 30T	HEW 30TL	HFW 30TL
1	4772.73	6477.27	8181.82	5454.55	3579.55	3323.86	3068.18	6545.45	4772.73	6477.27	8181.82	5454.55
2	3409.09	3863.64	5000	3181.82	2045.45	2215.91	1875	5181.82	3409.09	3863.64	5000	3181.82
3	6477.27	8181.82	9545.45	7159.09	1534.09	3579.55	1534.09	0	6477.27	8181.82	9545.45	7159.09
4	3068.18	3409.09	5795.45	3409.09	2045.45	2301.14	1278.41	6818.18	3068.18	3409.09	5795.45	3409.09
5	4090.91	5113.64	7840.91	5795.45	2301.14	2556.82	2556.82	6954.55	4090.91	5113.64	7840.91	5795.45
6	5409.09	6136.36	7500	6818.18	1193.18	681.82	852.27	1909.09	1931.82	2045.45	2500	2272.73
7	0	0	0	0	2556.82	2556.82	2556.82	5727.27	4772.73	4772.73	6818.18	4772.73
8	1363.64	1590.91	2500	1931.82	2045.45	2045.45	1875	4363.64	2727.27	3181.82	5000	3863.64
9	0	0	5454.55	4034.09	1363.64	1306.82	1005.68	3045.45	0	0	3636.36	2045.45
10	2272.73	3750	4772.73	2863.64	0	0	0	1090.91	2090.91	4545.45	4431.82	3545.45
11	4090.91	6818.18	6818.18	5454.55	2556.82	2386.36	2045.45	0	2727.27	4545.45	4545.45	3636.36
12	886.36	2272.73	5909.09	1448.86	2173.3	0	1056.82	0	2511.36	3977.27	5465.91	2642.05
13	4090.91	4772.73	8181.82	5454.55	2812.5	3068.18	2556.82	7363.64	4090.91	4772.73	8181.82	5454.55
14	4090.91	7840.91	8522.73	5454.55	1022.73	1022.73	1022.73	5454.55	2727.27	5227.27	5681.82	3636.36
15	3181.82	4318.18	6136.36	3863.64	960.23	1107.95	920.45	2318.18	1590.91	2159.09	3068.18	1931.82
16	4090.91	5454.55	8181.82	4772.73	2812.5	2556.82	2045.45	6545.45	4090.91	5454.55	8181.82	4772.73
17	4090.91	4090.91	6818.18	3750	1363.64	1534.09	1363.64	3818.18	2727.27	2727.27	4545.45	2500
18	4090.91	5113.64	7159.09	4772.73	1704.55	2215.91	1875	3818.18	2727.27	3409.09	4772.73	3181.82
19	2727.27	4090.91	6136.36	4090.91	2045.45	2045.45	1875	6000	2727.27	4090.91	6136.36	4090.91
20	5454.55	5795.45	8522.73	6477.27	1107.95	1193.18	767.05	2727.27	1818.18	1818.18	2840.91	2159.09
21	2159.09	2840.91	3750	2386.36	2556.82	2556.82	2215.91	4636.36	4318.18	5681.82	7500	4772.73
22	2727.27	2727.27	4090.91	2386.36	596.59	1363.64	1173.3	2727.27	1818.18	1818.18	2727.27	1590.91
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	3818.18	4363.64	6818.18	6000	2345.45	2481.82	1490.91	7941.82	3818.18	4072.73	6363.64	5600
36	2954.55	3636.36	2840.91	1704.55	1875	2045.45	1534.09	4363.64	2954.55	3636.36	5681.82	3409.09
37	3181.82	3409.09	5227.27	3181.82	2045.45	1875	1392.05	2181.82	3181.82	3409.09	5227.27	3181.82
38	4363.64	5454.55	7363.64	4090.91	3127.27	3627.27	2422.73	5498.18	4363.64	5090.91	6872.73	3818.18
39	4636.36	6000	7636.36	5454.55	2659.09	2727.27	1677.27	5192.73	4636.36	6000	7127.27	5454.55
40	6818.18	8181.82	0	0	3818.18	2727.27	1988.64	0	4545.45	5454.55	0	0
41	2727.27	3863.64	5000	4545.45	1022.73	1193.18	681.82	0	1363.64	1931.82	2500	2272.73
42	5181.82	6818.18	7636.36	5727.27	1465.91	1431.82	2795.45	7025.45	5181.82	6363.64	7127.27	5345.45
43	6000	7636.36	10363.64	7090.91	3713.64	4200	2795.45	6720	6000	7127.27	9672.73	6618.18
44	3409.09	3863.64	4772.73	3863.64	812.5	852.27	681.82	3136.36	1704.55	1931.82	2386.36	1931.82
45	3818.18	5454.55	8181.82	6000	2540.91	2481.82	2236.36	7636.36	3818.18	5090.91	7636.36	5600
46	4090.91	5113.64	8181.82	5454.55	2301.14	2301.14	2147.73	7772.73	3954.55	5113.64	8181.82	5090.91
47	5454.55	6818.18	9545.45	6136.36	3579.55	4090.91	3323.86	9409.09	5454.55	6818.18	9545.45	6136.36
48	4090.91	5454.55	8863.64	5454.55	3068.18	3323.86	2812.5	6545.45	4772.73	6136.36	9545.45	6136.36
49	4909.09	6000	9818.18	6545.45	2931.82	3054.55	2050	6109.09	4909.09	5600	9163.64	6109.09
50	6545.45	7090.91	9545.45	5181.82	2345.45	2481.82	2236.36	6109.09	6545.45	6618.18	8909.09	4836.36
51	1136.36	1590.91	2045.45	1363.64	3068.18	3068.18	2045.45	6954.55	4090.91	5113.64	6818.18	4090.91
52	6818.18	7159.09	9545.45	8181.82	3579.55	4090.91	3579.55	9409.09	7159.09	7159.09	9886.36	8181.82
53	2954.55	2954.55	6363.64	4545.45	3068.18	0	2556.82	8590.91	4431.82	6477.27	9545.45	6818.18
54	2727.27	3636.36	5909.09	3409.09	3068.18	2500	3068.18	6545.45	4090.91	5454.55	8863.64	5113.64
55	3636.36	4090.91	5681.82	4772.73	2386.36	2215.91	2386.36	5454.55	3863.64	4090.91	5681.82	4772.73

	LPW 31TL	LRW 31TL	SPW 31TL	LGPW 31T	HABW 31T	HADW 31T	HEW 31TL	HFW 31TL	LPW 32TL	LRW 32TL	SPW 32TL	LGPW 32T
1	3500	3323.86	3068.18	6545.45	4772.73	6477.27	8181.82	5454.55	3500	3323.86	3068.18	6545.45
2	3068.18	3323.86	2812.5	7772.73	5113.64	5795.45	7500	4772.73	3068.18	3323.86	2812.5	7772.73
3	1534.09	3579.55	1534.09	0	6477.27	8181.82	9545.45	7159.09	1534.09	3579.55	1534.09	0
4	2045.45	2045.45	1278.41	6545.45	2727.27	3409.09	5454.55	3409.09	2045.45	2045.45	1278.41	6545.45
5	1534.09	1704.55	1704.55	4636.36	2727.27	3409.09	5227.27	3863.64	1534.09	1704.55	1704.55	4636.36
6	2386.36	2045.45	1676.14	5727.27	5795.45	6136.36	7500	6818.18	2386.36	2045.45	1676.14	5727.27
7	3068.18	3068.18	2812.5	6545.45	5454.55	5454.55	7500	5454.55	3068.18	3068.18	2812.5	6545.45
8	0	0	0	2181.82	0	0	0	0	0	0	0	2181.82
9	2045.45	1647.73	1517.05	4090.91	0	0	5454.55	2840.91	2045.45	1647.73	1517.05	4090.91
10	0	0	0	0	0	0	0	0	0	0	0	0
11	3835.23	3579.55	3000	0	4090.91	6818.18	6818.18	5454.55	3835.23	3579.55	3000	0
12	0	0	0	0	0	0	0	0	0	0	0	0
13	2812.5	3068.18	2556.82	7363.64	4090.91	4772.73	8181.82	5454.55	2812.5	3068.18	2556.82	7363.64
14	1022.73	1022.73	1022.73	2727.27	2727.27	2613.64	5681.82	1818.18	1022.73	1022.73	1022.73	2727.27
15	775.57	1107.95	852.27	2318.18	1590.91	2159.09	3068.18	1931.82	775.57	1107.95	852.27	2318.18
16	2812.5	2556.82	2045.45	6545.45	4090.91	5454.55	8181.82	4772.73	2812.5	2556.82	2045.45	6545.45
17	681.82	767.05	681.82	1909.09	1363.64	1363.64	2272.73	1250	681.82	767.05	681.82	1909.09
18	2556.82	3323.86	2812.5	5727.27	4090.91	5113.64	7159.09	4772.73	2556.82	3323.86	2812.5	5727.27
19	3068.18	3068.18	2812.5	8181.82	4090.91	6136.36	9204.55	6136.36	3068.18	3068.18	2812.5	8181.82
20	3323.86	3579.55	2301.14	8181.82	5454.55	5454.55	8522.73	6477.27	3323.86	3579.55	2301.14	8181.82
21	3835.23	3835.23	3068.18	6545.45	6477.27	8522.73	11250	7159.09	3835.23	3835.23	3068.18	6545.45
22	1193.18	1193.18	1022.73	2727.27	1818.18	1818.18	2727.27	1590.91	1193.18	1193.18	1022.73	2727.27
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2454.55	2659.09	1636.36	8509.09	3818.18	4363.64	6818.18	6000	1636.36	1772.73	1090.91	5672.73
36	2812.5	3068.18	2301.14	6545.45	4431.82	5454.55	8522.73	5113.64	0	0	0	2181.82
37	3068.18	2687.5	2045.45	3272.73	4772.73	5113.64	7840.91	4772.73	0	0	0	0
38	3272.73	3886.36	2659.09	5890.91	4363.64	5454.55	7363.64	4090.91	2181.82	2590.91	1772.73	3927.27
39	1772.73	2045.45	1227.27	3709.09	3090.91	4000	5090.91	3636.36	886.36	1022.73	613.64	1854.55
40	5727.27	4090.91	3323.86	0	6477.27	8181.82	0	0	0	1363.64	0	3272.73
41	1022.73	1193.18	681.82	2454.55	1363.64	1931.82	2500	2272.73	0	0	0	0
42	1534.09	1534.09	3068.18	7527.27	5181.82	6818.18	7636.36	5727.27	1022.73	1022.73	2045.45	5018.18
43	3886.36	4500	3068.18	7200	6000	7636.36	10363.64	7090.91	2590.91	3000	2045.45	4800
44	937.5	2045.45	1363.64	6272.73	3409.09	4090.91	4772.73	3863.64	0	1107.95	0	3272.73
45	2659.09	2659.09	2454.55	8181.82	3818.18	5454.55	8181.82	6000	1772.73	1772.73	1636.36	5454.55
46	2301.14	2301.14	2301.14	7772.73	4090.91	5113.64	8181.82	5454.55	767.05	1534.09	715.91	5181.82
47	3579.55	4090.91	3323.86	9409.09	5454.55	6818.18	9545.45	6136.36	1193.18	1363.64	0	0
48	3068.18	3323.86	2812.5	8590.91	5113.64	6477.27	9886.36	5795.45	0	1159.09	954.55	2863.64
49	3068.18	3272.73	2250	6545.45	4909.09	6000	9818.18	6545.45	2045.45	2181.82	1500	4363.64
50	2454.55	2659.09	2454.55	6545.45	6545.45	7090.91	9545.45	5181.82	1636.36	1772.73	1636.36	4363.64
51	3068.18	3068.18	2045.45	6545.45	4090.91	5454.55	5397.73	2500	0	0	0	0
52	3835.23	4090.91	3835.23	9818.18	7159.09	7500	9545.45	8181.82	1193.18	1363.64	1193.18	2863.64
53	2045.45	1022.73	1704.55	5727.27	1477.27	2159.09	6363.64	4545.45	0	0	0	2863.64
54	3068.18	2215.91	3000	3490.91	4090.91	5454.55	8863.64	5113.64	0	0	0	2181.82
55	2386.36	2215.91	2386.36	6000	3863.64	4318.18	5681.82	4772.73	0	0	0	0

	HABW32T	HADW32T	HEW32TL	HFW32TL	LAT1RM5	LORO1RM	SP1RM5	LP1RM5	HABD1RM	HADD1RM	HEXT1RM	HFLX1RM5
1	4772.73	6477.27	8181.82	5454.55	48.3	45.45	45.45	90.91	48.3	62.5	82.39	53.98
2	5113.64	5795.45	7500	4772.73	0	0	0	0	0	0	0	0
3	6477.27	8181.82	9545.45	7159.09	0	51.14	0	95.45	65.34	82.39	102.27	76.7
4	2727.27	3409.09	5454.55	3409.09	0	0	0	0	0	0	0	0
5	2727.27	3409.09	5227.27	3863.64	0	0	0	0	0	0	0	0
6	5795.45	6136.36	7500	6818.18	0	0	0	0	0	0	0	0
7	5454.55	5454.55	7500	5454.55	48.3	48.3	42.61	100	56.82	56.82	79.55	59.66
8	0	0	0	0	36.93	42.61	34.09	86.36	42.61	42.61	65.34	51.14
9	0	0	5454.55	2840.91	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	100	51.14	65.34	93.75	76.7
11	4090.91	6818.18	6818.18	5454.55	48.3	48.3	34.09	0	39.77	62.5	73.86	56.82
12	0	0	0	0	0	0	0	0	0	0	0	0
13	4090.91	4772.73	8181.82	5454.55	22.73	28.41	5.68	54.55	11.36	17.05	45.45	39.77
14	2727.27	2613.64	5681.82	1818.18	0	0	0	0	0	0	0	0
15	1590.91	2159.09	3068.18	1931.82	48.3	48.3	39.77	90.91	48.3	56.82	85.23	56.82
16	4090.91	5454.55	8181.82	4772.73	0	0	0	0	0	0	0	0
17	1363.64	1363.64	2272.73	1250	31.25	34.09	31.25	81.82	42.61	45.45	62.5	36.93
18	4090.91	5113.64	7159.09	4772.73	36.93	48.3	34.09	81.82	42.61	53.98	76.7	51.14
19	4090.91	6136.36	9204.55	6136.36	45.45	42.61	39.77	127.27	45.45	65.34	93.75	62.5
20	5454.55	5454.55	8522.73	6477.27	42.61	48.3	31.25	113.64	56.82	56.82	90.91	62.5
21	6477.27	8522.73	11250	7159.09	42.61	45.45	36.93	59.09	36.93	48.3	59.66	48.3
22	1818.18	1818.18	2727.27	1590.91	28.41	28.41	22.73	54.55	25.57	31.25	39.77	28.41
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	2545.45	2909.09	4545.45	4000	.	.	.	.	.	.	.	.
36	0	0	2727.27	1704.55	39.77	39.77	34.09	95.45	0	0	0	0
37	0	0	0	0	45.45	36.93	39.77	36.36	51.14	53.98	76.7	45.45
38	2909.09	3636.36	4909.09	2727.27	.	.	.	.	.	.	.	.
39	1545.45	2000	2545.45	1818.18	.	.	.	.	.	.	.	.
40	0	0	3863.64	2272.73	51.14	53.98	45.45	181.82	68.18	85.23	116.48	62.5
41	0	0	0	0	42.61	51.14	31.25	104.55	45.45	62.5	79.55	62.5
42	3454.55	4545.45	5090.91	3818.18	.	.	.	.	.	.	.	.
43	4000	5090.91	6909.09	4727.27	.	.	.	.	.	.	.	.
44	0	0	2386.36	2045.45	22.73	28.41	5.68	54.55	11.36	17.05	45.45	39.77
45	2545.45	3636.36	5454.55	4000	.	.	.	.	.	.	.	.
46	1363.64	1704.55	2727.27	1818.18	34.09	34.09	28.41	109.09	39.77	51.14	73.86	45.45
47	1818.18	2272.73	0	0	48.3	53.98	45.45	127.27	53.98	68.18	85.23	59.66
48	0	0	3409.09	2159.09	42.61	48.3	39.77	122.73	71.02	68.18	93.75	65.34
49	3272.73	4000	6545.45	4363.64	.	.	.	.	.	.	.	.
50	4363.64	4727.27	6363.64	3454.55	.	.	.	.	.	.	.	.
51	0	0	0	0	51.14	48.3	42.61	109.09	48.3	59.66	93.75	53.98
52	2272.73	2386.36	0	0	51.14	53.98	48.3	109.09	71.02	73.86	93.75	73.86
53	0	0	3181.82	2272.73	22.73	28.41	5.68	54.55	11.36	17.05	45.45	39.77
54	0	0	2954.55	1704.55	45.45	48.3	39.77	81.82	42.61	51.14	85.23	53.98
55	0	0	0	0	48.3	48.3	48.3	136.36	48.3	65.34	79.55	68.18

	LAT1RM6	LORO1RM	SP1RM6	LP1RM6	HABD1RM	HADD1RM	HEXT1RM	HFLX1RM	vibseaw2	vibwrw2	vibsqw2	vibseaw3
1	51.14	48.3	45.45	95.45	51.14	68.18	88.07	59.66	.	.	.	.
2	39.77	48.3	36.93	109.09	51.14	62.5	79.55	51.14	.	.	.	.
3	22.73	51.14	22.73	104.55	68.18	85.23	96.59	73.86	.	.	.	.
4	31.25	31.25	19.89	81.82	31.25	36.93	62.5	36.93	.	.	.	.
5	34.09	34.09	36.93	100	45.45	51.14	82.39	59.66	.	.	.	.
6	0	0	0	77.27	56.82	59.66	73.86	62.5	.	.	.	.
7	48.3	42.61	42.61	86.36	62.5	68.18	79.55	56.82	.	.	.	.
8	42.61	42.61	39.77	90.91	45.45	51.14	79.55	62.5	.	.	.	.
9	28.41	28.41	25.57	68.18	0	0	59.66	48.3	.	.	.	.
10	0	0	0	0	56.82	73.86	107.95	85.23	.	.	.	.
11	53.98	51.14	42.61	72.73	45.45	71.02	73.86	59.66	.	.	.	.
12	39.77	42.61	36.93	100	39.77	45.45	88.07	53.98	.	.	.	.
13	39.77	42.61	36.93	100	39.77	45.45	88.07	53.98	.	.	.	.
14	0	0	0	113.64	42.61	76.7	90.91	56.82	.	.	.	.
15	45.45	45.45	42.61	100	51.14	68.18	96.59	62.5	.	.	.	.
16	39.77	36.93	31.25	86.36	45.45	48.3	85.23	51.14	.	.	.	.
17	25.57	34.09	28.41	81.82	45.45	45.45	71.02	39.77	.	.	.	.
18	36.93	0	39.77	0	39.77	45.45	0	0	.	.	.	.
19	45.45	45.45	39.77	136.36	51.14	65.34	96.59	65.34	.	.	.	.
20	48.3	51.14	34.09	118.18	56.82	62.5	90.91	68.18	.	.	.	.
21	51.14	53.98	42.61	90.91	68.18	88.07	0	71.02	.	.	.	.
22	42.61	48.3	36.93	68.18	45.45	56.82	68.18	51.14	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	.	.	.	.	.	.	.	.	1350	1350	1350	1350
36	39.77	42.61	34.09	95.45	45.45	59.66	90.91	53.98	1350	1350	1350	1350
37	45.45	39.77	36.93	36.36	48.3	48.3	82.39	51.14	1350	1350	1350	1350
38	.	.	.	.	.	.	.	.	1350	1350	1350	1350
39	.	.	.	.	.	.	.	.	1350	1350	4050	1350
40	48.3	59.66	48.3	136.36	71.02	82.39	116.48	68.18	1350	1350	1350	1350
41	42.61	51.14	31.25	95.45	39.77	62.5	79.55	73.86	1800	1350	1350	1350
42	.	.	.	.	.	.	.	.	1350	1350	1350	1350
43	.	.	.	.	.	.	.	.	1350	1350	2250	1350
44	42.61	48.3	31.25	131.82	53.98	62.5	76.7	62.5	1350	1350	1350	1350
45	.	.	.	.	.	.	.	.	1350	1350	1350	1350
46	31.25	31.25	34.09	100	42.61	53.98	85.23	56.82	2250	1350	1350	1350
47	51.14	59.66	48.3	131.82	56.82	71.02	102.27	65.34	1350	1350	1350	1350
48	39.77	48.3	39.77	109.09	53.98	68.18	107.95	68.18	1350	1800	1350	1350
49	.	.	.	.	.	.	.	.	1350	1350	1350	1350
50	.	.	.	.	.	.	.	.	1350	1350	1350	1350
51	45.45	0	39.77	0	48.3	0	0	0	1800	1350	1350	1350
52	51.14	56.82	51.14	122.73	73.86	76.7	102.27	85.23	1350	1350	1800	1350
53	45.45	45.45	34.09	122.73	42.61	59.66	90.91	68.18	1350	1350	1350	1350
54	45.45	42.61	45.45	90.91	45.45	56.82	93.75	51.14	2250	1350	1350	1350
55	51.14	48.3	51.14	113.64	59.66	65.34	90.91	76.7	0	0	0	0

	vibwrw3	vibsqw3	vibseaw4	vibwrw4	vibsqw4	vibseaw5	vibwrw5	vibsqw5	vibseaw6	vibwrw6	vibsqw6	vibseaw7
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
36	1350	1350	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700
37	1350	1350	1350	1350	1350	2700	2700	2700	2700	2700	2700	2700
38	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
39	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
40	1350	1350	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700
41	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
42	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
43	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
44	1350	1350	1350	1350	1350	2700	2700	2700	1800	1800	1800	2700
45	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
46	1350	1350	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700
47	1350	1350	1350	1350	1350	2700	2700	2700	2700	2700	2700	2700
48	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
49	1350	1350	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700
50	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
51	1800	1350	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700
52	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
53	1350	1350	1350	1350	1350	2700	2700	2700	1800	1800	1800	2700
54	1350	1350	1800	1800	1800	2700	2700	2700	2700	2700	2700	2700
55	0	0	1800	1800	1800	2700	2700	2700	1800	1800	1800	2700

	vibwrw7	vibsqw7	vibseaw8	vibwrw8	vibsqw8	vibseaw9	vibwrw9	vibsqw9	vibseaw10	vibwrw10
1	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.
35	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
36	2700	2700	2700	2700	2700	3675	3675	3675	3675	3675
37	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
38	2700	2700	2700	2700	2700	2700	2700	2700	5400	5400
39	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
40	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
41	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
42	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
43	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
44	2700	2700	2700	2700	2700	2700	2700	2700	5400	5400
45	2700	2700	2700	2700	2700	3675	3675	3675	3675	3675
46	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
47	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
48	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
49	2700	2700	2700	2700	2700	3675	3675	3675	3675	3675
50	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
51	2700	2700	2700	2700	2700	2700	2700	2700	5400	5400
52	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
53	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
54	2700	2700	2700	2700	2700	3675	3675	3675	5400	5400
55	2700	2700	2700	2700	2700	2700	2700	2700	5400	5400

	vibsqw10	vibseaw11	vibwrw11	vibsqw11	vibseaw12	vibwrw12	vibsqw12	vibseaw13	vibwrw13	vibsqw13	vibseaw14	vibwrw14
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
36	3675	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
37	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	6300	6300
38	5400	5400	5400	5400	3600	3600	3600	5850	5850	5850	6300	6300
39	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	5400	5400
40	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
41	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
42	5400	3675	3675	3675	3600	3600	3600	5850	5850	5850	6300	6300
43	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
44	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
45	3675	5400	5400	5400	3600	3600	3600	5850	5850	5850	6300	6300
46	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	5400	5400
47	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
48	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	6300	6300
49	3675	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
50	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
51	5400	3675	3675	3675	5400	5400	5400	5850	5850	5850	6300	6300
52	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	5400	5400
53	5400	5400	5400	5400	5400	5400	5400	5850	5850	5850	6300	6300
54	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	6300	6300
55	5400	3675	3675	3675	5400	5400	5400	5850	5850	5850	6300	6300

	vibsqw14	vibseaw15	vibwrw15	vibsqw15	vibseaw16	vibwrw16	vibsqw16	vibsw17	vibwrw17	vibsqw17	vibsw18	vibwrw18
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
36	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	5400	5400
37	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	8100	8100
38	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
39	5400	6300	6300	6300	4200	4200	4200	8100	8100	8100	5400	5400
40	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	8100	8100
41	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	5400	5400
42	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
43	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
44	6300	6300	6300	6300	4200	4200	4200	2700	2700	2700	5400	5400
45	6300	5400	5400	5400	4200	4200	4200	8100	8100	8100	8100	8100
46	5400	6300	6300	6300	4200	4200	4200	2700	2700	2700	8100	8100
47	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	8100	8100
48	6300	6300	6300	6300	4200	4200	4200	5400	5400	5400	8100	8100
49	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
50	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
51	6300	6300	6300	6300	4200	4200	4200	0	0	0	8100	8100
52	5400	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
53	6300	6300	6300	6300	4200	4200	4200	8100	8100	8100	8100	8100
54	6300	6300	6300	6300	4200	4200	4200	0	0	0	8100	8100
55	6300	5400	5400	5400	6300	6300	6300	5400	5400	5400	5400	5400

	vibsqw18	vibsw19	vibwrw19	vibsqw19	vibsw20	vibwrw20	vibsqw20	vibsw21	vibwrw21	vibsqw21	vibsw22	vibwrw22
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
36	5400	8100	8100	8100	9450	9450	9450	3150	3150	3150	0	0
37	8100	5400	5400	5400	0	0	0	0	0	0	6300	6300
38	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
39	5400	8100	8100	8100	9450	9450	9450	6300	6300	6300	9450	9450
40	1534.09	8100	8100	1534.09	9450	9450	1534.09	9450	9450	1534.09	9450	9450
41	5400	8100	8100	8100	0	0	0	6300	6300	6300	9450	9450
42	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
43	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
44	5400	8100	8100	8100	9450	9450	9450	6300	6300	6300	0	0
45	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
46	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	3150	3150
47	8100	8100	8100	8100	9450	9450	9450	9450	9450	9450	9450	9450
48	8100	8100	8100	8100	9450	9450	9450	9450	9450	9450	0	0
49	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
50	8100	8100	8100	8100	6300	6300	6300	9450	9450	9450	9450	9450
51	8100	5400	5400	5400	6300	6300	6300	6300	6300	6300	3150	3150
52	8100	8100	8100	8100	9450	9450	9450	9450	9450	9450	9450	9450
53	8100	8100	8100	8100	9450	9450	9450	9450	9450	9450	9450	9450
54	8100	8100	8100	8100	9450	9450	9450	3150	3150	3150	6300	6300
55	5400	5400	5400	5400	6300	6300	6300	6300	6300	6300	3150	3150

	vibsqw22	vibsw23	vibwrw23	vibsqw23	vibsw24	vibwrw24	vibsqw24	vibsw25	vibwrw25	vibsqw25	vibsw26	vibwrw26
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
36	0	0	0	3150	9450	9450	9450	6300	6300	6300	4200	4200
37	6300	6300	6300	6300	9450	9450	9450	6300	6300	6300	12600	12600
38	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
39	9450	9450	9450	9450	9450	9450	9450	9450	9450	9450	8400	8400
40	1534.09	6300	6300	1022.73	9450	9450	1534.09	6300	6300	1022.73	12600	12600
41	9450	3150	3150	0	6300	9450	9450	3150	6300	6300	8400	8400
42	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
43	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
44	0	9450	3150	3150	0	0	0	9450	9450	9450	8400	8400
45	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
46	3150	6300	6300	6300	6300	6300	6300	6300	6300	6300	12600	12600
47	9450	9450	9450	9450	9450	9450	9450	9450	9450	9450	12600	12600
48	0	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
49	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
50	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
51	3150	6300	6300	4725	3150	3150	3150	9450	9450	9450	4200	4200
52	9450	9450	9450	9450	9450	9450	9450	9450	9450	9450	12600	12600
53	9450	6300	6300	6300	9450	9450	9450	9450	9450	9450	12600	12600
54	6300	6300	6300	6300	9450	9450	9450	6300	6300	6300	12600	12600
55	3150	6300	6300	6300	6300	6300	6300	9450	9450	9450	8400	8400

	vibsqw26	vibsw27	vibwrw27	vibsqw27	vibsw28	vibwrw28	vibsqw28	vibsw29	vibwrw29	vibsqw29	vibsw30	vibwrw30
1	.	.	.	.	.	.	.	.	.	.	.	.
2	.	.	.	.	.	.	.	.	.	.	.	.
3	.	.	.	.	.	.	.	.	.	.	.	.
4	.	.	.	.	.	.	.	.	.	.	.	.
5	.	.	.	.	.	.	.	.	.	.	.	.
6	.	.	.	.	.	.	.	.	.	.	.	.
7	.	.	.	.	.	.	.	.	.	.	.	.
8	.	.	.	.	.	.	.	.	.	.	.	.
9	.	.	.	.	.	.	.	.	.	.	.	.
10	.	.	.	.	.	.	.	.	.	.	.	.
11	.	.	.	.	.	.	.	.	.	.	.	.
12	.	.	.	.	.	.	.	.	.	.	.	.
13	.	.	.	.	.	.	.	.	.	.	.	.
14	.	.	.	.	.	.	.	.	.	.	.	.
15	.	.	.	.	.	.	.	.	.	.	.	.
16	.	.	.	.	.	.	.	.	.	.	.	.
17	.	.	.	.	.	.	.	.	.	.	.	.
18	.	.	.	.	.	.	.	.	.	.	.	.
19	.	.	.	.	.	.	.	.	.	.	.	.
20	.	.	.	.	.	.	.	.	.	.	.	.
21	.	.	.	.	.	.	.	.	.	.	.	.
22	.	.	.	.	.	.	.	.	.	.	.	.
23	.	.	.	.	.	.	.	.	.	.	.	.
24	.	.	.	.	.	.	.	.	.	.	.	.
25	.	.	.	.	.	.	.	.	.	.	.	.
26	.	.	.	.	.	.	.	.	.	.	.	.
27	.	.	.	.	.	.	.	.	.	.	.	.
28	.	.	.	.	.	.	.	.	.	.	.	.
29	.	.	.	.	.	.	.	.	.	.	.	.
30	.	.	.	.	.	.	.	.	.	.	.	.
31	.	.	.	.	.	.	.	.	.	.	.	.
32	.	.	.	.	.	.	.	.	.	.	.	.
33	.	.	.	.	.	.	.	.	.	.	.	.
34	.	.	.	.	.	.	.	.	.	.	.	.
35	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
36	4200	0	4200	4200	8400	8400	8400	13500	13500	9000	9600	9600
37	12600	8400	12600	12600	0	0	0	9000	9000	9000	9600	9600
38	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
39	8400	12600	12600	12600	12600	12600	12600	13500	13500	13500	14400	14400
40	2045.45	8400	12600	1363.64	12600	12600	2045.45	13500	13500	76704.55	9600	9600
41	8400	4200	8400	4200	8400	8400	8400	9000	9000	9000	4800	4800
42	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
43	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
44	8400	8400	12600	12600	12600	12600	12600	9000	9000	9000	4800	4800
45	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
46	12600	12600	12600	12600	4200	4200	0	12600	13500	13500	14400	14400
47	12600	12600	12600	12600	12600	12600	12600	13500	13500	13500	14400	14400
48	12600	12600	12600	8400	12600	12600	12600	13500	13500	13500	14400	14400
49	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
50	12600	8400	8400	8400	12600	12600	12600	13500	13500	13500	14400	14400
51	4200	0	4200	4200	8400	8400	8400	4500	4500	4500	14400	14400
52	12600	12600	12600	12600	12600	12600	12600	13500	13500	13500	14400	14400
53	12600	8400	8400	8400	12600	12600	12600	9000	9000	9000	14400	14400
54	12600	8400	12600	12600	8400	8400	8400	13500	13500	13500	14400	14400
55	8400	4200	8400	4200	8400	8400	8400	9000	9000	9000	9600	9600

	vibsqw30	vibsw31	vibwrw31	vibsqw31	vibsw32	vibwrw32	vibsqw32	pcatpfmd	pcatpfpt	acatpfmd	acatpfpt	pcltpfmd
1	.	.	.	.	.	.	.	4.33	-0.7	2.16	-0.35	5.34
2	.	.	.	.	.	.	.	8.7	1.81	2.33	0.49	-1.24
3	.	.	.	.	.	.	.	-5.59	-3.96	-2.4	-1.7	-2.19
4	.	.	.	.	.	.	.	-4.65	-3.2	-1.9	-1.31	2.84
5	.	.	.	.	.	.	.	-8.57	-8.43	-2.85	-2.81	-7.36
6	.	.	.	.	.	.	.	-18.11	-24.1	-4.6	-6.13	-13.35
7	.	.	.	.	.	.	.	-4.25	-3.22	-1.71	-1.29	-4.59
8	.	.	.	.	.	.	.	7.66	3.79	2.44	1.21	2.32
9	.	.	.	.	.	.	.	-6.17	-1.57	-2.51	-0.64	0.39
10	.	.	.	.	.	.	.	-1.45	2.21	-0.67	1.02	-0.18
11	.	.	.	.	.	.	.	-6.03	-9.69	-2.5	-4.02	7.68
12	.	.	.	.	.	.	.	-0.1	3.93	-0.04	1.7	0
13	.	.	.	.	.	.	.	-3.76	1.95	-1.56	0.81	-1.41
14	.	.	.	.	.	.	.	1.67	0.55	0.76	0.25	1.9
15	.	.	.	.	.	.	.	-4.78	-2.09	-1.6	-0.7	7.64
16	.	.	.	.	.	.	.	-7.85	-8.44	-3.79	-4.07	-0.06
17	.	.	.	.	.	.	.	-6.25	-11.19	-2.54	-4.54	1.69
18	.	.	.	.	.	.	.	4.12	-0.13	1.83	-0.06	-5.03
19	.	.	.	.	.	.	.	-10.27	-10.44	-4.56	-4.64	-2.64
20	.	.	.	.	.	.	.	0.36	-2.48	0.15	-1.03	-1.6
21	.	.	.	.	.	.	.	13.18	13.66	4.75	4.93	5.48
22	.	.	.	.	.	.	.	-1.33	-7.66	-0.5	-2.9	-1.86
23	.	.	.	.	.	.	.	.	3.15	.	1.59	.
24	.	.	.	.	.	.	.	0.97	5.09	0.35	1.85	0.24
25	.	.	.	.	.	.	.	8.98	6.52	3.66	2.66	8.86
26	.	.	.	.	.	.	.	-0.79	0.07	-0.31	0.03	-0.64
27	.	.	.	.	.	.	.	1.98	-5.29	0.82	-2.18	-0.22
28	.	.	.	.	.	.	.	3.58	4.25	1.6	1.9	1.65
29	.	.	.	.	.	.	.	0.21	-3.12	0.1	-1.5	2.44
30	.	.	.	.	.	.	.	3.52	3.3	1.57	1.47	5.27
31	.	.	.	.	.	.	.	-1	6.83	-0.32	2.18	-0.62
32	.	.	.	.	.	.	.	1.27	3.07	0.49	1.19	-2.11
33	.	.	.	.	.	.	.	-1.1	2.01	-0.45	0.81	9.62
34	.	.	.	.	.	.	.	-17.51	-17.35	-10.85	-10.75	4.68
35	14400	14400	14400	14400	9600	9600	9600	-8	-14.49	-2.56	-4.64	-1.97
36	9600	14400	14400	14400	0	0	4800	-1.7	7.1	-0.88	3.66	2.91
37	9600	14400	14400	14400	0	0	0	-7.92	-4.2	-3.03	-1.61	-5.17
38	14400	14400	14400	14400	9600	9600	9600	-0.04	-12.3	-0.02	-4.46	3.35
39	14400	9600	9600	9600	14400	14400	14400	-6.13	1.7	-1.8	0.5	-2.05
40	1363.64	14400	14400	2045.45	0	4800	4800	-1.91	0.28	-0.69	0.1	-1.88
41	4800	4800	14400	4800	0	0	0	-4.71	1.38	-2.15	0.63	1.1
42	14400	14400	14400	14400	9600	9600	9600	-9.99	-23.37	-2.14	-5	-6.47
43	14400	14400	14400	14400	9600	9600	9600	6.41	13.8	2.19	4.71	10.34
44	4800	9600	9600	9600	0	4800	4800	-6.06	-7.39	-2.49	-3.03	-3.93
45	14400	14400	14400	14400	9600	9600	9600	-12.3	-7.05	-4.18	-2.4	-1.89
46	14400	14400	14400	14400	14400	14400	14400	-2.76	14.4	-0.99	5.19	-4.67
47	14400	14400	14400	14400	9600	9600	9600	-6.83	-0.89	-2.74	-0.36	2.19
48	14400	14400	14400	14400	4800	4800	4800	10.4	1.1	3.68	0.39	1.55
49	14400	14400	14400	14400	9600	9600	9600	-1.76	-3.83	-0.67	-1.46	-2.17
50	14400	14400	14400	14400	9600	9600	9600	-3.91	-3.77	-1.78	-1.71	-1.76
51	14400	14400	14400	14400	0	0	0	-0.41	-3	-0.18	-1.29	-7.44
52	14400	14400	14400	14400	14400	14400	14400	-6.67	-3.53	-2.3	-1.22	1.17
53	14400	9600	9600	9600	14400	14400	14400	0.46	-2.69	0.21	-1.21	0.91
54	14400	14400	14400	14400	0	0	4800	0.79	-0.11	0.3	-0.04	7.58
55	9600	9600	9600	9600	0	14400	0	-3.98	-5.75	-1.59	-2.3	3.19

	pcltpfpt	acltpfmd	acltpfpt	pcttpfmd	pcttpfpt	acttpfmd	acttpfpt	pcarpfmd	pcarpfpt	acarpfmd	acarpfpt	pclrpfmd
1	2.22	3.05	1.27	1.36	-1.65	0.7	-0.85	4.46	-0.26	2.15	-0.13	5.67
2	-3.31	-0.51	-1.37	-5.51	-10.44	-2.23	-4.22	9.2	2.16	2.35	0.55	-1.34
3	0	-1.2	0	-1.61	1.61	-0.8	0.8	-29.68	-3.16	-12.2	-1.3	-1.9
4	5.43	1.13	2.17	-7.93	-6.1	-3.42	-2.63	-4.27	-3.05	-1.68	-1.2	3.14
5	-2.09	-2.96	-0.84	-6.54	-5.12	-2.85	-2.23	-8.19	-8.29	-2.6	-2.63	-7.18
6	-14.37	-4.85	-5.22	-31.91	-27.76	-9.23	-8.03	-17.93	-24.16	-4.3	-5.8	-13.36
7	-3.88	-1.93	-1.63	-7.02	-2.07	-3.04	-0.9	-4.16	-3.44	-1.6	-1.33	-4.53
8	7.28	0.84	2.63	0.94	2.22	0.41	0.98	7.78	3.77	2.38	1.15	2.52
9	3.15	0.17	1.35	-3.07	-5.49	-1.29	-2.3	-5.78	-1.16	-2.26	-0.45	0.37
10	4.64	-0.1	2.5	-10.74	-4.76	-5.82	-2.58	-1.3	2.07	-0.58	0.92	-0.2
11	-0.78	3.76	-0.38	-7.82	-10.66	-3.69	-5.04	-6.7	-10.28	-2.7	-4.15	6.94
12	12.55	0	6.9	-0.09	1.05	-0.04	0.5	0.06	3.37	0.02	1.4	0.02
13	-1.34	-0.6	-0.57	-1.28	-1.64	-0.58	-0.75	-3.81	2.11	-1.52	0.84	-1.49
14	3.4	1.07	1.91	-4.9	-3.65	-2.28	-1.7	1.91	0.82	0.83	0.36	1.91
15	5.94	3.6	2.8	8.18	7.27	3.6	3.2	-4.1	-1.58	-1.3	-0.5	7.49
16	-0.48	-0.03	-0.23	5.73	2.8	2.62	1.28	-7.9	-8.44	-3.69	-3.94	-0.06
17	5.43	0.68	2.18	18.92	20.52	5.9	6.4	-6.32	-11.48	-2.45	-4.45	1.46
18	-6.02	-2.3	-2.75	-6.72	-3.28	-2.81	-1.37	4.47	-0.08	1.93	-0.04	-5
19	-6.11	-1.43	-3.32	-7.52	-8.73	-3.55	-4.12	-10.12	-10.34	-4.31	-4.4	-2.68
20	-3.88	-0.86	-2.08	-5.59	-9.24	-2.75	-4.54	0.67	-2.04	0.27	-0.81	-1.56
21	8.75	2.38	3.79	-0.21	5.14	-0.1	2.52	14.27	15.04	4.91	5.18	5.93
22	-1.41	-0.83	-0.63	-0.27	1.92	-0.12	0.88	-1	-7.66	-0.36	-2.76	-1.73
23	1.92	.	1.1	.	3.17	.	1.77	.	3.53	.	1.71	.
24	0.24	0.11	0.11	-6.42	-0.66	-2.57	-0.27	1.17	5.21	0.41	1.81	0.34
25	10.15	3.44	3.94	1.7	1.95	0.68	0.78	9.38	6.8	3.64	2.64	8.87
26	-2.52	-0.32	-1.23	-1.86	1.24	-0.83	0.55	-0.03	0.68	-0.01	0.26	-0.29
27	-0.79	-0.12	-0.42	3	-0.25	1.48	-0.12	2.11	-5.77	0.83	-2.27	-0.36
28	1.44	0.8	0.7	-1.05	2.31	-0.5	1.1	3.47	3.94	1.5	1.7	1.7
29	2.06	1.3	1.1	-2.83	-5.66	-1.5	-3	0.22	-3.01	0.1	-1.4	2.12
30	3.95	2.4	1.8	0.71	5.66	0.33	2.63	3.36	3.12	1.44	1.34	5.34
31	-0.4	-0.28	-0.18	-5.13	3.2	-2.22	1.38	-1.14	6.72	-0.35	2.05	-0.69
32	0.63	-1	0.3	-2.24	-3.21	-0.92	-1.32	1.13	3.01	0.42	1.12	-2.14
33	8.19	3.43	2.92	5.81	3.78	2.36	1.53	-1.42	2.2	-0.55	0.86	9.62
34	4.68	2.82	2.82	3.55	8.65	1.95	4.75	-19.2	-18.7	-11.62	-11.32	5.28
35	-0.86	-0.54	-0.24	-5.5	-6.71	-1.67	-2.04	-7.77	-14.16	-2.38	-4.34	-2.05
36	3.17	1.76	1.91	-9.37	-9.68	-5.46	-5.64	-2.04	7.32	-1.02	3.65	2.52
37	-5.71	-2.34	-2.58	-6.18	-7	-2.6	-2.94	-7.82	-4.07	-2.86	-1.49	-5.29
38	-12.34	1.74	-6.41	4.57	-13.99	1.56	-4.78	-0.05	-12.3	-0.02	-4.28	3.19
39	5	-0.83	2.03	-6.19	9.99	-1.62	2.62	-5.72	1.59	-1.58	0.44	-2.09
40	-3.42	-0.74	-1.34	-2.46	-5.42	-1.11	-2.44	-1.71	0.52	-0.6	0.18	-1.77
41	-0.54	0.59	-0.29	-5.74	-3.58	-2.78	-1.73	-4.29	1.83	-1.86	0.79	1.2
42	-10.2	-2.27	-3.58	-5.9	-14.63	-1.51	-3.75	-9.89	-23.15	-2.02	-4.73	-6.35
43	9.17	4.78	4.24	1.61	-2.24	0.85	-1.18	6.66	14.59	2.17	4.76	10.22
44	0.72	-1.8	0.33	-4.37	-5.71	-1.9	-2.48	-5.87	-7.32	-2.29	-2.86	-3.69
45	-0.4	-0.65	-0.14	-8.1	-6.76	-2.9	-2.42	-11.97	-6.73	-3.88	-2.18	-1.66
46	-0.73	-1.91	-0.3	-1.56	-1.91	-0.6	-0.73	-2.38	15.02	-0.82	5.14	-4.53
47	0.6	1.17	0.32	-3.15	-7.12	-1.61	-3.64	-6.5	-0.34	-2.5	-0.13	1.95
48	-3.86	0.78	-1.95	6.09	-7.92	2.65	-3.45	10.89	1.51	3.69	0.51	1.76
49	-4.9	-0.96	-2.18	-6.23	-9.2	-2.77	-4.09	-1.5	-3.96	-0.55	-1.45	-2.24
50	-3.84	-0.97	-2.12	-5.42	-4.84	-2.37	-2.11	-3.84	-3.52	-1.67	-1.53	-1.64
51	-1.98	-4.16	-1.11	-3.45	0.61	-1.64	0.29	-0.19	-3.23	-0.08	-1.34	-7.18
52	1.03	0.49	0.44	-1.39	3.61	-0.45	1.18	-6.11	-2.98	-2	-0.98	1.41
53	-1.7	0.5	-0.94	-3.29	-2.02	-1.6	-0.98	0.46	-2.89	0.2	-1.24	0.75
54	8.32	2.58	2.83	-0.05	0.63	-0.02	0.27	0.82	0.11	0.3	0.04	7.58
55	2.25	1.59	1.12	2.76	5.1	1.26	2.33	-3.93	-5.7	-1.5	-2.18	3.24

	pclrpfpt	aclrpfmd	aclrpfpt	pctrpfmd	pctrpfpt	actrpfmd	actrpfpt	pcafgmd	pcafgpt	acafgmd	acafgpt	pclfgmd
1	2.46	3.14	1.37	1.73	-1.11	0.88	-0.56	9.09	16.55	349.39	636.47	17.67
2	-3.53	-0.53	-1.4	-5.31	-10.38	-2.09	-4.09	19.69	8.37	334.49	142.25	-3.95
3	0.19	-1	0.1	-1.43	1.84	-0.7	0.9	-6.61	10.32	-200	312	1.42
4	5.66	1.2	2.17	-7.74	-5.77	-3.27	-2.44	2.84	3.74	65.55	86.16	11.35
5	-1.99	-2.78	-0.77	-6.42	-4.96	-2.73	-2.11	1.95	-6.53	31	-103.88	-3.85
6	-14.6	-4.64	-5.08	-31.94	-27.95	-9.04	-7.91	-13.49	-27.46	-192.28	-391.5	-15.37
7	-3.92	-1.83	-1.58	-6.92	-2.16	-2.94	-0.92	-4.67	-8.93	-140.11	-268.13	-6.78
8	7.66	0.87	2.66	1.03	2.6	0.44	1.12	15.43	6.68	303.24	131.3	4.49
9	3.31	0.15	1.37	-2.97	-5.28	-1.22	-2.17	1.33	7.55	30.76	174.18	-0.57
10	4.76	-0.1	2.48	-10.33	-4.32	-5.49	-2.3	9.78	-3.57	311.33	-113.72	2.73
11	-0.85	3.31	-0.4	-8.14	-10.74	-3.79	-5.01	3.03	-9.66	98.82	-314.45	-1.98
12	12.41	0.01	6.6	-0.06	0.86	-0.03	0.4	0	12.66	0.19	485	0
13	-1.28	-0.61	-0.53	-1.23	-1.64	-0.55	-0.73	-3.36	6.53	-95.07	184.56	-5.57
14	3.35	1.04	1.81	-4.58	-3.25	-2.07	-1.47	7.55	5.06	318.23	213.4	3.24
15	5.73	3.4	2.6	7.87	6.94	3.4	3	3.02	4.58	64	97	7
16	-0.53	-0.03	-0.25	5.48	2.95	2.46	1.33	-18.78	-15.39	-656.1	-537.85	1.21
17	5.08	0.56	1.96	18.85	20.49	5.77	6.27	-7.29	-14.1	-163.86	-316.86	-2.38
18	-6.1	-2.21	-2.7	-6.69	-3.31	-2.75	-1.36	21.11	-0.2	833.89	-7.85	-5.57
19	-6.04	-1.4	-3.16	-7.51	-8.78	-3.48	-4.06	-6.61	-4.86	-208.37	-153.31	-3.5
20	-3.51	-0.81	-1.81	-5.36	-9.06	-2.57	-4.35	7.56	5.66	216.69	162.23	-0.26
21	9.37	2.47	3.9	0.48	5.69	0.23	2.72	39.29	47.68	981.48	1191.02	13.25
22	-1.26	-0.74	-0.54	-0.47	1.54	-0.21	0.69	5.43	-8.76	82.69	-133.31	0.41
23	2.25	.	1.24	.	3.2	.	1.75	.	7.57	.	211.63	.
24	0.34	0.15	0.15	-6.23	-0.87	-2.44	-0.34	6.49	8.67	131.31	175.31	5.87
25	10.77	3.29	3.99	1.65	1.91	0.65	0.75	17.03	13.13	462.1	356.1	11.93
26	-2.22	-0.14	-1.04	-1.68	1.32	-0.73	0.57	43.19	44.99	852.79	888.42	8.61
27	-0.94	-0.18	-0.48	2.8	-0.53	1.35	-0.25	3.39	-12	96.33	-340.67	-0.41
28	1.49	0.8	0.7	-1.06	2.12	-0.5	1	-1.18	-0.19	-51	-8	-2.47
29	1.74	1.1	0.9	-2.86	-5.73	-1.5	-3	-1.99	4.71	-73	173	-0.64
30	3.73	2.33	1.63	0.64	5.24	0.29	2.39	6.65	-1.7	217.5	-55.5	5.82
31	-0.23	-0.3	-0.1	-4.82	3.25	-2.03	1.37	-7.2	8.9	-140.03	172.97	-0.32
32	0.7	-0.98	0.32	-2.37	-3.37	-0.95	-1.35	0.4	6.64	9.56	159.56	-1.42
33	8.29	3.3	2.84	5.82	3.7	2.33	1.48	-10.95	2.63	-298.27	71.73	10.6
34	5.28	3.1	3.1	4.04	8.87	2.17	4.77	-64.86	-64.75	-6171.88	-6161.88	27.85
35	-0.86	-0.54	-0.23	-5.44	-6.44	-1.62	-1.91	-5.39	-14.52	-82.64	-222.66	-5.08
36	2.86	1.48	1.68	-9.05	-9.21	-5.16	-5.26	5.07	42.2	209.03	1738.55	-6.57
37	-5.64	-2.31	-2.46	-6	-6.82	-2.47	-2.81	-3.66	1.91	-91.3	47.54	-11.68
38	-12.25	1.61	-6.16	4.59	-13.79	1.54	-4.62	2.03	-12.65	55.18	-344.41	0.02
39	5.13	-0.81	1.99	-6.02	9.9	-1.52	2.51	3.94	8.07	63.62	130.46	-2.06
40	-3.12	-0.67	-1.18	-2.31	-5.32	-1.02	-2.35	6.91	9.46	172.49	236.08	-1.01
41	-0.09	0.61	-0.05	-5.48	-3.45	-2.59	-1.63	4.3	9.19	123.89	264.77	4.79
42	-10.21	-2.14	-3.45	-5.92	-14.61	-1.49	-3.68	-5.99	-19.55	-67.34	-219.67	-6.12
43	9.6	4.56	4.28	1.39	-1.89	0.72	-0.98	47.02	78.2	1003.23	1668.49	8.84
44	0.88	-1.62	0.39	-4.24	-5.54	-1.79	-2.35	-1.1	-4.44	-26.65	-107.98	5.21
45	-0.36	-0.55	-0.12	-7.9	-6.36	-2.77	-2.23	-7.99	-1.96	-150.12	-36.82	1.97
46	-0.45	-1.77	-0.18	-1.58	-2.03	-0.6	-0.76	3.69	31.06	69.46	585.17	-0.98
47	0.41	1	0.21	-3.09	-6.91	-1.54	-3.45	2.51	12.76	68.35	347.11	-1.54
48	-3.97	0.86	-1.95	5.95	-8.11	2.55	-3.48	29.05	12.59	544.98	236.22	6.11
49	-4.96	-0.96	-2.12	-6.11	-9.04	-2.66	-3.94	8.74	0.13	193.71	2.81	-3.73
50	-3.51	-0.87	-1.87	-5.47	-4.76	-2.34	-2.03	-3.48	-0.89	-114.02	-29.29	-0.08
51	-2.26	-3.87	-1.22	-3.48	0.48	-1.63	0.23	4.67	-6.27	156.35	-209.94	-12.67
52	1.27	0.57	0.51	-1.21	3.94	-0.39	1.25	-0.39	2.71	-8.99	62.02	6.75
53	-1.95	0.4	-1.04	-3.12	-2.2	-1.49	-1.05	7.83	-2.58	239.14	-78.71	-0.69
54	8.21	2.48	2.69	-0.19	0.42	-0.08	0.18	15.24	16.26	394.83	421.27	4.47
55	2.43	1.56	1.17	2.68	5.16	1.21	2.32	-0.86	-4.9	-24.72	-141.55	6.71

	pclfgpt	aclfgmd	aclfgpt	pctfgmd	pctfgpt	actfgmd	actfgpt	pcalgmd	pcalgpt	acalgmd	acalgpt	pcllgmd
1	14.73	3544.91	2954.3	2.27	1.12	592.68	293.43	0.07	18.15	2.72	704.87	3.74
2	-8.93	-392.49	-886.3	-1.84	-11.17	-243.91	-1482.16	6.6	5.87	306	272.34	-1.9
3	4.13	208	605	-0.12	0.84	-25	182	3.1	18.14	125	731	6.35
4	9.67	771.59	656.76	-11.52	-5	-1593.29	-691.49	11.33	9.52	377.51	317.17	6.24
5	0.11	-259.51	7.09	-5.39	-2.23	-628.64	-260.02	16.28	6.56	518.08	208.76	8.94
6	-20.96	-1157.39	-1578.22	-38.91	-33.84	-3690.21	-3209.05	12.16	3.26	508.33	136.28	5.1
7	-9.75	-643.59	-925.23	-7.04	-4.71	-1228.5	-821.4	2.4	-3.66	107.82	-164.24	0.95
8	13.19	377.25	1107.35	-0.96	9.22	-171.4	1642.3	3.37	1	141.58	41.9	0.78
9	6.03	-47.88	502.65	0.28	-3.21	33.99	-387.32	12.58	10.68	422	358.37	-1.26
10	7.36	534.82	1440.16	-8.48	1.26	-2329.67	346.81	12.77	-7.36	475.53	-274.09	3.14
11	-4.88	-363.17	-892.74	-17.89	-15.14	-4203.19	-3557.14	14.34	6.83	657.57	313.16	-15.69
12	5.99	-0.3	1220	0	-0.55	0.21	-117	-0.01	4.84	-0.49	243	0
13	-4.09	-522.91	-383.99	1.8	1.39	308.09	237.26	3.07	3.11	122.98	124.25	-3.22
14	4.9	552.48	836.99	-3.4	-0.06	-579.79	-10.4	4.3	4.04	216.6	203.84	-1.16
15	6.65	890	845	12.13	13.08	1972	2126	10.55	7.67	444	323	-7.51
16	0.16	112.35	14.55	12.83	9.72	1675.26	1269.65	-5.4	-0.23	-201.98	-8.66	1.33
17	-0.84	-171.91	-60.91	33.86	31.06	2856.84	2620.84	3.27	4	107.9	131.9	-5.12
18	-9.91	-679.75	-1210.55	-11.4	-2.97	-1858.19	-483.87	12.48	0	615.87	-0.05	3.63
19	-11.37	-522.37	-1696.66	-11.62	-14.98	-2104.47	-2711.27	12.63	15.21	497.99	599.56	2.23
20	-2.35	-35.52	-323.01	-6.43	-8.75	-1140.87	-1553.14	6.91	10.37	280.03	420.28	3.25
21	16.8	1465.83	1858.64	11.04	15.45	2207.61	3089.42	13.92	19.73	616.25	873.22	2.87
22	-2.29	28.31	-158.69	-1.36	-1.85	-194.18	-263.18	7.74	3.53	193	88	3.78
23	6.77	.	941.97	.	7.48	.	1822.28	.	0.76	.	20.9	.
24	1.35	577.66	132.66	-4.85	-2.47	-573.65	-291.65	5.01	0.36	176.82	12.82	5.42
25	20.87	834.55	1459.55	2.31	4.17	292.5	529.5	0.84	1.32	33.17	52.17	-2.93
26	4.23	1005.04	494.06	-6.69	-0.89	-1246.09	-164.84	45.06	44.55	1364.49	1349.03	9.98
27	-3.72	-54.78	-497.78	0.45	-2.56	78.38	-446.62	-0.21	-3.75	-8.54	-151.54	0.22
28	-2.05	-392	-326	-1.32	2.78	-333	704	-7.2	-7.22	-384	-385	-5.7
29	-3.34	-104	-541	-10.25	-14.74	-2683	-3859	-2.42	11.07	-96	439	-5.41
30	1.12	567.29	109.29	1.51	4.45	256.32	752.32	0.26	-7.45	10.64	-302.36	-3.97
31	2.45	-29.93	232.07	-6.56	2.46	-897.9	337.1	-6.01	-1.43	-249.39	-59.39	0.86
32	0.42	-154.67	46.33	-5.84	-2.8	-731.64	-351.64	-1.66	1.52	-62.54	57.46	2.81
33	11.7	743.67	821.08	4.47	2.15	605.49	290.78	-9.28	-0.74	-374.69	-30	-4.49
34	34.75	6044.66	7540.66	20.79	22.02	5425.42	5746.42	-45.34	-45.29	-2650.23	-2647.23	13.24
35	-1.75	-230.96	-79.47	-0.93	-5.97	-69.29	-443.86	6.72	6.51	218.42	211.62	-2.46
36	0.91	-1315.46	183.02	-15.48	-17.63	-3671.31	-4180.9	8.82	22.94	342.95	891.9	-13.25
37	-10.87	-1181.45	-1099.41	-1.34	-7.38	-188.56	-1040.25	9.76	9.11	393.9	367.74	-2.89
38	-19.6	2.92	-2772.94	0.39	-19.73	46.07	-2312.22	2.09	6.38	100.17	305.28	-6.72
39	5.01	-184.96	449.7	0.57	14.35	34.92	872.78	13.53	5.64	527.52	219.8	1.39
40	-0.27	-86.94	-23.46	0.99	0.17	182.06	30.97	10.18	9.18	443.93	400.38	2.11
41	5.05	607.93	641.22	-1.28	-2.54	-210.66	-418.83	13.79	6.35	472.43	217.69	2.35
42	-7.78	-384.28	-488.42	-8.44	-18.22	-584.15	-1261.08	7.28	11.88	300.56	490.25	3.87
43	12.77	1308.86	1890.08	-3.12	-3.52	-933.34	-1053.38	33.59	45.2	1385.24	1864.03	-10.13
44	6.61	457.49	579.81	-0.32	-0.39	-41.79	-50.85	9.71	8.7	339.51	304.18	13.14
45	2.09	103.81	110.03	-7.48	-8	-766.68	-819.72	11.56	9.33	421.74	340.29	4.97
46	0.95	-72.49	69.91	-1.7	-3.06	-212.18	-380.93	8.28	5.1	277.26	170.86	7.22
47	-3.2	-223.73	-463.55	-0.83	-6.26	-167.35	-1257.8	15.07	14.25	611.08	577.68	-6.05
48	-10.03	779.95	-1280.98	9.47	-14.2	1395.39	-2091.1	10.23	10.45	350.04	357.63	2.83
49	-6.62	-376.15	-667.36	-9.24	-12.4	-1494.43	-2004.89	11.89	6.76	427.06	242.98	0.11
50	0.56	-11.79	82.38	-10.1	-6.59	-1560.61	-1017.42	3.72	6.17	146.5	243.17	3.91
51	-7.7	-2159.73	-1312.71	-3.8	2.86	-753.19	566.81	5.42	-1.24	239.84	-55.01	3.26
52	5.98	723.44	640.82	3.12	12.43	338.29	1348.86	10.48	8.4	454.79	364.47	4.62
53	-9.74	-100.72	-1425.9	-2.13	-8.07	-407.98	-1545.76	6.94	2.22	258.92	82.93	-2.69
54	3.4	373.48	284.07	-3.71	-3.59	-737.65	-713.74	13.77	16.35	571.19	678.34	-6.68
55	9.91	1008.22	1489.31	8.11	13.57	1509.77	2525.92	5.98	4.94	260.46	214.92	0.14

	pcllgpt	acllgmd	acllgpt	pctlgmd	pctlgpt	actlgmd	actlgpt	pcbtpfmd	pcbtpfpt	acbtpfmd	acbtpfpt	pcbrpfmd
1	9.11	560.45	1365.76	-0.57	4.56	-140.18	1117.83	3.43	0.1	1.8	0.05	3.76
2	-3.47	-267.55	-487.78	7.76	6.36	1517.73	1243.47	-3.05	-7.36	-1.17	-2.81	-2.93
3	4.19	771	509	2.97	-2.45	649	-536	-2.01	0.4	-1	0.2	-1.87
4	0.23	638.28	23.47	1.89	5.87	345.25	1070.85	-4.28	-2.23	-1.74	-0.91	-4.09
5	3.65	893.89	365.3	6.34	7.18	960.14	1086.37	-7.06	-4.5	-2.81	-1.79	-6.92
6	-0.1	672.54	-12.68	1.37	1.94	319.63	451.17	-22.58	-22.18	-6.85	-6.73	-22.66
7	-3.67	124.36	-482.09	5.33	-1.22	1217.77	-277.93	-5.97	-2.76	-2.47	-1.14	-5.88
8	1.35	116.18	199.49	-2.6	4.9	-591.81	1114.16	1.51	3.93	0.59	1.54	1.61
9	0.23	-139.34	25.88	5.75	6.59	961.68	1102.93	-2.38	-2.03	-1	-0.86	-2.29
10	-3.11	527.03	-523.12	15.56	12.19	3617.63	2834.84	-6.16	-0.72	-3.23	-0.38	-5.92
11	-3.52	-2991.82	-671.99	-4.69	4.07	-1229.97	1067.14	-1.61	-6.77	-0.75	-3.15	-2.16
12	-20.3	-0.11	-3384	0	-2.65	0.1	-620	-0.07	5.91	-0.04	2.9	-0.08
13	-1.89	-409.72	-240.05	4.21	4.43	869.17	913.32	-1.56	-1.09	-0.67	-0.47	-1.51
14	-2.87	-154.37	-383.5	5.9	7.11	1158.66	1395.86	-1.22	-0.43	-0.6	-0.21	-1.02
15	-4.64	-1074	-664	-2.92	-0.37	-604	-77	6.98	6.05	3	2.6	6.99
16	1.23	134.14	123.76	1.57	4.05	243.63	628.3	2.02	0.05	0.92	0.02	1.97
17	-9.37	-553.33	-1012.33	3.05	-1.46	567.77	-272.24	8.44	9.9	2.9	3.4	8.65
18	0.58	528.52	84.88	-0.44	2.79	-99.11	634.82	-4.46	-4.09	-1.89	-1.73	-4.42
19	1.13	279.48	141.4	2	0.61	404.78	123.66	-5.77	-8.3	-2.8	-4.03	-5.78
20	5.96	386.97	710.69	4.47	9.71	821.48	1783.73	-3.51	-6.61	-1.71	-3.21	-3.36
21	0.1	414.86	14.87	11.49	4.44	2393.19	925.69	2.65	6.74	1.19	3.01	3.33
22	0.12	328.32	10.32	-0.75	-5.29	-127.4	-897.4	-0.83	0.1	-0.36	0.04	-0.86
23	2.26	.	236.56	.	0.05	.	9.52	.	2.81	.	1.54	.
24	0.88	638.96	103.96	6.24	-1.19	1108.32	-211.68	-2.74	0.22	-1.11	0.09	-2.66
25	2.45	-322.58	269.42	-0.45	0.96	-84.58	180.42	5	5.26	1.94	2.04	5.25
26	9.7	1216.67	1182.18	-3.51	-2.99	-820	-697.56	-1.23	-0.72	-0.55	-0.32	-1.04
27	-2.1	26.14	-249.86	-5.45	-2.18	-978.49	-391.49	1.88	-0.6	0.91	-0.29	1.57
28	-4.7	-957	-790	0.73	-1.55	204	-430	0.21	2.14	0.1	1	0.22
29	-7.46	-768	-1058	-4.84	-3.95	-1124	-917	-0.78	-2.91	-0.4	-1.5	-0.99
30	-5.82	-463.5	-679.5	0.24	-5.83	47.22	-1136.78	2.54	4.77	1.14	2.14	2.4
31	3.17	100.17	369.17	2.24	-3.24	403.03	-582.98	-3.03	2.05	-1.25	0.85	-2.93
32	-0.83	338.68	-100.32	-2.08	2.85	-376.68	515.32	-1.75	-1.27	-0.73	-0.53	-1.88
33	-1.63	-568.57	-206.24	-5.17	-4.08	-1024.85	-809.34	6	4.68	2.27	1.78	5.96
34	19.37	1885.11	2758.11	11.62	0.42	2495.23	90.23	2.03	4.85	1.15	2.75	2.41
35	-0.68	-295.17	-81.63	7.34	3.52	1254.73	601.83	-4.37	-5.57	-1.25	-1.59	-4.29
36	-6.89	-1740.32	-904.77	5.45	3.45	926.51	587	-3.89	-2.68	-2.23	-1.53	-3.94
37	-1.15	-354.34	-141.36	9.88	4.75	1921	923.4	-6.34	-6.63	-2.64	-2.75	-6.21
38	3.76	-880.33	493.44	-6.27	0.1	-1414.16	23.56	3.32	-13.21	1.34	-5.33	3.24
39	-3.28	181.96	-429.7	9.56	0.3	1638.89	51.12	-4.54	5.77	-1.45	1.84	-4.38
40	5.32	283.02	713.21	5.62	10.79	1265.54	2429.3	-2.16	-4.31	-0.89	-1.77	-1.99
41	6.11	261.15	680.81	10.36	4.54	1824.41	799.82	-3.01	-1.86	-1.47	-0.9	-2.79
42	8.6	450.35	1000.11	-0.72	0.55	-144.5	111.12	-6.47	-12.91	-1.79	-3.57	-6.46
43	-4.94	-1741.56	-848.9	-6.36	0.99	-1708.31	264.76	3.72	1.2	1.79	0.58	3.52
44	5.35	1366.39	556.04	7.73	10.43	1315.55	1774.85	-3.88	-3.26	-1.65	-1.39	-3.71
45	2.82	495.5	280.88	5.22	2.21	957.34	405.25	-6.79	-4.73	-2.32	-1.62	-6.55
46	2.16	772.93	231.24	0.83	0.12	166.17	24.44	-2.65	-0.05	-1	-0.02	-2.58
47	-4.5	-774.42	-576.64	5.75	8.35	1109.08	1611.09	-1.41	-3.67	-0.7	-1.82	-1.41
48	-2.83	352.7	-352.46	-1.65	-0.96	-314.95	-183.59	4.35	-5.92	1.93	-2.62	4.4
49	2.11	13.57	266.27	1.61	3.39	325.32	684.13	-4.69	-7.23	-2.01	-3.1	-4.65
50	9.58	466.59	1142.93	-0.96	1.89	-192.28	378	-3.41	-4.08	-1.61	-1.92	-3.42
51	-3.49	438.17	-468.87	2.75	1.72	602.42	375.66	-5.3	-0.91	-2.6	-0.45	-5.17
52	4.15	679.39	609.87	5.27	6.52	1181.3	1461.73	-0.71	1.7	-0.25	0.61	-0.45
53	-6.41	-317.39	-756.4	4.35	-4.41	879.23	-890.69	-1.43	-2.23	-0.71	-1.1	-1.38
54	-8.43	-1083.1	-1367.61	-3.63	-4.64	-977.74	-1249.84	1.7	2.47	0.65	0.95	1.57
55	5.03	20.85	763.04	2.77	3.23	613.19	714.81	2.59	3.28	1.18	1.5	2.61

	pcbrpfpt	acbrpfmd	acbrpfpt	pcbfgmd	pcbfgpt	acbfgmd	acbfgpt	pcblgmd	pcblgpt	acblgmd	acblgpt	pcbffmmd
1	0.41	1.92	0.21	8.77	7.62	4492.46	3903.7	1.17	7.53	541.61	3484.35	0.73
2	-7.24	-1.08	-2.66	-1.19	-8.89	-304.04	-2277.17	3.85	2.62	1595.34	1087.82	3.53
3	0.41	-0.9	0.2	-0.03	3.01	-11	1212	4.16	2.45	1695	996	3.7
4	-2.09	-1.61	-0.82	-3.42	-0.09	-814.34	-22.19	3.85	3.93	1342.13	1367.27	3.36
5	-4.11	-2.66	-1.58	-4.46	-2.09	-930.22	-436.23	7.6	5.39	2385.81	1692.45	7.07
6	-22.19	-6.61	-6.47	-27.11	-27.67	-5173.89	-5281.11	3.41	1.68	1496.15	738.31	3.04
7	-2.72	-2.35	-1.09	-6.79	-6.7	-2091.18	-2062.8	3.29	-2.27	1438.02	-989.19	2.91
8	4.3	0.61	1.64	1.8	9.87	520.97	2856.5	-0.7	2.97	-314.38	1331.93	-0.8
9	-1.72	-0.94	-0.71	0.44	1.23	100.85	279.38	4.68	4.73	1458.98	1474.98	4.43
10	-0.46	-3.01	-0.23	-2.88	3.22	-1475.89	1652.91	10.54	4.63	4900.49	2150.85	9.57
11	-6.9	-0.98	-3.13	-9.68	-10.5	-4452.76	-4831.74	-6.92	1.48	-3654.18	783.71	-6.03
12	5.47	-0.04	2.6	0	3.51	0.08	1629	0	-7.83	0.45	-3779	0
13	-0.98	-0.63	-0.41	-1.04	0.05	-313.32	15.46	1.7	2.08	688.36	841.71	1.56
14	-0.24	-0.48	-0.11	0.74	2.61	290.65	1028.13	3.19	3.47	1301.02	1417.91	2.71
15	6.02	2.9	2.5	18.96	9.87	6041	3145	-2.97	-1.03	-1257	-434	-2.46
16	0.12	0.87	0.05	4.23	2.68	1129.67	716.37	0.46	2.57	146.44	825.15	0.63
17	9.86	2.86	3.26	13.72	12.31	2557.92	2295.92	0.24	-3.08	85.56	-1101.44	0.38
18	-4.31	-1.82	-1.77	-5.2	-5.04	-1739.1	-1683.59	2.47	2.17	1122.88	987.51	2.25
19	-8.29	-2.71	-3.89	-7.71	-12.49	-2859.78	-4633.53	3.28	2.82	1291.69	1111.41	2.95
20	-6.3	-1.58	-2.96	-2.79	-5.12	-988.95	-1811.53	4.1	8.11	1532.54	3034.75	3.58
21	7.26	1.43	3.13	13.46	17.76	4647.98	6130.91	8.16	4.29	3486.43	1832.51	7.04
22	-0.14	-0.36	-0.06	-0.37	-2.37	-86.92	-554.92	1.12	-2.6	343.35	-794.65	1.08
23	2.92	.	1.55	.	7.05	.	2958.97	.	0.74	.	257.29	.
24	0.16	-1.04	0.06	0.56	0.09	136.8	22.8	5.52	-0.16	1980.02	-57.98	5.06
25	5.52	1.95	2.05	6.95	10.22	1612.41	2370.41	-1.43	1.29	-525.24	471.76	-1.39
26	-0.41	-0.45	-0.18	1.77	3.71	584.98	1226.79	4.04	4.9	1666.46	2017.46	3.64
27	-0.78	0.74	-0.36	0.45	-3.7	155.45	-1283.55	-3.01	-2.55	-1110.94	-940.94	-2.62
28	2.2	0.1	1	-1.63	0.88	-755	409	-2.12	-3.11	-1125	-1647	-1.91
29	-3.18	-0.5	-1.6	-5.94	-8.96	-2802	-4226	-4.44	-3.55	-1976	-1577	-4.06
30	4.7	1.04	2.04	3.55	2.32	1091.62	713.62	-0.94	-6.21	-357.34	-2360.34	-0.9
31	2.1	-1.16	0.84	-4.19	3.03	-1085	786	0.75	-0.51	275.69	-188.31	0.41
32	-1.13	-0.76	-0.46	-3.13	-0.34	-832.23	-91.23	0.01	1.67	5.46	618.46	0.05
33	4.68	2.19	1.72	4.6	5.1	1105.8	1225.65	-4.93	-2.57	-1939.61	-1012.02	-4.7
34	5.13	1.33	2.83	9.02	12.09	5285.41	7085.41	4.03	0.07	1799.13	32.13	3.45
35	-5.66	-1.18	-1.55	-2.61	-5.4	-366.73	-760.05	3.62	2.38	1278.75	840.6	3.41
36	-2.65	-2.19	-1.47	-9.96	-4.77	-4874.65	-2335.81	-1.44	1.22	-527.76	447.97	-1.65
37	-6.3	-2.49	-2.53	-5.46	-7.83	-1504.38	-2158.56	5.49	3.22	2130.65	1248.91	5
38	-13.29	1.27	-5.19	0.45	-18.57	133.61	-5474.57	-4.95	2.39	-2160.64	1044.34	-4.72
39	5.98	-1.33	1.81	-0.32	8.52	-54.9	1478.38	6.64	-0.12	2463.79	-43.04	6.24
40	-3.91	-0.79	-1.56	0.38	0.31	117.53	95.17	4.15	8.11	1825.48	3571.39	3.77
41	-1.71	-1.3	-0.8	1.4	1.24	460.56	409.8	7.52	5.13	2625.27	1790.97	6.85
42	-12.94	-1.73	-3.46	-7.21	-13.61	-1071.11	-2023.98	1.67	4.3	650.35	1669.29	1.54
43	1.37	1.65	0.64	2.99	5.39	1431.59	2575.55	-4.14	3.11	-2124.29	1598.9	-3.59
44	-2.96	-1.52	-1.21	1.31	1.3	329.41	327.01	8.43	7.2	2849.98	2433.34	7.92
45	-4.62	-2.14	-1.51	-4.76	-4.36	-862.59	-789.62	5.77	3.05	2016.73	1066.13	5.15
46	0.19	-0.94	0.07	-0.97	1.24	-215.71	276.29	3.36	1.19	1237.23	437.04	3.16
47	-5.73	-0.68	-2.74	-1.21	-3.97	-462.07	-1522.76	1.59	3.42	622.55	1335.99	1.51
48	-6.05	1.89	-2.6	9.07	-10.54	2735.03	-3178.26	0.89	-0.57	338.52	-215.69	1
49	-7.29	-1.93	-3.02	-5.86	-9.36	-1715.74	-2740.01	2.25	3.02	874.8	1178.11	1.97
50	-3.95	-1.55	-1.79	-4.98	-2.99	-1708.17	-1025.84	1.36	5	523.82	1932.36	1.17
51	-1.11	-2.46	-0.53	-7.02	-2.29	-2893.88	-944.67	3.21	-0.39	1368.75	-165.18	2.66
52	1.79	-0.15	0.61	4.17	8.37	1023.31	2054.33	5.32	5.58	2362.29	2479.34	4.89
53	-2.52	-0.66	-1.21	-0.74	-8.11	-278.98	-3069.96	2.12	-3.94	816.33	-1514.21	1.92
54	2.42	0.59	0.91	0.66	0.26	209.46	81.4	-2.07	-3.68	-1046.76	-1864.12	-1.83
55	3.58	1.16	1.59	6.63	10.33	2480.6	3863.95	1.68	3.75	749.13	1672.07	1.76

	pcbffmpt	acbffmmd	acbffmpt	totload1	totload2	upper1	upper2	lower1	lower2	pctotlod	pcupplod	pclowlod
1	6.64	361.38	3270.7	454213	555727.3	109394.9	134659.1	344818.2	421068.2	22.35	23.09	22.11
2	2.16	1554.81	954.15	403573.9	431761.4	80085.21	99863.64	323488.6	331897.7	6.98	24.7	2.6
3	2.16	1607	938	502225.1	580840.9	70704.57	91022.73	431520.5	489818.2	15.65	28.74	13.51
4	3.36	1240.26	1237.95	270849.4	365818.2	63042.62	75909.09	207806.8	289909.1	35.06	20.41	39.51
5	4.89	2363.81	1636.25	407511.3	502051.1	76534.1	98039.77	330977.2	404011.4	23.2	28.1	22.07
6	1.46	1409.81	677.25	384761.4	475681.8	98136.37	94920.45	286625	380761.4	23.63	-3.28	32.84
7	-2.2	1344.58	-1015.65	393244.3	471151.1	80181.8	107096.6	313062.5	364054.6	19.81	33.57	16.29
8	2.53	-377.01	1194.03	345406.2	302698.9	79451.69	66494.32	265954.5	236204.6	-12.36	-16.31	-11.19
9	4.36	1450.14	1425.38	203707.4	199863.6	52980.12	58454.55	150727.3	141409.1	-1.89	10.33	-6.18
10	4.01	4732.17	1983.76	254740.3	225085.2	44423.28	471.59	210317	224613.6	-11.64	-98.94	6.8
11	1.58	-3331.46	872.32	386570.5	451801.1	93204.54	132392.1	293365.9	319409.1	16.87	42.04	8.88
12	-6.96	0.04	-3583	426617.5	186079.6	94504.51	35448.86	332113	150630.7	-56.38	-62.49	-54.64
13	1.86	663.19	789.78	324233	540704.6	81108	120000	243125	420704.6	66.76	47.95	73.04
14	2.91	1198.47	1288.45	302125	370568.2	51988.66	49090.91	250136.4	321477.3	22.65	-5.57	28.52
15	-0.64	-1102	-286	355993.1	384121.6	79517.04	85073.86	276476.1	299047.7	7.9	6.99	8.16
16	2.33	213.71	794.18	303505.6	510181.8	65539.77	109227.3	237965.9	400954.6	68.1	66.66	68.49
17	-2.72	142.69	-1029.32	269835.2	305403.4	51903.37	66051.14	217931.8	239352.3	13.18	27.26	9.83
18	2.03	1072.85	971.09	325664.8	403090.9	84732.97	92386.36	240931.8	310704.6	23.77	9.03	28.96
19	2.34	1241.08	985.51	349451.7	524122.2	77332.35	107855.1	272119.4	416267.1	49.98	39.47	52.97
20	7.07	1429.39	2826.01	290738.7	427448.9	57295.49	87448.86	233443.2	340000	47.02	52.63	45.65
21	3.62	3212.64	1649.25	393272.7	534590.9	83727.27	111863.6	309545.5	422727.3	35.93	33.6	36.56
22	-2.3	349.54	-743.46	127146.6	166951.7	30420.43	43076.7	96726.14	123875	31.31	41.6	28.07
23	0.59	.	218.04	0	0	0	0	0	0	0	0	0
24	-0.22	1929.74	-84.26	0	0	0	0	0	0	0	0	0
25	1.17	-544.34	457.66	0	0	0	0	0	0	0	0	0
26	4.43	1591.64	1935.84	0	0	0	0	0	0	0	0	0
27	-2.15	-1034.77	-850.77	0	0	0	0	0	0	0	0	0
28	-2.85	-1057	-1584	0	0	0	0	0	0	0	0	0
29	-3.22	-1896	-1505	0	0	0	0	0	0	0	0	0
30	-5.72	-360.43	-2301.43	0	0	0	0	0	0	0	0	0
31	-0.52	160.57	-203.43	0	0	0	0	0	0	0	0	0
32	1.59	18.79	624.79	0	0	0	0	0	0	0	0	0
33	-2.42	-1942.28	-1000.27	0	0	0	0	0	0	0	0	0
34	-0.01	1644.6	-4.4	0	0	0	0	0	0	0	0	0
35	2.19	1269.24	813.73	390912.7	514073.6	78590.91	95986.36	312321.8	418087.3	31.51	22.13	33.86
36	0.92	-644.82	361.94	438314.6	320352.8	99900	67525.57	338414.6	252827.3	-26.91	-32.41	-25.29
37	2.74	2057.34	1126.95	362388.2	276199.3	98868.18	66772.73	263520	209426.6	-23.78	-32.46	-20.53
38	1.9	-2169.2	872.1	402739.5	506211.8	111731.8	136859.1	291007.6	369352.7	25.69	22.49	26.92
39	-0.05	2492.67	-21.12	392744.6	484212.7	89740.91	102809.1	303003.6	381403.6	23.29	14.56	25.87
40	7.32	1744.15	3388.9	573342.7	374422.2	108204.6	160399.4	465138.2	214022.7	-34.69	48.24	-53.99
41	4.57	2579.71	1721.96	460033.6	321036.4	105950	69704.55	354083.6	251331.8	-30.21	-34.21	-29.02
42	3.95	626.49	1606.57	425956.8	549001.8	77220.45	83663.64	348736.4	465338.2	28.89	8.34	33.44
43	2.65	-1948.82	1436.29	537136.4	718535.5	127490.9	162259.1	409645.5	556276.4	33.77	27.27	35.79
44	6.5	2867.49	2353.47	447769.1	362403.4	96509.09	69494.32	351260	292909.1	-19.06	-27.99	-16.61
45	2.58	1918.02	961.76	394617.3	549472.7	86786.36	107927.3	307830.9	441545.5	39.24	24.36	43.44
46	1.02	1231.13	398.46	389765.5	366406.3	90190.91	77792.61	299574.6	288613.6	-5.99	-13.75	-3.66
47	2.95	630.35	1234.27	520470	600569.3	126431.8	141392.1	394038.2	459177.3	15.39	11.83	16.53
48	-0.54	398.79	-216.15	505340	562073.9	109172.7	116096.6	396167.3	445977.3	11.23	6.34	12.57
49	2.66	817	1100.1	464073.6	590140.9	93559.09	122504.6	370514.6	467636.4	27.17	30.94	26.21
50	4.32	484.12	1782.06	368318.2	576152.7	74136.36	102381.8	294181.8	473770.9	56.43	38.1	61.05
51	-0.22	1206.72	-98.35	474274.1	271039.8	119256.8	66994.32	355017.3	204045.5	-42.85	-43.82	-42.53
52	5.15	2309.08	2432.77	575980	670625	124745.5	148465.9	451234.6	522159.1	16.43	19.02	15.72
53	-3.67	790.78	-1512.56	442330	496965.9	99104.55	78693.18	343225.5	418272.7	12.35	-20.6	21.87
54	-3.42	-969.21	-1811.4	426201.8	380796.6	111300	91528.41	314901.8	289268.2	-10.65	-17.76	-8.14
55	3.63	828.42	1706.04	429640.5	422698.9	99338.64	96903.41	330301.8	325795.5	-1.62	-2.45	-1.36

	totload3	upper3	lower3	aclower1	acupper1	aclower2	acupper2
1	1009940	244054	765886	102.27	22.73	148.3	36.94
2	835335	179949	655386	64.2	2.84	104.55	14.2
3	1083066	161727	921339	55.68	2.84	127.27	5.69
4	636668	138952	497716	72.73	2.84	131.24	19.89
5	909563	174574	734989	93.18	17.05	158.53	28.4
6	860443	193057	667386	115.34	25.57	198.3	25.57
7	864395	187278	677117	78.98	25.57	132.39	31.26
8	648105	145946	502159	87.5	22.73	157.96	31.24
9	403571	111435	292136	.	19.89	.	2.85
10	479826	44895	434931	118.18	0	118.18	0
11	838372	225597	612775	63.64	17.05	111.91	45.46
12	612697	129953	482744	7.38	11.38	44.36	17.06
13	864938	201108	663830	123.3	19.89	195.45	39.77
14	672693	101080	571614	70.45	-34.09	186.64	-34.09
15	740115	164591	575524	87.5	14.2	144.88	19.89
16	813688	174767	638920	121.59	28.41	165.92	36.92
17	575239	117955	457284	56.23	17.04	106.24	19.88
18	728756	177119	551636	55.68	17.04	88.06	42.61
19	873574	185188	688386	88.07	14.2	168.75	28.41
20	718188	144744	573443	114.77	11.36	159.09	31.26
21	927864	195591	732273	131.82	25.57	210.22	42.61
22	294098	73497	220601	53.98	22.73	111.36	31.25
23	0	0	0	.	.	-9.09	0
24	0	0	0	1.7	2.84	-27.85	5.68
25	0	0	0	0.01	0	27.84	2.84
26	0	0	0	13.65	-5.68	-44.3	-5.68
27	0	0	0	2.85	-2.84	-8.52	17.04
28	0	0	0	-1.14	-8.52	35.78	28.4
29	0	0	0	-11.94	-14.2	-57.95	-2.84
30	0	0	0	.	.	-21.6	14.2
31	0	0	0	-28.97	-11.36	-5.68	-5.68
32	0	0	0	1.71	-2.84	-18.17	-2.84
33	0	0	0	4.53	-5.68	-22.73	8.52
34	0	0	0	1.71	-5.68	-6.26	0
35	904986	174577	730409	116.5	22.8	147.7	45.53
36	758667	167426	591242	78.4	25.6	181.24	34.09
37	638588	165641	472947	71	31.2	110.75	45.42
38	908951	248591	660360	91	28.3	126.17	36.86
39	876957	192550	684407	117.6	22.8	165.39	22.71
40	947765	268604	679161	131.2	36.9	248.96	59.6
41	781070	175655	605416	77.7	25.5	138.52	36.88
42	974959	160884	814075	155.1	0	167.6	11.35
43	1255672	289750	965922	162	42.6	272.84	48.23
44	810173	166003	644169	76.2	2.8	137.45	25.52
45	944090	194714	749376	171	25.5	214.19	36.93
46	756172	167984	588188	96.6	2.8	205.16	19.79
47	1121039	267824	853216	89.7	19.9	156.25	42.58
48	1067414	225269	842145	120.3	19.9	184.59	31.22
49	1054215	216064	838151	94.2	31.3	155.02	31.27
50	944471	176518	767953	106.8	17	181.26	31.25
51	745314	186251	559063	65.9	23.4	295.44	104.65
52	1246605	273211	973394	84.6	34	144.79	51.08
53	939296	177798	761498	90.9	25.5	175.01	31.18
54	806998	202828	604170	56.8	31.3	122.72	34.06
55	852339	196242	656097	93.2	25.6	163.05	39.76

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Zbap	Dependent Variable
1	Zbap1
2	Zbap3

Between-Subjects Factors

		Value Label	N
Trainig Group	1	R	21
	3	C	12
	5	VR	21

Descriptive Statistics

	Trainig Group	Mean	Std. Deviation	N
Zscore: bap pre	R	0.1286748	0.97798173	21
	C	-0.1922921	0.56123666	12
	VR	-0.0567694	0.76597118	21
	Total	-0.0147683	0.81466942	54
Zscore: bap post	R	0.0942761	1.08492136	21
	C	-0.3167772	0.66794338	12
	VR	-0.0615491	0.84804316	21
	Total	-0.0576678	0.91242014	54

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		of Squares	df	Mean Square	F	Sig.
Zbap	Sphericity Assumed	0.075	1	0.075	0.437	0.512
	Greenhouse-	0.075	1.000	0.075	0.437	0.512
	Huynh-Feldt	0.075	1.000	0.075	0.437	0.512
	Lower-bound	0.075	1.000	0.075	0.437	0.512
Zbap * group	Sphericity Assumed	0.056	2	0.028	0.163	0.850
	Greenhouse-	0.056	2.000	0.028	0.163	0.850
	Huynh-Feldt	0.056	2.000	0.028	0.163	0.850
	Lower-bound	0.056	2.000	0.028	0.163	0.850
Error(Zbap)	Sphericity Assumed	8.760	51	0.172		
	Greenhouse-	8.760	51.000	0.172		
	Huynh-Feldt	8.760	51.000	0.172		
	Lower-bound	8.760	51.000	0.172		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Zbap	of Squares	df	Mean Square	F	Sig.
Zbap	Linear	0.075	1	0.075	0.437	0.512
Zbap * group	Linear	0.056	2	0.028	0.163	0.850
Error(Zbap)	Linear	8.760	51	0.172		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Squares	df	Mean Square	F	Sig.
Intercept	0.458	1	0.458	0.341	0.562
group	2.082	2	1.041	0.776	0.465
Error	68.400	51	1.341		

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

ZCTX	Variable
1	ZCTX1
2	ZCTX3

Between-Subjects Factors

		Value Label	N
Trainig Group	1	R	22
	3	C	12
	5	VR	21

Descriptive Statistics

	Trainig Group	Mean	Std. Deviation	N
Zscore: ctx pre	R	0.2698712	1.20871532	22
	C	-0.0760330	0.98796723	12
	VR	-0.2392748	0.69671868	21
	Total	0.0000000	1.00000000	55
Zscore: ctx post	R	0.3060738	1.07565979	22
	C	-0.1833242	0.82885036	12
	VR	-0.2158921	0.96700771	21
	Total	0.0000000	1.00000000	55

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Squares	df	Mean Square	F	Sig.
ZCTX	Sphericity	0.006	1	0.006	0.013	0.910
	Greenhouse-	0.006	1.000	0.006	0.013	0.910
	Huynh-Feldt	0.006	1.000	0.006	0.013	0.910
	Lower-bound	0.006	1.000	0.006	0.013	0.910
ZCTX * group	Sphericity	0.089	2	0.045	0.089	0.915
	Greenhouse-	0.089	2.000	0.045	0.089	0.915
	Huynh-Feldt	0.089	2.000	0.045	0.089	0.915
	Lower-bound	0.089	2.000	0.045	0.089	0.915
Error(ZCTX)	Sphericity	26.113	52	0.502		
	Greenhouse-	26.113	52.000	0.502		
	Huynh-Feldt	26.113	52.000	0.502		
	Lower-bound	26.113	52.000	0.502		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	ZCTX	Squares	df	Mean Square	F	Sig.
ZCTX	Linear	0.006	1	0.006	0.013	0.910
ZCTX * group	Linear	0.089	2	0.045	0.089	0.915
Error(ZCTX)	Linear	26.113	52	0.502		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Squares	df	Mean Square	F	Sig.
Intercept	0.054	1	0.054	0.037	0.847
group	6.228	2	3.114	2.143	0.128
Error	75.570	52	1.453		

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

zrat	Dependent Variable
1	zratpre
2	zratpost

Between-Subjects Factors

		Value Label	N
Trainig Group	1	R	21
	3	C	12
	5	VR	21

Descriptive Statistics

	Trainig Group	Mean	Deviation	N
zratpre	R	-0.8862	2.59483	21
	C	0.3157	1.31021	12
	VR	1.2750	11.52518	21
	Total	0.2214	7.34503	54
zratpost	R	1.6054	6.75441	21
	C	0.2418	1.40990	12
	VR	0.1990	1.35446	21
	Total	0.7554	4.33468	54

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		of Squares	df	Mean Square	F	Sig.
zrat	Sphericity Assumed	5.040	1	5.040	0.155	0.696
	Greenhouse-Geisser	5.040	1.000	5.040	0.155	0.696
	Huynh-Feldt	5.040	1.000	5.040	0.155	0.696
	Lower-bound	5.040	1.000	5.040	0.155	0.696
zrat * group	Sphericity Assumed	69.677	2	34.839	1.069	0.351
	Greenhouse-Geisser	69.677	2.000	34.839	1.069	0.351
	Huynh-Feldt	69.677	2.000	34.839	1.069	0.351
	Lower-bound	69.677	2.000	34.839	1.069	0.351
Error(zrat)	Sphericity Assumed	1,662.354	51	32.595		
	Greenhouse-Geisser	1,662.354	51.000	32.595		
	Huynh-Feldt	1,662.354	51.000	32.595		
	Lower-bound	1,662.354	51.000	32.595		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	zrat	of Squares	df	Mean Square	F	Sig.
zrat	Linear	5.040	1	5.040	0.155	0.696
zrat * group	Linear	69.677	2	34.839	1.069	0.351
Error(zrat)	Linear	1,662.354	51	32.595		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Squares	df	Mean Square	F	Sig.
Intercept	21.185	1	21.185	0.510	0.478
group	4.347	2	2.174	0.052	0.949
Error	2,118.784	51	41.545		