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The purpose of this study was to compare the effectiveness of teaching volleyball to college women through the "Fingertip" and "Attack" methods. Effectiveness was considered in terms of the results of competitive play, the number of points scored and the reduction of ball-handling fouls in game situations, and the achievement of earlier, later, and continued success in playing as measured by Clifton's "Single Hit Volley Test for Women's Volleyball." The "Fingertip" method consisted primarily of the commonly recommended fingertip skills while the "Attack" method consisted primarily of the fisting skills recommended by Davis.

Thirty-seven college women served as subjects for the study. The study consisted of fourteen class meetings. The subjects were divided into a control and an experimental group and were instructed by the "Fingertip" and "Attack" methods respectively. The groups which were equated according to skill by Pretest scores on the Clifton Test received separate classes of instruction and practice.

Clifton Test scores were gathered at three intervals: the Pretest before classes began, the Retest after five classes of instruction and practice, and the Post Test after eleven classes of instruction and practice. The data collected from the Clifton Tests were treated statistically by means of Fisher's "t" test of significance of difference between means. The formula for correlated means was used to compare within group

differences while the formula for uncorrelated means was used to test between group differences. The formula for uncorrelated means was also used to compare the number of points scored per individual and per group, and the number of ball-handling fouls occurring during team competition.

Conclusions drawn from this study indicated that neither the "Fingertip" nor the "Attack" method was more effective in promoting the achievement of earlier success in playing. Furthermore, one method was not more effective than the other in terms of reduction of ball-handling fouls committed by individuals. Neither method provided individuals of one group with more effective skills in terms of scoring a greater number of points during competitive play. However, the "Attack" method was more effective in lessening ball-handling fouls committed by a team and also in promoting a higher team score. The "Attack" method was concluded to be generally superior in promoting continued success in volleyball playing ability.

# A COMPARISON OF THE EFFECTIVENESS OF TEACHING VOLLEYBALL THROUGH THE "FINGERTIP" METHOD AND THE "ATTACK" METHOD

by

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# CHAPTER I

## INTRODUCTION

When William G. Morgan tossed a light battered basketball bladder to a group of YMCA businessmen who could not physically withstand the demands of the more rigorous game of basketball, he could not have foreseen the remarkable growth of the sport. Following this accidental experimentation in 1895, the sport which evolved moved from indoors to outdoors, and volleyball quickly became a popular sport throughout the United States. Today over sixty million Americans take part in volleyball, (25) the most popular participant sport in the United States. (9)

A number of factors account for the widespread growth and continued popularity of the game as it is known today. It has been found to be adaptable to many school and playground situations, indoors as well as outdoors. It can be played during any season by few or by many as an organized sport on the schoolground, or it can be played as a leisure-time activity in backyards or on beaches. Boys and girls, separately or together, may be involved in this game which challenges people of all levels of skill. Since its beginning, volleyball has proved to be an economical way of providing physical activity. Also, it is an interesting way for people to work together if

they are intent upon their playing and concentrate upon doing more than merely batting the ball back and forth over the net. Although many schools in the United States had accepted volleyball as a worthwhile sport in their physical education program, a real boost for the sport's extensive growth came during World War I. American soldiers stationed abroad began playing volleyball during their recreational periods and then introduced it to friendly neighbors at home. This was probably one of the greatest influencing factors on the early growth of the sport. Other factors helped to perpetuate the development of volleyball. In 1920 the National Amateur Athletic Federation adopted volleyball as an official activity and subsequently appointed a member of the Women's Division as a representative to the Official Volleyball Rules Committee. By 1926, the Red Cover Series of the Spalding Athletic Library featured special volleyball rules for girls and women. Meanwhile, the National Section on Women's Athletics, an American Physical Education Association division, began work to establish an entirely different set of rules for girls and women. These rules were published in 1937. The NSWA later became the National Section for Girls and Women's Sports and published a book which included volleyball rules. The NSGWS became the Division of Girls and Women's Sports and is now a part of the parent organization which is known as the American Association of Health, Physical Education, and Recreation. The DGWS publishes a book which includes rules, standards, instructions in officiating, and professional teaching and coaching articles. (25)

Since the invention of the game, when the participants did little more than bat the volleyball around, the sport has changed considerably, becoming a faster, more aggressive, "harder-hitting" game. One important factor which was responsible for much of this change in the girls and women's game was the DGWS rule change in 1957 which reduced the consecutive double tap for each player to the single tap. With this change came a more controlled team effort and a more concentrated attention on the perfecting of passing and offensive skills. Also a result of the deletion of the set-up to self was the more rigid officiating of ball-handling fouls. In order to avoid much of this fouling, players became more dependent upon and put more faith in fisting skills. (47)

Another important reason for the development of a faster-moving game for girls and women was the inclusion of volleyball in the 1960 Olympics. (37) The importance of the high caliber of playing required to produce champions was felt when the Japanese women won the 1960 Olympics by large margins, displaying tremendous skills in handling hard-hit balls close to the floor or high in the air, with their fists as well as their fingertips. These dedicated team members were factory workers and received no extra pay for their efforts. Later, the Japanese touring team produced much awe and interest not only in the players themselves, but in the style of playing which they used. All over the United States those who viewed the women, whether in person or on television, were impressed with their playing.

Many notable changes, especially the extensive utilization of the fisting skills, were seen in their style of volleyball.

The new style of volleyball which has evolved since 1960 has caused considerable refinement in the quality of the game. A number of volleyball workshops and clinics sponsored by colleges and other interested organizations have not only helped in this refinement, but have also added to the growth of the sport. However some people still follow the more prevalent method of using the fingertips in handling all balls rather than allowing, teaching, or encouraging the use of the fisting skills. There has been much discussion as to which method should be advocated and/or taught. Schaafsma (47), at the Fourth National Institute on Girls' Sports stated that the trend has been away from resisting the use of the fisting skills and toward a learning of them. The writer was interested in learning whether the conventional fingertip skills or the fisting skills were superior.

## CHAPTER II

## STATEMENT OF PROBLEM

The purpose of this study was to compare the effectiveness of teaching volleyball to college women through the "Fingertip" method and the "Attack" method.

## DEFINITION OF TERMS

### Fingertip Method

The "Fingertip" method consisted primarily of the conventional or commonly recommended fingertip skills. Subjects using this method were taught to contact balls, whether above or below the waistline, with the fingertips. The only exception to this was the use of the fist for the serve.

### Attack Method

The "Attack" method consisted of the fisting skills, the one hand dig, thumb dig, simple double fist dig, reversed double fist dig, chop, and cupped hand spike, all recommended by Davis. (43) Subjects were taught to contact all balls below the waistline and particular ones above the waistline, hard serves and spikes, with their fists. The only exception to fisting was the use of the fingertips for the overhead volley.

### Effectiveness

Effectiveness was considered in terms of the results

of competitive play, the number of points scored, the reduction of ball-handling fouls, and the achievement of earlier, later, and continued success in playing as measured by Clifton's "Single Hit Volley Test for Women's Volleyball." (31)

# CHAPTER III

## REVIEW OF LITERATURE

### Ball-Handling Methods

As early as 1928 when volleyball was beginning to become a popular sport in girls and women's physical education programs, the use of fists for playing the ball was being mentioned. In an early publication on women's volleyball, Katherine Montgomery (18) noted that, while the best method of serving the ball was with the open palm, serving the ball with the fist was allowed and, in fact, advocated for players with weak wrists or for getting the desired spin. Of special interest in Montgomery's book were the pictures of volleyball players with their hands clearly in fisting positions, demonstrating a defensive play for meeting a low ball in front and a lunge to meet a low ball at the side. It seems that these girls must have inadvertently placed their hands this way for no mention of such a playing position was discussed in the analyses of skills. Montgomery stressed the use of the fingertip skills for handling the ball.

As late as 1955 the open hand method of playing was still emphasized for girls and women. The use of fingertips in volleying was stressed to prevent lifting and scooping. (2)

Miller and Ley (17), although advocates of the inside fleshy parts of the fingers and thumbs, suggested the use of a

one-handed fist hit in emergency cases where a lunge or long reach was necessary and the player was unable to get in line with or under a low ball. The open hands, however, were recommended in the net recovery.

Although the DGWS single tap rule was already in effect in 1958, Paterson (20) discussing the most common way of hitting the ball, the volley, said that a player should ". . . offer the fleshy part of the fingers as contact surface to the ball." (20:359) For the spike and the recovery from the net this was the advocated position. However, fisting was suggested for the serve.

In 1960 the method of using the fingertips for the underhand volley, the overhead volley, and the net recovery was also the suggestion of Vannier and Poindexter (27) and, as late as 1964, Cowell and Schwehn (7) were urging players of all levels to handle the ball in this same manner. The latter specifically stated that beginners should avoid the use of the hand or the fist.

By 1965 many authorities were recognizing the value of the more frequent use of the fisting skills. Meyer and Schwartz (16) advocated the use of the fingertips but noted that the dig pass, executed with the fist, was a more advanced method of handling balls hit downward by an opponent, particularly spikes.

Humiston and Michel (10) had a different view. They advocated returning low volleys exclusively with clenched fists, facing the palms up or down, and using either fists or fingertips

for the high volleys. At the same time, they did make it clear that greater accuracy is achieved by hitting the ball with the fingertips rather than the whole hand.

In the most current compilation of the advocated techniques, Barnes, et al. (3) said that the preferred fundamental technique for the chest level or higher ball is the overhead chest pass using ". . . the pads of the ten fingers." (3:438) The use of the closed fist was suggested for balls which cannot be reached by dropping to one or both knees, for serves, and for net recoveries that often lead to lifting or holding fouls.

Ball-handling skills are probably the most critical skills to be developed. (9) However, there is disagreement among authorities as to which particular skill is the most important.

Egstrom and Schaafsma (9) stated in their discussion of ball-handling skills that the pass in volleyball is an important skill requiring much practice. Emery (8) was more specific, stating that the most important pass in volleyball is probably the two-handed chest pass. He added that it should be mastered by everyone on the team because it is the most accurate way of advancing the ball to the set up player at the net. Danford (32) and Chiappy (30) agreed that if it is possible to say that any one skill in volleyball is more important than any other it is passing. Odeneal and Wilson (19) contended that the key to volleyball success is serve receiving.

More recently, authorities have recognized and acknowledged that the dig pass definitely has an important place in

the game of volleyball. (8) Some authorities feel the dig pass can and should be used both offensively and defensively and consider it to be a fundamental and accepted part of the game. (28) Others believe the dig pass, though it is fast becoming popularized, is now used almost exclusively by those who have achieved higher levels of skill. (9)

There are good reasons for the emphasis on the dig pass: (1) It has been known to mean the difference between gaining a point and losing a point. (2) It has been said that ". . . the greatest single turning point in actual competition lies in the execution of the dig pass." (38:38)(3) It is so important that inability to execute the pass correctly can result in almost complete disaster even for a strong offensive team. When it is properly executed, the dig pass can force the opposing team to alter its style of play. (28) (4) The closed-hand underhand pass allows youngsters to begin participating in the game earlier than would be feasible when using only "ordinary" skills. (40:105)

The purpose of the dig pass is to get the ball into the air and thus provide a teammate with the opportunity to make a good set or placement. (34) This is called the recovery purpose. "Court sense" is required of the player in determining when to employ this type of pass. (9)

Authorities have suggested particular times for possible use of the dig pass. Odeneal and Wilson (19), Welch (28), and Laveaga (12) stated that the dig pass may be used when serves are difficult and are coming fast and low, and when serves are

hit directly toward a player at an angle impossible to play the ball. The dig pass may also be used when balls come in so low that a chest pass would result in a holding violation. Welch (28) and Emery (8) added that if the spiker is being blocked, he must be able to make a quick recovery shot or retrieve the ball out of the net, and therefore might use a dig pass. Emery (8), Danford (32), and Kellam (34) have also supported the idea that in order to avoid having ball-handling fouls called on the team, especially holding, teachers and coaches substitute acceptable techniques of handling the low ball. These are the dig passes. Emery further stated that the dig pass is ". . . an important means of fielding balls almost out of the reach of the player." (8:21)

The idea of when the dig should be used was clearly defined by Egstrom and Schaafsma (9). In cautioning players to use closed hand skills discreetly, they emphasized that these should not be used whenever the overhead pass is possible.

According to Trotter (25), the ideal contact is the overhead finger volley, but since it is not always possible, variations of the dig are appropriate. She recommended that beginning classes and recreational volleyball groups be allowed to use the underhand finger volley in passing the ball, but stressed that intermediate, advanced, and competitive groups need alternate skills such as the one and two-handed dig passes for playing balls which drop below the waistline. Particular instances noted when the dig would be appropriate for "saving" or picking up the ball

were the receiving of powerfully driven spikes untouched by blockers, and serves, particularly those which are forceful and spinning. In addition, digs were recommended as the surest way of executing net recoveries.

Many times volleyball skills, unless properly executed, lead to the violation of the game rules. For this reason, Wickstrom (40) expressed concern about teaching children volleyball skills. An example which he cited as a skill which tends to result in a violation was the underhand pass. He suggested that when there is no safer alternative for playing the ball, the pass should be made with a closed hand or closed hands. This technique should be used only when making defensive or emergency passes.

The idea of the selective use of the fisting skills was discussed by Laveaga (12) who said that better control will be achieved if an attempt is made to play the ball with a chest pass; however, this is sometimes impossible. The chest pass is the skill that most players are taught to use whenever possible. Nevertheless,

> . . . occasionally it is necessary to use an underhand pass but it should be used only as a last resort because with the underhand pass there is danger of holding the ball and thus committing a foul. (12:24)

Although there are many advantages of using the dig pass, there is also a significant disadvantage to be considered. This lies in the fact that, because of the small playing surface of the hand being used and the amount of spin put on the ball being

fielded, less control is achieved. However, it should be pointed out that the dig can be mastered to such a degree that a dead ball without spin on it can be brought to a playable position. (8)

While acknowledging the overhead finger volley as an essential part of the game because it is the most controlled method of passing the ball, Davis (43) contended that the best method for making an underhand pass is the fist dig. Fisting skills were advocated for beginners because they are not capable of performing a controlled finger volley within a short period of time. Reasons given for this were that they do not have the needed skill or the strength. It was contended that "Attack Volleyball" equips the beginner with passing skills other than the finger volley with which she can participate in an aggressive, offensive game. Furthermore, the "Attack" game ". . . attempts to give any player, regardless of her skill, the same excitement and challenges that advanced volleyball presents to the highly skilled player." (43:28) The beginner then, is given the time for the development of the conditioning and movement patterns which are necessary for volleying the ball. It was suggested that this program using "Attack" skills could, with minor revisions, probably be adapted to any group of beginners from the seventh grade through college.

Staley (23) also recommended that emphasis be placed on "Attack" skills in teaching beginners. It was suggested that time be taken to teach and practice these skills for they add excitement and challenge to the game. It was emphasized that offensive techniques should not be reserved exclusively for

experienced players for there are "Attack" skills suitable to every team member, regardless of her skill.

Related Studies

Examination of the literature revealed that investigations concerning particular factors in the playing of volleyball have been made. Areas that have been studied are: volleying performance factors, skill, velocity, and accuracy tests, history and development, and methods. There were no methods studies found, however, in which separate groups were taught different volleyball skills for the purpose of comparing different methods of playing volleyball.

Cheesman (42) studied the relationship of height of college women to performance in a wall volley test which required three trials at each of three distances, three, five, and seven feet. Volleying at each distance was continuous for a period of fifteen seconds. The study revealed that the taller girls had higher mean scores at the three, five, and seven-foot restraining lines than the shorter girls. There was a significant difference at the seven-foot line when the scores of the taller girls were compared with scores of other girls. The wall volley test was considered a reliable measure of volleyball playing ability. As administered, the test had a high validity when the sum of three trials at each of the three distances was compared with the sum of the judges' ratings. It was also noted that there was an improvement in scores with each trial.

West (48) investigated the factors of height and motor ability in relation to success on three selected wall volley tests at the three-foot and seven-foot lines and the West Test which has no restraining line.

In order to facilitate analysis of the tests for the effective determination of playing ability, judges' ratings were used. Reliability coefficients of .98, .97, and .98 were obtained for the three-foot, seven-foot, and West Test respectively. Validities for the wall volley test, when correlated with the judges' ratings, were as follows: $r = .79$ for the three-foot test, $r = .81$ for the seven-foot test, and $r = .83$ for the West Test. The highest measure of validity was obtained by comparing the sum of the total scores at each distance with the judges' ratings. The validity coefficients of the West Test were consistently higher for the entire group than the tests which required restraining lines.

On each test for the selected groups, there was a significant difference between mean scores. West also concluded that there was a statistically significant correlation between height and total scores at each distance with the highest correlation being at the three-foot mark.

Scores showed improvement with practice for best scores were made on the last trial of each test. It was West's suggestion that beginning players use the three-foot test and skilled players use the West Test.

Camp (41) did a study involving high school girls who were given a single-hit repeated volleys test at each of three distances on two successive days. Reliability coefficients were .92, .89, and .88 when the test was given at three, five, and seven feet respectively. There was little relationship found between height and the distances at which the test was taken.

Butler (29) examined the relationship between scores of high school girls on the velocity serve test and accuracy scores obtained on the French and Cooper Placement serve test. Reliabilities for these tests were determined by the correlation of the odd and even scores using the Pearson-Product Moment Method. The resulting correlation coefficient for the velocity serve test was .97 and was raised to .98 for ten serves by the Spearman-Brown Prophecy Formula. The French and Cooper Placement Test had a reliability coefficient of .74 which became .84 for ten serves by application of the prediction formula. A resulting coefficient of .159 was obtained when the test scores of the two measures were correlated. This provided rather conclusive evidence that the tests were not measuring the same thing. It was found that the French and Cooper test did not measure the degree to which a subject was able to execute her intentions by placing the ball in a certain stated area, and it did not measure the subject's ability to execute a serve that was low in relation to the net. Therefore, the validity of the French and Cooper serving test was questioned for it did not appear to accomplish its design. (29)

Liba and Stauff (35) developed a test to assess the ability to execute a volleyball chest pass. The recommendation was that this test be incorporated into the program for beginners. The authors defined good performance in this skill as the ability to pass the ball to a desired height and desired distance. A number of what were called "desired trajectories" were identified according to the age level of those taking the test and the particular situation in which the pass might be used. It was noted that this test was adaptable to any of the desired trajectories.

The subjects for the test were college women and junior high school girls who took a slightly modified version of the test. The college women took a test for a trajectory having a passer-receiver distance of twenty feet and a desired height of about fifteen feet. A similar test was given the other group except for the trajectory for the younger group having a passer-receiver distance of twelve feet and a height of thirteen feet.

Using procedures to estimate reliability suggested by Feldt and McKee, Liba and Stauff obtained estimated reliability coefficients for college women of .82 and .78 for ten trials on a single day. These coefficients were claimed to be quite adequate for many purposes which were not enumerated in the study. For five trials recorded on each of two days, the coefficient estimates of .85 were recorded for the two groups respectively. It was found that junior high school girls did not perform as reliably as college women.

The authors felt that the skill or student behavior had been adequately and specifically defined so that there was no doubt that the volleyball chest pass was the skill being measured. Performance had been defined in terms of desired height and desired distance the ball should travel. The test was designed to measure both of these elements. The distances achieved were measured and logical validity was claimed for the proposed test as a measure of the ability to execute a volleyball chest pass. No attempt was made to establish the validity of the suggested pass test as a measure of volleyball playing ability.

Nelson (36) was concerned with skill in a different manner. He investigated the velocity of the spiked volleyball and concluded that either McCloy's previous study was in error or that his own study was in error. He reported that McCloy had found a mean velocity of 91'/second (62 mph) and a maximum velocity of 162'/second (110 mph), while he found that the maximum velocity observed in the spikes of eight highly skilled spikers from the best teams in the 1961 National Tournament was 67.7 mph. Nelson also suggested that both studies might be accurate or both might be erroneous. It was suggested that there be further replication of the experiment since it could not be determined which experiment was correct.

Interesting research dealing with the development of the game of volleyball has been done. Rodick (46) studied the forces affecting the development of the sport in the United States. He found that the game was well liked because it could be played

with simple rules and equipment and was a good indoor diversion. Schools, playgrounds, and especially YMCA's were important in fostering the game. Also, servicemen who learned the game during World War I helped to spread it throughout the Unites States. Following a national tournament, the United States Volleyball Association was formed in 1928 to provide centralized leadership. Although the growth slowed during the depression, interest continued and the doubles game was introduced. Another upsurge in participation was brought about by World War II. The rules and techniques were refined after this because so many people were participating in the sport. In 1947 the International Volleyball Federation was formed and ten years later the International Olympic Committee added volleyball to the Olympic Games.

Jensen (44) investigated the history and development of volleyball for girls and women. An extensive investigation was made of volleyball guides for women which had been published since 1926. She traced the evolution of volleyball rules for girls and women and described the values of the sport in physical education and recreational programs. The importance of the YMCA in the growth of the sport was noted because of its influence on playgrounds, parks, armed forces, schools and industries. Major organizations and their roles in the growth of volleyball were also discussed.

North (45) conducted a study to test the efficiency of teaching volleyball by the "part" and the "whole" method. There was found to be no significant difference between and within

group gains at the end of the twelve week period of instruction. Although the scores did not indicate a significant difference between the means of scores, the "whole" method was said to be slightly better than the "part" method. This was shown by an examination of the gain in points scored. Of the six "whole" method groups participating, five showed a gain in points scored. In the "part" groups only one team showed a gain in the number of points scored while five teams showed losses. On the basis of the Brady Volleyball Test scores which were obtained at the beginning and end of the twelve week period, there was no statistical evidence in favor of either the "part" or the "whole" method.

Uses of Volleyball Skill Tests

Many authorities in the evaluation and measurement field, as well as those of volleyball, have recognized the usefulness of objective skill testing. McCloy (13) was concerned with progress measurements. Therefore, he emphasized the measuring of achievement in specific sports. He said that because most achievement tests available in 1942 were so time-consuming, the use of ratings was generally preferred. After studying the use of available achievement tests, McCloy suggested that the element of chance, so predominant in tests given to novices, could be greatly reduced by testing seasoned players. In doing this, he contended, there would be a definite increase in the validity and reliability of the tests.

Scott and French (21) felt testing was a device for teaching as well as learning, and emphasized particular times in the learning period when knowledge of the relative status of the students' acquired skills would be desirable. A cited example was the beginning of a sport season when the division of classes or the selection of squad members within a class is beneficial in meeting the needs of a group of individuals with highly homogeneous abilities. This objective method of sectioning produces more satisfactory teaching and more competitive players; such teams can then be matched by players' abilities. There is also a value in determining the status at the end of the unit, for a student is usually interested in the extent of his improvement.

Recording improvement by an accurate measuring stick at definite intervals in the course of the pupil's education was advocated by Bovard, Cozens, and Hagman. (5) It was recommended that this measuring stick be applied when the instructor knows nothing of the ability of his students. It can be again beneficial at the end of a teaching period in indicating the actual results achieved. Objective measuring by means of skill tests may further serve in group comparisons and in objective estimations of the relative efficiency of individual pupils.

By 1950 the National Research Council of the American Association of Health, Physical Education, and Recreation Association (1) noted that progress had been made in the development of better skill tests. However, it did warn teachers to refrain from drawing limiting individual conclusions on the basis of test

scores, and to exercise wise judgment in their interpretation and use of the data.

Just one year later, Larson and Yocom (11), using skills as a basis, presented achievement scales for various sports. One of them was volleyball. They claimed ". . . these selections are of sufficient scope to yield an excellent measurement of sports ability." (11:196)

McCloy and Young (14) stated that achievement tests in sports, in order to be practicable, must not only be valid, but administrable to large groups. They felt a test should be used for developing as well as for measuring skill when at all possible.

Stroup (24) was of the opinion, although he did not deal in specific examples, that skill tests could be very useful even though they were not completely valid.

Three major purposes of skill testing in physical education were listed by Clarke (6) to be: (1) the determination of achievement and progress made by pupils in the various activities, thus evaluating the progress of each pupil and increasing his interest in the program; (2) the classification of pupils according to levels of ability and the equating of groups in specific sports for class . . . competition; and (3) the measurement of progress toward educational objectives.

Mathews (15) also noted the value of skill tests and pointed out such advantages as the use of ability scores for

classification of students . . . and equation of teams. In discussing the usefulness of skill tests, Mathews said that " . . . simply placing participants with similar scores on opposite teams is an effective way of equating the teams." (15:161)

More recently, Barrow and McGee (4) stated that measurement, when applied to the student, may be used for classification and evaluation purposes.

Volleyball authorities have suggested particular instances when objective wall volley tests might be used. In a recent article West claimed that the wall volley test ". . . can be used at the beginning of a unit to classify students into homogeneous teaching groups." (39:33) This was not a new recommendation. As early as 1937 French and Cooper recognized the value of objective skill tests in volleyball. In stating the results of their skill test study they noted that "the best single test for classifying is the Repeated Volleys Test with a reliability coefficient equal to .7162." (33:156) They also stated their battery, which included the Repeated Volleys Test, was neither difficult to administer and score nor costly in time and equipment. They recommended this test for classification and diagnostic purposes. (39)

For several years the French and Cooper Repeated Volleys Test (33) was used for many of the reasons listed by the authorities. In 1959 Scott and French (22) recommended the Repeated Volleys Test by French and Cooper as the best single volleyball test for girls and women. Simultaneously, they recognized the

change in rules prohibiting the setting up of a ball to oneself in girls' and women's volleyball as a possible source of complications in the recommended tests. They did not know how the test would be affected if it were altered to coincide with the rules.

Marguerite Clifton (31), cognizant of the rule changes, conducted a study in 1960 which took into account the single tap rule change. She developed a test to evaluate volleying ability of college women students. She obtained a reliability coefficient of .83 for the sum of trials one and two at the seven-foot restraining line, and a validity coefficient of .70 when correlated with a subjective rating criterion of five judges.

Authorities have emphasized the positive values of skill tests as well as their limitations. It is often beneficial to use skill tests which are reliable, valid, objective and which are administrable to large groups. They may be used for classifying groups, noting achievement and progress in learning, making group comparisons, and equating and evaluating teams. In general, they may be used in measuring sports ability.

# CHAPTER IV

## PROCEDURE

The purpose of this study was to compare the effectiveness of teaching volleyball to college women through the "Fingertip" method and the "Attack" method. Effectiveness was considered in terms of number of points scored in game situations, the reduction of fouls, and the achievement of earlier, later, and continued success in playing.

### Selection of Subjects

The subjects were thirty-seven women students enrolled in a physical education volleyball class at The University of North Carolina at Greensboro, Greensboro, North Carolina. The study was conducted during the first half of the spring semester of 1967. The class met for two days of instruction per week. During the first class period the students were given a brief explanation of the study and asked to cooperate in the experiment. The students were told they would be given a skill test on three occasions with their initial test scores to be used for dividing them into two equated groups. These groups would meet separately for half hour periods and would be taught by two different methods. After eleven lessons, they would meet for tournament play. The importance of attending classes and participating faithfully was emphasized.

## Selection of Skill Test

After surveying evaluation and measurement sources in physical education, it was decided that a skill test was an appropriate means of equating, classifying, and evaluating subjects. Clifton's "Single Hit Volley Test for Women's Volleyball" (31) was the only skill test found that took into account the 1957 DGWS single tap rule change. Furthermore, the subjects participating in the Clifton Test were college women as were the subjects participating in the present study. The test had sufficiently high reliability and validity coefficients and was purported to be a measure of volleyball playing ability. It could be administered easily to a large group in a short period of time. Therefore, it was considered the most appropriate skill test for use in this study.

## Training of Assistants

Sixteen volunteer undergraduate physical education majors assisted in administering the Clifton Test. A training session for the assistants was held prior to administering the initial test to acquaint them with the testing procedures and duties. During the practice session one student served as a subject taking the test while the remainder observed. One part of the group watched the taped line on the floor for foot faults and the other part of the group watched for volleying and wall violations. The line judges were told to call "foul" every time the subject crossed the restraining line while the persons scoring were told

to count the number of legal volleys completed during the designated time. The individual judges' scores were compared to check the reliability in calling violations. Scoring procedures were then explained. The score cards were examined by the assistants who were shown where the recording was to be done and how a score was to be obtained. An example of the score card appears in the Appendix A, Page 65. The assistants were told that the subject would be given one such card which she would hand to the judge calling volleying violations. The whole procedure of testing was repeated a number of times until the writer felt the assistants were proficient at both jobs. Directions for administering the Clifton Test appear in the Appendix B, Page 67.

Administration of Pretest

During the second class meeting, the Clifton Test, "Single Hit Volley Test for Women's Volleyball," was administered to the class members. Eight testing stations which met the specifications of the Clifton Test were used. The assistants were asked to report to their stations. The subjects were handed their score cards and were given testing instructions. A volleying demonstration was given by an assistant to acquaint the students with testing procedures. They were allowed to report to any stations providing there were no more than five people in each group. A short volleying practice period was allowed each girl. When all had completed this practice, the assistants notified the timer who then began the actual testing. The writer served as the timer for all

volleying tests except one make-up test for one subject. The make-up test was given during the class period following the time it was originally scheduled. Following her first trial of the test, the subject moved to an area a sufficient distance away so as not to interfere with the person being tested. After her second trial the subject was instructed to wait for the remainder of the group to complete their tests. Assistants collected score cards after the second trial. Upon the completion of testing, the assistants totaled the scores and checked for possible errors in recording and/or adding.

Designation of Groups

The 3:00 to 4:00 P. M. class was divided into two groups, the control and the experimental. The control group was taught "Fingertip" or conventional skills, the overhead and underhand finger volleys, the open hand spike, the overhand, underhand, and sidearm serves, and the block. The experimental group was taught "Attack" or fisting skills, the one hand dig, thumb dig, simple double fist dig, reversed double fist dig, chop, and cupped hand spike as recommended by Davis. (43) They were also taught the overhead finger volley, the overhand, underhand, and sidearm serves, and the block. The control group was assigned the 3:00 to 3:30 P. M. time period in order that the experimental group reporting to the gymnasium to begin class promptly at 3:30 P. M. would see only skills with which they were familiar.

Because the groups met for half hour classes with one group meeting exactly on the hour and the other ending at the end of the hour, students' class schedules had to be considered. This was accomplished by the students designating the times of their classes prior to and after the volleyball class on a sheet distributed in class.

Students were ranked on the basis of their Clifton Test scores. They were then assigned to groups by random selection. Two changes in groups were made because of conflicts presented by the students' time schedules. Ranks were kept the same by interchanging equal scores.

To insure the equality of the two groups, Fisher's "t" test of significance of difference between independent means was applied to the results of the initial skill test. The results indicated no significant difference between the groups as shown in Table I.

At the third class meeting of the semester the subjects were notified of the group to which they were assigned. The control group was asked to report on the hour and the experimental group on the half hour.

## Methods of Instruction

The two groups met together for the first three class periods. During the first meeting the class regulations, dressing, attendance, and participation, were explained. During the second class meeting, the Clifton Test was administered to the

TABLE I

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS
OF CONTROL AND EXPERIMENTAL
GROUPS PRETEST

| Between Group Means | Means | "t" |
|---|---|---|
| Control | 12.58 | .37 |
| Experimental | 13.47 | |

subjects. During the first class lesson they were taught the overhead finger volley, a skill required by both groups. At this time they were informed of the separate time schedules they were to follow. During the following eight separate class meetings, the groups were taught either by the "Fingertip" method or the "Attack" method. The "Fingertip" method consisted of the commonly recommended overhead and underhand finger volleys, the open hand spike, the overhand, underhand, and sidearm serves, and the block. The "Attack" method consisted primarily of the one hand dig, thumb dig, simple double fist dig, reversed double fist dig, chop, and cupped hand spike, all recommended by Davis. (43) In addition, the "Attack" method group were taught the overhead finger volley, the overhand, underhand, and sidearm serves, and the block. The same basic order of skill presentation, division of teams, emphasis on strategy, amount of practice, and stress of enthusiastic playing was followed in both groups. The subjects were made aware of the importance of the consistent use of their assigned methods of playing. The importance of adhering to their designated methods was emphasized throughout the experiment. Class members reminded each other to use their designated methods. Lesson plans may be found in Appendix C, Page 69.

Retest

Upon completion of five classes of instruction and practice, the Clifton Test was again administered to determine

if there had been a significant improvement between and within the groups.

Post Test and Between Group Competition

After nine classes of instruction and practice, each group was divided into teams on the basis of the Retest scores. Within the control group, the nine subjects with the higher scores, ranging from fifteen to thirty-one, constituted Team One. The ten subjects with the lower scores, ranging from four to fifteen, constituted Team Two. Within the experimental group the same procedure was followed for establishing teams. The nine subjects with higher scores ranging from seventeen to forty-two constituted Team One and the nine subjects with lower scores ranging from four to sixteen constituted Team Two. These teams were designated in order to provide an opportunity for subjects to work together in a fairly homogeneous group and to plan team strategies.

After the tenth and eleventh classes in which the newly formed teams practiced together, Team Two from each group competed in a match while Team One from each group was administered the Post Test by the assistants. The Clifton Test was again used.

The matches were played according to official DGWS rules with the exception of the method of rotation. Subjects not participating were assigned to an area adjacent to the left forward position. With each rotation, the first person in the waiting line moved into the left forward position and the person in the

left back position, moved to the end of the waiting line. This method of rotation allowed everyone to participate approximately the same amount of time and allowed substitutes to move onto the court in an orderly manner. During the competition, graduate physical education students holding national DGWS officials' ratings officiated the matches. At the same time other graduate physical education students recorded fouls committed by each team.

During the thirteenth class meeting, Team One subjects from each group played a match while Team Two subjects were administered the Post Test. The same testing and officiating procedures previously described were used. At this time, one subject was dropped from the study because of an injury. Her scores on the Pretest and Retest were disregarded because of her inability to complete the Post Test. Raw scores for all subjects appear in the Appendix D, Page 75.

## Treatment of Data

Before beginning instruction a "t" test of significance of difference for small uncorrelated groups was computed between the means of the Pretest scores on the Clifton Test for each group. This was for the purpose of determining if the groups were equated. The test was repeated a second and third time to determine whether there was a between group difference at the half-way point and at the end of instruction.

To determine whether there was a significant difference between the first and second trials, the second and third trials, and the first and third trials of the Clifton Test scores, a Fisher's "t" test of significance for small correlated groups was computed.

In order to determine whether one group had committed significantly fewer ball-handling violations than the other group, a "t" test of significance of difference for small uncorrelated groups was computed between the means of the total number of fouls committed by each group during the matches.

A "t" test of significance of difference between the means of the total number of points scored in the matches by each group was computed to determine if one group had scored significantly higher than the other.

The same "t" technique was used to determine if the higher skilled of one group had scored higher per game than had the higher skilled of the other group. The same procedure was repeated for the lower skilled of each group.

# CHAPTER V

## ANALYSIS AND INTERPRETATION OF DATA

The purpose of this study was to compare the effectiveness of teaching volleyball to college women through the "Fingertip" method and the "Attack" method. Effectiveness was considered in terms of achievement of earlier, later, and continued success in playing, the reduction of fouls, and the number of points scored in a game situation.

### Between Group Differences

Between group differences in playing ability were tested by comparing the results of Clifton's "Single Hit Volley Test for Women's Volleyball." (31) The Clifton Test was administered to the control and experimental groups three times during the study. The Pretest was given prior to beginning instruction, the Retest after five classes of instruction and practice, and the Post Test after eleven classes of instruction and practice.

Fisher's "t" test of significance of difference between means of small uncorrelated groups was used to compare between group data. The formula was:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\Sigma x_1^2 + \Sigma x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$$

(26:380)

Pretest. A statistical comparison of the Pretest scores on the Clifton Test was made to determine if the groups were equated before instruction began. There was no significant difference between the means of the Pretest scores as shown in Table II, Page 37. The "t" value was .37; "t" = 1.70 was required to signify a significant difference between the means.

Retest. The Clifton Test was again administered to each group after five classes of instruction and practice. The computed "t" indicated no significant difference between the group means. The data appear in Table II, Page 37.

Post Test. The same "t" technique was applied to the control and experimental groups' Post Test scores gathered after eleven classes of instruction and practice. No significant difference was found between the means as shown by the resulting "t" of 1.31 contained in Table II, Page 37.

## Interpretation of Between Group Data

A statistical comparison of the means of the Pretest, Retest, and Post Test of the Clifton Test revealed several things about the between group data. Initially, the groups were equated in skill as indicated by the "t" value of .37 which resulted from Fisher's test of significance of difference between means of the Pretest. Application of the same "t" technique to the means of the Retest scores showed that according to the obtained "t" of .93, the groups were still equated in skill after five lessons. However, both group means on the Retest showed an increase. When

TABLE II

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS
OF CONTROL AND EXPERIMENTAL GROUPS
AT DIFFERENT INTERVALS

| Test | N | Group | Means | "t" |
|---|---|---|---|---|
| Pretest | 19 | Control | 12.58 | .37 |
| | 17 | Experimental | 13.47 | |
| Retest | 19 | Control | 16.58 | .93 |
| | 17 | Experimental | 19.41 | |
| Post Test | 19 | Control | 16.05 | 1.31 |
| | 17 | Experimental | 19.29 | |

the Clifton Test was again administered after eleven lessons, both group means of the Post Test scores fell below the level achieved on the Retest. Although the experimental method mean remained greater than that of the control method mean, the resulting "t" of 1.31 of the test of significance of difference between the means was not significant. This information suggested that the skill levels of the groups remained statistically equal throughout the study. After five and after eleven lessons, there was no difference in the results of the methods used by the groups.

Within Group Differences

The results obtained from the Pretest, Retest, and Post Test scores on the Clifton Test were used to compare within group differences. The formula used was:

$$t = \frac{\bar{D}}{\sqrt{\frac{\Sigma d^2}{N(N-1)}}}$$

(26:383)

Pretest to Retest. A "t" was computed within the control and experimental groups to determine if there were a change in volleyball playing ability as indicated by the difference between the means of the Pretest and Retest scores on the Clifton Test. The "t" values for the control and experimental groups were found to be 3.79 and 3.66 respectively. Both values were

significant at the one per cent level of confidence. These data are shown in Table III, Page 40.

Retest to Post Test. A "t" was also computed for within group differences from the Retest to the Post Test for the purpose of determining if a change in volleyball playing ability had occurred in that period of time. The "t" values of .38 and .08 found for the control and experimental groups respectively signified no significant difference within either group.

Pretest to Post Test. To determine if a change occurred in the Clifton Test scores from the initial collection of data to the end of the experiment, another "t" was computed for each group. The "t" value for the control group was 2.19 which was significant at the five per cent level of confidence. A "t" value of 3.48 was found for the experimental group. This value was significant at the one per cent level of confidence. These data are presented in Table III, Page 40.

## Interpretation of Within Group Data

Within group differences were studied by use of the "t" test of significance of difference between correlated means. Fluctuation of the group means showed that changes in the scores within the groups had occurred. For example, from the Pretest to the Retest, both groups showed significant changes in their scores as noted by the obtained "t's." For the control group the "t" value was 3.79, while for the experimental group it was 3.66. Both of the values which were significant at the

TABLE III

WITHIN GROUP DIFFERENCES OF CONTROL AND EXPERIMENTAL MEANS AT DIFFERENT INTERVALS

| | Control (N=19) | | Experimental (N=17) | |
|---|---|---|---|---|
| Tests | Means | "t" | Means | "t" |
| Pretest | 12.58 | 3.79* | 13.47 | 3.66* |
| Retest | 16.58 | | 19.41 | |
| Retest | 16.58 | .38 | 19.41 | .08 |
| Post Test | 16.05 | | 19.29 | |
| Pretest | 12.58 | 2.19** | 13.47 | 3.48* |
| Post Test | 16.05 | | 19.29 | |

*Significant at the one per cent level of confidence.
**Significant at the five per cent level of confidence.

one per cent level of confidence indicated that the increase in volleyball playing ability after five lessons was due to some factor other than chance. Since the groups were equated in skill prior to instruction and practice, were taught specifically assigned methods of playing, and were given equal practice time, the increases in volleyball playing ability were attributed to the methods used by the groups. Thus, the control and experimental methods appeared equally effective in improving volleyball playing ability, as measured by the Clifton Test, within five lessons.

The means of Post Test scores in both groups dropped somewhat from those on the Retest; however, no significant change in volleyball playing ability was found. This was revealed by the "t" values of .38 and .08 on the applied tests of significance of difference between means. In both groups the initial learning was greater than the later learning. It seemed that both groups reached a plateau of learning after five classes of instruction and practice.

Both groups had statistically significant increases in volleyball playing ability as shown by the "t" test results from the Pretest to the Post Test. While there was no increase from lessons six to eleven, the difference at the end of the study was still real. Therefore, there was no loss of learning which could be noted. In addition, the obtained "t" of 3.48 for the experimental group was more highly significant than that of 2.19 for the control group which was significant at the five per

cent level of confidence. This suggested some difference between the two methods and further suggested that more faith might be placed in the experimental method as a means of developing playing ability.

Reduction in Fouls

In order to determine if one method contributed to playing with fewer ball-handling violations by the individual team members, a "t" test of significance of difference between means of small uncorrelated groups was computed. The "t" test was computed between the means of the total number of ball-handling fouls committed during competition by individuals in the control and experimental groups. The resulting value of t = .78 was not significant. These data appear in Table IV, Page 43.

A "t" test of significance of difference between means of small uncorrelated groups was also computed between the mean number of ball-handling fouls committed per game by the control and experimental groups. In Table V are shown the data with the obtained value of 3.07 significant at the five per cent level of confidence. This revealed that the experimental group scored fewer ball-handling violations than did the control group.

Interpretation of Reduction in Fouls Data

The mean number of ball-handling fouls committed by individuals of one group was not greater than that of the other group when the data were compared statistically. Therefore, it was shown that in game situations, individual players of one group

TABLE IV

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN FOULS OF INDIVIDUALS OF CONTROL AND EXPERIMENTAL GROUPS DURING COMPETITION

| Groups | Number of Players | Total Group Fouls | Mean Fouls Per Player | "t" |
|---|---|---|---|---|
| Control | 19 | 16 | .84 | .78 |
| Experimental | 18 | 5 | .28 | |

TABLE V

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN FOULS PER GAME OF CONTROL AND EXPERIMENTAL GROUPS DURING COMPETITION

| Groups | Number of Games | Mean Fouls Per Game | "t" |
|---|---|---|---|
| Control | 4 | 4.00 | 3.07* |
| Experimental | 4 | 1.25 | |

*Significant at the five per cent level of confidence.

were not more responsible for ball-handling violations than were individual players of the other group. Certainly, the small number of games played was a factor which very likely influenced the results obtained. It is quite possible that more fouls would have been committed by individuals had a greater number of games been played.

Different results were obtained when the ball-handling fouls per game were considered in a statistical comparison. The experimental group scored 1.25 mean fouls and the control group scored 4.00 mean fouls per game. An obtained "t" value of 3.07 on these means was significant at the five per cent level of confidence. This provided evidence that when the subjects played four games, fewer ball-handling fouls were committed by the experimental group than by the control group. Therefore, it seemed that the "Attack" method was more effective than the "Fingertip" method in contributing to the reduction of ball-handling fouls committed by a team.

Number of Points Scored

In order to determine whether one method of playing was more effective than the other in terms of the number of points scored by individual players, a "t" test of significance of difference between mean points per player was computed. The resulting "t" of 1.33, shown in Table VI, Page 45, was not significant.

TABLE VI

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN POINTS SCORED BY INDIVIDUALS OF CONTROL AND EXPERIMENTAL GROUPS DURING COMPETITION

| Groups | N | Group Points | Mean Points Per Player | "t" |
|---|---|---|---|---|
| Control | 19 | 22 | 1.16 | |
| | | | | 1.33 |
| Experimental | 18 | 60 | 3.33 | |

The same "t" technique was also used to determine if there was a significant difference between the mean points per game scored by the control and experimental groups. The obtained result of 3.96 as shown in Table VII, Page 47, was found to be significant at the one per cent level of confidence.

A statistical comparison of the higher skilled of each group was made to determine if the higher skilled of one group had scored higher per game than had the higher skilled of the other group. The same procedure was repeated for the lower skilled of each group. The "t" values of 1.009 and .88 found for the higher and lower skilled respectively were not significant. These data appear in Table VIII, Page 47.

Interpretation of Scoring Data

The "t" test of significance of difference between mean points per individual players of each group showed that the difference was not significant. One method was not more effective than the other in providing individual players of one group with skills which would enable them to score a greater number of points during competition. Since the test was computed on the mean scores of only two games per group, perhaps the value would have changed if the subjects had competed in additional games or matches. The number of times which they played the ball was necessarily limited in two games.

The "t" test of significance of difference between the mean points per game revealed that the experimental method

TABLE VII

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN POINTS SCORED BY CONTROL AND EXPERIMENTAL GROUPS DURING COMPETITION

| Groups | N | Group Points | Mean Points Per Game | "t" |
|---|---|---|---|---|
| Control | 4 | 22 | 5.5 | |
| | | | | 3.96* |
| Experimental | 4 | 60 | 15.0 | |

*Significant at the one per cent level of confidence.

TABLE VIII

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN POINTS OF PLAYERS OF HIGH SKILL BETWEEN GROUPS

| Groups | N | Skill Level | Number of Games | Mean Points Per Game | "t" |
|---|---|---|---|---|---|
| Control | 9 | Higher | 2 | .78 | |
| | | | | | 1.009 |
| Experimental | 10 | Higher | 2 | 3.00 | |

group had scored significantly higher per game than had the control method group. Thus, it appeared that the experimental method was more effective in promoting better team scoring in a game. Again, the results might have changed if more games had been played by each group. Another factor may have affected the scoring. An exceptionally good server of the lower skilled experimental method team scored eleven consecutive points in one game and nine consecutive points in the second game. This unusually effective server tended to upset the other team to such an extent that they did not seem to play as well as usual.

The control group scored more points in the second games during both matches played. The newness of the "Attack" method of playing used by the opponents seemed to startle the control group during the initial games. Possibly, the control groups' scores would have continued increasing as they participated more and became more accustomed to seeing skills which were unfamiliar at first.

When a statistical comparison of the means of the scores of the higher skilled and another for the lower skilled of each group were made, the "t" values of 1.009 and .88 were found for the higher and lower skilled respectively. The lack of significant difference represented by these values showed that neither method promoted higher scoring by the groups.

The lesser skilled, as well as the higher skilled, of the experimental method group won both games in which they competed. This did lend support to the theories of Davis (43) and Staley (23)

TABLE IX

SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN POINTS OF PLAYERS OF LOW SKILL BETWEEN GROUPS

| Groups | N | Skill Level | Number of Games | Mean Points Per Player | "t" |
|---|---|---|---|---|---|
| Control | 10 | Lower | 2 | 1.50 | |
| | | | | | .88 |
| Experimental | 8 | Lower | 2 | 3.75 | |

who contended that the "Attack" method is the best method for beginners.

# CHAPTER VI

## SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER STUDY

### Summary

The purpose of this study was to compare the effectiveness of teaching volleyball to college women through the "Fingertip" method and the "Attack" method. Effectiveness was considered in terms of the results of competitive play, the number of points scored and the reduction of ball-handling fouls in game situations, and the achievement of earlier, later, and continued success in playing as measured by Clifton's "Single Hit Volley Test for Women's Volleyball." (31) The "Fingertip" method consisted primarily of the commonly recommended fingertip skills while the "Attack" method consisted primarily of the fisting skills recommended by Davis. (43)

The subjects for this study were thirty-seven women students enrolled in a physical education class at the University of North Carolina, Greensboro, North Carolina. The study consisted of fourteen class meetings. The subjects were divided into a control and an experimental group which were instructed by the "Fingertip" and the "Attack" methods respectively. The groups which were equated according to skill by the Pretest scores on the Clifton Test, received separate classes of instruction and practice.

Clifton Test scores were gathered at three intervals: the Pretest before instruction began, the Retest after five classes of instruction and practice, and the Post Test after eleven classes of instruction and practice. The data collected from the Clifton Tests were treated statistically by means of Fisher's "t" test of significance of difference between means. The formula for correlated means was used to compare within group differences while the formula for uncorrelated means was used to test between group differences.

A culminating activity of the study was actual team competition with the control and experimental groups competing against each other in two matches. On the basis of the Retest scores on the Clifton Test, each group was divided into two teams. This was done as a matter of convenience so that the higher skilled and the lesser skilled from each group would compete at their levels of ability. On the basis of the number of points scored, the number of ball-handling fouls committed, and the achievement of earlier success in playing as measured by the Clifton Test, comparisons of the "Attack" and "Fingertip" methods were made.

## Summary of Findings

In the initial phase of the study, the control and experimental groups were equated in skill according to Clifton Test scores. After five lessons, and again after eleven lessons, between group comparisons showed that neither group showed greater

improvement than the other in volleyball playing ability. Within each group, both methods provided the players with skills which promoted an increase in volleyball playing ability after five lessons. There was no further increase in the latter part of the study. However, over an extended period of time, a real difference was still found within each group.

During competition, individuals of one group were not more responsible for ball-handling violations or for scoring a greater number of points than were individuals of the other group. Teams of the experimental method group committed fewer ball-handling fouls and scored higher per game than did the control method group teams.

## Findings

The findings of this study were as follows:

1. Both methods provided the groups with skills which enabled them to achieve early success in playing.
2. The skill levels of the groups remained statistically equal throughout the study, regardless of method.
3. Initial learning within each group was greater than the later learning.
4. The experimental method was somewhat superior to the control method in continued playing success. Superiority was determined by the

more critical level of confidence at which the obtained results of a statistical comparison of Clifton Pretest and Post Test results were acceptable.

5. Over an extended period of instruction and practice, no loss of learning within either group could be noted.
6. Individual players of one group did not commit a greater number of ball-handling violations than individuals of the other group.
7. Fewer ball-handling violations per group were committed by the experimental group.
8. Individuals of one group did not score a greater number of points than individuals of the other group during competition.
9. The experimental group scored higher per game than did the control group.
10. The control group teams scored more points in the second games in which they competed than in their first games.
11. Neither method promoted higher scoring by the higher or the lower skilled players.

## Conclusions

Based on the results of this study, the following conclusions were drawn:

1. Neither the "Fingertip" nor the "Attack" method was more effective in promoting the achievement of earlier success in playing.
2. Neither method was more effective than the other in terms of reduction of ball-handling fouls committed by individuals.
3. The "Attack" method was more effective in contributing to the reduction of ball-handling fouls committed by a team.
4. Neither method was more effective in providing individuals of one group with skills which would enable them to score a greater number of points during competition.
5. The "Attack" method was more effective in promoting better team scoring in a game.
6. Generally, the "Attack" method seemed superior to the "Fingertip" method in promoting continued success in volleyball playing ability.

## RECOMMENDATIONS FOR FURTHER STUDY

The following are suggested areas which might be investigated:

1. Further comparisons of the "Attack" and "Fingertip" method are needed. The duration of the study should be longer. More competition should be held between

the groups in order to more accurately determine the effectiveness of the methods.

2. Appropriate skill tests for the "Attack" method of playing volleyball should be developed.

3. A study should be conducted to determine the spirited and enthusiastic participation promoted by the "Attack" method of playing.

4. Appropriate visual aids emphasizing proper "Attack" techniques should be constructed for classroom use.

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# APPENDIX

# APPENDIX A

SCORE CARD FOR CLIFTON TEST
SCORES AT DIFFERENT
INTERVALS

SCORE CARD

NAME _____ GROUP _____
last, first

| | PRETEST | RETEST | POST TEST |
|---|---|---|---|
| Date | | | |
| Trial 1 | | | |
| Trial 2 | | | |
| Score | | | |

# APPENDIX B

"SINGLE HIT VOLLEY TEST FOR WOMEN'S VOLLEYBALL"
(31)

Directions

1. Stand behind the restraining line, ball in hand.
2. On signal, "Ready, Go," toss the ball to wall with an underhand movement.
3. On the return of the ball, volley repeatedly against the wall above the restraining line for thirty seconds.
4. Only one contact of the ball is allowed for each volley. (No set-ups to self are allowed.)
5. Catch the ball at any time and restart with an underhand toss.
6. If control of the ball is lost, recover it, and start again with an underhand toss.
7. Rest for at least two minutes before the second trial.

Scoring

1. Ball must be clearly volleyed with one contact from behind the restraining line.
2. The volleyed ball must touch on or above the 7½' line.
3. One person counts number of legal volleys.
4. Another person counts number of times person steps on or over the restraining line. She informs the subject of the foul as it occurs by saying, "Foul."
5. Score for thirty second trial: Subtract the number of foot faults from the number of legal volleys touching on or above the 7½' wall line.
6. The sum of the two trials on the test is the subject's score.

# APPENDIX C

# LESSON PLANS FOR CONTROL AND EXPERIMENTAL GROUPS

## 1st Class Meeting

1. Explanation of class regulations
2. Request for participation in study

## 2nd Class Meeting

1. General thesis information
2. Directions for Clifton Test
3. Administration of Clifton Test

### CONTROL GROUP

**Lesson 1**

Objective:

1. Present overhead volley

Activities:

1. Drills: Circle with a Purpose, Wall Rebound, Captain Circle and Semi-Circle
2. Volley Game

**Lesson 2**

Objectives:

1. Review overhead volley
2. Explain "Fingertip" Method
3. Introduce underhand volley

Activities:

1. Partner Volley
2. Volley Game

**Lesson 3**

Objectives:

1. Review overhead volley

### EXPERIMENTAL GROUP

**Lesson 1**

Objective:

1. Present overhead volley

Activities:

1. Drills: Circle with a Purpose, Wall Rebound, Captain Circle and Semi-Circle
2. Volley Game

**Lesson 2**

Objectives:

1. Review overhead volley
2. Explain "Attack" method
3. Introduce Simple Double Fist Dig and Reversed Double Fist Dig

Activities:

1. Partner Volley
2. Volley Game

**Lesson 3**

Objectives:

1. Review overhead volley

2. Review underhand volley
3. Emphasize proper body positions

Activities:

1. Partner and Circle Volley
2. Official Game-any legal serve permitted

2. Review Fist Digs (Simple Double Fist and Reversed Double Fist)
3. Introduce thumb dig (open and closed grip)
4. Introduce the chop
5. Emphasize proper body positions.

Activities:

1. Partner and Circle Volley
2. Official Game-any legal serve permitted

Emphasis: Use of Fists

Lesson 4
Objectives:

1. Introduce sidearm, underhand, and overhead serves
2. Introduce spike-open handed

Activities:

1. Serving Drill-5 trials, team returning serve using set-up.
2. Spiking Drill-Throwing ball to self, setting ball to spiker

Lesson 4
Objectives:

1. Introduce serves sidearm, underhand, overhead
2. Introduce cupped hand spike

Activities:

1. Serving Drill-5 trials, team returning serve using set-up
2. Spiking Drill-Throwing ball to self, setting ball to spiker

Lesson 5
Objectives:

1. Review spike
2. Introduce block
3. Introduce position for playing low ball

Activities:

1. Volley person sets up to spiker, double blockers
2. Partner throw and Recover Drill (for low balls)

Lesson 5
Objectives:

1. Review spike
2. Introduce block
3. Stress position for low ball
4. Introduce 1-hand dig

Activities:

1. Volley person sets up to spiker, double blockers
2. Partner throw and Recover Drill (for low balls)

3. Official Game

Lesson 6
Objectives:

1. Administer Clifton Test
2. Allow time for practice

Activities:

1. Clifton Test
2. Practice Game
   6 vs. 6; 3 vs. 3

Lesson 7
Objectives:

1. Make-up tests for Clifton Test
2. Introduce Recovery from net-using underhand volley

Activities:

1. Clifton Test
2. Recovery from net drill
3. 6 vs. 6-highly skilled

Lesson 8
Objectives:

1. Review setting up and spiking

Activities:

1. Set-spike drill
2. 6 vs. 6 playing;
   3 vs. 3 playing

Lesson 9
Objectives:

1. Review overhead volley
2. Practice returning serve
3. Teach rotating in at left forward position

3. Official Game

Lesson 6
Objectives:

1. Administer Clifton Test
2. Allow time for practice

Activities:

1. Clifton Test
2. Practice Game
   6 vs. 6; 3 vs. 3

Lesson 7
Objectives:

1. Make-up tests for Clifton Test
2. Introduce 1-hand dig (net recovery use)

Activities:

1. Clifton Test
2. Recovery from Net Drill
3. Game

Lesson 8
Objectives:

1. Review setting up and spiking

Activities:

1. Set-spike drill
2. 6 vs. 6 playing;
   3 vs. 3 playing

Lesson 9
Objectives:

1. Review overhead volley
2. Practice returning a serve
3. Teach rotating in-left forward position

Activity:

1. Game

Activity:

1. Game

Lesson 10
Objectives:

1. Divide class into teams for tournament
2. Review rotating in at left forward position
3. Emphasize: Game violations, positioning of players, strategy.

Lesson 10
Objectives:

1. Divide class into teams for tournament
2. Review rotating in at left forward position
3. Emphasize: Game violations, positioning of players, strategy

Activities:

1. Practice rotation
2. Play practice game

Activities:

1. Practice rotation
2. Practice game

Lesson 11
Objectives:

1. Practice for Tournament Games
2. Emphasize game violations

Lesson 11
Objectives:

1. Practice for Tournament Game
2. Emphasize game violations

Activity:

1. Practice game

Activity:

1. Practice game

Lesson 12
Objectives:

1. Competition: "Fingertip" and "Attack" (lesser skilled)
2. Administer Clifton Test (higher skilled)

Lesson 12
Objectives:

1. Competition: Lesser skilled of "Fingertip" and "Attack" Groups
2. Administer Clifton Test (higher skilled of "Fingertip" and "Attack" Groups)

Activities:

1. Game-"Fingertip" vs. "Attack" (lesser skilled)
2. Clifton Test (lower skilled)

Activities:

1. Competition - "Fingertip" vs. "Attack"
2. Clifton Test

Lesson 13

Objectives:

1. Competition: "Fingertip" vs. "Attack" (higher skilled)
2. Administer Clifton Test (lower skilled)

Activities:

1. Game-"Fingertip" vs. "Attack" (higher skilled)
2. Clifton Test (lower skilled)

Lesson 13

Objectives:

1. Competition: Higher skilled of "Fingertip" and "Attack" Groups
2. Administer Clifton Test (lesser skilled)

Activities:

1. Competition-"Fingertip" vs. "Attack"
2. Clifton Test

Lesson 14

Objectives:

1. Administer make-ups for Clifton Test
2. Allow groups to experiment with different method than taught in study

Activity:

1. Clifton Test
2. Games

Lesson 14

Objectives:

1. Administer Make-ups for Clifton Test

Activities:

1. Clifton Test
2. Games-groups mixed

# APPENDIX D

CLIFTON TEST SCORES FOR CONTROL GROUP
AT DIFFERENT INTERVALS

| Subject | Pretest | Retest | Post Test |
|---|---|---|---|
| 1 | 33 | 31 | 25 |
| 2 | 23 | 22 | 13 |
| 3 | 22 | 27 | 22 |
| 4 | 17 | 18 | 15 |
| 5 | 17 | 26 | 22 |
| 6 | 15 | 23 | 23 |
| 7 | 14 | 19 | 12 |
| 8 | 13 | 13 | 11 |
| 9 | 12 | 15 | 14 |
| 10 | 12 | 10 | 20 |
| 11 | 11 | 15 | 14 |
| 12 | 10 | 10 | 9 |
| 13 | 9 | 15 | 21 |
| 14 | 8 | 24 | 17 |
| 15 | 8 | 10 | 16 |
| 16 | 5 | 7 | 17 |
| 17 | 5 | 14 | 8 |
| 18 | 4 | 12 | 21 |
| 19 | 1 | 4 | 5 |

CLIFTON TEST SCORES FOR EXPERIMENTAL GROUP
AT DIFFERENT INTERVALS

| Subject | Pretest | Retest | Post Test |
|---|---|---|---|
| 1 | 27 | 42 | 39 |
| 2 | 26 | 25 | 23 |
| 3 | 21 | 27 | 26 |
| 4 | 19 | 33 | 17 |
| 5 | 16 | 22 | 18 |
| 6 | 16 | 35 | 30 |
| 7 | 14 | 9 | 10 |
| 8 | 13 | 26 | 34 |
| 9 | 12 | 17 | 13 |
| 10 | 12 | 13 | 13 |
| 11 | 11 | 19 | 28 |
| 12 | 10 | 14 | 17 |
| 13 | 9 | 15 | 16 |
| 14 | 8 | 6 | 13 |
| 15 | 6 | 7 | 11 |
| 16 | 5 | 16 | 11 |
| 17 | 4 | 4 | 9 |