


## Technical Note

# Can the judo training improve the muscle-skeletal acting in older women with low bone mineral density?

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### ABSTRACT

Borba-Pinheiro, C.J., Almeida, N.M., De Alencar, M.C.G., Janotta, A. & Martín, E.H. (2013). Can the judo training improve the muscle-skeletal acting in older women with low bone mineral density? *J. Hum. Sport Exerc.*, 8(4), pp.1067-1073. Osteoporosis is a bone disease that causes bone fragility with increased risks of fractures and negative consequences on human mobility. The planned and monitored physical activity by professionals have shown good results on bone density, body balance and quality of life, factors that are determinants to the functional autonomy and independence of older women. The exercises and techniques realization of adapted judo are of low difficulty, emphasizing the development of motor coordination, muscle strength, body balance and consequently the bone density. Thus, the objective of this work is to present the adapted judo training as a physical activity alternative for older women with low bone density, demonstrating that the adaptation of judo training with professional supervision can help maintain bone density and other related-variables listed in this population. **Key words:** ADAPTED PHYSICAL ACTIVITY, BONE HEALTH, HEALTH CARE.

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## **TECHNICAL NOTE**

The literature has been showing that the physical activity have beneficial effects related to bone mineral density (BMD) (Gutiérrez et al., 2004; Aveiro et al., 2006; Park et al., 2007) and maintenance of body balance, a factor directly related to the risk of falls (Jessup et al., 2003; Swanenburg et al., 2007), in addition, improves the perceived of quality of life in older women (Gutiérrez et al., 2004).

The judo is traditionally a sport that aims at the competition in high performance, besides the development of capacities and abilities movements for children's and adolescents with positive consequences for the social-cultural and affective development of the apprentices (Carvalho & Drigo, 2007).

In the scientific literature, studies that approach the variable bone mineral density (BMD) also exist, demonstrating positive effects for the judo apprentices, however these studies were accomplished with high performance or school athletes (Andreoli et al., 2001; Prouteau et al., 2006; Bréban et al., 2008).

Then, why is not that physical activity presented in the literature as alternative exercise for elderly? Since it develops, among another you varied, the motive coordination, the corporal balance, the muscular force and BMD, that it possesses a method peculiar of learning of techniques for reduction of falls, that favors the naturally socialization and the relationship among the people. Will it be that the fact of the judo to present in your methodology the application of projections of high impact in the ground (tatami) does it disable that sport as alternative physical activity for elderly?

In the Borba-Pinheiro et al. (2010, 2012) showed in an study that is possible to apply a judo training and to develop low BMD related-variables in the post-menopausal women with preserved physical autonomy. It is evident that the applied training for (Borba-Pinheiro et al., 2010, 2012) it did not go the traditional training to children or for athletes of high performance that possess the preserved physical integrity.

The adapted judo training (AJT) (Borba-Pinheiro et al., 2010, 2012) it was constituted of three stages: Warm up part (1); Main part (2) and Cool down (3) presented in the table.

**Table 1.** Judo class parts on Mondays, Wednesdays, and Fridays

Table 1: Judo class parts on Mondays, Wednesdays and Fridays		
Traditional Class parts	Judo class parts	Adapted judo training parts (Exercises and techniques realization with low difficulty)
• Warm up	Rei-Ho	1- Opening reverence to the memory of the founder of Judo and to the teacher.
	Taisso	1 - Calisthenics; 2 - Static stretching exercises for 10 sec. following slow music rhythm; 3 - Dynamic coordination and balance drills, involving walking, running back and forward, side walking and shuttle run; 4 - Crawling, jumping, skipping and squatting drills. • Training of the falls-reduction techniques:
• Main part	Ukemi	1 - Ushiro (Behind); 2 - Mae (Front); 3 - Yoko (Lateral); 4 - Mae-Mauare (Rolling on the shoulder). • Repetition drill training of throwing techniques:
	Uchi-komi	1 - O soto-gari; O soto-guruma; Ashi-Harai; Kibisu-Gaeshi; O goshi; Ippon seoi nague and repetition immobilization techniques: Hon keza gatame. 2 - Formations: Circulate; lines and walking to the front
• Cool down	Nage-ai	1 - Throwing training, while the ladies did not fall. During the Nage-ai, they have thrown the teacher or Judo athletes aging 15 to 20 years old.
	Kumi-kata drills	1 - Grab training in Kimono with movement in different directions.
	Mokusso	1 - Moment of concentration
	Rei-Ho	1 - Final reverence to the teacher and to the memory of the founder of Judo.

The second stage, it was constituted of the technical training. The techniques of falls-reduction (Ukemis) to the front with support of the forearms, for the sides right and left, and also back with the extended arms without the head plus the ground were used.



**Figure 1.** Training of falls-reduction techniques (Ukemis) with older women. File photo courtesy by Professor Borba-Pinheiro

It is worth to point out, that the automation of these exercises can make possible the use of the same ones in the older women day by day with possibility of falls, protecting of fractures. In (Borba-Pinheiro et al., 2012) the rolling exercise on the shoulder that is part of the falls-reduction techniques was avoided by women with the high corporal weight, however, the volunteers with appropriate corporal weight accomplished the exercise without difficulties.

The training of projection techniques in the judo possesses three phases, which are: the first is the unbalance (Kuzushi). The second is the preparation, which consists of the approach to the opponent (Tsukuri) and finally the projection or fall (Kake) (Carvalho & Drigo, 2007). In AJT (Borba-Pinheiro et al., 2012) they used the first two essentially of the learning for the projections, because the last, in other words, the fall, it was considered with risk of lesions for the older women. However, sometimes during AJT the volunteers tried the projection in a professional of experienced judo, and this action was only accomplished for the projection and never for the volunteer fall.

In this stage, the training is constituted of repetitions of the techniques in forward displacements and for the lateral ones, always to the pairs and without to execute the projection. Besides, the training of repetitions of techniques was also used with volunteers couples in a circulate, formed by all the participants, also without to execute of the projection.



**Figure 2.** Training of Osoto gari techniques with older women. File photo courtesy by Professor Borba-Pinheiro.

The exercises of immobilization techniques that are part of the fight on the ground were also used. In these exercises, there was repetition with position change (right and left). And finally, the last stage of the class was used again a session of static stretching (10s) with music for relaxation.



**Figure 3.** Training of immobilization techniques (Hon keza gatame) with older women. File photo courtesy by Professor Borba-Pinheiro

The fight or fighting (randori), so much the fight with projections as the ground fight, which is another part of the traditional training was excluded because it also represented a risk for injuries in the elderly. The training periodization can be observed in (Borba-Pinheiro et al., 2010, 2012).

Sterkowicz et al. (2007) affirms that an Institution of professional teaching specific could contribute in the learning of the planning to the athletes that considered, among other factors, physical preparation, tactics and psychological allied the technique training, and that the knowledge could be passed for new generations of trainers. This manner, this institution for professional judo might also consider other forms of training such as AJT, which aims to better health and functional autonomy of older people.

However, all methodological adjustments to a judo training, tailored to the needs of elderly women in order to develop balance, maintenance of BMD and improve the quality of life, must be accompanied by trained professionals, in order to include judo adapted in all the physical activities for elderly women.

## CONFLICTS OF INTEREST

We declared that the work did not have financial support of any Institution and no have potential conflicts of interest.

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## REFERENCES

1. Andreoli, A., Monteleone, M., Van Loan, M., Promenzio, I., Tarantino, U., & De Lorenzo, A. (2001). Effects of different sports on bone density and muscle mass in highly trained athletes. *Med Sci Sports Exerc*, 33(4), pp.507-11
2. Aveiro, M.C., Granito, R.N., Navega, M.T., Driusso, P., & Oishi, J. (2006). Influence of a physical training program on muscle strength, balance and gait velocity among women with osteoporosis. *Rev Bras Fisioter*, 10(4), pp.441-8
3. Borba-Pinheiro, C.J., Carvalho, M.C.G.A., Silva, N.S.L., Drigo, A.J., Bezerra, J.C.P., & Dantas, E.H.M. (2010). Bone density, balance and quality of life of postmenopausal women taking alendronate, participating in different physical activity programs. *Ther Adv Musculoskeletal Dis*, 2(4), pp.175-185
4. Borba-Pinheiro, C.J., Figueiredo, N.M.A., Carvalho, M.C.G.A., Drigo, A.J., Pernambuco, C.S., Jesus, F.P., & Dantas, E.H.M. (2012). Adapted Judo training on bone-variables in postmenopausal women in pharmacological treatment. *Sport Sci Health*, 8, 87-93
5. Bréban, S., Benhamou, C-L., & Chappard, C. (2008). Dual-Energy X-ray Absorptiometry, Assessment of Tibial Mid-third Bone Mineral Density in Young Athletes. *J Clinical Densitometry*, 12(1), pp.22-27
6. Carvalho, M.C.G.A., & Drigo, A.J. (2007). The Judo in the context to regulate of the physical education. *EFDeportes/Revista Digital*, 11(106), available at: <http://www.efdeportes.com>
7. Gutiérrez, C.V., Venegas, J.M.R., Oliveira, E.A., Qunitana, F.C., Villaverde, G.R., & Rodrigo, J.R. (2004). Ejercicio físico, densidad mineral ósea y calidad de vida en mujeres menopáusicas. *Cultura Ciencia y Deporte*, 1(1), pp.21-24



8. Jessup, J.V., Horne, C., Vishen, R.K., & Wheeler, D. (2003). Effects of Exercise on Bone Density, Balance, and Self-Efficacy in Older Women. *Biological Resear Nurs*, 4(3), pp.171-180
9. Park, H., Togo, F., Watanabe, E., Yasunaga, A., Park, S., Shephard, R.J., & Aoyagi, Y. (2007). Relationship of bone health to yearlong physical activity in older Japanese adults: cross-sectional data from the Nakanojo study. *Osteoporos Int*, 18(3), pp.285-93
10. Prouteau, S., Pelle, U.M., Collomp, K., Benhamou, L., & Corteix, D. (2006). Bone Density in elite judoists and effectes of weight cycling on bone metabolic balance. *Med Sci Sports Exerc*, 38(4), pp.694-700
11. Sterkowicz, S., Garcià, J.M.G., & Lerma, F.S. (2007). The importance of judo trainers' professional activities. *Archives of Budo*, 3, pp.57-61
12. Swanenburg, J., Brunin, E.D., Stanffacher, M., Mulder, T., & Uebelhart, D. (2007). Effects of exercise and nutrition on postural balance and risk of falling in elderly people with decrease bone mineral density: randomized controlled trial pilot study. *Clin Rehabil*, 21(6), pp.523–534