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JUMP TEST TO EVALUATE THE VOLLEYBALL PLAYER

Nelson Kautzner Marques Junior[1]

ABSTRACT

The objective of the review was to explain the most important jump tests for the volleyball player. The literature informed that the strength has two groups: active and reactive. The active strength is composed by explosive strength. The reactive strength is composed by elastic explosive strength and reflex elastic explosive strength. The jump test for evaluate the explosive strength is with the squat jump, but for evaluate the elastic explosive strength is with the countermovement jump, the test for evaluate the reflex elastic explosive strength is with the Bosco test. However, some authors consider best the intermittent tests with several jumps. But recently, an author recommended the uses the Kinovea® software to determine the jump and the reach of the athlete during the match for measures the elastic explosive strength and/or the reflex elastic explosive strength. In conclusion, the article determined the best jump test for the volleyball player.

Key Words: Volleyball. Sports. Muscle Contraction. Stretch-Shortening Cycle.

RESUMO

Teste de salto para avaliar o jogador de voleibol

O objetivo da revisão foi de explicar os testes de salto mais importantes para o jogador de voleibol. A literatura informou que a força tem dois grupos: ativa e reativa. A força ativa é composta pela força explosiva. A força reativa é composta pela força explosiva elástica e pela força explosiva elástica reflexa. O teste de salto para avaliar a força explosiva é com o squat jump, mas para avaliar a força explosiva elástica é com o countermovement jump, o teste para avaliar a força explosiva elástica reflexa é com o teste de Bosco. Entretanto, alguns autores consideram melhor o teste intermitente com vários saltos. Mas recentemente, um autor recomendou usar o software Kinovea® para determinar o salto e o alcance do atleta durante o jogo para mensurar a força explosiva elástica e/ou a força explosiva elástica reflexa. Em conclusão, o artigo determinou o melhor teste de salto para o jogador de voleibol.

Palavras-chave: Voleibol. Esportes. Contração Muscular. Ciclo de Alongamento e Encurtamento.

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INTRODUÇÃO

The volleyball is a sport practiced on the court and in the sand with complex action during the match (Silva and collaborators, 2016; Olmedo and collaborators, 2017).

The physical profile of the volleyball has actions during the rally and pause, when the ball touches on the court (Moreno and collaborators, 2015).

The volleyball player practices several jumps during the rally because the jump is an action important for the volleyball player performs the jump serve, the spike and the block (Marques Junior, 2015).

The volleyball skills with jump are the actions of the volleyball more decisive in the victory of this sport (Marques Junior, 2015b).

Then, the physical education teachers to evaluate the jump of the volleyball players use the jump test because this action is important during the volleyball match (Marques Junior, 2015c).

However, the sport researcher disapproves the jump test and others evaluate of laboratory because they do not simulate the game (Moreira and collaborators, 2006; Tubino and Moreira, 2003).

But, recently Marques Junior (2016) determined the spike jump, the block jump, the spike reach and the block reach of the volleyball players that competed the 3rd set in the final of the men`s volleyball of the Olympic Games of 1984. The author determined the jumps and the reaches with the Kinovea® software that is free on the internet (https://www.kinovea.org/). The physical education teacher can evaluate the jump of the volleyball player with which type of jump test?

The volleyball literature has several jump tests (American Volleyball Coaches Association, 1997; Arruda and Hespanhol, 2008), then, the objective of the review was to explain the most important jump test for the volleyball player.

Jump tests

The muscle strength evaluation is an important motor capacity of the high performance sports (Tricoli and Barbanti, 2003). The strength and power of the muscles can be evaluated by tests. Then, the physical education teacher needs to know the best jump test for the volleyball player.

But Barbanti (2002) informed that know the types of strength are important for the physical education teacher understand the physiological structures participants of the jump test. The same author informed that the strength has two groups: active strength and reactive strength.

The active strength occurs a simple cycle of the muscle contraction, the contractile shortening (Badillo and Ayestarán, 2001). The active strength is composed by maximal dynamic strength and explosive strength.

The maximal dynamic strength occurs during a slow speed because the load is high. The exercise for evaluate the maximal dynamic strength is performed by dumbbell squat with high load.

However, Barbanti (2002) informed about the maximal dynamic strength, this strength has a relationship with the others types of strength because the contractile capacity performs in greater or less proportion of accordance with the type of strength. The figure 1 illustrates the explanations.

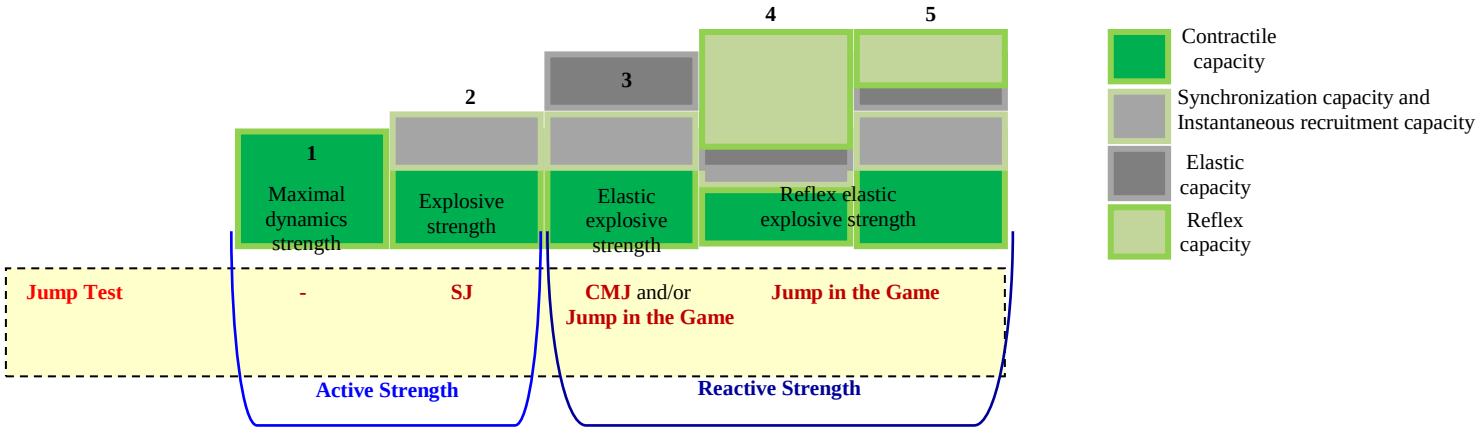

Figure 1 - Physiological structures participants of the jump test.

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The explosive strength occurs during a high speed of the muscular contraction with the objective of practice the action the fastest possible (Komi, 1984).

The jump test for evaluate the explosive strength is with the squat jump (SJ), the athlete practices three repetitions and the result is the best jump.

The SJ the volleyball player starting from a position with the knee at 90º because the jump performed without the countermovement and do not have the participation of the arms. The athlete practices the test with high speed of the lower members and he touches with his fingers the wall. The result is calculated by the following: Jump Height = jump reach – reach side = ? centimeters (cm).

However, the time of the pause for the SJ some studies indicate the time to restore the ATP-CP (3 to 5 minutes) (Harman and collaborators, 1990) and others references indicate successive jumps because the heating of the muscles provides a better performance (McArdle and collaborators, 2011).

The reactive strength occurs a simple cycle of the muscle contraction of stretch-shortening (Verkhoshanski, 1996). Therefore, the muscle action is eccentric and concentric. The reactive strength is composed by elastic explosive strength and reflex elastic explosive strength.

The elastic explosive strength occurs during in high speed, the volleyball player practices the countermovement and the muscle lower limbs accumulate energy that are quickly into mechanical energy for muscle contraction, when the athlete practices extension of the lower limbs (Komi, 1984).

This action with the countermovement increases the strength and provides a more potent jump. The jump test for evaluate the elastic explosive strength is with the countermovement jump (CMJ), the norm is equal to the SJ (repetition, pause and result). The CMJ the volleyball player starts in the standing position and the athlete practices quick flexion of the joints (hip, knee and ankle), but immediately performs fast extension of the same joint. The CMJ the volleyball player practices without the participation of the arms.

The reflex elastic explosive strength occurs similar to the elastic explosive strength, but the volleyball player practices several jumps at high speed (Barbanti, 2010). The jump test for evaluate the reflex elastic explosive strength is with the Bosco test, the athlete practices in the ergojump the maximum jumps during 0 to 15 seconds or 0 to 60 seconds (Bosco and collaborators, 1983). However, some authors consider the best intermittent tests with several jumps and pause (4x15 seconds, 10 seconds of pause) because this action occurs during the volleyball match (Hespanhol and collaborators, 2007).

But recently, Marques Junior (2016b) recommended the volleyball coach and/or physical trainer film the game and after uses the Kinovea® software to determine the spike jump, the spike reach, the block jump and the block reach. This jump test measures the elastic explosive strength and/or the reflex elastic explosive strength, depends of the moment during the game. The figure 2 illustrates the spike jump of 77 cm and the spike reach of 3,08 meters with use of the Kinovea® software.

Figure 2 - The physical performance of the spike was measured with the Kinovea® software.

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The review article presented the most important jump tests for the volleyball player.

CONCLUSION

The jump test is important evaluation for the volleyball player because the volleyball skills with jump are the actions more decisive in the victory of the volleyball.

The review article determined the SJ, the CMJ and the jumps with use of the Kinovea® software the best for the evaluation of the volleyball player.

REFERENCES

1-American Volleyball Coaches Association. Coaching Volleyball. Chicago. Master Press. 1997.

2-Arruda, M.; Hespanhol, J. Saltos verticais. São Paulo. Phorte. 2008.

3-Badillo, J.; Ayestarán, E. Fundamentos do treinamento de força. 2ª edição. Porto Alegre. Artmed. 2001.

4-Barbanti, V. Manifestações da força motora no esporte de rendimento. In. Barbanti, V.; Amadio, A.; Bento, J.; Marques, A. (orgs). Esporte e atividade física. Manole. 2002. p.13-25.

5-Barbanti, V. Treinamento esportivo: as capacidades motoras dos esportistas. Manole. 2010.

6-Bosco, C.; Luhtanen, P.; Komi, P. A simple method for measurement of mechanical power in jumping. Eur J Appl Physiol. Vol. 50. Num. 2. p.273-282. 1983.

7-Harman, E.; Rosenstein, M.; Frykman, P.; Rosenstein, R. The effects of arms and countermovement on vertical jumping. Med Sci Sports Exerc. Vol. 22. Num. 6. p.825-833. 1990.

8-Hespanhol, J.; Silva Neto, L.; Arruda, M.; Dini, C. Avaliação da resistência de força explosiva em voleibolistas através de testes de saltos verticais. Rev Bras Med Esp. Vol. 13. Num. 3. p.181-184. 2007.

9-Komi, P. Physiological and biomechanical correlates of muscle function: effects of muscle structure and stretch-shortening cycle on force and speed. Exerc Sports Sci Rev. Vol. 12. Num. 1. p.81-121. 1984.

10-Olmedo, J.; Pueo, B.; Tomás, A.; Mira, J.; Turpin, A. Physiological work áreas in profesional beach volleyball: a case study. Retos. Num. 31. p.94-97. 2017.

11-Marques Junior, N. Vertical jump of the elite male volleyball players in relation the game position: a systematic review. Rev Observatorio Dep. Vol. 1. Num. 3. p.10-27. 2015.

12-Marques Junior, N. Fundamentos que fazem ponto durante o jogo de voleibol: um estudo de correlação. Rev Observatorio Dep. Vol. 1. Num. 3. p.134-145. 2015b.

13-Marques Junior, N. Estudo de um jogador do voleibol na areia: verificação do preparo físico e a identificação do fluxo sanguíneo cerebral, 1999 a 2013. Revista Brasileira de Prescrição e Fisiologia do Exercício. Vol. 9. Num. 55. p.462-474. 2015c. Disponível em: <http://www.rbpfex.com.br/index.php/rbpfex/article/view/829/733>

14-Marques Junior, N. 3º set da final do voleibol masculine dos Jogos Olímpicos de 1984. Rev Observatorio Dep. Vol. 2. Num. 3. p.8-27. 2016.

15-Marques Junior, N. Uso do software Kinovea® para os testes de controle de alguns fundamentos do voleibol. 100-Cs. Vol. 2. Num. 2. p.51-84. 2016b.

16-McArdle, W.; Katch, F.; Katch, V. Fisiologia do exercício: nutrição, energia e desempenho humano. 7ª edição. Guanabara. 2011.

17-Moreno, S.; Marcelino, R.; Mesquita, I.; Ureña, A. Analysis of the rally length as a critical incidente of the game in elite male volleyball. Int J Perf Analysis Sport. Vol. 15. Num. 2. p 620-631. 2015.

18-Moreira, A.; Okano, A.; Ronque, E.; Souza, M.; Oliveira, P. Reprodutibilidade dos testes de salto vertical e salto horizontal triplo consecutivo em diferentes etapas da

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preparação de basquetebolistas de alto rendimento. Rev Bras Cineantropom Desempenho Hum. Vol. 8. Num. 4. p.66-72. 2006.

19-Silva, M.; Marcelino, R.; Lacerda, D.; João, P. Match analysis in volleyball: a systematic review. Monten J Sports Sci Med. Vol. 5. Num. 1. p.35-46. 2016.

20-Tricoli, V.; Barbanti, V. Avaliação da força motora. In. Kiss, P. (org.). Esporte e exercício. São Paulo: Roca. 2003. p.199-222.

21-Tubino, M.; Moreira, S. Metodologia científica do treinamento desportivo. 13ª edição. Shape. 2003.

22-Verkhoshanski, Y. Força: treinamento da potência muscular. Londrina. CID. 1996.

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