BioGecko Vol 12 Issue 03 2023

ISSN NO: 2230-5807

RESISTANCE AND AQUA RESISTANCE TRAINING PACKAGES AND ITS IMPACT ON SELECTED CORPOREAL VARIABLES AMONG MEN BASKETBALL PLAYERS

Mr. Mohmmad Chotemiya[1] , Dr. C. Vairavasundaram[2]
[1]PhD Research Scholar, [2]Assistant Professor
[1,2]Alagappa University College of Physical Education, Alagappa University, Karaikudi, Tamil Nadu, India.
[1]chotualagappa@gmail.com , [2]dr.c.vairavan09@gmail.com

ABSTRACT
Background: the main aim of this research is to evaluate the effectiveness of Resistance and Aqua resistance training packages and its impact on selected corporeal variables among men Basketball players.
Method: Therefore the purpose of the study is to investigate the Resistance and Aqua resistance training on explosive power and strength endurance among men basketball players. The selected subjects (N=45) would be classified into three equal groups of fifteen each (n=15) at random, Age ranged between 15 to 17 years. Group-I undergo Resistance training, Group-II Aqua resistance training, and Group III act as control group.
Timeline: The resistance and aqua resistance training consisted of 50 min/day, 3 days in a week till twelve weeks from the Hyderabad, Telangana, India. Corporeal variables completed of the both groups at zero time and after twelve weeks of aqua resistance and resistance training intervention group.
Results: The results on corporeal variables of explosive power and strength endurance of men basketball players produced significant changes.
Conclusion: The advantage of aqua resistance training group had shown significant improvement compared in all the other groups the selected corporeal variables. Therefore effect of aqua resistance training and resistance training covered in this study is beneficial for the men basketball players.

Keywords: Aqua resistance training, Resistance Training, corporeal variables, Men Basketball players.

INTRODUCTION

Basketball is a team sport that comprises high levels of powerful physical attributes such as jumping and sprinting (**Schelling and TorresRonda, 2016**). The ability to perform such actions requires optimal combination of force and velocity, and therefore producing maximal power output which is a crucial determinant in basketball. Resistance training is broadly used to develop muscular strength and power (**Suchomel et al., 2018**).

Resistance and aqua resistance training should be an integral part of an adult fitness programmes and of a sufficient intensity to enhance strength, endurance, explosive power and maintain fat free mass resistance training should be progressive in nature, individualized and provide a stimulus to major muscle groups adding resistance training to programme of regular physical activity will help to decrease the risk of chronic diseases while improving quality of life and functionality, allowing people of all ages to improve and maintain their health, fitness and independent life style.

METHODOLOGY

The purpose of the study was to investigate the Resistance and Aqua resistance training on explosive power and strength endurance among men basketball players. The selected subjects (N=45) would be classified into three equal groups of fifteen each (n=15) at random, Age ranged between 15 to 17 years. Group-I undergo Resistance training, Group-II Aqua resistance training, and Group III act as control group.

Research design:

The study was formulated as a post test only random group design. The duration of experimental period twelve weeks. After the experimental treatment, all the subjects were tested on corporeal variables. The resistance and aqua resistance training consisted of 50 min/day, 3 days in a week till twelve weeks from the Hyderabad, Telangana, India. corporeal variables completed of the both groups at zero time and after twelve weeks of aqua resistance and resistance training intervention group. Explosive power measured by Sarjent Vertical Jump test measured in the units of centimeters. Strength endurance measured by sit-up test measured in the units of numbers. Analysis of Co-variance was applied to determine the training programmes produced significantly different improvements in selected variables after twelve weeks of training. Since, the initial means were not matched, comparisons between actual could not be made, all means were adjusted by regression to a common mean. The significance on difference of pairs of adjusted final group means was tested for significance by applying Scheffe's post hoc test.

RESULTS AND DISCUSSION

Explosive Power

The analysis of paired sample-'t' test on the data obtained for the explosive power of the pretest and post-test means of the resistance training group, aqua resistance training group and control group has been analyzed and presented in table-1.

Table – 1

Analysis of covariance of the data on explosive power of pre, post and adjusted posttests scores resistance training, aqua resistance training and control groups (Centimeters)

Test	RTG	ARTG	CG	SOV	SS	Df	MS	F-ratio
Pre Test								
Mean	2.06	2.03	1.99	**B.M**	767.96	2	383.98	2.87
				W.G	5638.92	42	134.26	
Post Test								
Mean	2.18	2.36	2.08	**B.M**	1.908	2	0.954	**38.17***
				W.G	1.05	42	0.025	
Adjusted Post Test								
Mean	2.21	2.34	2.07	**B.S**	1.16	2	0.58	**34.12***
				W.S	0.697	41	0.017	

***significant at 0.05 level of confidence.*

The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively.

The table-1 shows that the pre-test mean values on resistance training group, aqua resistance training group and control group are 2.06, 2.03 and 1.99 respectively. The obtained 'F' ratio 2.87 for pre-test scores was less than the table value, 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on explosive power. The post-test mean values on resistance training group, aqua resistance training group and control group are 2.18, 2.36 and 2.08 respectively. The obtained 'F' ratio 38.17 for post-test scores was greater than the table value 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on explosive power. The adjusted post-test means of resistance training group, aqua resistance training group and control group are 292.21, 2.34 and 2.07 respectively. The obtained 'F' ratio of 34.12 for adjusted post-test means was greater than the table value of 3.23 for degrees of freedom 2 and 41 required for significance at

0.05 level of confidence on explosive power.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-2.

Table – 2

The scheffe's test for the difference between paired means on explosive power

RTG	ARTG	CG	MD	CI
2.21	2.34	-	**0.13***	0.12
2.21	-	2.07	**0.14***	
-	2.34	2.07	**0.27***	

**Significant at 0.05 level of confidence.*

The table 2 shows that the mean difference values between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) are 0.13, 0.14 and 0.27 respectively which are greater than the confidence interval value 0.12 at 0.05 level of confidence. The results of the study showed that there were a significant difference between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) on explosive power.

The pre, post and adjusted post-test means values of resistance training group (RTG), aqua resistance training group (ARTG) and control group (CG) on explosive power graphically represented in the figure–1.

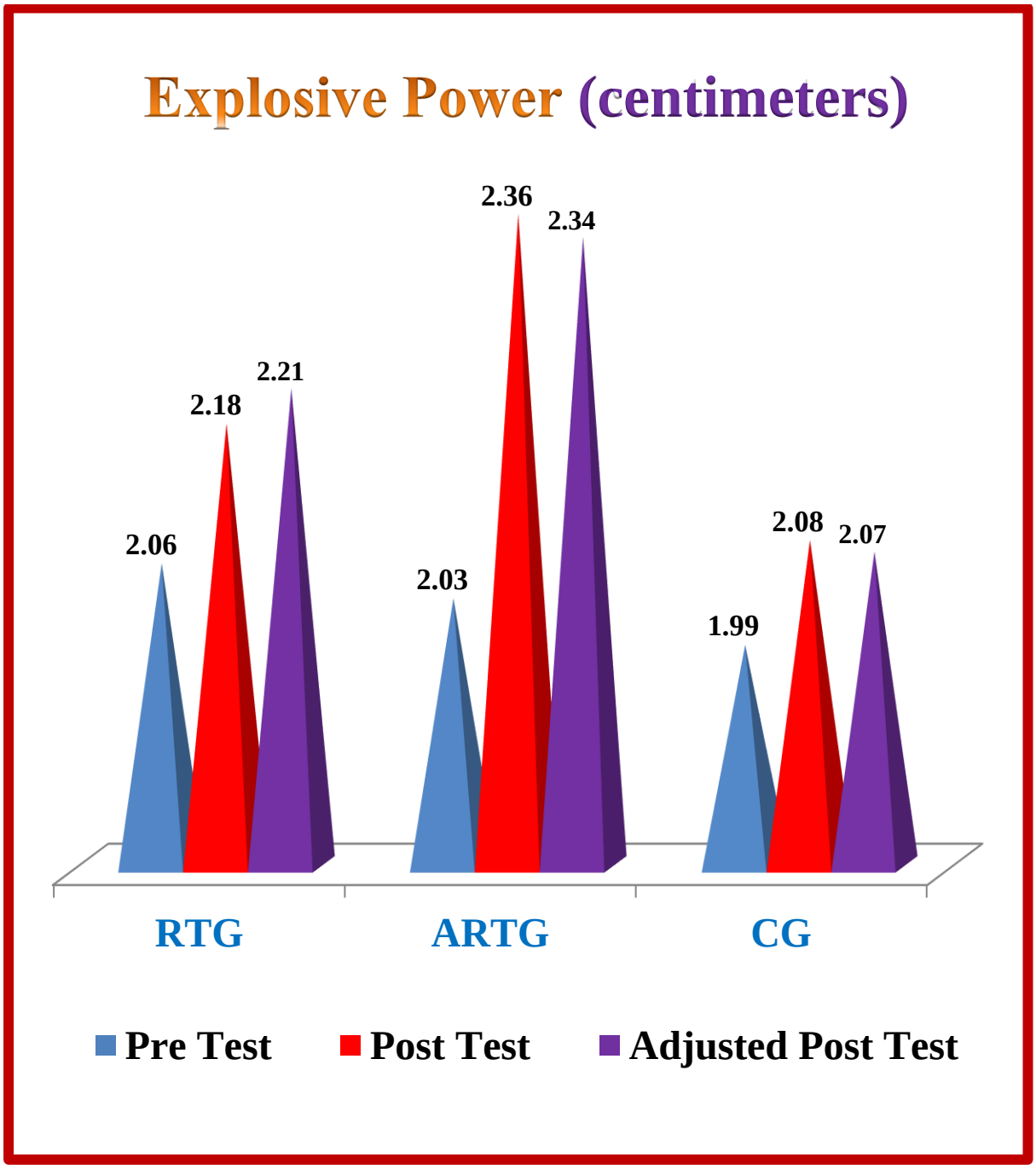

Figure 1: Pre, post and adjusted post-test means values of resistance training group (RTG), aqua resistance training group (ARTG) and control group (CG) on explosive power.

Strength Endurance

The analysis of paired sample-'t' test on the data obtained for the strength endurance of the pretest and post-test means of the resistance training group, aqua resistance training group and control group has been analyzed and presented in table-3.

Table – 3

Analysis of covariance of the data on strength endurance of pre, post and adjusted posttests scores resistance training, aqua resistance training and control groups (numbers)

Test	RTG	ARTG	CG	SOV	SS	Df	MS	F-ratio

Pre Test								
Mean	30.79	29.83	30.44	**B.M**	28.14	2	14.07	0.097
				W.G	6090.84	42	145.02	
Post Test								
Mean	38.27	41.59	31.06	**B.M**	1203.54	2	601.77	**31.49***
				W.G	802.62	42	19.11	
Adjusted Post Test								
Mean	38.64	42.16	31.14	**B.S**	858.08	2	429.04	**28.06***
				W.S	626.89	41	15.29	

***significant at 0.05 level of confidence.*

The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively.

The table-3 shows that the pre-test mean values on resistance training group, aqua resistance training group and control group are 30.79, 29.83 and 30.44 respectively. The obtained 'F' ratio 0.097 for pre-test scores was less than the table value, 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on strength endurance. The post-test mean values on resistance training group, aqua resistance training group and control group are 38.27, 41.59 and 31.06 respectively. The obtained 'F' ratio 31.49 for post-test scores was greater than the table value 3.22 for degrees of freedom 2 and 42 required for significance at 0.05 level of confidence on strength endurance. The adjusted post-test means of resistance training group, aqua resistance training group and control group are 38.64, 42.16 and 31.14 respectively. The obtained 'F' ratio of 28.06 for adjusted post-test means was greater than the table value of 3.23 for degrees of freedom 2 and 41 required for significance at 0.05 level of confidence on strength endurance. The result of the study indicates that there was a significant difference among the adjusted post-test means of resistance training group, aqua resistance training group and control group on strength endurance.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-4.

Table – 4

The scheffe's test for the difference between paired means on strength endurance

RTG	**ARTG**	**CG**	**MD**	**CI**
38.64	42.16	-	**3.82***	3.63
38.64	-	31.14	**7.20***	
-	42.16	31.14	**11.02***	

**Significant at 0.05 level of confidence.*

The table-4 shows that the mean difference values between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) are 3.82, 7.20 and 11.02 respectively which are greater than the confidence interval value 3.63 at 0.05 level of confidence. The results of the study showed that there were a significant difference between resistance training group (RTG) & aqua resistance training group (ARTG), resistance training group (RTG) & control group (CG), aqua resistance training group (ARTG) & control group (CG) on strength endurance.

The pre, post and adjusted post-test means values of resistance training group (RTG), aqua

resistance training group (ARTG) and control group (CG) on strength endurance graphically represented in the figure–2

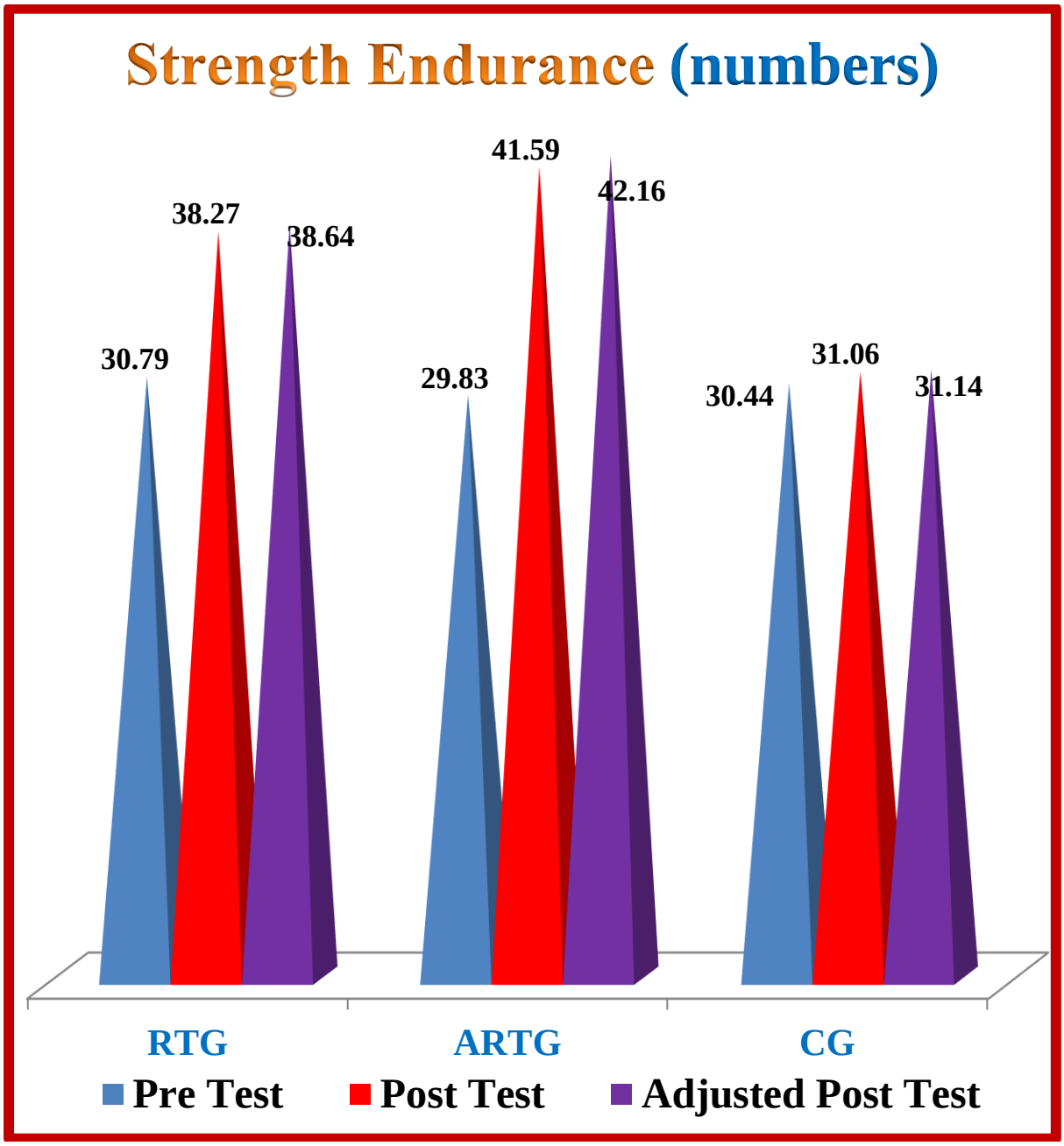

Figure 2: Pre, post and adjusted post-test means values of resistance training group (RTG), aqua resistance training group (ARTG) and control group (CG) on strength endurance.

Discussion on findings

Moreover the mean difference of aqua resistance group shows better improvement on explosive power and strength endurance compare to other groups, because of specific aqua resistance training on explosive power of men basketball players. The results conformity with other studies research conducted the effect of land based and water based aerobic exercises significantly changed explosive power among school students (**Kalaiselvi 2018**). The results showed that the effect of aqua aerobics and floor aerobics in breath holding time among school girls was a significant difference among the

experimental and control group on arm span (**Shelvam et al, 2013**) and effect of varied impacts and frequencies of aerobics dance training significantly improvement on arm span male subjects (**Murugavel 2014**). The experimental groups showed significant difference than the control group after aerobic training in all the selected physiological variables (**Senthilkumar et al, 2019**). The results showed that the combined aerobics and resistance training improves respiratory and exercise out comes more than aerobic training in adolescent changed significantly on vital capacity (**Xavier et al, 2020**). The experimental group positive effects showed six weeks inspiratory resistance training ameliorates endurance performance in obese (**cheng et al, 2020**)

Conclusion

The experimental group 'I' had shown significant improvement in all the selected corporeal variables after undergoing the resistance training for a period of twelve weeks on Basketball players. The experimental group 'II' had shown significant improvement in all the selected corporeal variables after undergoing the aqua resistance training for a period of twelve weeks on Basketball players. The experimental group 'II' had shown better result than the experimental group 'I' and control group.

Declarations:

Funding statement:

This work was supported by RUSA 2.O , Alagappa University, karaikudi, Tamil Nadu, India.

Data availability statement:

Data included in article/Supp. Material/ referenced in article.

Acknowledgement: The author would like to acknowledge all the volunteers of this article.

Reference

1. L Chun (2023) **Physical capacity of basketball players in resistance training**. *Revista brasileira de medicina do esporte, 2.*
2. Xiong W (2023) Lower extremity resistance training in basketball players. *Revista Brasileira de Medicina do Esporte, 29.*
3. Mohmmad Chotemiya et.al., (2021) Effect of Resistance training on selected corporeal variables among Basketball players. *Indian Journal of Applied Research, Vol. (11),* No.1, P.1-2.
4. Krčmár, M., Krčmárová, B., Bakaľár, I., & Šimonek, J. (2021). Acute performance enhancement following squats combined with elastic bands on short sprint and vertical jump height in female athletes. *Journal of Strength and Conditioning Research, 35(2),* 318–324.
5. Mohmmad Chotemiya et.al., (2020) Isolated and Combined effect of Aqua and Resistance training on selected Physiological variables among men Basketball players. *XI'n University of Architecture and technology, Vol. (12),* No. 7, P. 743-754.
6. Pichardo A et.al., (2021) Effects of Combined Resistance Training and Weightlifting on Injury Risk Factors and Resistance Training Skill of Adolescent Males. *Journal of Strength and Conditioning Research,35(12) 3370-3377.*
7. Matti Munukka (2020) Effects of progressive aquatic resistance training on symptoms and quality of life in women with knee osteoarthritis: A secondary analysis. *Scandinavian Journal of Medicine and Science in Sports, 30(6) 1064-1072.*
8. Arazi, H., Salek, L., Nikfal, E., Izadi, M., Tufano, J. J., Elliott, B. T., & Brughelli, M. (2020). Comparable endocrine and neuromuscular adaptations to variable vs. constant gravitydependent resistance training among young women. *Journal of Translational Medicine, 18(1),* 239.
9. Katushabe, E. T., & Kramer, M. (2020). Effects of combined power band resistance training on sprint speed, agility, vertical jump height, and strength in collegiate soccer players. *International Journal of Exercise Science, 13(4),* 950–963.
10. John Wiley & Sons. Cormier, P., Freitas, T. T., Rubio-Arias, J., & Alcaraz, P. E. (2020). Complex and contrast training: does strength and power training sequence affect performance-based adaptations in team sports? a systematic review and meta-analysis. *Journal of Strength and Conditioning Research, 34(5),* 1461–1479.
11. Freitas, T. T., Calleja-González, J., Carlos-Vivas, J., Marín-Cascales, E., & Alcaraz, P. E. (2019). Short-term optimal load training vs a modified complex training in semi-professional basketball players. *Journal of Sports Sciences, 37(4),* 434–442.

12. Blazevich, A. J., & Babault, N. (2019). Post-activation potentiation versus post-activation performance enhancement in humans: historical perspective, underlying mechanisms, and current issues. *Frontiers in Physiology, 10,* 1359–1359.
13. Kobal, R., Loturco, I., Barroso, R., Gil, S., Cuniyochi, R., Ugrinowitsch, C., Roschel, H., & Tricoli, V. (2017). Effects of different combinations of strength, power, and plyometric training on the physical performance of elite young soccer players. *Journal of Strength and Conditioning Research, 31(6),* 1468–1476.
14. Kompf, J., & Arandjelović, O. (2016). Understanding and overcoming the sticking point in resistance exercise. *Sports Medicine, 46(6),* 751–762.
15. Haff, G. G., & Triplett, N. T. (2016). Essentials of strength training and conditioning. Human kinetics. Joy, J. M., Lowery, R. P., de Souza, E. O., & Wilson, J. M. (2016). Elastic bands as a component of periodized resistance training. *Journal of Strength and Conditioning Research, 30(8),* 2100–2106.
16. Andersen, V., Fimland, M. S., Knutson Kolnes, M., Jensen, S., Laume, M., & Hole Saeterbakken, A. (2016). Electromyographic comparison of squats using constant or variable resistance. *Journal of Strength and Conditioning Research, 30(12),* 3456–3463.
17. Ataee, J., Koozehchian, M. S., Kreider, R. B., & Zuo, L. (2014). Effectiveness of accommodation and constant resistance training on maximal strength and power in trained athletes. *PeerJ, 2(1),* e441.
18. Frost, D. M., Cronin, J., & Newton, R. U. (2010). A biomechanical evaluation of resistance: fundamental concepts for training and sports performance. *Sports Medicine, 40(4),* 303–326.
19. Folland, J. P., & Williams, A. G. (2007). The adaptations to strength training : morphological and neurological contributions to increased strength. *Sports Medicine, 37(2),* 145–168.