



Quantification of Motor Qualities in Response to Sports Specific Fitness Training Combined with Muscle Relaxation Techniques of Junior Football Players.

J. Stanley¹, and Dr. P.K. Senthilkumar²

¹Ph.D. Research Scholar in Exercise Physiology and Nutrition, Department of Exercise Physiology and Biomechanics, Tamil Nadu Physical Education and Sports University

²Professor, Department of Exercise Physiology and Biomechanics, Tamil Nadu Physical Education and Sports University

Abstract

The purpose of study was to find out the Quantification of Motor Qualities in response to sports specific training combined with muscle relaxation techniques of Junior Football players. To achieve this purpose of the study, sixty junior soccer Players from Shree Bharath Vidyaashram Chennai, Tamil Nadu were randomly selected as subjects. The age of the subjects ranged from 11 to 13 years old boys. The study was formulated as pre and post-test random group design, in which Sixty subjects were divided into four equal groups. The experimental group-1 (n=15, SSFT) underwent Sports Specific Fitness training, the experimental group-2 (n=15, SSFT+FR) underwent Sports Specific Fitness training with Foam Roller Exercise, experimental group-3 (n=15, SSFT+SE) underwent Sports Specific Fitness Training with Stretching Exercise and group 4 served as Control Group (n=15, CG) did not undergo any Specific training. Speed was selected as dependent variables. and tested by 50 Yard dash were performed were recorded in seconds; three days in a week for the period of twelve weeks, as per the stimulated training program. The performance of the speed was assessed before and after the training period. The collected pre and post data was critically analysed with apt statistical tool of one-way analysis of co-variance, for observed the significant adjusted post-test mean difference of three groups with respect to each parameter. The Scheffe's Post Hoc test was used to find out pair-wise comparisons between groups with respect to each parameter. To test the hypothesis 0.05 level of significant was fixed in this study

Key words ;1) Sports Specific fitness training 2) foam roller exercise 3) Stretching exercise 4) Ancova

5) Speed

INTRODUCTION

Children and adolescents require involving habitually (i.e., maximum days of the week) in sixty or more minutes of vigorous physical activity (PA) that is fun, worth the effort, 100. As aerobic activities such as bicycling and swimming are usually suggested for youth, clinical impressions and scientific evidence point to that strength training be able to present exclusive benefits for girls and boys supplied that age-appropriate training regulations are followed. With proper supervision and instruction, usual participation in an adolescent strength training program can contain positive effects on body composition, musculoskeletal health, cardiovascular risk factors, psychological well-being, and fitness performance. There are two broad

categories of youth, and both need strength training to develop and enhance fundamental locomotor (e.g., running), non-locomotor (e.g., lifting), and manipulative (i.e., throwing) skills that are the components of most games and sports. Lack of regular physical activity has contributed to the unabated increase in the prevalence of obesity among children and adolescents. Since obese youth may lack the motor skills and confidence to be physically active, they may perceive physical activity to be discomforting and embarrassing. Thus, these youth desperately need strength training to condition their muscles, tendons, ligaments, and bones because a fundamental level of musculoskeletal fitness is essential for youth to experience and enjoy a physically active lifestyle. (Feigenbaum, Westcott, 2009).

A complete interval training program usually comprises several short, alternating periods of both higher and lower intensity exercises. Interval training involves alternating periods of activity and recovery. It is important to understand the energy demands of the sport. Coach or intend to coach. You need to know how to determine the energy capabilities of your athletes, and then you need to train them specifically for their event or position. If all this sounds daunting, relax: we will do our best to make it understandable. (Rafael L, Konsai, 2023) Plyometric training contributes to improvement in vertical jump performance, acceleration, leg strength, muscular power, increase of joint awareness and overall sport-specific skills. Multifaceted nature of physical requirements in soccer, including strength, endurance, power and agility, soccer training must be able to fulfil the needs of improvement. (Ying-Chun Wang and Na Zhang, 2016). Strength is an essential component of the Football players. Without strength the football players cannot propel the ball aggressively with vigor and to tackle the opponent. It is also one of the performance determinant factors. (Mehrez Hammami, 2017). Studies have determined the relative energy requirements of track events ranging from 100 meters to the marathon, understanding energy demands helps to focus on the training needed for success. Understanding each athlete's strength and weaknesses helps to focus on areas most in need of improvement. Since 1967, when Holloszy first reported the cellular effects of training in muscle (rat), studies have demonstrated the specific effects of training on animal and then human muscle fibers. This section summarizes the documented effects of training on anaerobic and aerobic energy systems. (Holloszy, 1967). In sports requiring maximal or near-maximal force production (e.g., heavy lift, sprints), most of the energy needs are met with stored ATP and PCr and with the nonoxidative (anaerobic) breakdown of muscle glycogen, sprint and power athletes need to do sufficient anaerobic training to form a foundation for performance, to overcome soreness, and to allow efficiency at high intensities of effort. Just don't overdo it. (Erkan Cetinkaya, 2018). Unlike those for anaerobic training, the effects of aerobic training are clear, dramatic, and specific, Aerobic training provides significant benefits compared to anaerobic training. It increases the number of mitochondria in muscle fibers, doubles oxygen uptake, and enhances ATP production through aerobic processes. Swim training doesn't improve running performance; training the arms won't improve the legs; and aerobic capabilities, or vice versa. Experienced coaches design training programs that will specifically improve the muscles and energy pathways used in the sport. (Rajkumar Sharma, 2015) Foam rolling is a type of self-myofascial release that can be used to help relieve muscle knots and trigger points. Foam rolling can be an effective way to help lengthen and release the built-up tension in the fascia by breaking up adhesions and scar tissue to help speed up the healing and recovery process after a workout. It can also be an effective way to help loosen up common areas of tightness before a workout (Scot, 2015).

METHODOLOGY

To achieve the purpose of the study, Sixty junior soccer Players from Shree Bharath Vidyaashram Chennai. Tamil Nadu, as far as independent variables were concerned the study was delimited to three different training approaches, i.e., Specific Fitness Sports Training (SSFT), Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR), and Sports Specific Fitness Training with Stretching Exercise (SSFT + SE) The training period was delimited to twelve weeks for three days. The details training performance as follows. Sports Specific Training includes the Plyometric Interval and Resistance training. As far as Muscle Relaxation Technique is concerned the Foam Rolling Exercise and Stretching Exercise are in cooperated, During the training programme the following training variables Intensity, Frequency, Rest Intervals, Reptation and Set as manipulated once in a for week for respective training. The total duration of the training period was twelve weeks, 3 days per week. Before the training programme the subject were performed fifteen minutes warming up and fifteen minutes warming down activity.

TABLE - I
COMPARISON OF MEAN ON SPEED BETWEEN PRE AND POST TEST OF SELECTED TRAINING GROUPS
(Scores in seconds)

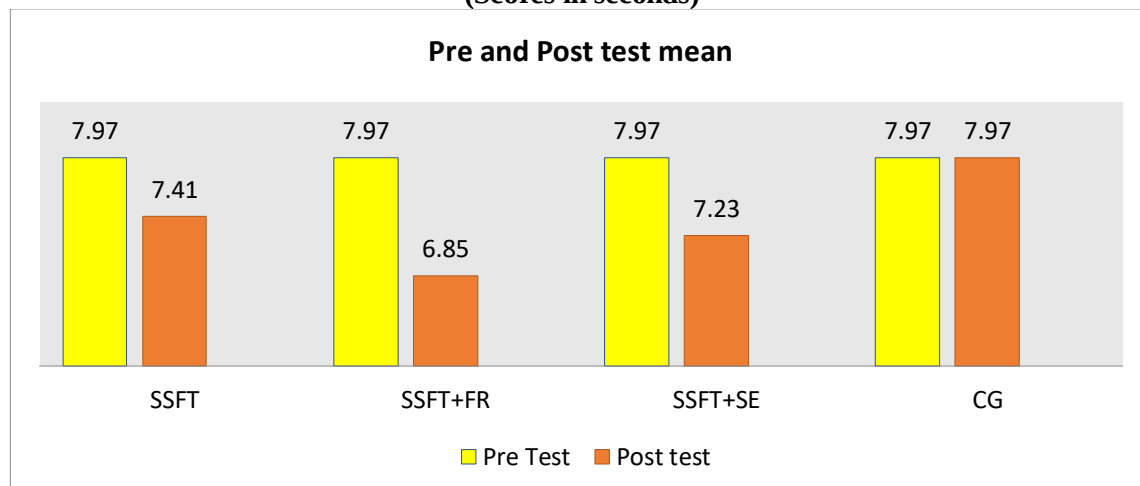
Group	Test	Mean	SD	Mean Difference	't'ratio	P value
SSFT	Pre	7.97	0.14	0.56	18.46*	0.00
	Post	7.41	0.19			
SSFT+FR	Pre	7.97	0.13	1.11	28.98*	0.00
	Post	6.85	0.09			
SSFT+SE	Pre	7.97	0.14	0.73	18.25*	0.00
	Post	7.23	0.11			
CG	Pre	7.97	0.16	0.01	1.38	0.18
	Post	7.97	0.17			

*Significant at .05 level.

The Sports Specific Fitness Training group (SSFT) shows the pre and post-test mean and standard deviation on speed was 7.97 ± 0.14 and 7.41 ± 0.19 respectively. The calculated 't' test was ($t=18.46$, $p<0.05$) shows significant. From this, the Sports Specific Fitness Training group (SSFT) have shown significant improvement on Speed. Sports Specific Fitness training with Foam Roller Exercise (SSFT+FR) shows the pre and post-test mean and standard deviation on speed was 7.97 ± 0.13 and 6.85 ± 0.09 respectively. The calculated 't' test was ($t=28.98$, $p<0.05$) shows significant. From this, the Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR) have shown significant improvement on Speed. Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) shows the pre and post-test mean and standard deviation on speed was 7.97 ± 0.14 and 7.23 ± 0.11 respectively. The calculated 't' test was ($t=18.25$, $p<0.05$) shows significant. From this, the Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) have shown significant improvement on Speed. Control group shows the pre and post-test mean and standard deviation on Speed was 7.97 ± 0.16 and 7.97 ± 0.17 respectively. The calculated 't' test was ($t=1.38$, $p<0.18$) shows in significant. From this, the control group have shown no significant improvement on Speed. Therefore, it was inferred that significant change on Speed was observed for the Sports Specific Fitness Training group (SSFT), Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR), Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) and control group of the Junior football players as a result of the respective training.

The result of the pre and post-test means on speed of the selected training groups are diagrammatically presented in figure-1.

FIGURE-1
PRE AND POST TEST MEAN ON SPEED OF SELECTED TRAINING GROUPS
(Scores in seconds)



Results of adjusted post-test mean on speed of selected training group

A one-way ANCOVA was applied to determine statistically significant difference if any among the Sports Specific Fitness Training group (SSFT), Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR), Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) and control group on Speed after controlling the difference in pre-test and the result is given in table – II.

TABLE-II
ANALYSIS OF COVARIANCE ON SPEED OF SELECTED TRAINING GROUPS
(Scores in seconds)

Adjusted Post Test Means				SV	SS	Df	MS	'F'-ratio	P Value
SSFT	SSFT+FR	SSFT+SE	CG	B	9.87	3	3.29	260.2*	0.00
7.41	6.85	7.23	7.98	W	0.69	55	0.01		

Significant at .05 level.

Adjusted post-test mean values of the Sports Specific Fitness Training group (SSFT), Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR), Specific Fitness Training with Stretching Exercise (SSFT+SE) and control group on Speed was 7.41, 6.85, 7.23 and 7.98 respectively. The calculated 'F' value shows significant differences ($F=260.2$, $p<0.05$) among the four selected groups by taking pre- test scores as covariate. To evaluate which training caused a greater improvement on Speed, the Scheffe's Post Hoc test was applied to test the significant paired mean differences between the groups. The same is discussed in table II(a).

TABLE II(a)
SCHEFFE'S POST HOC TEST ON SPEED OF SELECTED TRAINING GROUPS
(Scores in seconds)

SSFT	SSFT+FR	SSFT+SE	CG	Mean Differences	P value
7.41	6.85	-----	-----	0.55*	0.00
7.41	-----	7.23	-----	0.17*	0.00
7.41	-----	-----	7.98	0.57*	0.00
-----	6.85	7.23	-----	0.38*	0.00
-----	6.85	-----	7.98	1.12*	0.00
-----	-----	7.23	7.98	0.74*	0.00

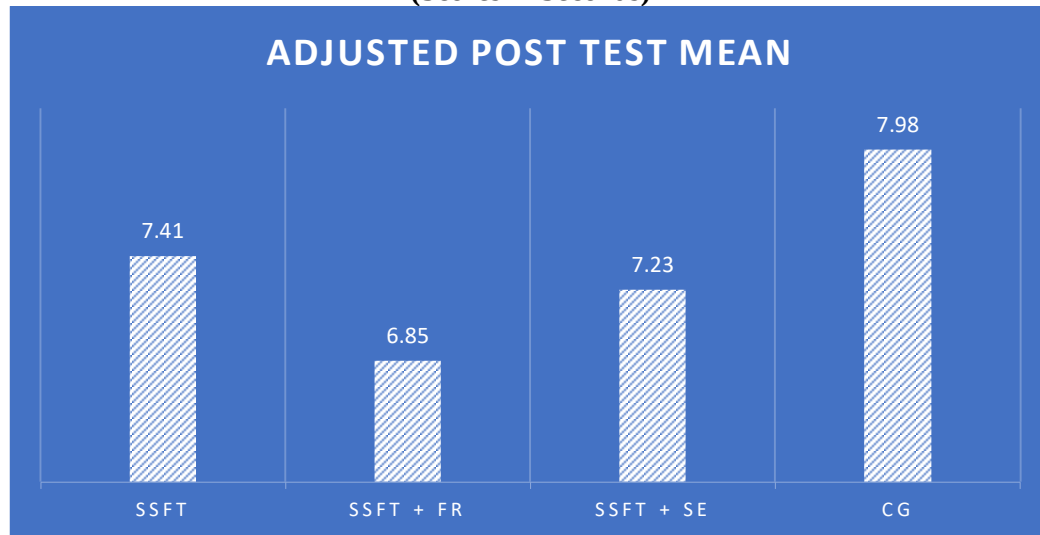
*Significant at .05 level.

Results of pairwise comparisons on speed:

Comparison between SSFT and SSFT+FR: The mean differences of the Sports Specific Fitness Training group (SFTG), Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR) shows 0.55. This is higher than the P value 0.05. It shows that the both the training have produced significantly different effect on Speed. Comparison between SSFT and SSFT+SE: The Sports Specific Fitness Training group (SSFT) and Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) shows 0.17. This is higher than the P value 0.05. It shows that the both the training has produced significantly different effect on Speed. Comparison between SSFT and CG: The mean differences of the Sport Specific Fitness Training group (SSFT) and Control group shows 0.57. This is higher than the P value 0.05. It shows that the both the training has produced significantly different effect on Speed. Comparison between SSFT+FR and SSFT+SE: The mean differences of the Sport's Specific Fitness Training with Foam Roller Exercise (SSFT+FR), shows 0.38. This is higher than the P value 0.05. It shows that the both the training has produced significantly different effect on Speed. Comparison between SSFT+FR and CG: The mean differences of the Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR), control group shows 1.12. This is higher than the P value 0.05. It shows that the both the training has produced significantly different effect on Speed. Comparison between SSFT+SE and CG: The mean differences of Sports Specific Fitness Training with Stretching Exercise (SSFT+SE),

control group shows 0.74. This is higher than the P value 0.05. It shows that the both the training have produced significantly different effect on Speed.

FIGURE-2
ADJUSTED POST TEST MEAN VALUES ON SPEED
(Scores in Seconds)



The results of this comparison clearly indicates that the performance of speed was better improved in Sports Specific Fitness Training with Foam Roller Exercise (SSFT+FR). The second-best improvement was noticed in Sports Specific Fitness Training with Stretching Exercise (SSFT+SE) and least improvement was noticed in Sport Specific Fitness Training group (SSFT). The adjusted post-test mean values on speed is shown in figure-2.

Dr. S. Malar, Dr. D. Maniazhagu (2022) Effect of Circuit Training Combined with Speed Agility Quickness Drills and Jump Rope Drills on Agility, they found that the speed was significantly improved in another study Dr. D. Maniazhagu, Mr. Kannadasan, and Ms. S. Malar. (2017). “Effects of explosive strength and strength endurance-based circuit training on speed performance, explosive strength and strength endurance circuit training on speed performance was increased. Dr. R. Venkatachalapathy, (2015), Effect of Circuit Training Programme on Speed and Agility that shows the circuit training programme significantly improved on speed. S. RameshKannan conducted a study on effect of intensive sports specific endurance circuit training on selected motor fitness components of male handball players.

during preparatory phase, and he concluded that intensive sports specific endurance circuit training on speed was improved significantly and also Dharuman, M. (2023) conducted a study on Effects of Circuit Training and Battle Rope Training On Cardio Respiratory Endurance of School Girls and circuit training and battle rope training significantly improved on cardio respiratory endurance. Raj, D.S., & Maniazhagu, D.D. (2022). Effect of Circuit Training Combined with Speed Agility Quickness Drills and Jump Rope Drills on Upper body Muscular Endurance in this study proved that Circuit Training Combined with Speed Agility Quickness Drills and Jump Rope Drills were significantly made a change on Upper body Muscular Endurance, Annasai, F conducted a study Circuit training based physical condition training model to increase speed, agility, arm power, and limb muscle power of basketball athletes(2023) and he concluded his study with Circuit training based physical condition training model to increase speed ,In additional Rao, V.D. (2023). Speed, Strength, and Explosive Power: Effect of Circuit Training and Weight Training on Sprinters of Hyderabad he found that Circuit Training and Weight Training were improved the speed, Kotzamanidis, Christos & Chatzopoulos, Dimitris & Michailidis, Charalambos & Papaiakevou, Georgios & Patikas, Dimitrios. (2005). The Effect of a Combined High-Intensity Strength and Speed Training Program on the Running and Jumping Ability of Soccer Players they found that speed was significantly improved in another study Thomas MH, Burns SP. Increasing Lean Mass and Strength: A Comparison of High Frequency Strength Training to Lower Frequency Strength Training, he concluded that strength training significantly made change. Lockie, Robert & Murphy, Aron & Schultz, Adrian & Knight, Timothy & Janse de Jonge, Xanne. (2011). The Effects of Different Speed Training Protocols on Sprint Acceleration

Kinematics and Muscle Strength and Power in Field Sport Athletes. They found that significantly speed training protocols significantly improves the speed. S. Karunanidhi, & Dharuman, Maniazhagu. (2012). Effects of circuit resistance training SAQ training and their combination on performance variable of male soccer players they found that circuit resistance training SAQ training and their combination on speed among soccer player were significantly improved. Dr. L. Santosh Singh, Dr. S. Opendra Singh, Sumit Kr. Thapa, (2018), Effect of Plyometric and Weight Training on Selected Physiological Variable of Football Player and they found that plyometric training and weight training improved the selected physiological variables in another study about Dr. Lamlun Buhiril, Dr. Narendra Gangwar, (2020), The effect of plyometric training on agility, speed and anaerobic power of soccer players. Concluded that plyometric training speed improved significantly. Hikmat Abdel Sattar Alwan, (2023), The effect of special speed training in developing the speed of the complex skill performance of young footballers in this study speed were significantly improved. S. Lourdu Raj, D Maniazhagu (2023), Effects of Different Surface of Plyometric Training on Speed of Junior Volley Ball Players, After the 6 weeks of sand surface and normal surface plyometric training, the nature of speed was improved. However, the speed was similar in both the groups. Control group did not show any significant improvement on speed. U, Maniazhagu D, Muktamatha V, et al., Effects of two modes of resistance training on speed leg explosive power and anaerobic power of college men they concluded that two modes of resistance training on speed were significantly improved.

CONCLUSIONS

The Sports Specific Fitness Training combined with Foam Roller Exercises (SSFT+FR) produced the greatest improvement on Speed performance compared to the other groups. However The Sports Specific Fitness Training combined with Stretching Exercises (SSFT+SE) showed the improvement on Speed performance compared to the other group (SSFT). The Sports Specific Fitness Training group (SSFT) showed the least improvement on Speed performance and the Control group showed no improvement on speed performance

REVIEWS

1. Annasai, F., Sumaryanti, A., Nugroho, C.S., Amri, B., Ace, H., Chesa, A., & Arianto, A.K. (2023). Circuit training based physical condition training model to increase speed, agility, arm power, and limb muscle power of basketball athletes. *Pedagogy of Physical Culture and Sports*.
2. Dharuman, M. (2023). Effects Of Circuit Training and Battle Rope Training On Cardio Respiratory Endurance of School Girls. *Indian Journal of YOGA Exercise & Sport Science and Physical Education*, 8(1), 26–32. <https://doi.org/10.58914/ijyesspe.2023-8.1.4>
3. Dr. L. Santosh Singh, Dr. S. Opendra Singh, Sumit Kr. Thapa, (2018), Effect of Plyometric and Weight Training on Selected Physiological Variable of Football Players. *Journal of Advances in Sports and Physical Education*, Vol-1, Iss-3 (Sept-Oct, 2018): 75-78.
4. Dr. Lamlun Buhiril, Dr. Narendra Gangwar, (2020), The effect of plyometric training on agility, speed and anaerobic power of soccer players. *International Journal of Physiology, Nutrition and Physical Education* 2020; 5(1): 255-257.
5. Dr. R. Venkatachalapathy, (2015), Effect of Circuit Training Programme on Speed and Agility, Received 6th January 2015, Accepted 20th February 2015. Retrieved on 27.04.2016
6. Dr. S. Malar, Dr. D. Maniazhagu (2022) Effect of Circuit Training Combined with Speed Agility Quickness Drills and Jump Rope Drills on Agility *Asian Journal of Applied Science and Technology (AJAST)* Volume 6, Issue 1, Pages 111-121, January-March 2022
7. Dr.D. Maniazhagu, Mr. Kannadasan, and Ms.S. Malar. (2017). “Effects of explosive strength and strength endurance-based circuit training on speed performance.” *International Journal of Research - Granth Alayah*, 5(8:SE), 76-82. <https://doi.org/10.5281/zenodo.888019>
8. Kotzamanidis, Christos & Chatzopoulos, Dimitris & Michailidis, Charalambos & Papaikovou, Georgios & Patikas, Dimitrios. (2005). The Effect of a Combined High-Intensity Strength and Speed Training Program on the Running and Jumping Ability of Soccer Players. *Journal of strength and conditioning research / National Strength & Conditioning Association*. 19. 369-75. 10.1519/R-14944.1.
9. Lockie, Robert & Murphy, Aron & Schultz, Adrian & Knight, Timothy & Janse de Jonge, Xanne. (2011). The Effects of Different Speed Training Protocols on Sprint Acceleration Kinematics and Muscle Strength and Power in Field Sport

- Athletes. Journal of strength and conditioning research / National Strength & Conditioning Association. 26. 1539-50. 10.1519/JSC.0b013e318234e8a0.
10. Mehre Z Hammami, Yassine Negra, Roy J. Shephard, Mohamed Souhaïel Chelly, (2017) The Effect of Standard Strength Vs. Contrast Strength Training on The Development of Sprint, Agility, Repeated Change of Direction, And Jump in Junior Male Soccer Players. 31(4): 901–912.
 11. Meysam Chaleh, Rouhollah Fatemi, Alireza Shahsavari, (2012), Relationship between speed, agility and anaerobic power of 14-16 years elite soccer players. International Research Journal of Applied and Basic Sciences. Vol., 3 (2), 427-432.
 12. Prof. Dr. Hikmat Abdel Sattar Alwan, (2023), The effect of special speed training in developing the speed of the complex skill performance of young footballers. Scientific Research Journal of Multidisciplinary, Volume-3, ISSN 2788-9467.
 13. Rafael L. Kons, Lucas B. R. Orsatto, Jonathan Ache-Dias, Kevin De Pauw, Romain Meeusen, Gabriel S. Trajano, Juliano Dal Pupo and Daniele Detanico, (2023), Effects of Plyometric Training on Physical Performance: An Umbrella Review, Sports medicine, 9:4.
 14. Raj, D.S., & Maniazhagu, D.D. (2022). Effect of Circuit Training Combined with Speed Agility Quickness Drills and Jump Rope Drills on Upper body Muscular Endurance. Journal of Advances in Sports and Physical Education.
 15. Rao, V.D. (2023). Speed, Strength, and Explosive Power: Effect of Circuit Training and Weight Training on Sprinters of Hyderabad District. International Journal of Pharmaceutical Research and Allied Sciences.
 16. S. RameshKannan, Dr. B. Chittibabu, Dr. P.C. Tripathy, M.D. (2015), effect of intensive sports specific endurance circuit training on selected motor fitness components of male handball players during preparatory phase, Asian Journal of Applied Research (AJAR) 2015, Retrieved on 28.04.2016
 17. S. Karunanidhi, & Dharuman, Maniazhagu. (2012). Effects of circuit resistance training SAQ training and their combination on performance variable of male soccer players. International Journal of Physical Education Sports Management and Yogic Sciences. 2. 21-24.
 18. Thomas MH, Burns SP. Increasing Lean Mass and Strength: A Comparison of High Frequency Strength Training to Lower Frequency Strength Training. Int J Exercise Sci. 2016 Apr 1;9(2):159-167. doi: 10.70252/HDLQ5133. PMID: 27182422; PMCID: PMC4836564.
 19. S. Lourdu Raj, D Maniazhagu (2023), Effects of Different Surface of Plyometric Training on Speed of Junior Volley Ball Players, Asian Journal of Applied Science and Technology Volume 7, Issue 4, Pages 120-125, October-December 2023
 20. Muktamath U, Maniazhagu D, Muktamatha V, et al., Effects of two modes of resistance training on speed leg explosive power and anaerobic power of college men students British Journal of Sports Medicine 2010;44: i23.