EFFECT OF PROPRIOCEPTIVE TRAINING ON DYNAMIC AND STATIC BALANCE AMONG SOCCER PLAYERS

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Abstract: The purpose of the study was to find out the effect of proprioceptive training on dynamic and static balance among soccer players. To achieve the purpose of this study, 20 male soccer players were randomly selected as participants from Wilson Football Club (WFC) and Spirited Football Club (SFC), Tuticorin, Tamilnadu, India. Their age were ranged from 18 to 22 years. The selected participants were randomly divided into two groups such as Group-I underwent proprioceptive training (n=10) and Group-II acted as control group (n-10). Group-I underwent proprioceptive training for three alternative days and one session per day and each session lasted for 60 minutes for eight week of periods. Group-II was not exposed to any specific training but they were participated in their regular activities. The data on dynamic and static balance were collected and administering by "Y" balance and stork balance stand tests. The pre and posttests data were collected on selected criterion variables prior to and immediately after the training programme. The pre and post-test scores were statistically examined by the dependent 't' test and Analysis of co-variance (ANCOVA) for each and every selected variables separately. It was concluded that the proprioceptive training group had shown significantly improved in dynamic and static balance. However the control group had not shown any significant improvement on any of the selected variables such as dynamic and static balance.

Index Terms: Proprioceptive Training, Dynamic Balance, Static Balance, Soccer Players.

I. INTRODUCTION

Proprioceptive training program is the kind of exercise is also known as sensory-motor training. Proprioception is inborn "talent" for body awareness and knowing just where the body is positioned in space [1]. Proprioception is generally defined as the ability to assess a respective limb's position without the assistance of vision. Proprioception is governed by central and peripheral mechanisms that come mainly from muscular receptors, but also includes tendinous, articular and cutaneous receptors [2].

Proprioception is defined as the awareness of posture, movements & changes in equilibrium as well as the knowledge of position, weight & resistance to objects in relation to the body [3]. Many of proprioceptive training are performed on the lower limbs, including proprioception training on one leg and proprioception plan training. Based on this, proprioception training is used as an effective method for rehabilitation from sport injuries and prevention practices [4].

The proprioception training activates the different parts of the sensory and motor systems which involved in joint stability and improve the motor-sensory system function. Lack of the attention to the proprioception training disrupt the nerve-muscles system and result in repeated ligamentous lesions and subluxation. Furthermore the proprioception training can be performed in the bodybuilding in athletes' fitness programs [5]. Joint position sense pertains to the accuracy of position replication, and is an individual's ability to reproduce a predetermined joint angle [6].

Proprioception is an important factor for promoting functional stability in playing soccer [7]. An improvement of motor abilities using proprioceptive training is noticed in some research with uninjured and untrained individuals [8]. Static balance may be assessed by having an individual maintain a motionless position while standing on one or both legs [9]. Whereas, dynamic balance can be assessed by controlling the center of mass with one leg while the other leg is reaching for maximum distance. The dynamic balance test has a greater demand on the balance and neuromuscular-control systems [10].

Soccer is currently considered the most popular sport, and research show that, worldwide, there are about 200 thousand athletes playing it professionally and 240 million as non-professional players. Soccer is a team sport and its practice involves specific techniques, game tactics and several skills such as, jumping, running, rapid acceleration, sudden stops, speeding and shots [11].

II. PURPOSE OF THE STUDY

The purpose of the study was to find out the effect of proprioceptive training on dynamic and static balance among soccer players.

III. METHODOLOGY

To achieve the purpose of this study, 20 male soccer players were randomly selected as subjects from Wilson Football Club (WFC) and Spirited Football Club (SFC), Tuticorin, Tamilnadu, India. Their age were ranged from 18 to 22 years. The researcher reviewed the available scientific journals, periodical, magazine, e-resources and research papers were taking into consideration feasibility criteria, availability of the instrument and relevance of the variables of the present study the following dependent variables namely dynamic and static balance were selected. Similarly proprioceptive training was chosen as independent variable. The dynamic and static balances were assessed by "Y" balance and stork balance stand tests respectively. This study was conducted to determine the possibility cause and effect of proprioceptive training on dynamic and static balance among soccer players. The subjects were divided into two equal groups consists of 10 each and named as experimental group (Group-I) and control group (Group-II). Group-I (n=10) underwent proprioceptive training and Group II (n=10) acted as control group. The control group was not given any treatment and the experimental group was attended proprioceptive training for three alternative days per week, for a period of eight weeks and one session per day. The related group research design was used in this study. All subjects were performed Bicycle leg swing, Cross body leg swing, Partial squats & jumping, skipping, Twisting, one leg jumping, ladder workouts, One leg stance with eyes closed, toe walking, heel walking, Tendem walking, runner's pose stance, Hip adduction, hip abduction, jump on & off, ladder exercises, jumping over the ball, change of direction exercises and the base of support is varied in their training period. The collected data from the two groups prior to and after the experimental treatment on dynamic and static balance were statistically analyzed by using the statistical technique of dependent 't' test and analysis of covariance (ANCOVA). In all the cases 0.05 level of confidence was fixed as a level of confidence.

IV. RESULT AND FINDINGS

The effect of proprioceptive training on dynamic and static balance were analyzed and presented below.

4.1 Dynamic Balance

Table-4.1: Computation of 't' - ratio between pre and post test means of proprioceptive training and control groups on dynamic balance (in percentage)

Criterion variables	Test	Proprioceptive Training Group Mean	Control Group Mean
Dynamic balance (in Percentage)	Pre test	74.99	74.44
	Post test	85.42	75.23
	't'test	**26.02***	1.65

Significant at 0.05 level. (Table value required for significance at .05 level for 't'-test with df 9 is 2.26)

The table 4.1 shows that the pre-test mean values of proprioceptive training and control groups are 74.99 and 74.44 respectively and the post test means are 85.42 and 75.23 respectively. The obtained dependent t-ratio values between the pre and post test means of proprioceptive training and control groups are 26.02 and 1.65 respectively. The table value required for significant difference with df 9 at 0.05 level is 2.26. Since, the obtained 't' ratio value of proprioceptive training group was greater than the table value, it was understood that proprioceptive training group had significantly improved the dynamic balance. However, the control group has not improved significantly. The 'obtained t' value is less than the table value, as they were not subjected to any specific training.

Table-4.2: Analysis of covariance on dynamic balance of proprioceptive training and control groups

Adjusted Post Test Means		Source of variance	Sum of squares	df	Mean square	F – ratio
Proprioceptive Training Group	Control Group	Between	402.11	1	402.11	**82.91***
85.16	75.49	Within	82.45	17	4.85	

Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table-4.2 indicates that the adjusted post test means values on dynamic balance. The obtained f- ratio of 82.91 for adjusted post test mean is greater than the table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicate that there is a significant mean difference exist between the adjusted post test means of

proprioceptive training and control groups on dynamic balance. The bar diagram shows the mean values of pretest, post test and adjusted post test on dynamic balance of proprioceptive training and control groups.
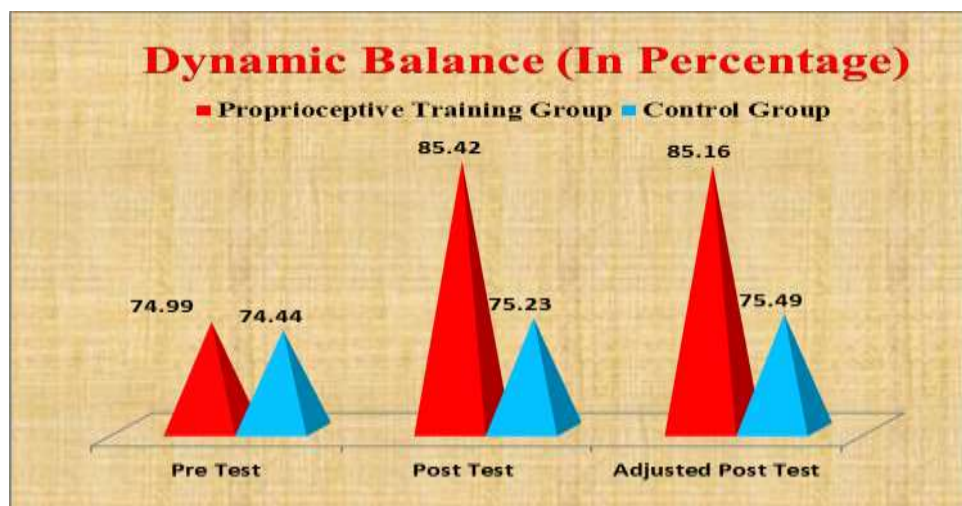

Figure-4.1:pre, post and adjusted post tests mean values of proprioceptive training and control groups on dynamic balance.

4.2 Static Balance

Table- 4.3: Computation of 't' - ratio between pre and post test means of proprioceptive training and control groups on static balance (in seconds)

Criterion Variables	Test	Proprioceptive Training Group Mean	Control Group Mean
Static Balance (in Seconds)	Pre test	101.18	101.48
	Post test	133.91	103.91
	't'test	**8.79***	1.09

**Significant at 0.05 level. (Table value required for significance at .05 level for 't'-test with df 9 is 2.26)*

The table 4.3 shows that the pre-test mean values of proprioceptive training and control groups are 101.18 and 101.48 respectively and the post test means are 133.91 and 103.91 respectively. The obtained dependent t-ratio values between the pre and post test means of proprioceptive training and control groups are 8.79 and 1.09 respectively. The table value required for significant difference with df 9 at 0.05 level is 2.26. Since, the obtained 't' ratio value of proprioceptive training group was greater than the table value, it was understood that proprioceptive training group had significantly improved on static balance. However, the control group has not improved significantly. The 'obtained t' value is less than the table value, as they were not subjected to any specific training.

Table-4.4: Analysis of covariance on static balance of proprioceptive training and control groups

Adjusted Post Test Means		Source of Variance	Sum of Squares	df	Mean Square	F – ratio
Proprioceptive Training Group	Control Group	Between	4319.59	1	4319.59	58.81*
133.96	103.75	Within	1248.65	17	73.45	

* Significant at 0.05 level. Table value for df 1, 17 was 4.45

Table 4.4 shows that the adjusted post test means values on static balance. The obtained f- ratio of 58.81 for adjusted post test mean is greater than the table value 4.45 with df 1 and 17 required for significance at 0.05 level of confidence. The results of the study indicate that there was a significant mean difference exist between the adjusted post test means of proprioceptive training and control groups on static balance. The bar diagram shows the mean values of pre, post and adjusted post tests on static balance of proprioceptive training and control group.
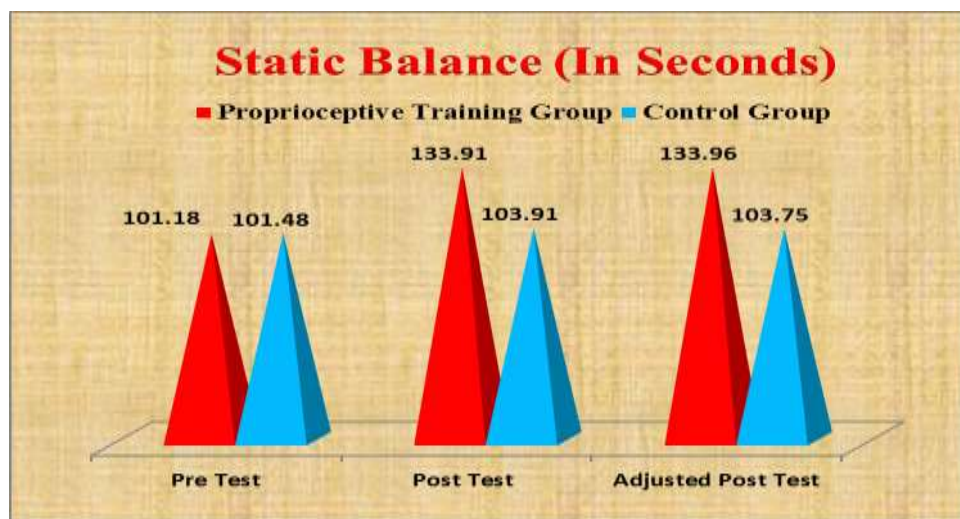
Figure-4.2: pre, post and adjusted post tests mean values of proprioceptive training and control groups on static Balance**.**

V. DISCUSSION ON FINDINGS

Jukic, (2008) [12] conducted the study on the effects of proprioceptive training on jumping and agility performance. The results of his research showed that there were significant changes in the experimental group under the influence of the proprioceptive training programme in double-leg vertical jump explosive strength tests and in forward agility (20Y test). **Venugopal (2018** [13] conducted the study on the effect of eight weeks proprioceptors training on agility of male kho-kho players. The finding of their study showed that the Proprioceptive training improve performance of Illinois agility test of male kho-kho players. **Satheesh Kumar, K & Arumugam, S (2018)** [14] conducted the study on influence of bous med ball exercises on selected motor fitness variables among basketball players. They concluded of his study the balance was significant improvement on bous med ball training among basketball players.

From above these both supportive study I intent to conduct this study the result of the my study indicates that there was a significant improvement on dynamic and static balance due to the effect of proprioceptive training among soccer players when compared to control group.

VI. CONCLUSIONS

1.　There was significant improvement on dynamic balance due to the effect of proprioceptive training among soccer players.
2.　There was significant improvement on static balance due to the effect of proprioceptive training among soccer players.
3.　However the control group had not shown any significant improvement on any of the selected variables.

REFERENCES

[1]. Batson, G. (2008). Proprioception. International association for dance medicine and science. Research paper retrieved on 15.01.2018 at the World Wide Web: http://www.iadms.org/associations/2991/files/info/proprioception.pdf.

[2]. Gaurav, S., Pooja, A., Shishir, N., & Tanvi, A. (2013). Comparative analysis of effectiveness of conventional proprioceptive training and multistation proprioceptive training on vertical jump performance in Indian basketball players. *Journal of Exercise Science and Physiotherapy*, vol. *9*(2), p.97.

[3]. Ya-Wen Liu, Shiow-Chyn Jeng, Alex J. Y. Lee 2005. The influence of ankle sprains on proprioception. *Journal of Exercise Science and Fitness*, vol. 3(1), pp.33- 38.

[4]. Niktab AR, Salari A, (2003). The Effect of mental and physical practice on standing balance: The Ortthopaedic Rehabilitaion Approach, *Journal of Kerman University of Medical Sciences*, vol. 10(3), pp.172-179.

[5]. Scott E Ross, Brent L Arnold, J Troy Blackburn, Cathleen N Brown, and Kevin M Guskiewicz. (2007). Enhanced balance associated with coordination training with stochastic resonance stimulation in subjects with functional ankle instability: an experimental trial, vol.4, p.47.

[6]. Subasi, S. S., Gelecek, N., & Aksakoglu, G. (2008). Effects of different warm-up periods on knee proprioception and balance in healthy young individuals. *Journal of Sport Rehabilitation*, vo. *17*(2), pp.186-205.

[7]. Safran, M. R., Harner, C. D., Giraldo, J. L., Lephart, S. M., Borsa, P. A., & Fu, F. H. (1999). Effects of injury and reconstruction of the posterior cruciate ligament on proprioception and neuromuscular control. *Journal of Sport Rehabilitation*, vol. *8*(4), pp.304-321.

[8]. Šmek, S. (2006). Promjene u rezultatima testova za procjenu motoričkih sposobnosti poduticajem proprioceptivnog treninga (Changes in the results of tests for assessing motor skills under the influence of proprioceptive training). Master thesis. Zagreb: Faculty of Kinesiology, University of Zagreb. In Croatian

[9]. Gribble., P. A., & Hertel, J. (2003). Considerations for normalizing measures of the Star Excursion Balance Test. *Measurement in physical education and exercise science*, vol. *7*(2), pp.89-100.

[10]. Earl, J. E., & Hertel, J. (2001). Lower-extremity muscle activation during the Star Excursion Balance Tests. *Journal of Sport Rehabilitation*, vol. 10(2), pp.93-104.

[11]. Bauer, N., Preis, C., & Neto, L. B. (2013). A importância da propriocepção na prevençãoe recuperação cinético-funcional esportiva. *Revista Brasileira de Reabilitaçãoe Atividade Física*, vol. 2(1).

[12]. Simek, S., Milanovic, D., & Jukic, I. (2008). The effects of proprioceptive training on jumping and agility performance. *Kinesiology: International journal of fundamental and applied kinesiology*, vol. *39*(2), pp.131-141.

[13]. Ashutosh Pandey, & Reeta Venugopal. (2018)   Effect of eight weeks proprioceptors training on agility of male Kho-Kho players. *International Journal of Yoga, Physiotherapy and Physical Education,* vol. 3(1), pp.33-38- 61.

[14]. Satheesh Kumar, K & Arumugam, S (2018) Influence of bous med ball exercises on selected motor fitness variables among basketball players, *Journal of Emerging Technologies and Innovative Research,* Vol-5, Issue-5, pp 774-778, ISSN No:2349-5162, Impact Factors: 5.87, UGC Serial No: 63975