e-ISSN:2582-7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 6, Issue 3, March 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.54

International Journal Of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 7.54|

| Volume 6, Issue 3, March 2023 |

| DOI:10.15680/IJMRSET.2023.0603016 |

To Compare The Effect Of Training On Balance Master V/S Sports Metrics Training On Static And Dynamic Balance And Stability Among Young Male Football Athlete With Ankle Instability: A Pilot Study

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ABSTRACT:

OBJECTIVE: Football has a growing number of participants and along with increases in the number of injuries among athlete. A most frequent injury is an ankle sprain, and lateral ankle sprains are particularly common and if go untreated will lead to instability. Balance master training and sports metrics training included balance and stability exercises.

METHODS: 20 Subject who were meeting the inclusion criteria were included in the group and randomly allocated into two groups. Group A (Training on Balance Master) and Group B (Sports Metrics Training) for 6 weeks. Outcome measures for Static Balance assessed by Single-leg stance test, Dynamic Balance assessed by Y-Balance test and Stability assessed by Cumberland ankle instability tool pre and post treatment intervention.

RESULT: The results of Single-leg stance test, Y-Balance test and Cumberland ankle instability for static, dynamic balance and stability respectively were reported in mean and standard deviation. On comparison of pre and post intervention of mean difference and standard deviation of Group-A Training on Balance Master v/s Group-B Sports Metrics Training.In Y-balance test Group B shows Significant improvement than Group A, meanand SD value for Group A (5.999310345 ± 1.659883669), Group B (11.03107143 ± 2.577849145). In single leg-stance test Group A shows significant improvement than Group B, Mean and SD value for Group A (8.69 ± 1.491), Group B (5.36 ± 1.254). In Cumberland Ankle instability tool Group B Shows Significant improvement than Group A, mean and SD value for Group A (4.41 ± 1.452) and Group B (5.07 ± 1.824).

CONCLUSION: This study concludes that both groups shows significant improvement in static, dynamic balance and stability, but there is more significant improvement in Group B with sports metrics training.

KEYWORDS: Ankle instability, static balance, dynamic balance, ankle sprain, stability

I. INTRODUCTION

Football is one of the most popular sports universalwith an increasing number of active players as well as increases in the number of injuries [(1,2)]. Football is marked by physical contact and performance of specific sports actions such as running, jumping, landings, acceleration, slowdown, abrupt changes of direction, and tramping are the extrinsic causative factors related to the occurrence of sports injuries [(3)].

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Ankle Sprain is the most common sports injury, in which the Lateral ankle sprain is the common [4,5,6]. Anterior talofibular ligament (ATFL) is the weakest with the lowest ultimate load along with anatomical positions and insertions it is most commonly injured in a lateral ankle sprain.Lateral ankle sprains are also referred to as inversion ankle sprains or occasionally as supination ankle sprain [6,7]. Undertreated ankle sprains can result in Instability [8].
Ankle instability can be classified as "Mechanical" and "Functional"[9]."Mechanical" ankle instability involves ankle hypermobility and laxity.Mechanical instability may be caused by factors that alter the mechanics of one or more joints within the ankle complex [9]. "Functional" ankle instability (FAI) is characterized by subjective feeling of recurrent giving way of outer (lateral) side of the ankle which often develops after repeated ankle sprains [8,10].Functional instability may be caused by specific insufficiencies in proprioception, neuromuscular control, postural control, or strength [9].

Sports metrics™ provides a complete training regimen to address fundamental strength, coordination and balance. It includes agility drills and three different cardiovascular workouts that are both aerobic and anaerobic. Each cardio workout has a slightly different combination of short bursts of hard running and longer distance, lower intensity movements. The entire program can be performed on the soccer field with no equipment required other than a soccer ball for each athlete. It should be performed in the athlete's off or preparatory season, 3 to 6 days per week. If training is performed 3 days per week, all components of training are performed every day.The warm-up, agility drills and flexibility exercises are performed daily [11].

The Sensbalance MiniBoard (Balance Master) combines the interactive training software and exercise games with the well-known benefits of a conventional wobble board. With easy exchangeable accessories the tilting angle and exercise difficulty can be customized. Standard a rubber accessory allowing tilting of 10˚ in all directions is supplied with the MiniBoard. Three other accessories are optional: A sturdy rubber accessory allowing tilting of approx. 15˚ in all direction, A sturdy rubber accessory allowing tilting of approx. 20˚ in all directions. A sturdy rubber accessory allowing tilting of approx. 15˚ in two directions (Front-Back, or Left-Right).

Cumberland Ankle Instability Tool is a simple, valid, and reliable tool to measure severity of functional ankle instability. Cumberland Ankle Instability Tool (CAIT) is a 9- item 30-point scale, for measuring severity of functional ankle instability. A score of ≤ 25 on the CAIT indicates the presence of ankle instability [12]. Test- retest reliability ($ICC_{2,1}$)- .96[12], sensitivity- 82.9%[12], specificity- 74.7%[12].

Single leg- stance test (also referred to as unipedal balance test, one leg stance test, and one-leg standing balance) is a simple test for measuring static aspects of balance [23]. It can be performed with eyes open/eyes closed and hands on the hips. Single-leg stance with closed eyes, has been widely used to evaluate functional ankle instability after ankle sprain and to objectively evaluate chronic ankle instability[13].

Dynamic balance is thought to be essential for those participating in physical activity [14].so, deficits in balance have been widely investigated as a predictor of lower extremity injury[14,15]. Furthermore, dynamic balance is regularly used during the rehabilitation process to track progress and make return to play decisions[15,16]. Y-Balance Test tool is used to test a person's risk of injury and dynamic postural control [15,17]. It can be used for both the upper quarter (UQYBT) and lower quarter (LQYBT). The Y- Balance test for the lower quarter (LQYBT) has been thoroughly researched as its protocol is based on research done on the star excursion balance test [15].

II. METHOD OF COLLECTION OF DATA

This Study was designed as a comparative study with the aim of analysing and comparing the effects of two different interventions on a particular outcome. The sampling method used in this study was the odd and even method, which involves selecting participants based on whether their identification numbers are odd and even. A total of 20 participants were selected for this study using this sampling method. This method ensures that the sample is selected in a way that is unbiased and fair. By using comparative study design and the odd and even sampling method, this study can provide valuable insights into the effectiveness of the interventions being compared.

INCLUSION CRITERIA:
Age -18 – 30 years (acc to ASIAN classification of Age group), Young Male football players, playing since last 2years (5-6 hours/week), Subjects willing to participate in the study, Participant with 3 months of complaint of ankle instability, according to CAIT cut off participant should score less than/equal to 25 out of 30, Unilateral affected limb.

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EXCLUSION CRITERIA:

Presently having any kind of injury in lower limb, Any musculoskeletal disorders, neurogenic disorders, cardiovascular, respiratory, haematological or endocrine disorders, Subject having a h/o upper limb/lower limb/trauma that had requires treatment, Any h/o surgery (last 1year), Subject having any acute/ chronic abnormal pain related to surgical/ medical illness and those receiving psychiatric treatment, Participants who are included in any other studies are excluded.

OUTCOME MEASURES:

Y- Balance test- to assess the dynamic balance
Single leg Stance Test- to assess the static balance
Cumberland Ankle Instability Tool – to assess the stability

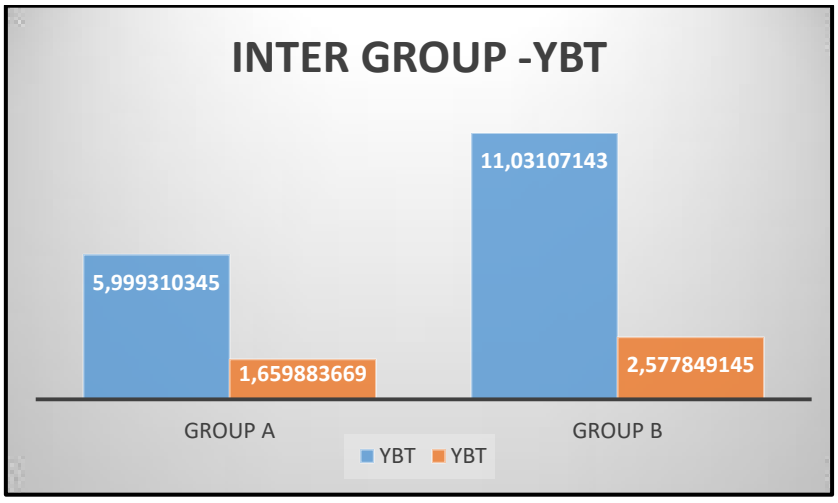
MATERIALS:

- Consent form
- Diary
- Pen
- Measuring tape
- Cones
- Sticky tapes
- Performance measuring sheet
- stepper
- Balance master
- Ladder

Athletes who want to participate and match inclusion criteria willingly were included in this study. Subjects were randomly assigned into two groups, Group A- Training on Balance Master and Group B- Sports Metrics Training. A total of 18 sessions were conducted for six weeks, three days a week. On training days, the session consisted of the warm-up phase, Training onBalance Master and Sports Metrics Training and cool down for groups A and B, respectively.

III. RESULTS

The statistical software SPSS version 20 used for the analysis of the data involving pre and post comparison and Microsoft word and Excel have been used to generate graphs, tables etc. Descriptive statistical analysis has been carried out Intra group Analysis were done by using Wilcoxon signed ranks test and Inter Group Analysis were done by using Mann Whitney test. which resulted in a p-value of 0.05.



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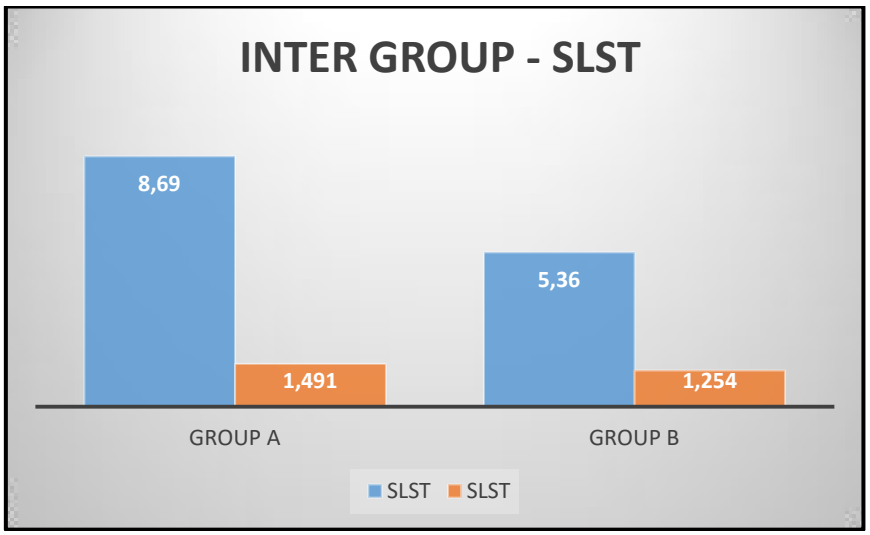

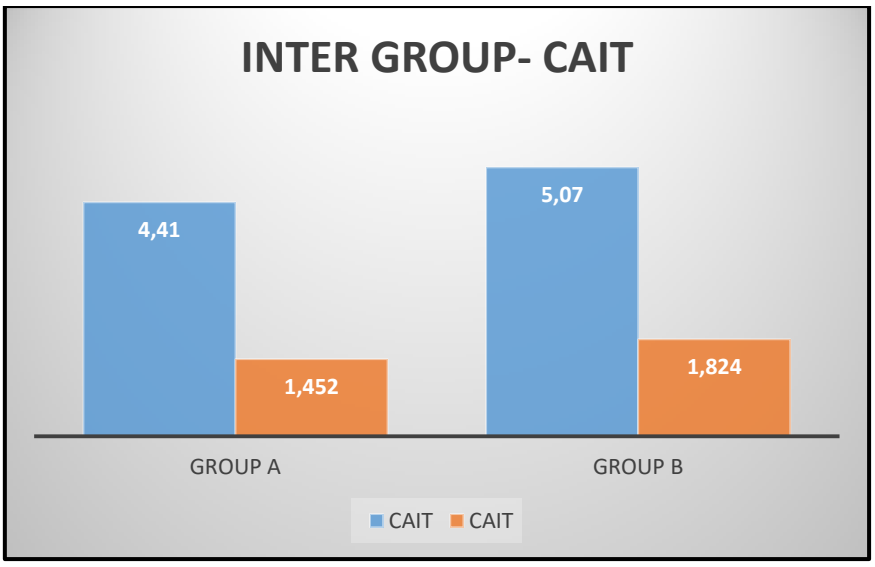

The results of the Y Balance test, single leg stance test and Cumberland ankle instability tool are reported in mean and standard deviation. On comparison of Pre and post intervention mean and SD difference of Y- Balance test, Single leg stance test and Cumberland ankle instability toolfor Group A and B. In Y-balance test for Group A (5.999310345 ± 1.659883669)Group B (11.03107143 ± 2.577849145), In single leg stance test for Group A (8.69 ± 1.491) Group B (5.36 ± 1.254) and CAIT for Group A (4.41 ± 1.452) Group B (5.07 ± 1.824). The p-value considered was > 0.05, indicating that there was a not statistically significant difference between group A and group B after the intervention. However, Group A's results demonstrated a higher increase in Single- leg stance Test score than group B's. Where group B shows higher improvement in y-balance test and Cumberland ankle instability tool score than Group A.

III. DISCUSSION

The Present study was conducted to evaluate the “Effect of training on balance master v/s sports metrics training on static and dynamic balance and stability among young male football athlete with ankle instability”. Data was collected from the participants by assessing there Static and dynamic balance and stability by Single-leg stance test, Y- balance test and Cumberland ankle instability toolrespectively. Intervention was applied and results were obtained.
In this Study Group-A Received Training on Balance Master and Group-B received Sports Metrics Training. Statistical analysis was done for both the groups i.e., Group-A and Group-B, and the post-intervention analysis showed significant improvement in Y-balance test, single-leg stance test and improvement in CAIT score as well.

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The results were statistically analysed using Wilcoxon Signed Ranks Test and Mann-Whitney Test using SPSS version 2.0.

The hypothesis part at this time, both the Groups is presented statistically significant improvement, the alternative hypothesis made gets accepted each and null hypothesis made here are rejected post intervention as both the groups have showed significant results by improving in strength and reducing pain and disability.
When looking at the tables and graphs for each objective individually that Y-balance test, Single-leg stance test and Cumberland ankle instability tool between groups together, the results post intervention revealed that there was significant enhancement in both the groups that is GROUP-A and GROUP-B respectively, but Group B shows more improvement than Group A, in which there was statistically higher significant improvement in single-leg stance test in Group A than in comparison with Group B and, improvement in Y- balance test and Cumberland ankle instability tool in Group B than Group A.
In previous study,Tamer M. Shousha1,2, Nehad A. Abo-zaid3 ET al. found that Virtual reality and Biodex balance training have an evident therapeutic effect on improving the degree of balance in cases of CAI in adolescent athletes but with no significant difference observed between VR and BBT during the rehabilitation of athletic adolescents with CAI.

Another study, Je-Ho Kim, Yo-Han Uhmfound the effect of eight weeks of ankle stability exercise using biofeedback on balance ability and lower limb muscle activity in football players with functional ankle instability and concluded that biofeedback not only effective in treating the central nervous system but is also an effective treatment for normal people or athletes.
Noyes, Frank R ET.al, found out that neuromuscular training program significantly improved lower limb alignment on a drop-jump test, abdominal strength, estimated maximal aerobic power, and vertical jump height in high school female volleyball players.
In previous study, Phillip Plisky Et.al they found out the reliability of Y-balance test (lower quarter) that is there was moderate to high quality evidence demonstrating that the YBT-LQ is a reliable dynamic neuromuscular control test. It also shows about the significant differences in sex and sport. If general cut points (i.e., not population specific) are used, the YBT-LQ may not be predictive of injury. Clinical population specific requirements (e.g., age, sex, sport/activity) should be considered when interpreting YBT-LQ performance, particularly when used to identify risk factors for injury.
Therefore, Balance master training is more beneficial in training the player for improving static balance were significant. But Sports metrics training is more beneficial in training the player for improving stability and dynamic balance as the results showed. GROUP B is highly significant as compared to GROUP A. In both the Groups, that is GROUP A and GROUP B results showed that improvement in balance (static and dynamic) and decreases the instability by improving the stability.

IV. CONCLUSION

The purpose of the current study was to identify effect of Training on balance master versus Sport Metrics training on Static and Dynamic balance and stability among young male football athlete with ankle instability. Based on the study conducted, and the results were analysed, it is concluded that there is significant improvement in both the groups, but Balance master training (GROUP B) is more beneficial in training the player for improving static balance and Sports metrics training (GROUP A) is more beneficial in training the player for improving stability and dynamic balance. GROUP B is highly statistical significant as compared to GROUP A.

LIMITATION AND FURTHER RECOMMENDATION:

Participants in the study were taken from a single geographical area.Sample size taken in this study is small.Less study on the intervention used in this study.Further research on balance master and sports metrics needed to know its effect on instability and balance.A multi-centric study can be conducted by including participants from different GEOGRAPHICAL LOCATIONS.

SOURCE OF FUNDING

This study was not funded by any public, commercial, or not-for-profit agencies.

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ETHICAL APPROVAL

Ethical approval was obtained from The Institutional review board of Parul Institute of Physiotherapy, Waghodia, Vadodara.

CONFLICT OF INTEREST

None

CONSENT FOR PUBLICATION

All individuals participating in this research signed an informed consent form before their inclusion in the study.

AUTHORS CONTRIBUTION

MD: conceptualization, project administration, methodology, reviewing, writing, and editing; methodology, formal analysis, and reviewing; BG: reviewing and editing.The final draft of the manuscript has undergone critical review and approval by all authors, who take full responsibility for its content and similarity index.

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Impact Factor
7.54

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