

Original Article

EFFECT OF WOBBLE BOARD BALANCE TRAINING PROGRAM ON STATIC BALANCE, DYNAMIC BALANCE & TRIPLE HOP DISTANCE IN MALE COLLEGIATE BASKETBALL ATHLETE

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ABSTRACT

Aim & Objective: The aim of the study was to determine the effect of wobble board balance training program on static & dynamic balance & on triple hop distance in male collegiate basketball athletes.

Methodology: Fifty healthy basketball players within a age group of 18-22 yrs. were randomly selected with a baseline BESS score between 6 to 14 & modified SEBT score equal to or greater than 94 (till 100) and they randomly divided into control (n-25) & training group (n-25).The training group were given eight weeks of training (for first two weeks on floor & next six weeks on wobble board) & training was given five times a week for first four weeks & three times a week for next four weeks while the control group performed their regular training under the supervision of a physiotherapist . Pre (0 week) & post (8 weeks) measurements of static & dynamic balance & triple hop distance were noted for both groups.

Results: The pre and post test readings of BESS score shows significant improvement. Similarly, there is a significant improvement in m-SEBT score in all three positions. Pre and post test readings for the triple hop distance shows equal improvement for both control & training group.

Discussion & Conclusion: This study concluded that wobble board balance training program is an effective mean for improvement of static & dynamic balance in male collegiate basketball athletes.

KEYWORDS: Static balance, Dynamic balance, Triple hop distance, Wobble board, Balance Error Scoring System, Modified Star Excursion Balance Test.

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INTRODUCTION

Basketball has gained worldwide popularity and fascinated players and spectators with its dynamic characteristics as a team sport. ¹

Basketball is a multidirectional sport that involves explosive activities such as sprinting,

rapid changes of direction and jumping; all which occur in a confined area amid multiple competitors.²

Recently various forms of balance exercises have become a part of both athletic training & rehabilitation.³

Unstable surface training or balance training has become popular in the past few years as a supplementary workout for competitive athletes. For years balance training has been implemented in injury prevention programs & in many facets of the rehabilitation process. It is generally accepted in the realm of sports medicine that any form of balance training will assist in increases in proprioception, kinaesthetic awareness, muscular strength & core strength.⁴

Balance is one of the important co-ordination abilities in the field of sport in general & basketball in particular. Balance is a form of neuromuscular control which contributes in developing physical & skill performance. Balance enables players to control the body whether in static or dynamic positions & also protects them from falling & injury in performing rapid movements.

Player's basic strategy in basketball is man to man defense which requires pressure on competitors. This requires a high capacity to control the body in order to avoid bodily contact & exposure to commit legal faults. A player who controls the body after performing the sequence movements can achieve or defend good shooting, take the rebounding, begin a counter attack exploit defensive gaps through fast change in directions.⁵

Electromyographic activity for soleus, biceps femoris, rectus femoris, lower abdominals and lumbosacral erector spinae was judged while participants assumed standing and squatting postures while balancing on a variety of unstable surfaces such as dyna disc, BOSU ball, wobble board and a Swiss ball. The results indicated that moderately unstable training devices (i.e. dyna disc, BOSU ball) did not provide sufficient challenges to neuromuscular system in highly trained individuals while acquiring the mentioned position.⁶

Hence the purpose of this study is to impart the eight week wobble board balance training & examine its effect on static balance, dynamic balance & triple hop distance in male collegiate athletes as a measure of functional performance. This is the fact that incorporation board training would enhance one's total functional effectiveness which has been proved to be specific for every skill of sports.

Methodology

50 healthy male subjects were recruited as sample from 80 subjects of basketball players. Subjects had been practicing the game for at least 1 year. Subjects were screened for inclusion & exclusion criteria with baseline score for BESS (6 to 14 score of error)⁷ & modified SEBT (greater than or equal to 94)⁸. After the subjects met the inclusion criteria, they were randomly divided into control (n-25) & training group (n-25).

The training group were given eight weeks of training (for first two weeks on floor & next six weeks on wobble board)⁹ & training was given five times a week for first four weeks & three times a week for next four weeks with their routine training for strength & agility, while the control group performed only their routine training for agility & strength under the supervision of a physiotherapist. Before each testing & training session the subjects complete 5 minutes of warm up exercises¹⁰. Pre (0 week) & post (8 weeks) measurements of static balance (BESS Score)¹¹ & dynamic balance (modified SEBT Score)¹² & triple hop distance¹³ were noted for both groups.

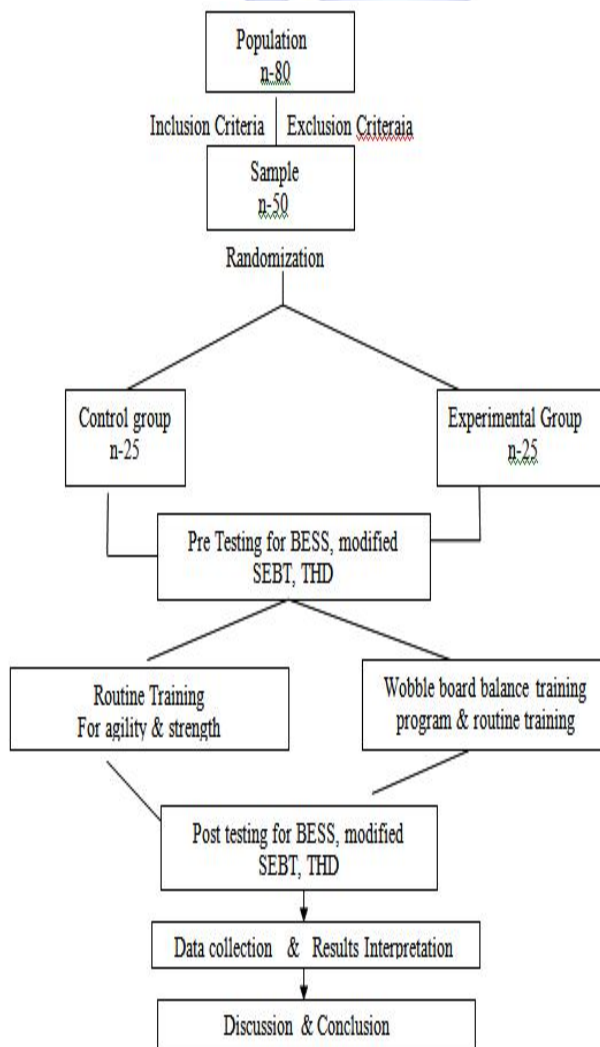
Protocol for Experimental Group

Phases	Surface	Eyes	Exercise
Phase 1 Week 1	Floor	Open	Single-leg stance
		Open	Single-leg stance while swinging the raised leg
		Open	Single-leg squat (30°-45°)
		Open	Open Single-leg stance while performing functional activities (dribbling, catching)
Phase 2 Week 2	Floor	Closed	Single-leg stance
		Closed	Swinging the raised leg
		Closed	Single-leg squat (30°-45°)
Phase 3 Week 3	Board	Open	Single-leg stance
		Open	Swinging the raised leg
		Open	Single-leg squat (30°-45°)
		Open	Double-leg stance while rotating the board
Phase 4 Week 4	Board	Closed	Single-leg stance
		Open	Swinging the raised leg
		Open	Single-leg squat (30°-45°)
		Open	Single-leg stance while rotating the board
Phase 5 Week 5 to 8	Board	Closed	Single-leg stance
		Open	Single-leg squat
		Open	Single-leg stance while rotating the board
		Open	Single leg stance while performing functional activities (dribbling, catching)

Fig. 1: Single leg squat on wobble board.



Procedure Flow Chart



DATA ANALYSIS

The data was managed on excel spread sheet and was analysed using SPSS (Statistical Package for the Social Sciences) software, version 17.0. For all statistical tests, the level of significance was set at p valued"0.05. All values were expressed as mean and standard deviation. A paired t-test was applied to analyze the difference of BESS Score, mSEBT Score & THD

between pre- and post- intervention of basketball players in both experimental and control group. An independent t-test was applied to analyze the difference of BESS Score, mSEBT Score & THD among the experimental and control group.

RESULTS

Fig. 2: Comparison of pre & post mean values of BESS score for both experimental & control group.

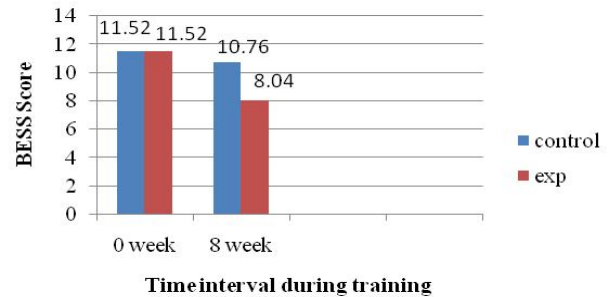


Fig. 3: comparison of pre & post mean values of modified SEBT forward for both experimental & control group.

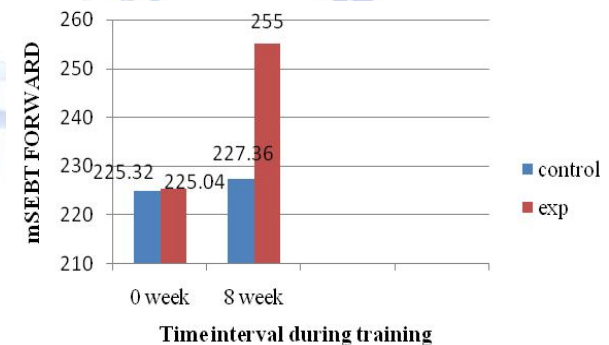


Fig. 4: Comparison of pre & post mean values of modified SEBT posteromedial for both experimental & control group.

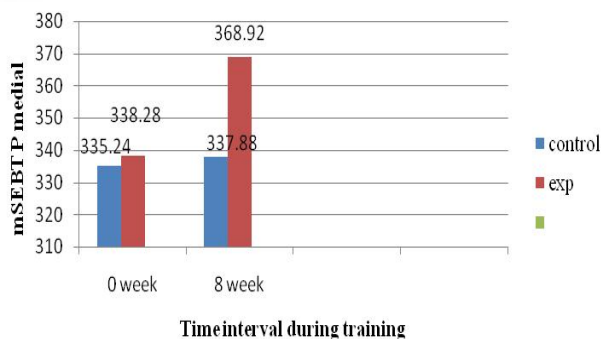


Fig. 6: Comparison of pre & post mean values of THD for both experimental & control group.

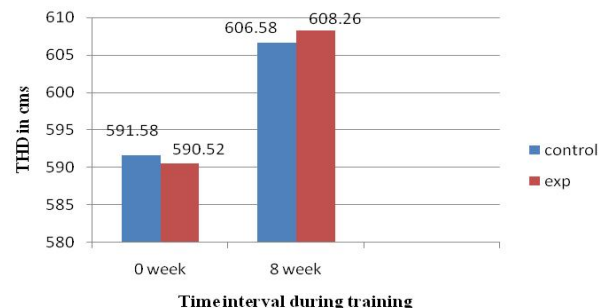


Table1: Shows pre values of mean, t & p value of all variables.

Variables	Group	Mean	t-value	p-value
Pre BESS	con	11.52	0.001	1
	exp	11.52	0.001	1
Pre SEBT Forward	con	225.04	-0.051	0.959
	exp	225.32	-0.051	0.959
Pre SEBT P medial	con	335.24	-0.284	0.778
	exp	338.28	-0.284	0.778
Pre SEBT P lateral	con	317	-1.951	0.057
	exp	336.64	-1.951	0.057
Pre THD	con	591.5824	0.112	0.911
	exp	590.5294	0.112	0.911

Table 2: Shows post values of mean, t & p value of all variables.

variables	Group	Mean	t-value	p-value
Post BESS	con	10.76	5.21	0.001
	exp	8.04	5.21	0.001
Post SEBT Forward	con	227.36	-3.889	0.001
	exp	255	-3.889	0.001
Post SEBT P medial	con	337.88	-3.549	0.001
	exp	368.92	-3.549	0.001
Post SEBT P lateral	con	323.2	-4.676	0.001
	exp	365.08	-4.676	0.001
Post THD	con	606.58	-0.171	0.865
	exp	608.26	-0.171	0.865

DISCUSSION

The hypothesis for this study was that the eight weeks wobble board training when performed by healthy collegiate basketball players will be useful in improving static balance as assessed by BESS (balance error scoring system) score ,dynamic balance as assessed by modified SEBT (star excursion balance test) score & THD (triple hop distance) in them. The reason for the hypothesis was based on previous researches confirming the effect of balance training on these variables.

This study shows that eight weeks of wobble board balance was found to be effective in improving static balance using BESS score in healthy collegiate basketball players. The improvement in static balance following wobble board balance training is consistent with findings of other studies.

The reason for improvement in static balance can be due to effect of training on reflex control of muscle activity when exercising in close kinematic chain. The gain in strength, improved intramuscular & intermuscular coordination & more economic activation of agonists helps in achieving stabilisation of extremities & thus improves static balance. ¹⁴

Dootchai Chaiwanichsiri et al demonstrated that

concentric & eccentric muscle contractions, proprioception , coordination as well as postural control involved during various exercises of wobble board balance training program may have improved static balance of athletes. ¹⁵

The improvement in static balance of control group may be because the athletes were in season & participated in conditioning regimen program that laid down the ground work for basic functional strength may result in improved static balance.

It was found on analyzing result for dynamic balance using modified SEBT score that dynamic balance was improved significantly in experimental group than in control group. The reason for improvement in dynamic balance may be due to similar pattern of movement to control body weight as in exercise program & in modified SEBT test as one foot is planted & other will reach in different directions .This modified SEBT test well matched with the training provided by program & thus increases modified SEBT score following eight weeks of wobble board balance training. ¹⁶

It has been found that modified SEBT is practice based test and hence improvements in scores of modified SEBT may be due to repeated practice of the test. Thus maturity effect of test practice may also improve dynamic balance in these athletes ¹⁵. Also training on unstable surfaces undermines the principle of specificity of training & poses specific demands & thus may improve dynamic balance in these athletes. ¹⁷

The study done by Gretchen et al in 2009 concluded that unstable surface training results in improved core strength & in previous studies it has been proved that core strength had direct relation with dynamic balance .Thus the improved core strength result in increased score of modified SEBT score.

On comparing result for THD in healthy collegiate basketball players it was found that THD increased equally in both experimental & control group suggesting that wobble board balance training specifically was not effective in improving THD.

Training on wobble board produces less force & result in lesser muscle activation .The force output decreases with decreasing stability thus

the loss in power task which did not improve jumping activities in these athletes.¹⁸

In addition to the wobble board training it should be noted that all participants were in season & participated in not only practice but also in regimen strength & conditioning program.

This in season strength & conditioning programs laid the groundwork for basic functional strength for specific sports which may be responsible for improving triple hop distance in both experimental & control groups of basketball athletes.

CONCLUSION

It can be concluded from this research that wobble board balance training is particularly important for basketball players when improving their dynamic balance & static balance. But, use of wobble board balance training program for improving triple hop distance of basketball players cannot be established through this research.

Clinical relevance of study

Wobble board is a simple, cheap & portable tool which can be used for balance training by various rehabilitation professionals & coaches for enhancement of functional performance, prevention of lower extremity injuries & post rehabilitation of lower extremity injuries in various athletic populations specially in the Indian scenario where infrastructure is lacking at various levels (district & state level) of sports set up.

Therefore prevention of injuries, enhancement of fitness level & better post rehabilitation post injuries at gross root level of sports will lay a foundation for preparation of well trained, healthy national & international athletes.

Limitations & future research of the study

Sample included was population with age 18-22 years, so, results cannot be generalized to athletic population of other age groups. The study was conducted during in season & athletes were undergoing practice & conditioning regimen as advised by their coach which had also contributed in the improved static & dynamic balance & triple hop distance scores in both groups.

Balance boards of different sizes should be used to select the best choice for each age group.

Similar study should be conducted on female basketball athletes with different age groups. The effect of wobble board balance training can further be checked on other functional parameters as vertical jump height, agility & sprint time.

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Conflicts of interest: None

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