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Comparıng the ınfluence of force traınıngs applıed wıth dıfferent methods

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Abstract

The aim of this study is to examine the influence different models of force trainings on balance values.In the research, 30 volunteer participants including 20 experimental (experiment A, experiment B) and 10 control aged between 18-22 have taken part. Volunteer participants partaking in experiment group have been incorporated into different force trainings of 3 days in a week during eight weeks. Training program 4. It has been modified their 1 maximum ranks (1TM) by being identified again at the end of the week. While the participants taking part in Experiment A (n=10) were given classic force training, those taking part in Experiment B (n=10) were given super slow motion force training. The participants in control group have gone on their routine daily lives. Before and after the training period, the values of Star Excursion Balance Test (SEBT) have been recorded. The values of Skewness & Kurtosis have been looked up to retain whether the datum obtained show normal distribution or not. When Repeated Measure ANOVA (Repeated Measure Anova) test was being applied to identify the differences between groups, Simple Effect Test has been implemented to determine the development level in the group. Significance level has been determined as $p< 0.05$. According to the results of Repeated measures Anova test, even though the significant change has been seen when the differences in the values of left foot star balance test in both experiment group were compared before and after the training period, a statistically significant difference has been determined in the values of right foot star balance test**.** According to the Simple Effect Test results, while the increase in the classic force training (experiment A) group is meaningless,it has been found that the increase in Super Slow Motion force training (experiment B) group is statistically meaningful. The results obtained show that classic and super slow motion force trainings have contributed to the development of force after the implementation period. Depending on the force gaining, the development in the values of dynamic balance has been seen. However, depending on string out in terms of time of tending to concentric and eccentric muscular contraction in slow motion force trainings, its influence on balance performance has more come into prominence.

Keyword: Classic force, dynamic balance, super slow motion force

INTRODUCTION

Force is one of the must features of each sport branch (1). When the analysis of target performance in sports actions is conducted, it has been seen that the force has affected the performance directly in some sports branches and indirectly in some others (10). The training programs aiming to develop the force and the power in many sports have been supported with weight trainings. The strength trainings are becoming much more important in sports requiring particular skills (24).

One of these methods is Super Slow Motion (19). Although it has been implemented successfully for many years, there has been no certain evidence respecting the influence of this method. By the reason of the fact that Super Slow provides high level of muscle tension, it is thought to be an efficient way because it increases muscle hypertrophy and force (5).

Balance is a skill that one can keep his body in balance in several positions (19). In other words, it is ensuring compliance of the body against gravity with the evaluation of vestibular, proprioceptive and visual datum blending in central nervous system during movement or rest (4). Balance is classified under two titles as static balance and dynamic balance. While static balance is an ability to provision the balance of the body in certain place or position, dynamic balance is defined as the ability to provide balance of the

entire body in action or a part of it (18).

The ability of mankind in balance can be described as a decisive factor in developing other motor systems (3). The ability (stability) of lower extremity to remain stable is extremely important for both positive effect of sport performance and preventing potential injuries in daily life. For this reason, revealing the effects of conducted education programs on stability of lower extremity has become more of an issue (16).

In the literature (body of literature), it has drawn attention that many researches and methods has been conducted on the purpose of developing participants' balance level. It is known that the performed strength trainings have a positive effect on balance performance. The aim of this study is compare the effects of different strength training methods aimed at developing force on balance performance.

METHOD

Voluntary policy in participation has been considered and the form has been signed with respect to their voluntariness. The athletes participating in the research have been informed about the study and tests. In the research, 10 people have performed strength training (3 sets and 8 runs with the 80% of a maximum run, 10 seconds concentric -5 seconds eccentric), 10 people have performed Super Slow strength training (3 sets and 10 runs with the 50% of a maximum run, 10 seconds concentric -5 seconds eccentric) and 10 people have participated in only measurements by creating a control group. Trainings lasted 8 weeks and programs have been implemented 3 days a week and in at the end of the third week the program has been modified.

Star Excursion Balance Measurements

Star Excursion Balance Test Dynamic Balance is evaluated with Star excursion balance test (12). While SEBT is being conducted, when one is trying to make his body stable, it is required to stretch out in maximum with other foot on different directions and return to the same position. The participants in the study were asked to stretch out to eight different lines (anterior, posterior, medial, lateral, anterior medial, anterior lateral, posterior medial and posterior lateral) in the latest spot that they can reach During the measurement, it ensured that the participants returned to starting point on the center without twisting the position with other feet by doing light touch to stretching point. The margin that stretching foot reached at the last point was defined as maximum stretching margin. If the participant lifts his foot from the ground, distracts from the center spot, or his stretching foot steps upon stretching point by means of support instead of touching, the trial is cancelled and ensured to repeat again (13,20).

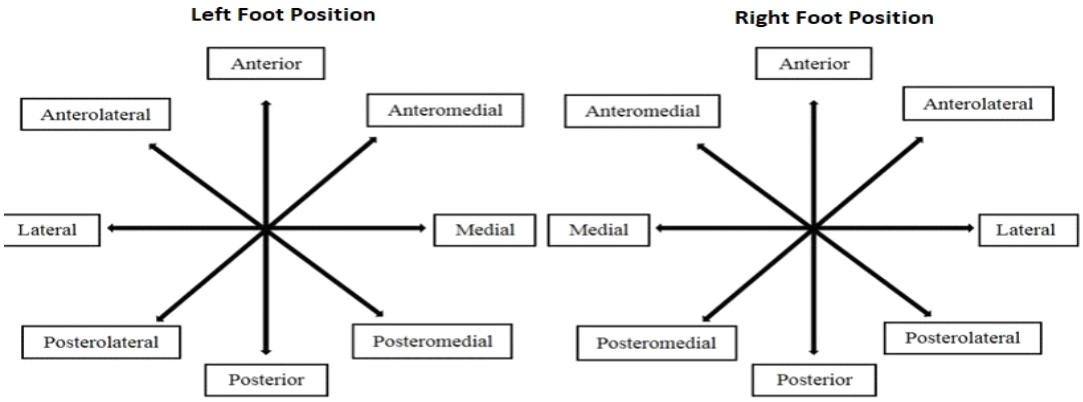

Figure 1. Stars Excursion Balance Test.

In Star Excursion Balance Test (SEBT), each participant had 3 runs to try with two legs in 8 lines.

Each subject was ensured to start the test by means of their right foot on the center and to perform 3 more runs with other foot by pausing for 5 minutes at the end of 3 runs.

Data Analysis

On the purpose of evaluation of datum obtained from the study and creating the tables, SPSS (Statistical Package For Social Sciences 23) statistical program has been used. In order to determine whether the datum show a normal distribution or not, Skewness & Kurtosis values have been maintained (17). In order to determine the differences between groups, while Repeated Measure Anova Test is being implemented, Simple Effect Test has been applied to identify the level of development within group. Significance level has been evaluated as $p< 0.05$.

RESULTS

Table 1. Descriptive Statistic of Groups

		N	Mean	Std. Deviation	Min.	Max.
Age	Super Slow Motion	12	20.5000	1.83402	18.00	24.00
	Standard	12	20.7500	1.76455	18.00	23.00
	Control	12	20.4167	1.50504	18.00	24.00
	Total	36	20.5556	1.66381	18.00	24.00
Years of Doing Sports	Super Slow Motion	12	8.8333	4.04145	2.00	16.00
	Standard	12	8.0833	2.10878	5.00	12.00
	Control	12	6.6667	2.93361	1.00	13.00
	Total	36	7.8611	3.17268	1.00	16.00
Height	Super Slow Motion	12	179.9167	5.19542	172.00	193.00
	Standard	12	176.6667	5.24549	164.00	183.00
	Control	12	178.0000	5.57592	167.00	187.00
	Total	36	178.1944	5.36027	164.00	193.00
Weighy	Super Slow Motion	12	71.5500	8.90878	61.50	83.90
	Standard	12	75.4417	7.55085	59.30	88.00
	Control	12	70.0167	9.64910	54.10	85.70
	Total	36	72.3361	8.80270	54.10	88.00

Table 2. Star balance test left foot group x time interaction results

Group	N	Measurement	Avg. ± Std. H.		F	P
Super Slow Motion	12	Pretest	62.865	± 1.499	2.542	0.094
	12	Posttest	68.885	± 2.142		
Standard	12	Pretest	63,240	± 1.499		
	12	Posttest	65,646	± 2.142		
Control	12	Pretest	61,583	± 1.499		
	12	Posttest	62,313	± 2.142		

According to the results of Repeated Measurements Anova group x time interaction, there has been no significant difference between the methods applied statistically while comparing the differences between the values of each group's own pretest and posttest in itself ($F_{2,33;}$ 3.901; $p<0.05$) (See. Table 1).

Table 3. Star balance test left foot Simple Effect test results

Group	Measurement 2	Measurement 1	AVG. Difference ± Std. H.		P
Super Slow Motion	Posttest	Pretest	6.021	± 1.696	001 *
Standard	Posttest	Pretest	2,406	± 1.696	0.165
Control	Posttest	Pretest	0.729	± 1.696	0. 675

* p<0,05

However according to the results of Simple Effect implemented in order to identify which training

method is more effective, while an significant improvement statistically in the group which Super Slow Motion has been implemented drew attention, there has been no significant improvement statistically in control group and the group which standard strength training has been applied.

Table 4. Star balance test right foot group x time interaction results

Group	N	Measurement	Avg. ± Std. H.		F	P
Super Slow Motion	12	Pretest	63.010	± 1.642	3.901	.030*
	12	Posttest	69.125	± 2.157		
Standard	12	Pretest	64.287	± 1.642		
	12	Posttest	65.177	± 2.157		
Control	12	Pretest	61.073	± 1.642		
	12	Posttest	61.719	± 2.157		

* p<0.05

When we look up to the results of Repeated Measures Anova group time interaction, there has been a significant difference between the methods applied statistically while comparing the differences between the values of each group's own pretest and posttest in itself ($F_{2,33;}$ 3.901; p<0.05) (See. Table 3).

Table 5. Star balance test right foot Simple Effect test results

Group	Measurement 2	Measurement 1	AVG. Difference ± Std. H.		P
Super Slow Motion	Posttest	Pretest	6.115	± 1.564	0. 000 *
Standard	Posttest	Pretest	0.891	± 1.564	0. 573
Control	Posttest	Pretest	0. 646	± 1.564	0.682

* p<0.05

In addition to that, according to the results of Simple Effect implemented in order to identify which training method is more effective, while an significant improvement statistically in the group which Super Slow Motion has been implemented drew attention, there has been no significant improvement statistically in control group and the group which standard strength training has been applied.

DISCUSSION & CONCLUSION

Force is a factor that affects the properties of the balance and a good leg strength brings with a good balance (22).

In the study that Heitkamp and friends, have conducted related to the increase of force and muscle balance after balance training; they identified that balance training is effective on muscle strength gains and evening of muscle imbalances can be possible after balance training (14).

In the study that Mohammadi and friends, have conducted on young male athletes, an improvement in dynamic and static balance with increasing of muscle strength has been occurred as a result of the strength trainings for leg muscles for 6 weeks (21).

Eylen has notified to find the significant difference in dynamic and static balance scores with leg strength in the study that he has conducted on volleyball players between the ages of 18-25 (9).

Yucel has stated that strength training has a positive increase in static balance values of volleyball players and on the other hand it has no significant effect on handball players in his study that he has conducted on players dealing with volleyball and handball (25).

According to the results of Repeated Measures Anova test applied in our study, while there is no significant difference between the methods implemented on left foot, the differences have been found when compared to the differences in right foot.

In our study,in both the left foot and right foot; in Super Slow Strength training group and classic strength training group, by the end of 8 weeks, a significant increase has been obtained but while the increase in classic strength training group is meaningless, the increase in Super Slow strength training group has been found statistically meaningful.

Gur has stated that there is no significant difference after the study that he has searched the effect of though training on static and dynamic force features with tennis players aged between 8-14 (11).

By contrast with that, Bulgay and Polat have stated in their study which they have applied on elite male wrestler average aged between 19,09±,30 that it has a meaningful relationship with the force in left leg balance performance but in right leg the force is not effective on balance performance (7).

Borujeni and friends have implemented a chain training program on mentally handicapped children, the average age of 11. 53 ± 2.25, and stated that they have found significant differences in the values of both static and dynamic balance compared to control group (6).

Zamanian has performed balance trainings with total 40 women average aged 72.3 ± 10.2 and by the end of 6 weeks he has informed that the study group compared to control group has shown an important improvement in tandem and semi-tandem balance tests (28).

Carmeli and friends in their studies performed by 26 people with the average age of 63 have not applied a program consisting not only a treadmill and they have indicated that the experiment group has a significant increase in dynamic balance performance (8).

McLeod et al. have stated that 6 weeks balance training has a meaningful change in the balance scores of high-school women basketball players (20).

In Yuksel et al. studies called the effect of core lower extremity strength trainings in basketball players on dynamic balance and smash hit, they have indicated that the experiment group has shown a statistically significant improvement compared to control group in both right and left foot (27).

Ahmadi and his friends in their studies implemented on mentally handicapped children, the average age of 11, have stated that in the experiment group there is a meaningful difference in post-lateral and post-medial values but the difference in anterior values is meaningless (2).

Yuksel and Akın have stated that after tough training for 8 weeks dynamic balance values of experiment group were more significant when compared to control group in their study that they have applied with national badminton team athletes aged 16-24 (26).

There are so many studies intended to the fact that though training has a positive effect on balance performance (23,15).

As a result, it can be stated that Slow Motion strength training has affected level of balance positively and it is more effective than classic strength trainings. In order to improve level of balance, this has put forward Slow Motion training as an alternative and effective training method.

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