IJNRD.ORG ISSN : 2456-4184
INTERNATIONAL JOURNAL OF NOVEL RESEARCH AND DEVELOPMENT (IJNRD) | IJNRD.ORG
An International Open Access, Peer-reviewed, Refereed Journal

EFFICACY OF BALANCE TRAINING AND STRENGTHENING EXERCISES AMONG FOOTBALL PLAYERS WITH CHRONIC ANKLE INSTABILITY

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ABSTRACT

BACKGROUND OF THE STUDY

Ankle sprain is common sport injury among various players in different games. About 20% of the players with ankle sprain presents chronic ankle instability. The common ligament affected will be the anterior talofibular ligament or calcaneofibular ligament. Most of the players who have sprain presents repeated symptoms of pain, giving way which is known as ankle instability in chronic stages. Also the common mechanism of injury is inversion injuries that results in sprain and balance deficits are common among the players during single limb support.

AIM OF THE STUDY

The aim of the study is to identify the efficacy of balance training and strengthening exercise in football players with ankle instability.

METHODOLOGY

This quasi - experimental design included 30 participants in which they were divided into 2 groups. The samples were allocated based on the inclusion criteria. The participants in Group A received resistance band exercises along with balance training. The participants in Group B received only resistance training. The outcome measures used were Numerical pain rating scale, range of motion and 'Y' Balance test.

RESULTS

The results were analyzed using student't' test and unpaired't' test. The results of the present study shows statistically significant improvement in Group A in all the outcome measures used comparing to Group B. The Group B variables shows 'p' value less than 0.001.

CONCLUSION

The study concluded that resistance band and balance training is effective in improving stability among the players with chronic ankle instability.

KEY WORDS

Ankle instability, balance, resistance band, strength training, theraband strengthening.

INTRODUCTION

Football is a common sport worldwide and participating in football requires high agility, neuromuscular control and strength. One of the major components of football players to enhance their performance is about good physical ability which consists of various parameters like strength, endurance, balance, and proprioception and posture control. Among the injuries common in football players, lower limb injuries are more common among the players. The injuries may be by contact injuries as well as by non-contact. The football game includes sudden start, sprint, twist, kick, leap and rotation motions which cause damage to the soft tissues.

Ankle sprains are commonest among the athletes and this is always associated with ligament instability. The sprains in ankle are common and this is characterized by stretching or tearing of the ankle ligaments. Lateral ankle ligament complex are the most common structure involved in sprain.[1] The high incidence of acute ankle sprains were observed in the different types of games which comprises of running, jumping in sports such as basketball, football, volleyball. [2, 3] The prolonged symptoms of ankle instability were severe pain, reduced range of motion of ankle joint and instability in the ankle. The instability will be mostly associated with deficits in balance which in turn will lead to decreased functional performance of an athlete.

The functional rehabilitation protocols and lower extremity strength improves balance and play an important role in treating ankle instability. The strength training for lower extremities alone will not help in improving the instability. The authors from previous research focussed on strength training in improving the functional performance. But balance training and resistance training can also improve the mobility of the ankle joint as well as helps in reducing the instability of the ankle.[4, 5] Muscle weakness is one of the common deficit in ankle instability. Thus strength training is an important part of rehabilitation protocol. The strength training also improves the physical conditioning of an athlete in which this promotes the enhanced muscle activity and also neural factors. Therefore, strength training improves the proprioception and balance among the athletes in order to improve the performance rate of the player.

Postural control plays an important role in sports and impaired posture control may result in poor participation of an athlete and reduced performance rate in the game. It is more important to have a proper landing and jumping tasks for an athlete only when he have a good neuromuscular and postural control. To focus the balance component of an athlete, various rehabilitation protocol has been developed and one of the program developed by the previous author has been used in this study. Much of the previous studies focus on specific training programs such as balance, strengthening or stretching in isolation. This rehabilitation protocol focuses on stretching, strengthening, functional tasks, home exercise programs. The present study included the single limb stance component of the protocol in order to improve balance and thereby enhancing the performance.

The Y Balance test is a portable and readily available tool which is designed to measure the dynamic balance of an individual. The Y Balance test assess the single-leg balance, dynamic neuromuscular control, strength and proprioception. The individual reaches with the non-stance limb in three different directions. This test is a reliable measure of dynamic balance with intra –class correlation coefficients ranging from 0.85-0.91 for intra-rater reliability and from 0.85-1.00 for inter –rater reliability. This tool is a reliable tool in evaluating the residual posture control deficits in asymptomatic individuals. The Y Balance test was performed using a single center platform with three directions drawn in the ground. Each directions were marked separately like one in the Anterior, second one in the Posteromedial and the third direction marked as Posterolateral. The reach distances were recorded for the individual and the composite score will be calculated by the researcher. Thus the present aim of the study aims at identifying the importance of resistance band training and balance training protocol with single limb stance program on improving the stability of the chronic unstable ankle joint among the football players.

METHODOLOGY

The study is an experimental design and comparative type which included 30 amateur football players. The players were divided into two groups based on the inclusion criteria. Informed consent obtained from all the participants and the effects of treatment were explained well by the assessor. The group A received resistance band strengthening and single limb stance balance training. The group B players received resistance band strengthening in 4 different directions. The interventions in both the groups were performed for 3 sessions per week for 4 weeks.

The players in group A received strengthening with resistance band for dorsiflexors/plantarflexors and invertors and evertors. This was done for 3 sets of 10 repetitions per session. The players then received single limb stance of balance training which consists of eyes closed and eyes open, single limb stance with ball toss, and single limb stance with kicking against resistance in 4 directions and step down with single limb in 4 directions.

The players in group B received strengthening through resistance band in all 4 directions for about 3 sets of 10 repetitions. The players were measured before intervention and after intervention using the Numerical pain rating scale for pain, Goniometer to measure the range of motion and 'Y' balance test to assess the balance.

Fig: 01

Fig: 02

Fig: 03

Fig: 04

Fig: 05

DATA ANALYSIS

Statistical analysis was done by using student t test for within group and unpaired t test between the groups to calculate the amount of improvement obtained at baseline and at end of 4th week.

T Test is often called Student's t test in the name of its founder "Student". T test is used to compare two different set of values. It is generally performed on a small set of data. T test is generally applied to normal distribution which has a small set of values. This test compares the mean of two samples. T test uses means and standard deviations of two samples to make a comparison.

Table: 1 (EXPERIMENTAL GROUP A)

PRE **AND POST VALUE OF GROUP A (RESISTANCE BAND AND SINGLE LIMB BALANCE)**

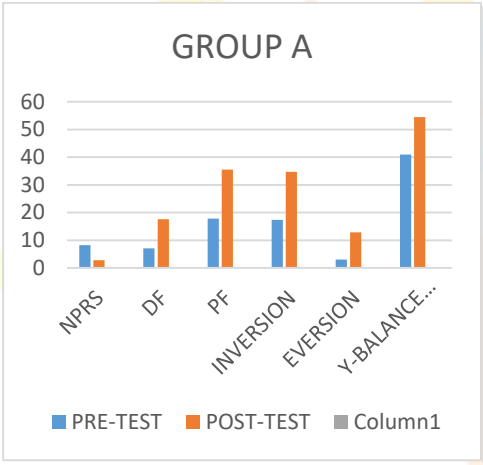
SNO	OUTCOME MEASURE	MEAN		SD		t-VALUE	p-VALUE
		PRE-TEST	POST-TEST	PRE-TEST	POST-TEST		
1.	NPRS	8.2	2.866	0.774	1.125	-15.128	<0.0001
2.	ROM-DORSIFLEXION	7.13	17.66	1.807	1.877	15.657	<0.0001
	PLANTAR-FLEXION	17.8	35.46	1.897	3.979	15.516	
	INVERSION	17.4	34.66	1.956	3.309	17.391	
	EVERSION	3.06	12.86	1.980	2.231	12.724	
3.	Y-BALANCE TEST	40.926	54.436	7.254	7.693	4.949	<0.0001

Table: 2 (CONTROL GROUP -B)

PRE AND POST VALUES OF GROUP B (RESISTANCE BAND EXERCISE)

S.NO	OUTCOME MEASURE	MEAN		SD		t-VALUE	p-VALUE
		PRE-TEST	POST-TEST	PRE-TEST	POST-TEST		
1.	NPRS	7.46	3.4	1.125	1.121	-9.916	<0.0001
2.	ROM-DORSIFLEXION	6.8	11.066	1.780	2.685	5.129	<0.0001
	PLANTAR-FLEXION	17	26.66	2.070	2.636	11.163	
	INVERSION	16.66	25.26	2.526	3.654	7.498	
	EVERSION	2.8	7.4	2.077	2.823	5.083	
3.	Y-BALANCE TEST	47.891	59.495	6.582	6.753	6.616	<0.0001

GRAPH: 01



GRAPH: 02

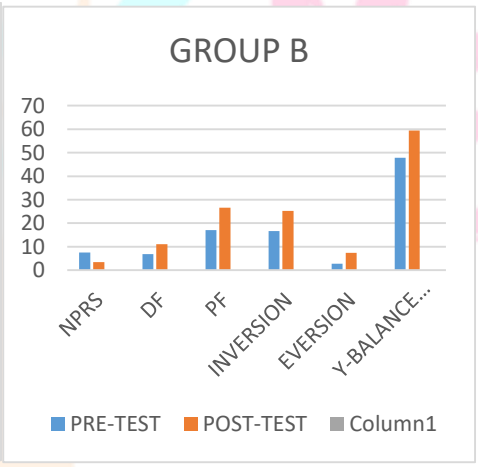
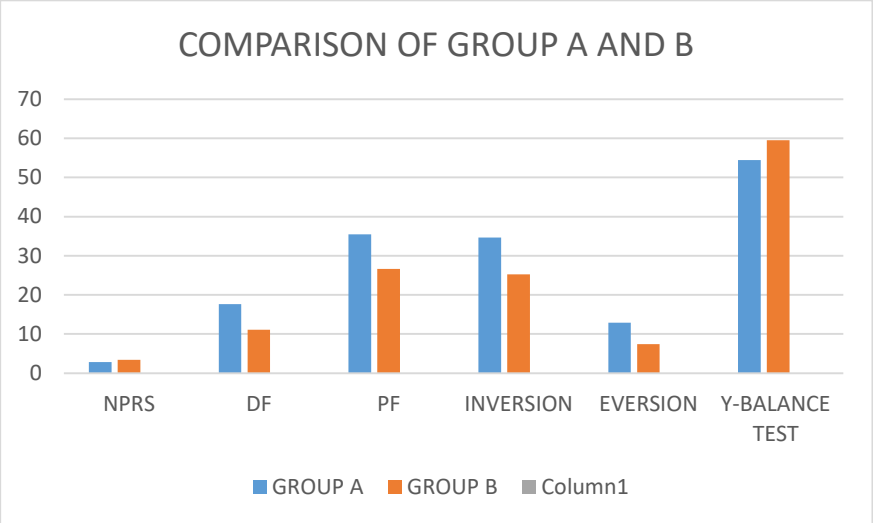


Table: 3 COMPARISON OF POST VALUES OF GROUP A AND GROUP B

S.NO	OUTCOME MEASURE	GROUP A	GROUP B
		POST-TEST	POST-TEST
1.	NPRS	2.866	3.4
2.	ROM-DORSIFLEXION	17.66	11.066
	PLANTAR-FLEXION	35.46	26.66
	INVERSION	34.66	25.26
	EVERSION	12.86	7.4
3.	Y-BALANCE TEST	54.436	59.495

GRAPH: 03



RESULT:

As a result Numerical pain rating scale the pre mean value was (8.2) post mean value was (2.86) p-value was 0.0001. ROM of dorsiflexion pre mean value was (7.13) post mean value was (17.66), plantar flexion pre mean value was (17.8), post mean value was (35.46), inversion pre mean value was (17.4) post mean value was (34.66), eversion pre mean value was (3.06) post mean value was (12.86), p-value was 0.0001, Y- balance test pre mean value was (40.92) post mean value was (54.43) p- value was 0.0001. The present study revealed that both the groups shows statistically significant improvement but comparatively Group A shows high significance than Group B.

DISCUSSION

The study included 30 amateur football players with chronic ankle instability in which the resistance band training and single limb stance balance training was given for the participants. The outcome measures used were numerical pain rating scale, range of motion and 'y' balance test. Emily A. Hall et al in their study included 39 volunteers with chronic ankle instability with 6 weeks of balance and strength training. The research identified the strength and balance training was effective in improving balance and functional performance among the players. Ben anguish et al in his previous research also focussed on balance training protocols in improving the balance among the chronic ankle instability recreational athletes. So there were previous evidence on balance training that improves performance and also strength training that has been incorporated for improving the balance and strength training among the subjects with chronic ankle instability. There were less evidence that included the resistance band training and single limb stance balance exercises among subjects with ankle instability.

Postural control is one of the important component for sports performance and this is mostly affected in subjects with chronic ankle instability. Ankle sprains are linked with deficits in neuromuscular control, proprioception and strength which is commonly found in the chronic ankle instability subjects. Proprioception is a somatosensory afferent which consists of kinaesthetic sense and joint position sense. Joint position sense is the ability to identify the position of the limb under both static and dynamic situations. The previous studies on instability stated that chronic ankle instability is associated with damage to the mechanoreceptors within the articular surfaces and this results in reduced joint position sense which in turn will have an impact on balance of an individual. Again lower extremity strength also have an impact on balance in such way that the cortical excitability mechanism plays a vital role for voluntary muscle activation and also in the control of reflexes during the performance of postural tasks. Thus, any weakness in the lower extremity muscle will have an impact on reduced balance among the individuals.

The present study, thus focussed on application of both strengthening with resistance band and single limb stance balance exercises among the football players in order to improve the balance and functional performance among the chronic ankle instability. The intervention which was applied for two groups shows statistically significant improvement among the football players with chronic ankle instability. The group A which used both the strength and balance training shows significant improvement.

CONCLUSION

The present study concluded that single limb stance balance training along with resistance band strengthening exercise shows significant improvement in balance and functional performance among the football players with chronic ankle instability.

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