International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Efficacy of Sensory Motor Training in Improving Balance in Athletes with Plantar Fasciitis

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Abstract: ***Plantar fasciitis is one of the most common musculoskeletal disorders affecting athletes, often leading to impaired balance and functional limitations. This study aimed to evaluate the effectiveness of sensory motor training in improving balance among athletes with plantar fasciitis. An experimental study was conducted with 30 subjects divided into two groups: Experimental Group A received sensory motor training and Control Group B received ultrasound therapy and conventional exercise. The intervention was carried out for 6 weeks, three sessions per week. Balance was assessed using the Balance Error Scoring System (BESS). Statistical analysis using paired and unpaired t-tests showed significant improvement in both groups ($p < 0.05$), with Experimental Group demonstrating greater improvement compared to Control group. The findings suggest that sensory motor training is more effective than regular conventional therapy in enhancing balance in athletes with plantar fasciitis.***

Keywords: Sensorimotor training, Plantar fasciitis, Balance, BESS, Athletes, Ultrasound therapy

1. Introduction

Plantar fasciitis is a common orthopedic condition characterized by inflammation of the plantar fascia, typically at its calcaneal attachment. It is frequently seen in athletes and individuals subjected to repetitive stress on the foot. The condition leads to heel pain and functional limitations, affecting daily activities and athletic performance.

Balance is defined as the ability to maintain the body's center of gravity within the base of support. Impairment in balance is commonly observed in plantar fasciitis due to pain and altered biomechanics.

Sensorimotor training enhances proprioception and neuromuscular control by stimulating sensory receptors and improving motor response. It plays a crucial role in rehabilitation by improving joint stability and coordination.

2. Need of the Study

Plantar fasciitis affects athletic performance by impairing balance and functional ability. Although various treatment methods exist, there is a need to evaluate the effectiveness of sensorimotor training in improving balance compared to conventional modalities like ultrasound therapy.

3. Aim and Objectives

Aim

To evaluate the effectiveness of sensory motor training in improving balance among athletes with plantar fasciitis.

Objectives

- To assess the effect of sensory motor training on balance.
- To evaluate the effect of ultrasound therapy on balance.
- To compare the effectiveness of both interventions.

4. Hypothesis

Null Hypothesis (H_0):
There is no significant difference in balance improvement between sensory motor training and ultrasound therapy.

Alternate Hypothesis (H_1):
There is a significant improvement in balance with sensory motor training compared to ultrasound therapy.

5. Methodology

Study Design
Experimental study

Sample Size
30 athletes

Sampling Method
Convenience sampling

Groups

- Experimental Group (A): Sensory motor training (n = 15)
- Control Group (B): Conventional Exercise & Ultrasound therapy (n = 15)

Study Duration
6 weeks intervention

Outcome Measure
Balance Error Scoring System (BESS)

6. Intervention

Group A – Sensory Motor Training

Training included:
- Static exercises
- Dynamic exercises
- Functional exercises
- Wobble board training
- Single-leg stance
- Foam surface balance training

Group B –Conventional Exercise & Ultrasound Therapy
- Frequency: 1 MHz
- Intensity: 1 W/cm²
- Duration: 8 minutes/session
- Mode: Continuous

7. Statistical Analysis

Data were analyzed using:
- Paired t-test (within-group comparison)
- Unpaired t-test (between-group comparison)

Statistical significance was set at $p < 0.05$.

Table 1.1: Showing the pre and post- test value of Group A: (paired 't' - test values)

Group A	Mean	SD	t'- value	Table Value	p' - value
Pre Test	47.20	4.71	19.7604	2.145	<0.001
Post Test	41.27	4.33			

Table 1.2: Showing the pre and post- test value of Group B: (paired 't' - test values)

Group B	Mean	SD	t'- value	Table Value	p' - value
Pre Test	48.80	1.86	18.5203	2.145	<0.001
Post Test	44.13	1.68			

Table 2: Showing the pre- and post- test values of Group A and Group B (unpaired 't' test - values)

Group	Mean	SD	t' – value	Table Value	p' - value
Group A	5.93	1.16	3.2314	2.048	<0.001
Group B	4.67	0.98			

8. Results

Both groups showed significant improvement in balance ($p < 0.05$). However, Group A (sensory motor training) demonstrated greater improvement compared to Group B (ultrasound therapy).

9. Discussion

The results indicate that sensory motor training is effective in improving balance by enhancing proprioception and neuromuscular control. The improvement observed may be due to increased sensory input and better motor coordination. Conventional Exercise along with Ultrasound therapy showed benefits in pain reduction but was less effective in improving balance compared to sensorimotor training.

10. Conclusion

Sensory motor training is more effective than Conventional Exercise along with Ultrasound therapy in improving balance among athletes with plantar fasciitis. It should be considered a primary intervention in rehabilitation programs.

11. Limitations

- Small sample size
- Short duration of study
- Limited to athletes aged 18–25 years

12. Recommendations

- Larger sample size
- Longer duration studies
- Inclusion of general population

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