*Galore International Journal of Health Sciences and Research*
*[Indexed, Peer-Reviewed Journal]*
*Vol. 10; Issue: 3; July-Sept. 2025*
*Website: www.gijhsr.com*
*Original Research Article* *P-ISSN: 2456-9321*

# Kinesiotaping Versus Ultrasound on Pain and ROM in Patients with Sever's Disease

**Hema Eldo[1], Prof. R. Rejeesh Kumar[2], Prof. K. S. Sharad[3]**

[1,2,3]Department of Musculoskeletal and Sports Injury Rehabilitation,
BCF College of Physiotherapy, Kerala University of Health Sciences, Kottayam, India.

Corresponding Author: Prof. R. Rejeesh Kumar

**DOI: https://doi.org/10.52403/gijhsr.20250310**

## ABSTRACT

**Background and objectives:** Calcaneal apophysitis, is a musculoskeletal injury seen among children. It is typically a self-restricting condition that occurs most frequently in individuals aged 8 to 15. It is believed that the pain associated with this inflammation goes away after the calcaneus fuses. The physiotherapy interventions used for the studies are ultrasound therapy and kinesiotaping. Kinesiotaping has the ability to reduce pain and inflammation, optimize performance, avoid injury, and assist the body's natural healing process. The physiotherapy intervention helps in the reduction of pain and rom improvement in Sever's disease. The research aim is to assess the effects of ultrasound therapy and kinesiotaping on pain and range of motion in individuals having Sever's disease.

**Purpose:** Study compares the impact of ultrasound therapy and kinesiotaping on pain relief & range of motion among patients with sever's disease in an effort to provide clinical information.

**Methods:** Total 30 children with heel pain were randomly assigned into two groups;15 individuals in conventional group ultrasound therapy and 15 individuals in experimental group kinesiotaping. Pre and post assessment taken using VAS and ROM using goniometer.

Results significant improvement was found in all the measured variables of both experimental and conventional group. When comparing the Posttest values of experimental & conventional group it shows significant difference between the groups.

**Conclusion:** Study shows significant difference in each group and hence conclude that kinesiotaping is more effective than ultrasound therapy in improving functional stability and pain reduction.

***Keywords:*** *Sever's disease, kinesiotaping, Range of motion (ROM), Pain.*

## 1. INTRODUCTION

Early 20th century, Sever described a disease in which children who are overweight or very active experience pain over the posterior & inferior region of heel. Radiological examination revealed an enlarged ossific nucleus and cloudiness, along with obliteration of the epiphyseal line in the calcaneus. Over a decade later, Lewin suggested that calcaneal apophysitis was caused by inflammation due to the force acting in the opposite direction between the achilles tendon, aponeurosis and plantar fascia. (10)

Calcaneal apophysitis, is another name for posterior heel discomfort, a frequent musculoskeletal ailment in youngsters, accounting for 2% to 16% of cases in sports clinics. Typically, the condition known as sever's is a self-limiting that typically manifests between an age's groups of 8-15 years, although cases in individuals as young as six have been observed. The pain associated with this condition often subsides

after the fusion of the calcaneus. However, the incidence of this condition in the general population has not yet been studied. Pain during walking and sports, particularly activities involving running & jumping, is commonly reported. Rarely, untreated calcaneal apophysitis may lead to fracture caused by calcaneal apophyseal avulsion. (10) Beyond their physical suffering & limitations, children with this condition often report lower scores in the 'Happiness &Physical Function' subscales of the Pediatric Orthopaedic Surgeons of North America 'Musculoskeletal Quality of Life' questionnaire, in contrast to their peers who did not have the condition. (9)

Arch taping is an effective temporary treatment for pain or injury due to overpronation. If successful, more permanent solutions such as orthotics can be considered. Arch taping provides short-term external support to the medial longitudinal arch, maintaining its shape and height while the foot bear's weight. This strapping also adjusts how the forefoot interacts with the ground, reducing strain by limiting motion at the midtarsal joints (talonavicular and calcaneocuboid joints). (14)

Ultrasound (US) therapy involves the use of mechanical energy, using sound waves with frequencies typically between 1.0 and 3.0 MHz, above the range of 16HZ-15 to20,000HZ that humans can typically hear. The ultrasound device includes a coaxial cable connected high frequency generator attached to a transducer or treatment head. Applying different frequencies or potential differences to a quartz crystal within the treatment head induces the piezoelectric effect, producing ultrasonic waves as the crystal compresses and relaxes. Ultrasound therapy induces both thermal and non-thermal effects in tissues, similar to other modalities like pulsed shortwave therapy. In this context, an 8-minute therapeutic ultrasound session was administered at a dosage of 0.5 W/cm², using a 3 MHz frequency and a 1:4 pulsed mode. (1)

## 2. NEED OF THE STUDY

Reviews of earlier narrative literature and expert opinions offer some evidence for the use of heel raises. Nevertheless, no research has been done on this taping method in the acute phase. Therefore, the research aims are to evaluate how K-taping affect pain relief and range of motion (ROM) in individuals with Sever's disease.

## 3. AIM OF THE STUDY

The study aims to compare the effectiveness of Kinesiotaping and ultrasound on pain reduction and improving ROM in individuals suffering from Sever's disease.

## 4. OBJECTIVES

The objectives of the study is to compare Kinesiotaping and ultrasound on pain reduction and improving ROM in patients with severe disease.

## 5. HYPOTHESIS

### NULL HYPOTHESIS

There is no significant difference in pain reduction and range of motion between "kinesiotaping" and "ultrasound therapy" in patients with severe disease.

### RESEARCH HYPOTHESIS

There is a significant difference in pain reduction and range of motion between "kinesiotaping" and "ultrasound therapy" in patients with severe

## MATERIALS & METHODS

- Kinesio tape
- Ultrasound machine
- Ultrasound gel
- Couch
- Scissor
- Goniometer

## METHODOLOGY

### RESEARCH QUESTIONS

- Does the kinesiotaping is effective in pain relief and improving ROM in individuals with Sever'sdisease?
- Does ultrasound therapy is effective in pain relief and improving ROM in individuals withSever's disease?

- Is kinesiotaping is more effective than ultrasound therapy for improving ROM &pain relief in individuals with Sever's disease?

**STUDY DESIGN:**
Comparative study.
**STUDY SETTING:**
Carmel English Medium School, Cherthala, Kerala.
Govt U.P school, Akkarappadam, Vaikom, Kerala.
**STUDY DURATION:**
1 year [data collection was done from 04/10/23 to 04/01/24]
**SAMPLE SIZE:**
30 students
**SAMPLING METHOD:**
Convenience sampling method.

**VARIABLES:**
**INDEPENDENT VARIABLE:**
- kinesiotape
- ultrasound therapy

**DEPENDENT VARIABLE:**
- Pain
- Range of motion

**INCLUSION CRITERIA:**
- Patients with posterior heel pain
- Age group between 8 to 16 years
- Both sexes were selected
- Positive calcaneal squeeze test
- Posterior calcaneal tenderness
- Antalgic gait pattern
- Subjects with unilateral involvement were only included

**EXCLUSION CRITERIA:**
- Achilles Tendinitis
- Plantar Fasciitis
- Recent fracture

**OUTCOME MEASURES:**
- **NUMERIC PAIN RATING SCALE (NPRS):** The NPRS is a unidimensional tool used to assess pain intensity in patients, including those with chronic pain. This 11-point numeric scale ranges from '0,' indicating no pain, to '10,' representing the most severe pain.
- **ROM USING GONIOMETER:** The Range of Motion is assessed using a goniometer, a tool designed to measure the movement at the joint. In these studies, dorsiflexion is evaluated.

## PROCEDURE

A total number of 30 subjects with Sever's disease will be chosen for the study with their consideration based on inclusion and exclusion criteria. The subjects will be selected from the above-mentioned school with concern from parents and school authorities. They will be explained about the procedure and those who are willing to participate shall sign a detailed consent form. They will be allotted to two groups: GROUP A will be given K-taping and GROUPB will be given ultrasound therapy. Subject scores on the outcome measure like VISUAL ANALOGUE SCALE and ROM will be taken as part of the assessment on day 1.
Pre-test and Post-test assessment were conducted before and after the treatment.

**GROUP A-EXPERIMENTAL GROUP**
Kinesiotaping is given
The patient in prone lying with ankle 0°dorsiflexion (neutral)with a pillow placed under the feet K- taping is applied (I strip) over the calcaneal region with 2 functional strips over the anchor about 60° stretch [16]
Duration: - 3 sessions of 2 weeks.

**Fig 1: kinesiotaping technique**

**GROUP B-CONVENTIONAL GROUP**

Ultrasound therapy is given

The ultrasound will be given with a dose of 0.5 w/cm $^2$, 3 MHz in pulsed mode (1:4) for eight minutes. The patient will be positioned in a prone lying with the ankle in neutral positionsupported by a pillow.

The duration of treatment will be given for 7 sessions for 2 weeks. (1)

**Fig 2: ultrasound therapy**

## RESULT

This study aims to compare the effectiveness of kinesiotaping and ultrasound therapy on pain reliefand ROM improvement in patients with Sever's disease.

## STATISTICAL ANALYSIS

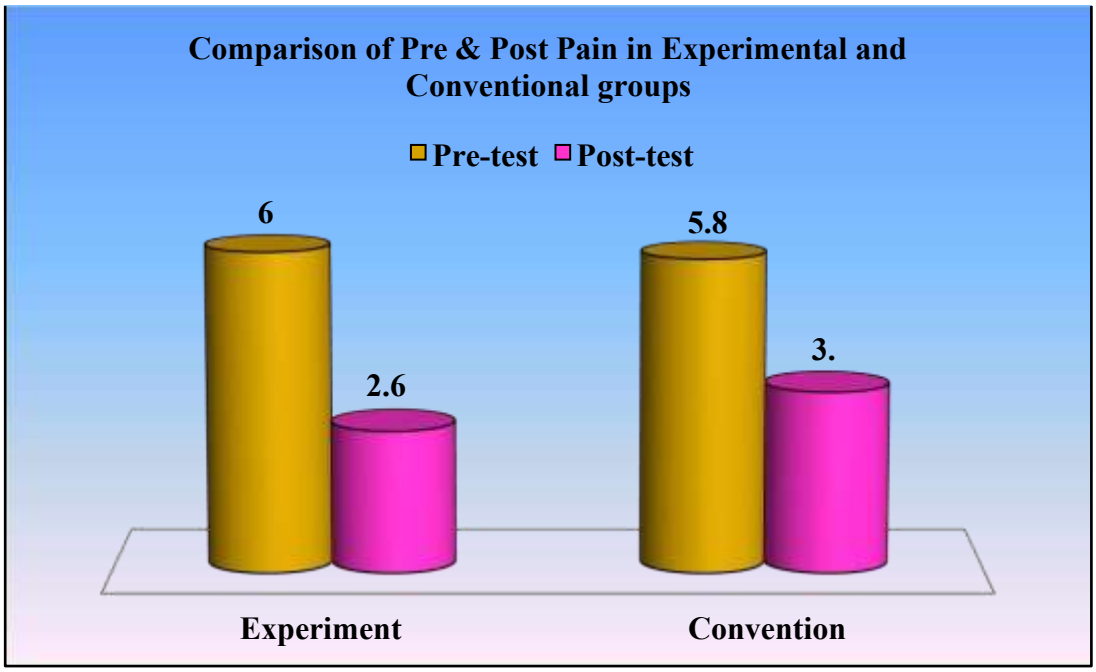
Statistical analysis of the results was conducted using SPSS software (version 20). Descriptive analysis is used to analyze the demographic data. Paired T-test within group comparison and unpaired T-test between group comparison. For each outcome, corresponding p value less than 0.01considered significant.

### Statistical analysis of pain using t-tests

Comparison of pre-test& post-test pain in Experimental and Conventional groups

| Group | Pretest mean | SD | Posttest mean | SD |
|---|---|---|---|---|
| Experimental | 6.0 | 0.65 | 2.67 | 0.72 |
| Conventional | 5.87 | 0.74 | 3.4 | 0.51 |

**Table 1. Comparison of pain in experimental and conventional groups**




**Graph 1. The graphical representation comparing pain level between experimental and conventional group**

**Mean, S.D. and t-value to compare pre-test and post-test pain (VAS) in Experimental Group**

| Test | Mean | SD | Mean change | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Pre-test | 6.0 | 0.65 | 3.33 | 15 | 17.84 | 14 | *p < 0.001* |
| Post-test | 2.67 | 0.72 | | | | | |

**Table 2. VAS score in experimental group**

The mean column shows the average pre-test and post-test pain levels for individuals in the Experimental Group. SD represents the standard deviations of pain scores before and after the intervention. The mean change of 3.33 reflects the difference between the pre-test and post-test scores (6.0 and 2.67, respectively). With a p-value of less than 0.001, there is a significant difference between the pre-test and post-test pain levels in the Experimental Group. This indicates a substantial reduction in pain post-intervention, demonstrating the effectiveness of K-taping in alleviating pain.

**Mean, S.D. and t-value to compare pre-test and post-test pain (VAS) in Conventional Group**

| Test | Mean | SD | Mean change | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Pretest | 5.87 | 0.74 | 2.47 | 15 | 10.44 | 14 | *p < 0.001* |
| Post test | 3.4 | 0.51 | | | | | |

**Table 3. VAS score in conventional group**

The mean column shows the average pain scores for pre-test and post-test measurements within the Conventional Group, along with the standard deviations for these scores. The mean change of 2.47 indicates the difference between pre-test and post-test pain scores (5.87 vs. 3.4). With a p-value < 0.001, this indicates a significant reduction in pain following the treatment, demonstrating the effectiveness of ultrasound in alleviating pain.

Given that both the Experimental Group and the Conventional Group have shown a significant decrease in pain, the next step is to assess whether the pre-test pain scores were consistent between the two groups. This will help us determine if k-taping is more effective by comparing the posttest pain scores between the Conventional Group and the Experimental Group.

**Mean, S.D. and t-value to compare pretest pain (VAS) between Experimental Group and Conventional Group using t-test**

| Group | PretestMean | SD | Differencein mean | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Experimental | 6.0 | 0.65 | 0.13 | 30 | 0.521 | 28 | *p = 0.61* |
| Conventional | 5.87 | 0.74 | | | | | |

**Table 4. Comparison of VAS scores between the Experimental and Conventional groups (pre-test)**

The Mean column in the t-test table displays the average pre-test pain scores for the Experimental and Conventional Groups, which are 6.0 and 5.87, respectively. The Standard Deviation column shows the variability of these scores within each group. The Difference of 0.13 represents the gap between the means of the two groups. Since the p-value is greater than 0.05, there is no statistically significant difference in pre-test pain scores between the groups. Thus, the groups can be considered similar at the baseline level.

**Mean, S.D. and t-value to compare posttest pain (VAS) between Experimental Group and Conventional Group using t-test**

| Group | Post-testMean | SD | Differencein mean | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Experimental | 2.67 | 0.72 | 0.73 | 30 | 3.21 | 28 | *< 0.01* |
| Conventional | 3.4 | 0.51 | | | | | |

**Table 5. Comparison of VAS score between experimental and conventional group (post-test)**

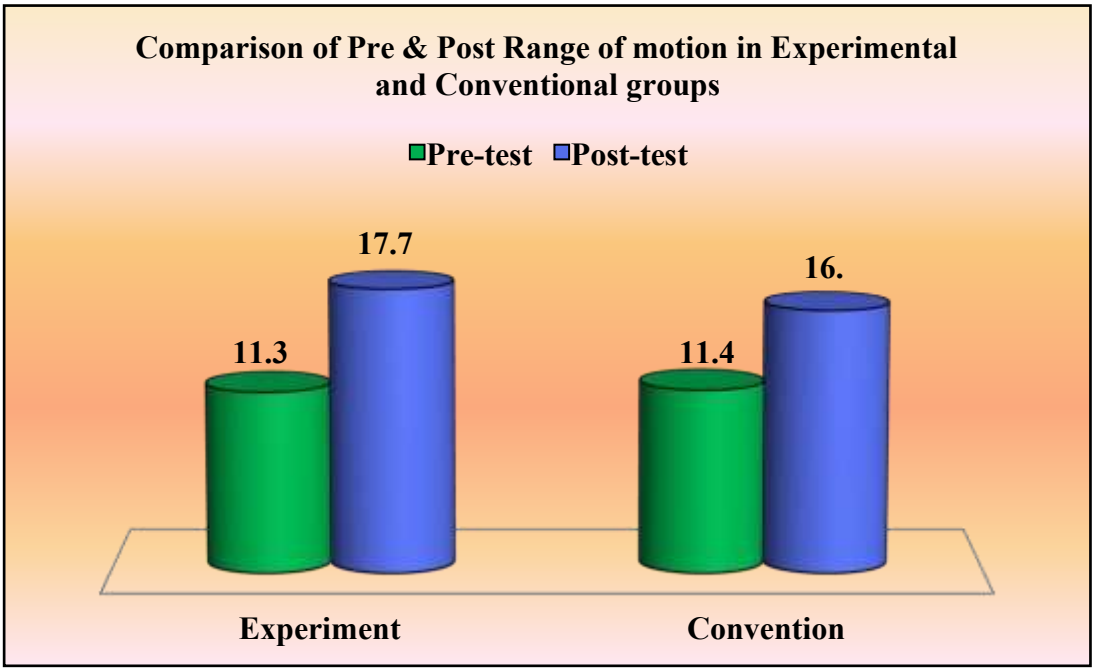
The Mean column in the t-test table shows the average post-test pain scores for the Experimental Group and the Conventional Group, which are 2.67 and 3.4, respectively. The Standard Deviation column reflects the variability of scores within each group. The Difference of 0.73 represents the gap between the mean scores of the two groups. With a p-value of less than 0.01, this difference in post- test pain scores is statistically significant. The Experimental Group demonstrates a substantially lower pain level, indicating that kinesio-taping is more effective than ultrasound in reducing pain.

**Statistical analysis of Range of motion using t-tests**

**Comparison of pretest &posttest Range of motion in Experimental and Conventional groups**

| Group | pretest mean | SD | posttest mean | SD |
|---|---|---|---|---|
| Experimental | 11.33 | 1.18 | 17.73 | 1.44 |
| Conventional | 11.47 | 1.13 | 16.4 | 1.4 |

**Table 6. ROM score between experimental and conventional group**




**Graph 2. comparison of ROM in experimental and conventional group**

**Mean, S.D. and t-value to compare Pretest and Posttest Range of motion in Experimental Group**

| Test | Mean | SD | Mean change | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Pretest | 11.33 | 1.18 | 6.4 | 15 | 12.91 | 14 | *p < 0.001* |
| Post test | 17.73 | 1.44 | | | | | |

**Table 7. Comparison of ROM score in experimental group**

The Mean column shows the average Range of Motion scores for individuals in the Experimental Group before and after the intervention. The Standard Deviation (SD) indicates the variability in these scores for both pre-test and post-test. The Mean Change of 6.4 represents the difference between the pre-test score (11.33) and the post-test score (17.73). With a p-value less than 0.001, the increase in Range of Motion from pre-test to post-test is statistically significant. This demonstrates a substantial improvement in Range of Motion, highlighting the effectiveness of k-taping.

**Mean, S.D. and t-value to compare Pretest and Posttest Range of motion in Conventional Group**

| Test | Mean | SD | Mean change | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Pretest | 11.47 | 1.13 | 4.93 | 15 | 12.46 | 14 | $p < 0.001$ |
| Post test | 16.4 | 1.4 | | | | | |

**Table 8. Comparison of ROM score in conventional group**

The mean column displays the mean pre-test and post-test Range of motion among individualsin the Conventional Group. SD is the standard deviations of the Range of motion scores in pre & post respectively. Mean change 4.93 is the difference between pre-test and post-test (11.47 & 16.4). Since the *p-value < 0.001,* there is a significant difference existing between the pre-test and post-test Range of motion among individuals in the Conventional Group. The Range of motion has significantly increased in the post test. This proves the effect of ultrasound on Range of motion.

So, we have seen that there is significant improvement in Range of motion among the individuals inExperimental Group as well as in Conventional Group.

Now let us find whether there was homogeneity among Range of motion scores in the pre-test between Conventional Group and Experimental Group and hence test whether k-taping is more effective by comparing the posttest Range of motion scores between Conventional Group and Experimental Group.

**Mean, S.D. and t-value to compare Pretest Range of motion between Experimental Group and Conventional Group using t-test**

| Group | Pre-testMean | SD | Differencein mean | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Experimental | 11.33 | 1.18 | 0.14 | 30 | 0.32 | 28 | $p = 0.75$ |
| Conventional | 11.47 | 1.13 | | | | | |

**Table 9. Comparison of ROM score between experimental and conventional group (pretest)**

The Mean column in the t-test table shows the average pre-test Range of Motion scores for the Experimental and Conventional Groups, which are 11.33 and 11.47, respectively. The Standard Deviation column indicates the variability of these scores within each group. The Difference of 0.14 reflects the gap between the two group means. With a p-value greater than 0.05, there is no statistically significant difference in pre-test Range of Motion scores between the groups. Therefore, we can consider the groups to be similar at baseline

**Mean, S.D. and t-value to compare post-test Range of motion between Experimental Group and Conventional Group using t-test**

| Group | Post testMean | SD | Differencein mean | n | *t* | *df* | *p-value* |
|---|---|---|---|---|---|---|---|
| Experimental | 17.73 | 1.44 | 1.33 | 30 | 2.57 | 28 | $< 0.05$ |
| Conventional | 16.4 | 1.4 | | | | | |

**Table 10. Comparison of ROM score between experimental and conventional group (post-test)**

The Mean column in the t-test table presents the average post-test Range of Motion scores for the Experimental Group and the Conventional Group, which are 17.73 and 16.4, respectively. The Standard Deviation column indicates the variability of scores within each group. The Difference of 1.33 represents the gap between the mean scores of the two groups. With a p-value less than 0.05, there is a statistically significant difference in post-test Range of Motion scores between the groups. The Experimental Group shows a significantly higher Range of Motion, indicating that k-taping is more effective than ultrasound in enhancing Range of Motion.

## DISCUSSION

This comparative study investigates the effectiveness of kinesiotaping versus ultrasound therapy in pain relief and improving range of motion (ROM) among individuals with Sever's disease. This study utilized a goniometer to measure ROM improvements and a visual analogue scale (VAS) to assess pain reduction in both treatment groups.

Sever's disease, also known as posterior heel pain or calcaneal apophysitis, is a common musculoskeletal injury in children aged 8-15 years. Prolonged microtrauma on the unossified apophysis as a result of traction of achilles tendon causes painful inflammation of the calcaneal apophysis. Kinesiotaping is a therapeutic tool used in rehabilitation to stabilize or support an injury and relieve pain by offloading vulnerable or painful structures. Ultrasound therapy aids in pain reduction by producing sound waves that penetrate the body, generating heat, increasing blood flow, and relaxing both muscle and connective tissue.

30 subjects were chosen according to specific inclusion and exclusion criteria from Carmel English Medium School in Cherthala and Akkarappadam Government UP School. The subjects were randomly divided into an experimental group and a conventional group using the lottery method. The experimental group received Kinesio taping, while the conventional group underwent ultrasound therapy. Outcome measures included VAS scores for pain and dorsiflexion ROM, assessed before and after the intervention. Descriptive analyses were conducted for demographic data, and to compare result within each group and between the two groups, statistical analysis was carried out using paired t-tests and unpaired t-tests. A significance threshold of $p<0.001$ was applied.

The statistical analysis of VAS scores revealed a mean difference of 0.73 between the two groups (2.67 in the experimental group and 3.4 in the conventional group). With a p-value $< 0.01$, there is a significant difference in post-test pain scores between the experimental and conventional groups, indicating that pain levels were significantly lower in the experimental group. This suggests that kinesiotaping is more effective than ultrasound therapy in reducing pain. Additionally, the standard deviations of the ROM scores were analyzed both before and after the intervention. The experimental group showed a mean change of 6.4 in ROM scores, increasing from 11.33 to 17.73, with a p-value $<0.001$. This indicates a significant improvement in ROM following the intervention, demonstrating the positive impact of kinesiotaping.

## CONCLUSION

This study evaluates the impact of kinesio-taping on acute pain and range of motion when compared with ultrasound therapy in individuals with severs disease. This study evaluates the comparison of kinesiotape and ultrasound therapy on pain and range of motion. From the statistical analysis there is a significant difference within the experimental and conventional group. The study shows significant difference in each group and hence conclude that kinesiotaping is effective on functional stability and pain reduction in patients with severs disease.

***Declaration by Authors***

**Ethical Approval:** Approved
**Source of Funding:** Self-funding
**Conflict of Interest:** The authors declare no conflict of interest.

## REFERENCES

1. Angela Fostor, et al (2002): Clayton's Electrotherapy: 9th edition page no: 199-207
2. A. P. P. Chanmugam (2004): Electrophysical agents in physiotherapy 2nd edition, page no: 110-142.
3. Chad Starkey, et al (1995): Laboratory activities for therapeutic modalities, page no:9
4. David Baxter G., et al., (1998): Pain A text book for therapists, page no: 129:130
5. John Low and Reed (1990): Electrotherapy explain, principles and practical, page no: 148- 178
6. Jagh Mohan Sing (2005): Text book of Electrotherapy, page no: 225-242
7. Karin A. Austin; Kathryn A. Gwynn-Brett. (2004): Illustrated guide to taping techniques, Page no: 110-114
8. Sever JW. Apophysitis of the os calcis. NY Med J. 1912; 95:1025.
9. Lewin P. Apophysitis of the os calcis. Surg Gynecol Obstet. 1926; 41:578.
10. Micheli LJ, Fehlandt AF. Overuse injuries to tendons and apophyses in children and adolescents. Clin Sport Med. 1992; 11:713–726.
11. Orava S, Puranen J. Exertion injuries in adolescent athletes. Br J Sport Med. 1978; 12:4. doi: 10.1136/bjsm.12.1.4.
12. de Inocencio J. Musculoskeletal pain in primary pediatric care: analysis of 1000 consecutive general pediatric clinic visits. Pediatrics. 1998;102: E63. doi: 10.1542/peds.102.6. e63.
13. Orava S, Virtanen K. Osteochondroses in athletes. Br J Sports Med. 1982;16:161–168. doi: 10.1136/bjsm.16.3.161.
14. Hendrix C. Calcaneal apophysitis (sever disease) Clin Podiatr Med Surg. 2005; 22:55–62. doi: 10.1016/j.cpm.2004.08.011. vi.
15. Holdgate A, Asha S, Craig J, Thompson J. Comparison of a verbal numeric rating scale with the visual analogue scale for the measurement of acute pain. Emerg Med (Fremantle). 2003 OctDec;15(5-6):441- 6. doi: 10.1046/j.1442-2026.2003.00499. x. PMID: 14992058.
16. Hunt GC, Stowell T, Alnwick GM, Evans S. Arch taping as a symptomatic treatment in patients with Sever's disease: a multiple case series. The foot. 2007 Dec 1;17(4):178-83.
17. Tezel N, Umay E, Bulut M, Cakci A. Short-Term Efficacy of Kinesiotaping versus Extracorporeal Shockwave Therapy for Plantar Fasciitis: A Randomized Study. Saudi J Med Med Sci. 2020 SepDec;8(3):181-187. doi: 10.4103/sjmms.sjmms_624_19. Epub 2020 Aug 20. PMID: 32952509; PMCID: PMC7485659.
18. García-Gomariz, C., García-Martínez, M. T., Alcahuz-Griñán, M., Hernández-Guillén, D., & Blasco,J. M. (2024). Effects on pain of kinesiology tape in patients with plantar fasciitis: a randomized controlled study. Disability and Rehabilitation, 1–7. https://doi.org/10.1080/09638288.2024.2304645

How to cite this article: Hema Eldo, R. Rejeesh Kumar, K. S. Sharad. Kinesiotaping versus ultrasound on pain and rom in patients with sever's disease. *Gal Int J Health Sci Res*. 2025; 10(3): 92-100. *DOI: https://doi.org/10.52403/gijhsr.20250310*

******