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## Effectiveness of shockwave therapy along with contrast bath and static Achilles stretch in patients with retrocalcaneal bursitis

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### Abstract

**Background:** Several studies have studied the effect of TENS, contrast bath, Ultrasound and Achilles tendon stretching on retrocalcaneal bursitis (RCB). However combined effect of extracorporeal shockwave therapy (ESWT) with contrast bath and Achilles stretch has not been reported so far.

**Objective:** To study the effectiveness of ESWT along with contrast bath and static Achilles stretch in patients with RB.

**Study Design:** Experimental study.

**Methodology:** 30 patients having retrocalcaneal bursitis (female, male) fulfilling the inclusion and exclusion criteria were recruited and were randomly allocated in two groups. Group A subjects were given with contrast bath & Achilles stretch exercises and group B subjects were given ESWT along with contrast bath & Achilles stretch exercises. Pain, AROM of ankle dorsiflexion (DF) & plantarflexion (PF) and functional ability were depicted by using VAS scale, goniometer and Roles and Maudsley's (RM) score respectively.

**Data Analysis:** Data Analysis was done by using SPSS version 15.0.

**Result:** Significant changes were seen between & within both groups for VAS, Ankle ROM and functional ability.

**Conclusion:** Study proves that ESWT has an additional effect in the management of RCB.

**Keywords:** Retrocalcaneal bursitis, extracorporeal shockwave therapy, roles and maudsley's score

### Introduction

Posterior heel is the second most common location of mechanically induced heel pain [1]. It is commonly caused by Retrocalcaneal bursitis. Retrocalcaneal bursitis is an inflammation of the bursa in the recess between the anterior inferior side of the Achilles tendon and the posterosuperior aspect of the calcaneus causing painful swelling superior to calcaneus. It is also known as 'Insertional Heel pain' [2].

RCB may also be associated with conditions such as gout, rheumatoid arthritis, and seronegative spondyloarthropathies [3]. In some cases, RCB may be caused by bursal impingement between the Achilles tendon and an excessively prominent posterosuperior aspect of the calcaneus (Haglund deformity) [4]. Individuals who are accustomed to wearing high-heeled shoes on a long-term basis may experience increased stretch and irritation of the Achilles tendon and its associated bursa when switching to flat shoes [5]. Factors responsible for this condition are Overtraining in an athlete, such as with excessive increases in running mileage may lead to RCB, tight or poorly fitting shoes that produce excessive pressure at the posterior heel and ankle due to a restrictive heel counter are another cause of retrocalcaneal bursitis [6].

The exact incidence and prevalence of Achilles bursitis or tendinitis is not known because many cases go unreported. However, this condition is most common in active middle-aged individuals and individuals over age 65 [7].

RCB is indicated if the sharp definition of the retrocalcaneal recess is lost and normal lucency in the region of the pre-Achilles fat pad is replaced by a soft tissue density, or if there's erosion of the posterior-superior calcaneus. Here, to evaluate for calcification at the Achilles tendon insertion and prominent posterior calcaneal tuberosity is best seen on lateral view [8].

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ESWT is a new technique used for treatment of conditions such as tennis elbow, jumper's knee, shoulder pain and Achilles tendon pain conditions which are otherwise difficult to treat with conventional physiotherapy. Here, a high-intensity sound wave interacts with the tissues of the body. This leads to a cascade of beneficial effects such as neo-vascularisation ingrowths, reversal of chronic inflammation, stimulation of collagen and dissolution of calcium build-up<sup>[9]</sup>.

### Objectives

To assess the effectiveness of ESWT along with Contrast bath & Static Achilles tendon stretching in patients with RCB.

### Material and Methodology

**Study Design:** Experimental study

**Study setting:** T.D.T.R D.A.V Institute of Physiotherapy and Rehabilitation, Yamunanagar

**Sampling method:** Non- randomized sampling

**Samples size:** 30 subjects

### Inclusion Criteria

- Diagnosed case of Retrocalcaneal bursitis by orthopedician
- Cases who had antero-posterior and lateral radiographs of the affected ankle that revealed calcifications and/or spurs in the Retrocalcaneal bursa area
- Age group between 20 to 65 years

### Exclusion criteria

- Patients having rheumatoid arthritis, generalized polyarthritis, Reiter syndrome, local infection, bleeding disorders, tumours, severe endocrine disease and advanced peripheral vascular disease
- Contraindications to ESWT (pregnancy, local malignancy, coagulopathy or a pacemaker)
- Patients with a history of previous Achilles tendon surgery were also excluded.

### Procedure

The subjects who fulfil the inclusion and exclusion criteria were included in the study by taking their written consent and were conveniently divided into two groups named group A and group B.

### Group A (Control group)

In this group, subjects received contrast bath & static Achilles tendon stretching

### Group B (Experimental group)

In this group, subjects received ESWT along with contrast

bath & static Achilles tendon stretching.

### Group A- Control Group

This group was first given Contrast bath. Each control group subject made to immersed his/her treatment leg in a contrast bath apparatus. Here, subject spent the first 4 minutes with the ankle to be treated immersed in a warm whirlpool (40°C). Then that treatment leg was immersed in a cold whirlpool (15°C) for 1 minute, after which the subject began to cycle the treatment leg through a series of warm (4 minutes) and cold (1 minute) whirlpool sequences to maintain a warm-to-cold time ratio of 4:1. Four cycles were completed. After completion, this was followed by 5 minutes relaxation.

After this, subject was made to do actively Static stretch for Achilles tendon. So, subject was made to sit on the bed/ plinth with back vertical to it. The treatment side knee was fully flexed in sitting such that its heel is close to buttocks and the opposite leg was straightened or kept out of the bed/plinth depending on the subject's comfort. Now subject was asked to hold foot to be treated and pull towards the body using both the hands, keeping the heel in contact with the bed. Subject was asked to hold it for 5-10 seconds there, relax and repeat this for 10 times.

### Group B- Experimental Group

This group was given combination of ESWT along with Contrast bath and Static Achilles tendon stretching. Subjects were first given ESWT. Subjects were in prone lying with dorsum of foot supported on the edge of bed. Applicator was placed perpendicularly over the recess between insertion of Achilles tendon and the posterosuperior aspect of calcaneum. Low energy 2000 focussed shock waves in form of beats applied at a frequency of 6 Hz and a pressure of 3 MPa on the posterior heel. It was applied for duration of 15 minutes.

After that, subjects received Contrast bath therapy followed by Static Achilles tendon stretching with the same method as explained for Group A.

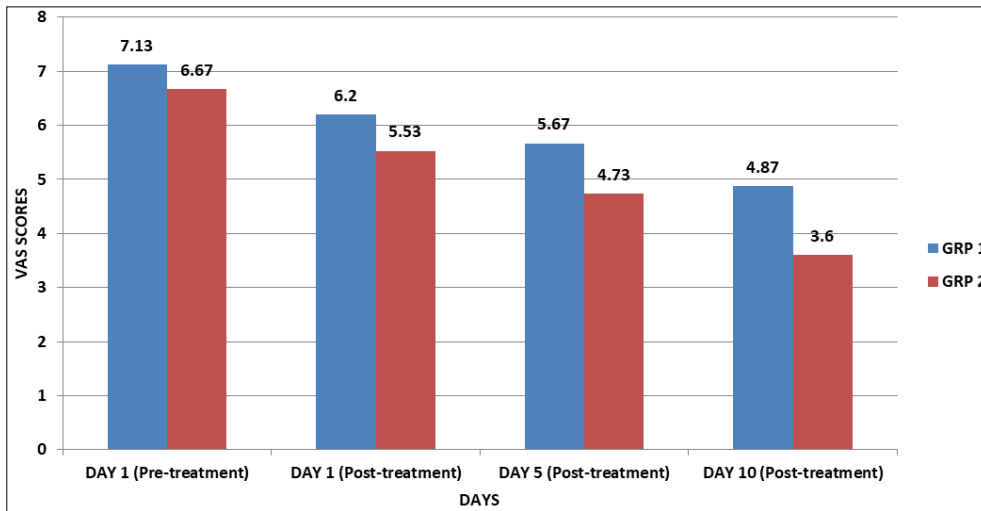
The treatment was given for 10 days to both the groups.

### Outcome Measures

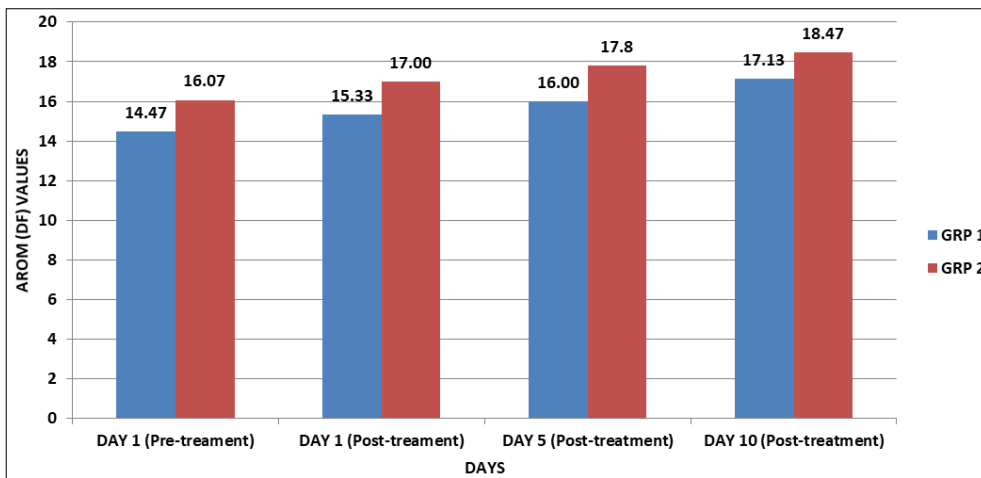
The outcome measures of pain, ankle AROM of DF & PF and functional ability were taken using VAS scale, Goniometer and RM score respectively on first day (pre intervention ) and post intervention on first, fifth and tenth day.

### Data analysis and result

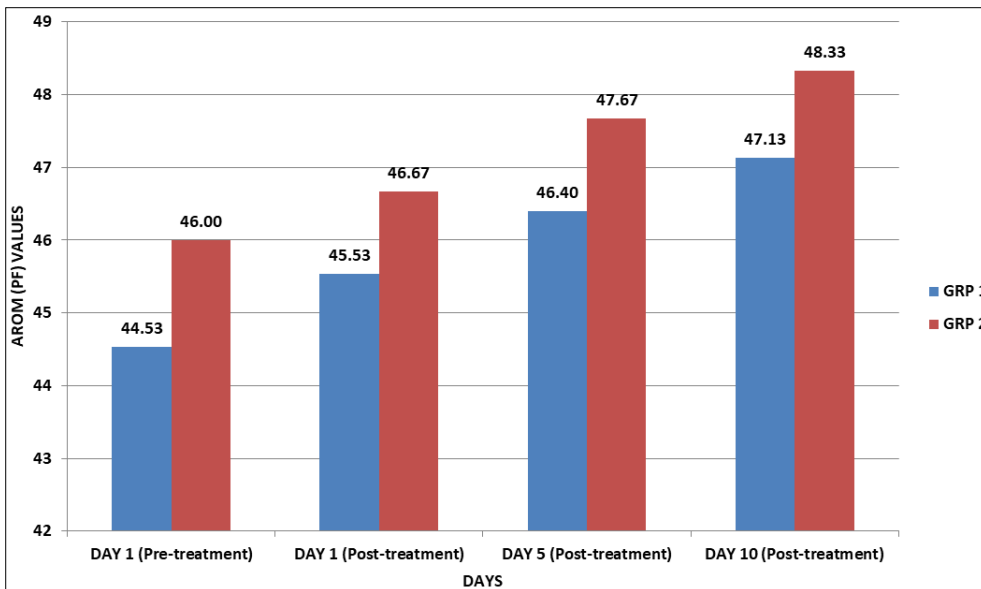
Data was analysed using the software SPSS-15.0. Unpaired & Paired T- was applied to compare the outcomes between & within the groups. Study found that all four variance i.e. pain, AROM (DF), AROM (PF) and RM score have significantly improved in both the group. However experimental group have shown significant improvement as compare to the control group in all the four variance.



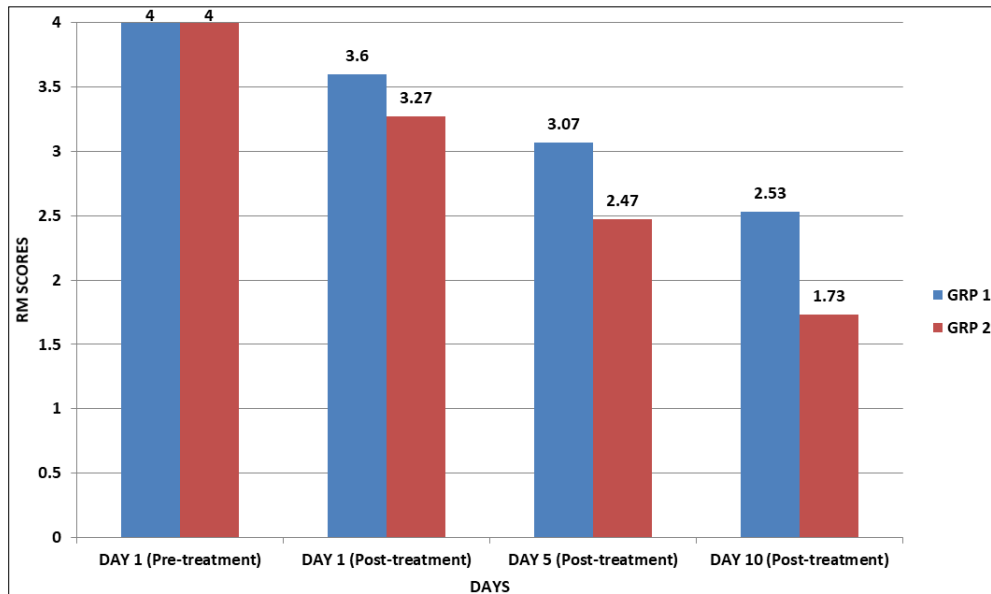
**Graphs 1:** Comparison of VAS between the Groups



**Graphs 2:** Comparison of AROM (DF) between the Groups



**Graphs 3:** Comparison of AROM (PF) between the Groups



**Graphs 4:** Comparison of RM Scores between the Groups

## Discussion

### Improvement in Pain Intensity (VAS)

ESWT is found to be significantly more effective in reducing pain intensity. The results are in accordance with the findings of Andrew Aramaki who reported significant pain reduction and increased functionality in patients with posterior heel pain [10]. This could be explained as when high-intensity sound wave interacts with the tissues of the body, a cascade of beneficial effects such as neo-vascularisation ingrowths, reversal of chronic inflammation, stimulation of collagen and dissolution of calcium build-up takes place. Stimulation of these biological mechanisms creates an optimal healing environment. As the injured area is returned to normal, functionality is restored and pain is relieved [9].

### Improvement in Active Range of Motion (AROM)

Halbertsma *et al* and Magnusson *et al* found that stretch training alone show no effect on muscle stiffness of achilles tendon following three weeks of stretch training [11]. They explained that from the standpoint of maximizing muscular performance, stretching creates an acute decrease in performance, therefore stretching should not normally be recommended prior to exercise with apparently healthy individuals, but be programmed during the cool-down after exercise training. Stretching also results in significant acute stress-relaxation in the muscle, but does not appear to affect muscle stiffness/elasticity. Stretch training has a chronic effect of increasing range of motion. However, typical Achilles tendon-stretching exercise does not specifically recreate windlass mechanism and other interventions may be needed to treat heel pain [12].

In present study, significant improvement in ankle DF & PF is found in experimental group when stretching is given with ESWT, which is in concordance with the results of Paolo Sanzo (2013) [13]. Cheing G.L *et al.* (2007) also showed ESWT effective in improving pain and range of ankle in heel pain in comparison to ultrasound therapy [14].

### Improvement in Roles and Maudsley's (RM) Score

The study has found that ESWT leads to significant decrease RM score immediately after treatment intervention. The result is in concordance with the Rompe JD *et al.* (2009) who found excellent or good scores (on RM scale) in patients got ESWT. [15] This could be due to progressive decrease in pain and

acceleration in the healing process that collectively leads to the improvement in functional abilities of the patient.

## Conclusion

The study has concluded that ESWT has proved to be an effective treatment for RCB in decreasing pain, ROM and improving functional ability.

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