

# Effect of Bowens, Cyriax and Modified Graston Technique for Reduced Ankle Dorsiflexion in Subjects with Heel Pain-Randomized Clinical Trial

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**Abstract:** Heel pain, often rooted in plantar fasciitis, continues to affect a significant number of middle-aged adults, particularly women and individuals with higher BMI. In my view, this condition, while frequently overlooked, has a profound effect on mobility and daily life. This randomized controlled trial offers a comparative snapshot of three manual therapy techniques-Bowen, Cyriax, and Modified Graston-in conjunction with standard conservative care, aimed at alleviating pain and improving ankle mobility. The study involved 36 participants equally divided into three intervention groups. While all groups showed measurable improvements in pain levels, range of motion, and functional indices post-treatment, subtle differences emerged in their efficacy. It is evident that each technique operates through distinct physiological pathways-be it fascia release in Bowen, deep tissue realignment in Cyriax, or microtrauma-induced regeneration in Graston. That said, the absence of long-term follow-up raises questions about the sustainability of these outcomes. What stands out most is the nuanced interplay between traditional therapeutic interventions and newer soft tissue mobilization techniques, suggesting a growing need for more integrative rehabilitation protocols. Taking this further, future research could benefit from imaging diagnostics and extended timelines to verify carryover effects. This suggests that while no single therapy emerged as dominantly superior, all three hold meaningful potential in clinical practice when addressing plantar fasciitis-related heel pain.

**Keywords:** Heel pain, Plantar fasciitis, Bowen therapy, Cyriax massage, Graston technique

## 1. Introduction

In medical terms Plantar fasciitis occurs when there is inflammation to the plantar fascia and is considered to be most common cause of pain in heel. Pain and tenderness are mostly located inferiorly at origin of the plantar fascia. The plantar fascia includes medial, central, and lateral portions. Literature has stated the incidence of heel pain to be most common in that age group of 40-60 years. A study done on Indian population indicates that approximately one person in group of five people report heel pain, stiffness or aching, with females having a higher prevalence, those aged 50 years and above and those having BMI in obese category<sup>3,4</sup>. Other causes of over use of plantar fascia are injury while running or jumping on hard surfaces or a bruise incurred while walking or having more weight. Heel pain can also be caused due to soft tissue injury, damage to bone nerve and plantar fascia. Due to the plantar fascia inflammation, a band of fibrous tissue on the foot that provides support to the arch, overloading or overstretching of plantar fascia can aggravate symptoms of Plantar fasciitis which can lead to small tears in the cross fibers of the fascia, especially where the fascia connects the heel bone.<sup>4</sup>

Combination of treatment modalities have been more effective in managing heel pain rather than administering only one treatment at a time.<sup>4,5</sup> Deep frictional massage was invented by Dr. Cyriax, as a approach to facilitate the regeneration of the soft tissues, including tendinous tissue. The Bowen technique is named after Tom Bowen. He described it as a soft tissue remedial therapy, the therapist uses thumb or fingers to apply gentle and pain-free rolling movement over muscles, ligaments, tendons and other connective tissues in other parts of the body.<sup>8</sup> Bowen therapy, also known as Bowen work or Bowen technique, is a form of bodywork.<sup>6</sup>

Graston Technique is a method of soft tissue mobilization in which a tool is used which does micro trauma and increases the temperature of skin around the area treated followed by an inflammatory response which helps in accelerating the healing process and improve flexibility of damaged tissue

## 2. Methodology

All subjects with heel pain were screened for inclusion criteria and exclusion criteria. Subjects were informed and aware about the aims and procedure of the study. Allocation to the groups was done using lottery method. 36 subjects were allocated into 3 groups. 12 subjects were included under Bowens group, 12 under Cyriax group and 12 in Graston group. Demographic details were noted and all outcome measures assessed, before intervention and after intervention. Common treatment for all 3 groups included Therapeutic Ultrasound, Cryotherapy and TA stretching. Group A received Bowens technique was given for 20 mins, Cyriax's technique was given for 20min. Group C received Modified Graston technique which was given for 15 minutes.

## 3. Statistical Analysis

Comparison between the groups was done using ANOVA and Welch's ANOVA, pre and post data were compared using one tailed two sample paired t-test. Comparison of difference in pre and post between the groups is done by Tukey's HSD for multiple comparison and ANOVA. P-value<0.05 was considered as statistically significant.

## 4. Results

15 female participants were included in the study which was comparatively less than the total number of male participants which was 21 with a ratio of 15:21. The mean BMI of the

subjects in Grastons group was  $22.08 \pm 1.59$ , in Cyriax group was  $22.12 \pm 2.03$  and in Bowens group was  $22.08 \pm 1.66$ .

The mean  $\pm$  SD in Group A pre intervention score was  $5.25 \pm 0.97$  and post intervention score was  $3.92 \pm 0.67$  with p value 0.0025 in Group B pre intervention values were  $5.25 \pm 0.97$  and post intervention values were  $4.33 \pm 0.65$ , p value 0.0039 in Group C pre intervention values ranged from  $5.75 \pm 0.75$  and post intervention  $4.75 \pm 0.75$  with p value 0.0022. Group A pre- treatment scores for Plantar flexion was  $35.3 \pm 1.37$  and post treatment scores  $40.42 \pm 1.24$  & ( $p < 0.0017$ ) and for Dorsiflexion were  $14.50 \pm 0.80$  and  $17.83 \pm 0.94$  ( $p < 0.0018$ ). We conclude that mean  $\pm$  SD for Foot Functional index in Group A pre-intervention was  $125.42 \pm 10.6$  and after post- intervention was  $137.25 \pm 9.14$  & ( $p < 0.0001$ \*) for Group B pre -intervention values were  $130.75 \pm 9.27$  and post- intervention were  $141.58 \pm 8.88$  & ( $p < 0.0001$ \*) Foot and ankle disability index for pre and post intervention in all groups are as follows. mean  $\pm$  SD for Group A pre-intervention was  $62.58 \pm 4.48$  and post-intervention was  $70.17 \pm 4.24$  & ( $p$ - value  $< 0.0001$ ), and in Group B pre-intervention values were  $65.92 \pm 4.52$  and post intervention were  $73.58 \pm 4.48$  & ( $p$  - value  $< 0.0001$ ), Group C pre intervention values were  $63.67 \pm 4.38$  and post intervention  $71.08 \pm 4.54$  and ( $p$ -value  $< 0.0001$ ), the results showed a statistical significant increase in mean  $\pm$  SD values over all 3 groups.

## 5. Discussion

The present randomized controlled trial was done to compare the immediate effects of Bowens technique, Cyriax (transverse frictional massage) and Modified Graston technique on reduced ankle dorsiflexion and plantarflexion ROM using goniometry, pain intensity using VAS and foot function using foot functional index and Foot and ankle disability index in subjects with heel pain.

The decrease in pain and increase in ROM could have been reduced with Grastons intervention can be due to following reasons. A soft tissue injury can result from overuse or excessive tension Inflammation and proliferation in new cells occurs after a injury, followed by fibrosis and scar tissue formation in the injured soft tissue. These changes lead to reduction of tissue elasticity and cause adhesion in the tissue, which leads to impaired soft tissue function and pain. In particular, scar tissue restricts the perfusion to the injured soft tissue, inhibiting the oxygen supply and nutrients, and interferes with tissues regeneration, which may lead incomplete functional recovery.

The improvement in Cyriax group could be because Cyriax's massage being a soft tissue mobilization increases the temperature of skin which increases the blood supply to the area which helps the fibrils to heal. The transverse movement which is performed helps in restoring normal mobility of the structures as the movement promotes alignment and lengthening of these damaged fibers. There is release of histamine which helps in reduction of pain.

Authors from previous studies have also stated that application of transverse frictions maintain muscle function,

stimulate structural orientation without excessive formation of scar tissue.<sup>13</sup>.

Another study was done to determine the effectiveness of cyriax transverse friction massage with ultrasound therapy in the management of plantar fasciitis. The results were similar to our study which showed Decrease in pain and improvement in functional ability.<sup>15</sup>

Bowens therapy was given in treatment of frozen shoulder in terms of pain, functional ability and well-being on 20 participants were included in the study, outcome measures like shoulder active and passive ROM and pain intensity scores were taken and it was concluded that it improved functional ability and reduced pain.<sup>15,16</sup>

Literature also states that Bowens works at a level of the superficial fascia and stimulates the relationship between the fascia and the nerve, muscle or tendon being mobilized. Fascia helps in muscle co-ordination, promotes postural alignment and overall structural and functional integrity. All of these are affected when the fascia gets stiff, contracts, torques or dehydrates. After a Bowens session, commonly there is loosening of adhesions, softening of scar tissue, improvement of posture and mobility.<sup>16,17</sup>

Limitation of the study was that long-term effect or follow up was not assessed in the present study to better understand the carryover effect and recurrence rate. Since conventional treatment was included in all three groups which intervention was more effective was unclear. Long terms and carryover effects of the treatment can be evaluated in future studies. More objective outcome measures such as XRAY and MRI can be included. This study proves that Bowens, Cyriax and Graston technique was found to be effective in treatment of heel pain. Hence these treatments should be included by the clinicians or exercise therapist in preventive rehabilitation or in rehabilitation towards heel pain.

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