



## EFFECT OF JADE STONE MOBILIZATION VERSUS BOWEN TECHNIQUE FOR HAMSTRING TIGHTNESS IN SUBJECTS WITH NON-SPECIFIC LOW BACK PAIN: A RANDOMIZED CINICAL TRIAL

### Physiotherapy

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### ABSTRACT

This study was done to compare the effects of Jadestone mobilization versus Bowen technique in the treatment of the non-specific lower back pain with hamstring tightness. Total 30 participants were randomly allocated in two groups of 15 each. Group A was given Jadestone mobilization and Group B was given Bowen technique with a common conventional therapy protocol given to both the groups for 2 weeks. Both the groups showed statistically significant values for improved low back pain, disability, hamstring flexibility and ROM ( $p < 0.0005$ ). Group A showed more significance than Group B in the AKET and SART outcome measures ( $p < 0.0005$ ) but not in other two. Hence, both Jadestone mobilization and Bowen technique are efficient in lowering NS-LBP, increasing hamstring flexibility, ROM and reducing functional disability.

### KEYWORDS

Jadestone, Gua Sha, Bowen , Low back pain

### INTRODUCTION

The musculoskeletal system leads to the movement of the human body. The pain emerging in the lumbosacral (L1-S1) area where the lordotic bend is formed is termed as lower back pain (LBP).<sup>1</sup> Non-specific LBP is characterized as pain without any pathology like infections, tumors, bone diseases, lumbar spine fractures, postural abnormalities or cauda equine syndrome.<sup>2</sup> LBP is experienced once in a lifetime by over 80% of human race around the world.<sup>3</sup>

As per world health organization in 2002, LBP constitutes 37% of all occupational risk factors and ranks first amongst the work-related health complications. In western countries like USA, it is one of the main reasons for unfitness with prevalence of 10-56%. It was found that 6.2 % (general population) to 92% (construction workers) have LBP in India.<sup>4</sup>

Hamstring tightness is a typical condition found in both symptomatic and asymptomatic subjects. It is characterized as impaired lengthening of the hamstring musculature through its full range. It has been correlated with LBP in in both juvenile and adults cross sectional studies.<sup>5</sup> Physiotherapy which includes manual therapy like myofascial release, electrotherapeutic modalities and exercise therapy plays an important role in recovery of subjects with hamstring tightness and non-specific LBP.<sup>6,7</sup>

Jade stone mobilization (JM) is also called as Gua Sha, where Gua means to rub/scratch and Sha means redness. It is an ancient Asian healing technique where in the body surface is given unidirectional 'press stroking' with a tool that leads to therapeutic effects. The superficial layer of the muscle is scratched off to assuage fluid stagnations which helps reduce inflammation and improve the surface micro perfusion. The redness usually disappears within 2-5 days.<sup>8,9,10</sup>

Bowen's Technique (BT) was invented by Thomas Bowen in 1950. It is a type of myofascial mobilization which involves manual pain free gentle rolling movements over the soft tissues (muscle, ligaments, tendons, etc.) on precisely designated points on the body stimulating the nervous system to initiate body's own healing mechanism.<sup>11,12</sup>

Various studies have proven JM and BT to be effective in improving pain, tension, extensibility and functional status in different conditions. However, there is paucity of literature on the effect and comparison of these two techniques on non-specific LBP with hamstring tightness. Hence, this study was conducted.

### MATERIALAND METHODS: (Refer Chart 1)

Ethical clearance was obtained from the Institutional Ethical Committee.

Sample size was calculated using this formula Sample size =  $2 + (SD/D)^2 [Z_{1-\alpha/2} + Z_{1-\beta}]^2$   
SD=5.62

$d=5$   
 $\alpha \text{ error}=5\%$   
 $Z\alpha=1.96$   
 $Z\beta=0.842$

The sample size obtained for this Quasi-experimental design was 30 subjects which were randomized into two groups using envelope method after taking informed consent from each one. Subjects between aged 18-45 years, tight hamstring muscles ( $<160^\circ$  of knee extension with  $90^\circ$  Hip flexion), non-specific low back pain ( $<3$  weeks) were included in the study and those with spinal surgery, neurological deficit, radiating pain, tumor, trauma, Spondylolisthesis, Ankylosing Spondylitis or systemic infections were excluded.

The instruments used were Jadestone mobilizer, Interferential therapy (IFT) [vectrostim-100], hot moist pack (HMP), universal goniometer, measuring tape, stepper, assessment proforma and data collection sheet and following outcome measures-

#### 1) Numeric pain rating scale(NRS)

It is a scale which has a marking from 0 (no pain) to 10 (highest pain) and the subjects were asked to verbally choose an esteem which was near to the pain which they have experienced within a couple of hours.<sup>13</sup>

#### 2) Sit and Reach Test (SART)-

It was used to measure hamstring flexibility. The subject was asked to be seated on the ground without shoes in line opposite to a rigid support (stepper) with both the lower limbs joined and extended tight against the ground. With the palms facing down they were asked to extend the arms and reach beyond a pre measured line as far as possible. After a trial round, measurement was taken.<sup>14</sup>

#### 3) Active Knee Extension Test (AKET)-

It was used to measure range of motion (popliteal angle) of the right limb in recumbent position with hip and knee flexed to  $90^\circ - 90^\circ$  and pelvis tied with a strap to the couch. The fulcrum of the goniometer was placed at lateral condyle of femur and the subject was asked to extend the knee as far as possible till a mild stretch was felt.<sup>15</sup>

#### 4) Modified Oswestry Disability Index (MODI)-

This questionnaire gives information about the influence of pain in regular daily activities, thus pain related disability. It comprises of 10 questions scored from 0 to 5, with higher score indicating more disability. The total score is divided by 50 multiplied by 100 and expressed as percentage.<sup>16</sup>

The demographic details and assessment using the outcome measures was taken at baseline (day 1) and after completion of 12 sessions. Duration of the treatment was 2 weeks, 6 sessions per week of JM or BT interspersed with conventional treatment on alternate days. Group A received JM while Group B received BT.

Conventional therapy included application of HMP over the lower

back region for 15 mins in prone position, then IFT for 20 mins at 200Hz frequency and beat frequency 140 Hz followed by back and core strengthening exercises which included Bridging, Dead bugs, Side planks, Plank with leg lifts ( 1 set of 5 second hold, 10 repetition each).<sup>17-19</sup>

**Group A:**

JM was performed in prone lying position with foot outside the couch in dorsiflexion and toes extended. Hamstrings muscle was given downward pressured strokes as per subject's tolerance with Jadestone mobilizer in one area until "sha" (petechiae) appear and then moved onto the next area for a total of 20 minutes covering the entire muscle length.<sup>2</sup>(Photograph 1)



**Photograph 1- Jadestone Mobilisation**

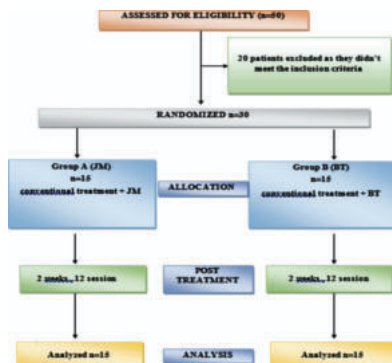
**Group B:**

In BT, thumb was placed over the hamstring muscle then hooked into the lateral edge of the muscle to form a firm pressure against it followed by a rest pause which triggers neural response in anticipation of 'something is about to happen.' Then flatten the thumb in medial direction which will create a response in the form of 'pluck' or 'plop' by just carrying the skin and challenging the muscle, first with the thumb (left side of body) followed by the fingers (right side of body). There should be a gap of 1 inch between the thumbs and fingers in order to play the muscles simultaneously. The total treatment time for each session was 20 minutes.<sup>20</sup>(Photograph 2)



**Photograph 2-Bowen's Technique**

**FLOWCHART:**



**RESULTS AND DISCUSSION:**

The statistical analysis was done using SPSS version 22.0. Normality of different variables was done by Kolmogorov Smirnov test. There were 66.67% males and 33.33% females in group A while 20.00% male and 80.00% females in group B. The demographic details are described in Table 1.

**Table-1: Demographics details of the subjects**

| Variable      | Groups  | Mean±SD     | SE   | t-value | P-value |
|---------------|---------|-------------|------|---------|---------|
| Age in yrs    | Group A | 22.73±2.15  | 0.56 | 0.2806  | 0.7811  |
|               | Group B | 22.53±1.73  | 0.45 |         |         |
| Height in cms | Group A | 150.00±7.64 | 1.97 | -1.9006 | 0.0677  |
|               | Group B | 154.93±6.53 | 1.69 |         |         |
| Weight in kgs | Group A | 63.67±14.26 | 3.68 | -0.3642 | 0.7184  |
|               | Group B | 65.20±7.91  | 2.04 |         |         |
| BMI           | Group A | 28.05±4.95  | 1.28 | 0.5652  | 0.5764  |
|               | Group B | 27.19±3.12  | 0.80 |         |         |

For within group analysis (Pre and post therapy) of NRS and SART scores, Wilcoxon Rank test was used (Table 2). While the scores of AKET and MODI were analyzed by paired-t test (Table 3). There was significant difference observed in both the groups p<0.05 post intervention. The comparative analysis between groups A and B of NRS and SART was done using Mann Whitney test while that of AKET and MODI was done by unpaired-t test. The analysis of NRS and MODI scores was not found to be statistically significant but that of SART and AKET showed group A scores significantly higher than Group B. (Table 4)

**Table 2. Within group analysis of NRS and SART Scores**

| OUTCOME MEASURE | NUMERIC PAIN RATING SCALE |           |           |           | SIT AND REACH TEST |            |             |             |
|-----------------|---------------------------|-----------|-----------|-----------|--------------------|------------|-------------|-------------|
|                 | GROUP A                   |           | GROUP B   |           | GROUP A            |            | GROUP B     |             |
| TIME POINT      | Pretest                   | Posttest  | Pretest   | Posttest  | Pretest            | Posttest   | Pretest     | Posttest    |
| Mean±SD         | 4.47±2.00                 | 2.07±2.09 | 5.53±1.51 | 3.67±2.29 | 19.13±2.99         | 25.34±3.07 | 26.47±31.21 | 28.30±31.32 |
| Mean Diff.±SD   | 2.40±1.30                 |           | 1.87±1.96 |           | -6.21±4.26         |            | -1.83±1.83  |             |
| %change         | 53.73                     |           | 33.73     |           | -32.44             |            | -6.93       |             |
| z-value         | 3.4078                    |           | 2.7118    |           | 3.4078             |            | 3.0594      |             |
| p-value         | 0.0007*                   |           | 0.0067*   |           | 0.0007*            |            | 0.0022*     |             |

**TABLE 3. Within group analysis of AKET and MODI scores**

| OUTCOME MEASURE     | Active knee extension test |              |              |              | Modified Oswestry low back pain disability Questionnaire |            |             |             |
|---------------------|----------------------------|--------------|--------------|--------------|--|------------|-------------|-------------|
|                     | GROUP A                    |              | GROUP B      |              | GROUP A  |            | GROUP B     |             |
| TIME POINT          | Pretest                    | Posttest     | Pretest      | Posttest     | Pretest  | Posttest   | Pretest     | Posttest    |
| Mean±SD             | 145.93±10.33               | 160.80±10.33 | 144.73±16.65 | 150.73±19.73 | 19.60±15.02  | 8.60±13.28 | 22.13±11.62 | 16.67±12.42 |
| Mean Diff.±SD diff. | -14.87±13.45               |              | -6.00±7.07   |              | 11.00±11.59  |            | 5.47±8.59   |             |
| %change             | -10.19                     |              | -4.15        |              | 56.12  |            | 24.70       |             |
| Paired t            | -4.2800                    |              | -3.2863      |              | 3.6764   |            | 2.4639      |             |
| p-value             | 0.0008*                    |              | 0.0054*      |              | 0.0025*  |            | 0.0273*     |             |

**Table 4. Comparison between group A and B**

| OUTCOME MEASURE | Time points | Groups | Mean ±SD | Mean rank | U-value | Z-value | P-value |
|-----------------|-------------|--------|----------|-----------|---------|---------|---------|
|-----------------|-------------|--------|----------|-----------|---------|---------|---------|

|                 |            |         |              |       |           |         |         |
|-----------------|------------|---------|--------------|-------|-----------|---------|---------|
| NRS             | Difference | Group A | 2.40±1.30    | 17.03 |           |         |         |
|                 |            | Group B | 1.87±1.96    | 13.97 | 89.50     | -0.9540 | 0.3401  |
| SART            | Difference | Group A | 6.21±4.26    | 20.63 |           |         |         |
|                 |            | Group B | 1.83±1.83    | 10.37 | 35.50     | -3.1938 | 0.0014* |
| OUTCOME MEASURE | TIME POINT | GROUPS  | MEAN±SD      | SE    | t - Value | P-value |         |
| AKET            | Difference | Group A | 14.87±13.45  | 3.47  | 2.2595    | 0.0318* |         |
|                 |            | Group B | 6.00±7.07    | 1.83  |           |         |         |
| MODQ            | Difference | Group A | -11.00±11.59 | 2.99  | -1.4855   | 0.1486  |         |
|                 |            | Group B | -5.47±8.59   | 2.22  |           |         |         |

## DISCUSSION:

As per our knowledge this is a preliminary study where the effect of Jade stone mobilisation versus Bowen technique has been investigated in the treatment of nonspecific low back pain with hamstring tightness. The statistical analysis supports JM and BT in the management of NS-LBP with hamstring tightness in terms of pain intensity, hamstring flexibility, ROM and low back disability. It is worthwhile noting that there were no dropouts in this study. Also, there were no adverse effects seen in any participant. The age group of 18 to 45 years was included on the basis of study conducted by Hussain et al., who established relationship between hamstring flexibility and low back pain and stated that hamstring tightness was most prevalent among the mean age 25.51±8.698.21

There was significant improvement in AKET, SART, pain and MODI scores in subjects post Gua Sha Therapy. Also, on comparison with group B, group A showed significant improvement in AKET and SART scores. These effects could be attributed to increased microcirculation of the surface tissue, relaxation of the tightened musculature (hamstring) due to controlled microtrauma caused by the scrapping action (mechanotransduction), thus improved flexibility and postural mechanics. The stimulation of the dermal free nerve endings and mechanoreceptors alleviated pain by activating the serotogenic and nor-adrenogenic narcotic gating mechanism.<sup>8,22,23</sup> Our results were in tandem with the study conducted by Maximilian B. et al., in which 41 subjects with chronic neck and back pain found Gua sha therapy to be effective in improving pain, function, and quality of life.<sup>24</sup>

The results also showed improvement in pain, active Knee ROM, hamstring flexibility and function in group B (BT) candidates. The findings were similar to a study conducted by Carter B et al., who found improvement in pain, ROM and quality of life in Frozen shoulder clients after Bowen's therapy.<sup>12</sup> Our results were also consistent with Marr et al., who stated improvement in hamstrings extensibility in healthy individuals after a single session of BT with the effects lasting on 1 week follow up.<sup>25</sup> The manual stimulation of the myofascial tissue, its anatomical linkages and continuity cumulated with neuromodulation could be the rationale behind the findings observed in these subjects. However, in terms of pain and functional status, there was no significant difference found between the two groups.<sup>11,12</sup>

## Limitations

The investigator was not blinded due to practical difficulties. The long-term effect of the therapies on the participants was not monitored. Also, the stand-alone effect of Jadestone mobilization and Bowen's was not studied but in combination with conventional therapy.

## CONCLUSION:

The present study suggests that both the interventions were effective in relieving pain, improving hamstring flexibility, ROM and functional status in subjects with NS-LBP with hamstring tightness. JM was found to be better than BT for improving hamstring flexibility. However, none of the technique was proved superior in improving pain and disability due to LBP.

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## Conflict Of Interest: None.

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