EFFECTS OF INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION TECHNIQUES ON POST-OPERATIVE KNEE PAIN AND STIFFNESS: A CASE REPORT

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Abstract: 34-year-old male visited to MGM Physiotherapy Rehabilitation and Fitness Centre, Aurangabad. He presented with the complaint of pain and difficulty in bending left knee. In this study, The Nord Blade 2.0 was used to perform instrument assisted soft tissue mobilisation technique (IASTM) on the quadriceps, hamstring, and calf muscles. This technique was given 3 times in a week for 1 week of protocol. As a result, study concludes that application of IASTM was more beneficial and effective in pain reduction and increasing knee range of motion.

Keywords: Instrument Assisted Soft Tissue Mobilization, Post-operative knee stiffness

I. Introduction

Intra- and extra-articular fibrosis, as well as scarring adhesions in the quadriceps-femoral apparatus, cause restricted mobility range, commonly known as knee stiffness. Immobilization of the knee after surgery can cause a variety of issues, including decreased range of motion (ROM), decreased functional ability, poor quality of life due to restricted activities of daily living (ADLs), knee instability pain, decreased flexibility and strength, poor balance, abnormal gait while walking, and impaired proprioception. Exaggerated pathological fibrous hyperplasia, which may be the cause of post-operative knee stiffness, is a severe surgical complication that can impede accessory joint mobility, muscle activation, and result in a reduction in physiologic range of motion. Affected quadriceps-femoral connection results in loss of knee flexion and extension motions, which alters gait pattern, restricting functional squatting, stair climbing, running, and leaping, as well as sitting. (Role of Physiotherapy in Post-Operative Knee Stiffness.)

In the field of physical therapy IASTM is a common technique by using metal or plastic instruments with smooth edges with physically compressing the damaged muscles and tendon in a massage-like action (Kim et al., 2017). IASTM is based on the ancient Chinese treatment known as "gua-sha." The term "gua-sha" refers to a red patch on the skin that occurs when an instrument is used to press or scrape the skin, boosting blood flow and facilitating the delivery of blood and oxygen to the tissues. It can help alleviate pain from sports injuries and enhance soft tissue function and joint ROM. (The Effect of Mechanical Load on Degenerated Soft Tissue - ScienceDirect, n.d.) IASTM provides myofascial relaxation, nociception interruption, and improved underlying tissue mobility. (Cheatham et al., 2019) IASTM has been shown to increase the number of fibroblasts in skeletal muscle fascia, which activates downstream signaling

II. Case

2.1 Patients description

A 34-year-old male presented to musculoskeletal department of MGM Physiotherapy, Aurangabad. By occupation he was worker. His primary complaint was pain and difficulty in bending left knee since two and half month. Patient described how he slipped on a smooth surface while walking and fell on his left knee, bending it. He went to local hospital; investigations were done and doctor advised for surgery and he underwent surgery. After 3 months patient visited MGM Physiotherapy Rehabilitation and Fitness Centre, Aurangabad with pain and difficulty in bending left knee. The onset of pain was gradual and intermittent in nature. Initially he rated 3 on VAS on resting and 6 on VAS on activity. Patient complained of a dull aching pain.

2.2 Physical examination

On postural evaluation in lateral view left knee was slightly flexed. On observation swelling was present over anterior aspect of left knee. On palpation, tenderness (Grade1) was present over the apex of patella and muscle wasting was noted in quadriceps muscle leads to difficulty in knee bending and walking. Patient had tightness in hamstring muscle and tendoachilles. During physical examination of affected leg (left knee) it found that patient was unable to do full flexion. Active and Passive Range of motion of left knee flexion / extension is mentioned in Table 1.1.

| Table 1.1 Pre-treatment evaluation of active and passive range of motion |
|---------------------------------|---------------------------------|
| **Motions** | **Session** | **Active Range of motion** | **Passive range of motion** |
| Knee Flexion | 1 | 0-34 ° | 0-40 ° |
| 2 | 0-39 ° | 0-45 ° |
| 3 | 0-45 ° | 0-49 ° |
| Knee Extension | 1 | 34-0 ° | 40-0 ° |
| 2 | 39-0 ° | 45-0 ° |
| 3 | 45-0 ° | 49-0 ° |

2.3 Investigation and diagnosis

Diagnosis was done on the basis of subjective and objective evaluation which gives post-operative left knee pain and stiffness.

2.4 Intervention

The patient was treated 3 times a week for 1 week. Pre-treatment ranges were taken on each day. Nord blade was used for warm up with the application of lubricant. Then proper scanning was done and swipping, granstan, static and dynamic separation technique was given on hamstring, quadricep and calf muscle for 4 minutes each technique total 12 minutes session each day for 3 alternate days in a week. Post treatment ranges were taken on each day for 3 alternate days.
2.5 Follow up and outcomes
Outcomes measures used were pain (using VAS) scale and range of motion (using Universal Goniometer). In post-knee stiffness, IASTM is an effective intervention for pain relief and improving knee range of motion.
On 1st day pain was 6 on VAS and after 1 week of treatment protocol pain was 2 on VAS. Similarly, it was found that after 1 week of protocol there increase in left knee range of motion as mentioned in Table 1.2

### Table 1.2 Post-treatment evaluation of active and passive range of motion.

<table>
<thead>
<tr>
<th>Motions</th>
<th>Session</th>
<th>Active Range of motion</th>
<th>Passive Range of motion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knee Flexion</td>
<td>1</td>
<td>0-43°</td>
<td>0-46°</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0-49°</td>
<td>0-54°</td>
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<tr>
<td></td>
<td>3</td>
<td>0-52°</td>
<td>0-60°</td>
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<tr>
<td>Knee Extension</td>
<td>1</td>
<td>43-0°</td>
<td>46-0°</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>49-0°</td>
<td>54-0°</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>52-0°</td>
<td>60-0°</td>
</tr>
</tbody>
</table>

III. Discussion

The study was done to check the effectiveness of IASTM in the post-operative knee stiffness patient. Maria Simatou et al in 2020 examine the effects of three soft tissue treatments on the hip adduction range of motion in different regions of the myofascial lateral line (LL) (ROM). Implementing Ergon IASTM, foam rolling, and stretching can help to improve hip range of motion and found that Ergon Technique is more effective than foam rolling and stretching (Cheatham et al., 2019). Kim Do-Hyun et al in 2018 also showed that IASTM can help people with hamstring shortness increase their strength, associated strength ratio, knee joint passive stiffness, and pain threshold (Effects of Instrument-Assisted Soft Tissue Mobilization Technique on Strength, Knee Joint Passive Stiffness, and Pain Threshold in Hamstring Shortness - IOS Press, n.d.). Purva Katariya et.al in 2019, also suggested Edge tool used for Instrument Assisted Soft Tissue Mobilization is useful to increase Hamstring Muscle Extensibility. So, in our research, the IASTM was proven to be beneficial in reducing post-operative knee stiffness. (Immediate effect of instrument assisted soft tissue mobilization on hamstring muscle extensibility – pre and post test design | vims journal of physical therapy.)

3.1 Limitations
1. A case report included only three sessions of treatment on alternate days for a week.

3.2 Conclusion
Instrument assisted soft tissue mobilization was found to be effective in pain reduction and increased range of left knee in post knee operative stiffness. Hence in future its needs to be done on large scale

3.3 Informed consent
Informed consent of patient was taken.
Figures

(A) Instrument NORD BLADE 2.0, (B) Assessment-Scanning, (C) Cyriax/ Deep strokes over the quadriceps muscle, (D) Wipes over the calf muscle, (E) Static separation over the hamstring muscle.

Figure: (A) Instrument NORD BLADE 2.0, (B) Assessment-Scanning, (C) Cyriax/ Deep strokes over the quadriceps muscle, (D) Wipes over the calf muscle, (E) Static separation over the hamstring muscle.
References


