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## Original Research Article

## Effectiveness of KIASTM along with muscle energy technique on pain and functional disability evaluation in patients with periarthritis shoulder

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## ABSTRACT

**Introduction:** Periarthritis of the shoulder affects 2% to 3% of the general population and is commonly seen in the age group between 40-60 years. Periarthritis is defined as an idiopathic painful restriction of shoulder joint movements due to restriction of the glenohumeral joint. Patients with periarthritis of the shoulder clinically represent difficulties in activities of daily living like dressing, grooming, performing overhead activities, and disturbing sleep on the affected side.

**Aim and Objective:** The aim of the study is to see the effectiveness of KIASTM along with the Muscle Energy Technique on pain and functional disability index with periarthritis shoulder.

**Method:** 30 patients with periarthritis shoulder who visited the physiotherapy department OPD were included in the study with patient consent. Patients were divided randomly into two groups; Group A received KIASTM with Muscle energy technique, and Group B received Muscle energy technique only (Isometric contraction method of MET). Pain was evaluated by VAS and Functional Disability evaluation was done by SPADI scale. Pre-and post-intervention in both groups. Independent t-tests were used to compare the pre-and post-intervention results in both groups.

**Results:** Both groups exhibited significant improvement in SPAID post-intervention. However, there was a significant difference in Group A, who were treated with KIASTM and MET.

**Conclusion:** KIASTM is an effective tool for fascia release and can be incorporated with other techniques like MET for effective and fast results in pain relief and overcoming disability in patients with shoulder periarthritis. Therefore, we commend it to be a good technique for such patients.

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## 1. Introduction

The shoulder joint or glenohumeral joint is a ball and socket type of joint between the glenoid cavity of the scapula and the humerus head. It connects the upper limb to the trunk. It is the most mobile joint in the human body. In 1872, Duplay first described the term periarthritis.<sup>1</sup> Periarthritis of the shoulder (PAS) is characterized by pain,

loss of active and passive movement at the glenohumeral joint, fibrosis, and contracture of the shoulder/GH joint capsule.<sup>2</sup> PAS is more common in women as compared to men. It mostly affects between 40-60 years. It can be unilateral or bilateral. About 2-5% of the population is affected, and among them, 10-20% of patients have a history of diabetes.<sup>3</sup> Patients with PAS have difficulties in activities of daily living like dressing, grooming, and performing overhead activities. Physiotherapy treatment for PAS includes exercise and electrotherapy modalities.

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Electrotherapy includes thermo-therapy, transcutaneous electrical nerve stimulation, therapeutic ultrasound, dry needling, and LASER. Exercise includes ROM exercises, stretching exercises, joint manipulation and mobilization techniques, and a home exercise program. Muscle energy technique (MET) is a unique technique in which the patient gives an initial effort while the therapist facilitates the movement. It is a useful technique to achieve normal ROM and increase mobility. Effect of MET works on two major physiological processes, i.e., Post-isometric relaxation (PIR) and reciprocal inhibition (RI).<sup>4</sup> Kinesio instrument-assisted soft tissue mobilization (KIASTM) is a treatment technique by Kinesio Prehab Institutions that is used to restore the myofascial property of the muscle to overcome myofascial restrictions. It is used for mobilizing soft tissue structures for pain relief, improving range of motion, breaking tissue adhesions, and providing a deep tissue effect without creating stress on the therapist's hands. It works on the principle of James Cyriax's theory of deep transverse friction massage (DTFM) that helps to improve tissue mobility, prevention from scar tissue formation, and also helps in repair and regeneration for fibroblast recruitment which helps for remodeling of adhered structures.<sup>5,6</sup>

## 2. Materials and Methods

### 2.1. Population

Subjects from the outpatient department of physiotherapy, Bhubaneswar.

### 2.2. Sample size

30 subjects both male and female ranging from 45-65 years, satisfying the sampling criteria were taken in this study.

### 2.3. Study duration

4 weeks (5 days a week).

### 2.4. Sampling technique

Allocation of the subjects for the study was done by block randomization.

#### 2.4.1. Inclusion criteria

Age group 45-65 years, both males and females, shoulder stiffness for a time period of 3 months, idiopathic onset, patients with type 2 DM, unilateral periarthritis.

#### 2.4.2. Exclusion criteria

History of Systemic disease, history of thoracic surgery, patients with bilateral periarthritis, rotator cuff tear, known history of RA, Secondary Periarthritis due to fracture or any dislocation or pathology, neurological disorder, pregnancy,

malignancy, RSD, TOS, and Peripheral nerve injury.

### 2.5. Procedure

The patient, after proper assessment, showed the positive sign for the empty can test and Apley's scratch test, was explained about the study, and willing patients were taken for the intervention. 30 patients were divided into two groups, fulfilling the inclusion and exclusion criteria, and written consent was taken from them. Group A received KIASTM by ACCEL tool. KIASTM will be done on the supraspinatus, deltoid, infraspinatus, and teres minor muscle using scanning, combing, and gliding techniques for 2 minutes on each muscle. This is followed by MET using the isometric relaxation method for shoulder flexion, abduction, and external rotation 10 times each with a hold of 10 counts and a rest of 5 counts. Similarly, Group B received only MET using the isometric relaxation method for shoulder flexion, abduction, and external rotation 10 times each with a hold of 10 seconds and a rest of 5 seconds. Both the groups were taught home exercises to be performed 20 times each twice a day, followed by a hot pack, and advised not to do massage on the affected shoulder.

### 2.6. Statistical analysis

Statistical comparisons of the two groups, group A (experimental) and group B (control), were performed by using SPSS 22. Confidence level and  $p$ -value  $<0.05$  was considered statistically significant. The improvement in the reduction of pain was assessed by the visual analog scale (VAS), and disability index was assessed using the shoulder pain and disability index (SPADI). These were calculated using the pre-test (session 1) and post-test (session 20) treatment results. The data obtained were analyzed using paired "t" test.

## 3. Result

**Table 1:** Change in pain (VAS)

| Group   | Pre-treatment<br>(n=15) Mean $\pm$<br>SD | Post-treatment<br>(n=15) Mean $\pm$<br>SD | p-value |
|---------|--|---|---------|
| Group A | 5.4 $\pm$ 1.008                          | 1.9 $\pm$ 0.08                            | 0.001   |
| Group B | 5.9 $\pm$ 0.96                           | 2.22 $\pm$ 0.65                           | 0.001   |

**Table 2:** Change in functional disability (SPADI)

| Group   | Pre-treatment<br>(n=15) Mean $\pm$<br>SD | Post-treatment<br>(n=15) Mean $\pm$<br>SD | p-value |
|---------|--|---|---------|
| Group A | 61.49 $\pm$ 8.49                         | 21.84 $\pm$ 4.37                          | 0.001   |
| Group B | 61.96 $\pm$ 8.79                         | 32.93 $\pm$ 6.60                          | 0.001   |

Group A was treated with MET along with KIASTM. The pre-treatment result for VAS (in cm) was 5.4  $\pm$  1.008,

post-treatment was  $1.9 \pm 0.80$  and SPADI scoring for disability evaluation for pre-treatment was  $61.49 \pm 8.49$  and post-treatment was  $21.84 \pm 4.37$ .

Group B was treated with MET. The result for VAS (in cm) was  $5.9 \pm 8.79$ , and post-treatment was  $2.22 \pm 0.65$ , and SPADI scoring for disability evaluation was  $61.96 \pm 8.79$ , and post-treatment was  $32.93 \pm 6.60$ .

Group A, who was treated with KIASTM and MET, showed significant difference in pain relief and improvement in functional disability.

#### 4. Discussion

This study was done to find the effectiveness of KIASTM along with MET in patients with unilateral periarthritis shoulder on Pain and Functional Disability.

This study shows Group A, who were treated with KIASTM and MET, gives a better result on VAS and SPADI. Both the groups had received MET. In post-isometric relaxation contraction, there is the activation of mechano receptors present in the muscle and joint, which leads to decrease in pain by the evoke in the sympathoexcitation level.<sup>7</sup> Viswas Rajadurai (2011) suggests that MET is effective in reducing pain and improving Maximal Mouth Opening in patients with TMJ Dysfunction.<sup>8</sup> The finding of this study is similar to the study conducted by Gupta S. and Jaiswal P. (2008), which states that post-isometric relaxation is an effective method to decrease pain and disability and helps to improve cervical range of motion as compared to isometric exercises.<sup>9</sup> IASTM uses a metal tool that helps to localize soft tissue restrictions and helps in treating it. It is seen that IASTM produces local inflammation and breakdown of adhesion and reduces scar tissue in subjects with soft tissue lesions.<sup>3,9</sup> Many study have shown the effectiveness of IASTM on acute and chronic injuries.<sup>10,11</sup> It helps to identify and to treat effectively the thickenings, ridges, adhesions, fibrotic nodules, crystalline deposits, and scar tissue more efficiently and more deeply penetration to the tissue.<sup>12,13</sup> Many studies have concluded that IASTM causes a localized micro-trauma to soft tissue by producing microvascular and capillary hemorrhage, followed by initiating the body's inflammation process that stimulates the process of the body's healing process, and repair occurs.<sup>4,14</sup> The inflammatory process helps to restart the healing process by increasing the delivery of blood, nutrients, and fibroblasts to the area, which facilitates collagen synthesis, deposition, and maturation.<sup>11</sup> The result of this study states that KIASTM, along with MET, is effective in pain reduction and improving functional disability in patients with periarthritis shoulder. Several case studies have shown the effectiveness of IASTM on patients with both acute and chronic injuries in reducing pain and disability index.<sup>11,12,15</sup> In the future, studies can be done to see the long-term benefits of KIASTM alone on different

orthopedic conditions. The result of this study may be used for the treatment of periarthritis shoulder.

#### 5. Conclusion

KIASTM is an effective tool for fascia release and can be incorporated with other techniques like MET for effective and fast results on pain relief and to overcome disability in patients with periarthritis shoulder. Therefore, we commend it to be a good technique for such patients.

#### 6. Source of Funding

None.

#### 7. Conflict of Interest

None.

#### 8. Informed Consent

Informed consent was obtained from all participants.

#### 9. Acknowledgment

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