

Effect of ultrasound therapy, maitland mobilization and resisted isometric exercises on trismus a case report

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Abstract

Objective: The aim of the study was to see the effect of ultrasound therapy, Maitland mobilization and resisted isometric exercises on trismus. **Method:** The subject was 28yrs old female presenting with locked-jaw, tenderness and swelling on the right temporomandibular joint. The intervention given was ultrasonic therapy of 8 minutes for all consecutive 8 days, followed by Maitland mobilization grade I and II for four days and grade III and IV for next four days and resisted isometric exercises all for consecutive 8 days. **Outcome measure:** Pain on numerical pain rating scale (NPRS) and range of motion with scale and finger method were taken. **Result:** The pain on numerical pain rating scale (NPRS) got reduced from day one today eight and there was improvement in restricted range of motion of the temporomandibular joint after the intervention. **Conclusion:** This study revealed that ultrasound therapy combined with Maitland mobilization and resisted isometrics given significant improvement in reducing pain and improvement in range of motion of TMJ.

Key Words: ultrasound therapy, maitland mobilization.

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INTRODUCTION

Temporomandibular joint is a synovial, condylar, modified ovoid, and hinge type joint with fibrocartilagenous surfaces rather than hyaline cartilage and an articular disc; this disc completely divides each joint into two cavities. Gliding, translation or sliding movement occurs in the upper cavity of temporomandibular joint, whereas rotation or hinge movement occurs in the lower cavity of joint. Both rotation and gliding movement are essential for full opening and closing of the mouth. The capsule of the

TMJs is thin and loose.¹ Muscles surrounding the TMJ in the skull and face aid its function by contributing to the opening and closing. These muscles of TMJ are also known as muscles of mastication. The primary muscles involved are following: Temporalis, Masseter, Medial pterygoid, and Lateral pterygoid respectively.² There is difference between jaw movements and limb movements. Limb movements are resisted tone of the antagonistic muscle whereas in jaw opening there is little antagonistic muscle action for deceleration so when this imbalance takes place trismus is the resultant.⁴ Trismus is an inability to open the mouth. According to Dorland's Illustrated Medical Dictionary¹ trismus (Greek *Trimos*: 'grating', 'grinding') is a motor disturbance of the trigeminal nerve, especially spasm of the masticatory muscles, with difficulty in opening the mouth. The normal range of mouth opening varies from patient to patient, within a range of 40–60 mm, although some other authors place the lower limit at 35 mm. The width of the index finger at the nail bed is between 17 and 19 mm. Thus, two fingers' breadth (40 mm) up to three fingers' breadth (54–57 mm) is the usual width of opening.³ The lateral pterygoid muscle opens the mouth

(depresses the mandible), whereas medial ptergoid, temporalis and masseter help in closing the mouth. i.e. elevates the mandible.⁴ The aetiology of trismus may be due to infection, trauma, dental treatment, temporomandibular joint disorders, tumors and oral care, drugs, radiotherapy and chemotherapy, congenital problems, miscellaneous disorders.⁴ Taking into account the third cause of trismus either dental treatment is the cause of trismus in the present study. It usually happens due to inflammation of the muscles of mastication or direct trauma to the temporomandibular joint.

CASE REPORT

Case description

The subject was 28yrs old female. The area of the patient's symptoms was the right temporomandibular joint which got locked while undergoing may be due to root canal (dental treatment). The patient had immense pain which was 7 on numerical pain rating scale (NPRS) and swelling and tenderness were present on the same joint. The duration of the presence of pain was 7 days i.e. acute in onset and was continuous since then. It was throbbing in nature and aggravated while the patient was eating food and drinking water respectively. The muscles surrounding the temporomandibular went into spasm. The patient got some amount of relief while she took

medications or to be specific muscle relaxants and pain-killers which were prescribed by the orthodontic surgeon. The subject was provided informed consent prior to enrollment in the study. The range of motion of jaw opening on day one was found 2cms i.e. only one finger was getting inserted. The special test for temporomandibular mobility was positive with hypomobile temporomandibular joint and another test called as the three-knuckle test was performed in which the patient only able to insert one knuckle into her mouth. The interventions in this study given were ultrasound, mobilization and resisted isometrics for consecutive 8 days. Ultrasound was given on the right temporomandibular joint for 8 minutes on pulsed mode with the pulsed width 0.8 watt/cm². Four sessions of Maitland mobilization, were anterior, lateral and inferior glides grade I and II were performed for four sessions and four sessions of grade III and IV were performed in eight consecutive days for 10 minutes (figure number 1). Resisted isometric exercises were given for protrusion, extrusion and lateral deviation were given counter-force for a duration starting from 5 seconds to 30 seconds, 10 times in one session (figure number 2). After the session the patient was also told to perform these exercises several times a day to maintain the gained strength of muscles of mastication after the session.



Figure 1: Mobilization of temporomandibular joint



Figure 2: Resisted isometric exercises

Outcome measures

The pain was measured on Numerical pain rating scale (NPRS) and the Range of motion (ROM) of TMJ was measured by the finger method and scale-method. The pre and post treatment measurements were taken for understanding the effectiveness of the given treatment.

Table 1: Outcome parameters

OUTCOME	Day 1	Day 5	Day8
Pain on NPRS	7	5	1
ROM- Scale method	1.5cms	3cms	4.5cms
Finger method	1 finger	2 fingers	3 fingers



Figure 3: Day 5, Improvement seen in patient's mouth opening by finger method

RESULT

On day one the pain was 7 on numerical pain rating scale which got reduced to 3 on day fifth and which further got reduced to one on day eighth. (Table no 1).TMJ Range of Motion was taken on day one the range was 1.5cm on scale. On day fifth the range got increased to 3cms and which further got increased to 4.5cms on day eighth. (Table no 1).TMJ Range of Motion by the finger method was taken on day one with the finger method only one finger was getting inserted into the mouth of the patient. On day fifth with the finger method two fingers were getting inserted into the mouth. On day eighth 3 fingers were getting inserted into the mouth of the patient with the finger method respectively. (Table no 1) (Figure no 3)

DISCUSSION

Trismus is a rarely occurring condition usually seen in the patients undergoing dental treatments. The aim of the study was to see the effect of ultrasound therapy, Maitland mobilization and resisted isometric exercises on trismus with in the duration of eight days. The mechanism of ultrasound action is based on massage and thermal effect. The ultrasonic waves which are absorbed are converted into thermal energy to increase circulation, for acceleration of lymph drainage and for the removal of waste.⁵ Maitland mobilization decreased the symptoms of pain and swelling and increased the range of motion. The oscillations during mobilization have an inhibitory effect on perception of pain stimuli by repetitively stimulating the mechanoreceptors that block nociceptive pathway at the spinal cord level.⁶ Resisted isometric exercises maintained the increased the strength of muscles of mastication and promoted muscular contraction without

the occurrence of adjacent joint movement.⁷ The effectiveness of treatment depends upon frequency, number of repetitions, intensity of performance and manner of conducting the exercises. This study gives an advantage of just a short treatment period of 8 days with maximal effect.

CONCLUSION

We conclude that ultrasound therapy, Maitland mobilization technique and resisted isometric exercises are effective in trismus. The pain reduced from 7 to 1 on NPRS and the restricted range increased effectively in trismus after 8 days.

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