

# Comparison of two physiotherapy programmes for rehabilitation after temporomandibular joint arthroscopy

**W. A. Abboud<sup>1,2</sup>, N. Yarom<sup>3</sup>,  
 R. Yahalom<sup>1</sup>, M. Joachim<sup>1</sup>,  
 S. Reiter<sup>3</sup>, O. Koren<sup>3</sup>, H. Elishoov<sup>3</sup>**

<sup>1</sup>Department of Oral and Maxillofacial Surgery, Sheba Medical Center, Affiliated to Tel-Aviv University, Tel-Hashomer, Israel; <sup>2</sup>Institute of Movement Disorders, Department of Neurology, Sheba Medical Center, Affiliated to Sackler School of Medicine, Tel-Aviv University, Tel-Hashomer, Israel; <sup>3</sup>Department of Oral Pathology and Oral Medicine, School of Dentistry, Tel-Aviv University, Tel-Aviv, Israel

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**Abstract.** The purpose of this study was to compare two physiotherapy programmes for rehabilitation after temporomandibular joint (TMJ) arthroscopy. The medical files of 137 consecutive patients diagnosed with closed lock and treated by arthroscopic lysis and lavage were analyzed retrospectively. Sixty-eight patients were rehabilitated with gradually increasing range of motion self-exercises (gradual programme) and 69 patients were rehabilitated with immediate full range of motion self-exercises (immediate programme). The outcome variables were maximum mouth opening (MMO) and pain (on a visual analogue scale). The postoperative measurements taken at 1 month, 6 months, and last follow-up examination available (mean of 10 months postoperative) were analyzed and compared between the two groups. The results showed significantly better MMO and pain outcomes for the immediate group than for the gradual group at the 1-month and 6-month postoperative evaluations. The results of the two groups were comparable at the last follow-up examination available. It is concluded that after arthroscopic treatment of closed lock of the TMJ, a physiotherapy programme consisting of immediate postoperative full range of motion mobilizations achieves better results (in terms of pain and mouth opening) than a physiotherapy programme consisting of gradual and controlled increases in range of motion.

**Key words:** temporomandibular disorder; closed lock; physiotherapy; physical therapy; arthroscopy.

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Physiotherapy (PT) is an integral part of rehabilitation after temporomandibular joint (TMJ) surgery and is intended to help patients achieve their full

potential<sup>1–3</sup>. Arthroscopic lysis and lavage is a widely accepted treatment for closed lock of the TMJ and is aimed at eliminating the mechanical interferences

that restrict joint mobility<sup>4–13</sup>. While there are numerous clinical trials reported in the literature on the topic of TMJ arthroscopy, there are very few

publications reporting postoperative PT rehabilitation.

The aim of post-arthroscopic PT is to prevent secondary immobilization of the patient, which carries the risk of cicatricial tissue formation, adhesions, and contracture of the healing tissues, with further limitation of range of motion. In addition, PT aids the adaptation of the joint structures and masticatory muscles to the newly formed range of motion, promotes healing of tissues, strengthens and re-trains the muscles of mastication, and improves function<sup>14–18</sup>.

Remarkable agreement appears to exist between proposed post-surgical PT protocols with respect to aims and procedures<sup>1,19,20</sup>. The majority agree that mobilization techniques, both exercises performed by the patient themselves (self-exercise) and hands-on exercises guided by a physiotherapist, constitute the primary treatment modality during rehabilitation<sup>21–27</sup>. Furthermore, the majority of PT protocols comprise a three-stage programme in which the first stage involves pain-free hinge-only movements (for 1–2 weeks postoperative), the second involves active and assistive exercises aimed at gradually increasing range of motion (usually performed for 1–2 months postoperative), and the third is aimed at strengthening and re-educating the muscles of mastication to further improve function<sup>1–3,14,28,29</sup>.

The intention of these protocols is to achieve full range of motion gradually, in a controlled fashion, in a matter of weeks after surgery. The rationale behind the gradual and controlled increases in range of motion is to prevent early over-stretching of the healing tissues, which could increase the inflammatory process during the early postoperative recovery phase and compromise joint tissues<sup>2</sup>. In addition, it is argued that early full range of motion mobilization necessitates the unnecessary consumption of analgesics and could affect patient cooperation with the exercises and motivation to participate actively in the rehabilitation programme. Although a broad scientific basis for these post-surgical TMJ PT protocols is lacking, empirical and some scientific evidence has been gathered regarding their beneficial effects<sup>1</sup>.

The classic three-stage gradually increasing range of motion PT protocol was implemented in the Department of Oral and Maxillofacial Surgery of Sheba Medical Center for years. This protocol has recently been changed to a rehabilitative programme that starts with full range of motion mobilizations immediately after

surgery, starting in the recovery room. Instead of starting the PT exercises with rotational movements and increasing the excursions in a gradual manner until reaching full range of motion within 2–3 weeks after surgery, patients initiate full range of motion mobilizations immediately after arthroscopy. The rationale behind this shift was the finding that the joint was freely and easily movable in full range of motion at the end of the operation, and when not adequately mobilized, some rapid loss of the newly achieved range of motion occurred, probably due to the scarring inherent in the healing process<sup>30–32</sup>.

The purpose of this study was to compare the efficacy of the two PT programmes in terms of regaining full mouth opening, decreasing pain, and returning to good function.

### Materials and methods

The series consisted of 137 consecutive patients with closed lock of the TMJ treated by arthroscopic lysis and lavage in the study department over a 4-year period. The cohort was divided into two groups depending on the postoperative PT programme implemented. The first group consisted of 68 patients treated between September 2012 and November 2014, who were rehabilitated with a PT programme aimed at achieving full range of motion gradually in a matter of 2–3 weeks after surgery (gradual programme). The second group consisted of 69 patients treated between November 2014 and July 2016, who were rehabilitated with a PT programme consisting of full range of motion exercises immediately after surgery (immediate programme).

The diagnosis of closed lock, corresponding to both Wilkes stage III internal derangement<sup>33</sup> and the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) category ‘disc displacement without reduction with limited opening’<sup>34</sup>, was based on preoperative anamnestic, clinical, and imaging evaluation, and intraoperatively on arthroscopy findings<sup>35</sup>. Clinically, mouth opening was less than 35 mm and the patients complained of a somewhat abrupt development of limitation in mouth opening. Prior to the limitation patients could have been asymptomatic, have suffered from clicking, or have suffered from intermittent locking and transient pain episodes. The involved joint was symptomatic in at least three of the five following clinical examinations: assisted opening (opening stretch), palpation, contralateral loading, contralateral excursion, and protrusion.

Magnetic resonance imaging (MRI) demonstrated an anteriorly displaced articular disc without reduction on opening. The disc morphology varied from near-normal to various degrees of folding and thinning; however, there were no signs of degeneration of the joint structures. MRI scans were performed with various machines, but all included at least closed- and open-mouth proton density-weighted images in the sagittal oblique plane, closed-mouth T1-weighted images in the true coronal plane, and closed mouth T2-weighted images in the axial plane. All scans were performed within less than 8 months from the arthroscopic intervention and were interpreted by a radiologist specialized in head and neck radiology.

At Sheba Medical Center, the minimum waiting time for a non-oncological elective surgical procedure under general anaesthesia is in the range of 5 months. Patients diagnosed with closed lock of the TMJ are referred for conservative treatment consisting of splint therapy, non-steroidal anti-inflammatory drugs (NSAIDs), and guided PT, and are simultaneously scheduled for an arthroscopic intervention. The patients are re-evaluated a couple of days before the scheduled date of arthroscopy to determine whether they are still candidates for a surgical intervention or whether the conservative treatment has been sufficient to alleviate the problem. Only patients failing to demonstrate a tendency towards improvement are advanced to arthroscopy.

Arthroscopic lysis and lavage was performed under general anaesthesia with nasoendotracheal intubation. A 2.4-mm 30° arthroscope (Karl Storz GmbH, Tuttlingen, Germany) was inserted into the posterior recess of the superior joint compartment and a 1.9-mm blunt obturator was inserted into the anterior recess of the superior joint compartment. Under direct visualization, the obturator was used to mobilize the articular disc in all directions and stretch the synovial membrane attaching the disc at its junction with the anterior synovium, the retrodiscl lamina, and the medial synovial drape, increasing the disc mobility. The junction of the anterior synovium and disc was fully stretched with the blunt obturator up to the point where minimal tears in the synovium were evident. All surgeries were performed by the same surgeon (WA), and the procedure took approximately 30 minutes. Roughly 150 ml of isotonic saline solution was used during the procedure.

Arthroscopically, the joint cavity demonstrated various degrees of hyperaemia

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