

Arthroscopy & Arthrocentesis of the Tm Joint: in Relation of Pain & Functional Management: A Comparative Study

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Abstract

In 2021 and 2022 720 patients with pain in the temporo-mandibular joint area were examined and treated. The authors describe their therapeutic protocol. Sixty-two patients were not relieved by conservative nonsurgical therapy and were treated by arthroscopy or arthrocentesis. In both groups the differences in functional result and in pain control were analysed. Results show that both arthroscopy and lavage are useful in improving function and diminishing pain. Arthroscopy shows better results for functional treatment whereas arthrocentesis and arthroscopy show similar results in pain control.

Keywords: TMJ, VAS.

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Introduction

During many decades, meniscectomy was the main surgical treatment of internal derangement of the temporomandibular joint. The advent of arthroscopy (Onishi, 1975) allowed better understanding of the intra-articular lesions and less destructive treatment. The evolution of arthroscopic techniques led to two different attitudes. Some authors describe a real surgical arthroscopic technique (Conway, 1992; McCain, 1992a; Tarro, 1994; Bellot et al., 1996) with anterior release and posterior cauterization, with or without sutures, while others perform only intraarticular lavage and lysis (Nitzan and Dolwick, 1990). [1] The results obtained by these two different methods seem to be similar. McCain et al. (1992b) report on a multicentre study of 4831 joints. In this study, six centres performed lysis and lavage to treat internal joint derangement while six other centres performed anterior release and posterior cauterization in 83% of cases, or lysis and

lavage (17%). [2] In the first six centres 90.9% of patients had good or excellent motion, 87.8% good or excellent pain reduction and 94.3% good or excellent reduction in disability. In the six other centres the results were 91.8%, 95% and 92.7%, respectively. [3]

Nitzan et al. (1991) described a technique of irrigation of the upper compartment of the temporomandibular joint (TMJ) with Ringer's lactate solution to treat limited mouth opening due to internal derangement. [4] The authors called this technique 'arthrocentesis'. They reported an increase in mouth opening from a range of 12±30 mm prior to the procedure, to 35±50 mm following it. On a visual analogue scale of 0±15, the pain decreased from a mean rating of 8.75 to 2.3. This technique marked an evolution towards less surgical treatment. [5]

In this paper we will compare our results using these two techniques: lavage and lysis with arthroscopy versus arthrocentesis plus irrigation. [6]

Material and Methods

From 1993 to 1994, 720 new patients suffering from facial pain were examined and treated by our team. Based on simple clinical evaluation, patients were grouped under a global diagnosis of 'TMJ pain and dysfunction syndrome' (Richter and Chausse, 1989 and 1990). We identified three different problems, according to the classification of temporomandibular disorders by Kaplan (1991):

1. Internal derangement: discoligamentous dysfunction;
2. Muscular dysfunction (myofascial dysfunction); and
3. Psycho-active disorders to which we paid special attention. This last point being obvious for most practitioners who treat this kind of patients.

Whilst it is clear that these three are closely interconnected, the most important complaint was pinpointed at the first appointment.

This model enabled us to offer systematic, nonsurgical treatment for over a 6-month period, whatever the diagnosis was.

After this period of 6 months the patients still suffering from pain and/or dysfunction were assigned to either the arthroscopic or the arthrocentesis group. Seventy per cent of the patients were female. The average age of patients in this series was 38 years (range 16±72 years), and was consistent with previous studies (McCain et al., 1992b).

At the first consultation, a precise functional assessment, measurement of mandibular mobility and evaluation of the pain using a visual analogue pain scale (VAS) ranging from 0±10 were made. This was in addition to the case history which included personal data, history of present

illness, past medical history and past dental history. Finally, a brief

psychosocial assessment was made. Clinical examination noted mandibular movements in all directions (opening, protrusion, lateral excursions); definition of sounds according to timing during mandibular movement; pattern of opening sketched on paper; and muscle tenderness. A dental panoramic radiogram was routinely taken. Of the original 720 patients, 10 were treated for symptoms due to wisdom teeth, caries or periodontal disease and in two cases coronoid hypertrophy was treated by coronoid ectomy, leaving 708 patients to be treated for TMJ pain dysfunction syndrome.

Based on the history and clinical examination, we distinguished three different phases of treatment based on the presence of disc displacement with or without reduction (internal derangement), or muscular dysfunction or psychosomatic disorders.

First treatment phase: explanation and auto-physiotherapy

To help the patients towards a better understanding of their condition and to help them to express, auto physiotherapeutic exercises were prescribed at the first consultation. For internal dysfunction, exercises in protrusion and a combination of protrusion with opening were proposed. The patient was advised to concentrate on symmetry whilst doing these exercises. In cases where muscular pain was the predominant symptom, manual/finger massage of the masticatory muscles and their insertion points was demonstrated and the patient taught to do this. A review appointment was given 3 weeks later.

Eight point eight percent (62) of all patients said they were satisfied with the results thus obtained and needed no further treatment other than advice and explanations.

Second treatment phase: occlusal release, physiotherapy and psychological support

For the 646 remaining patients (91.2%) a simple occlusal splint was inserted in order to open the articular space, to relax the muscles and diminish the intra-articular pressure. No dental treatment was initiated for altering the occlusion.

At the same time, physical therapy was prescribed. In case of internal dysfunction, with clicking and pain in the joint, physiotherapy was focused on active and passive jaw protrusion and opening movements.

With pain of muscular origin, the physiotherapy consisted of 'stretching' exercises and massage with gymnastics, ultrasound and ionophoresis (electrogalvanic stimulation with transdermal transport of medical agents). This was undertaken by a physiotherapist in our team, especially TMJ trained.

When psycho-active problems were evident, either the clinician gave 'support' sessions, or collaboration with a psychiatrist was overed if the case appeared to be complex. The psychiatrist then supervised the sessions or participated actively in the consultation. He was then able to decide whether to carry out additional analyses or parallel medical treatment.

Following these treatments either in combination or in sequence, 584 patients (82.5%) felt improvement. Muscular pain generally improved dramatically with physiotherapy. In several cases with disc displacement, symptoms were ameliorated, and many 'clicks' disappeared. Sixty two patients from the 708 required further care and were referred to the third treatment phase (Table 1).

Third phase: arthroscopy or arthrocentesis

After the first 6 months of treatment, 62 patients (9%) still had dysfunction and/or pain. In these patients 33 arthroscopies and 29 arthrocenteses were performed. The choice of technique was randomized, regardless of clinical features and each

technique was performed by one and the same surgeon.

Routine preoperative magnetic resonance images (MRI) were requested to exclude pathology which might preclude arthroscopy (Buthiau et al., 1994). MRI revealed 54 (87%) anterior disc displacements without reduction and 8 (13%) anterior disc displacements with reduction. Displacements with reduction were not counted here when there was a displacement without reduction on the contralateral side of the same patient.

Arthroscopy

Arthroscopy was carried out under general anaesthesia with naso-tracheal intubation, using a lateral approach. Only one cannula was introduced 1 cm anterior to the tragus and 2 mm below a line from tragus to external canthus. Through this cannula, an arthroscope of 1.8 mm diameter and a 08 onset was introduced. The cannula was equipped with a double connection to allow saline in- and out how (Fig. 1). This modification avoided a second intra-articular puncture. The upper compartment of the TMJ was distended by injecting Ringer's lactate solution.

During arthroscopy the synovial membrane and the fossa were inspected first checking for adhesions and disc perforations. The upper compartment was washed out and any brows adhesion was detached which could restrict the disc. No other intervention was performed. By manipulating the mandible it was possible to visually check the disc function. Neither corticosteroids nor anti-inflammatory drugs were injected intra-articularly.

Table 1 ± Distribution of the different phases of treatment (708 patients)

Self-physiotherapy	62 patients (8.8%)
Occlusal treatment and physiotherapy	584 patients (82.4%)
Surgical treatment	62 patients (8.8%)



Figure 1: ± Cannula with double connection for arthroscopy.

Arthrocentesis

Arthrocentesis was carried out according to Nitzan's technique (Nitzan et al., 1991), under local anaesthesia, using two needles inserted into the upper compartment (Fig. 2).

After hydraulic distension, the lavage itself consisted of irrigating the joint with 100 ± 150 ml of saline solution. After this, a soft diet was recommended for 2 weeks. Mandibular exercises were started on the first postoperative day, training of jaw movements by a physiotherapist was started 2 weeks later.

Follow-up

The results of treatment were evaluated after one year. Improvement of mouth opening was measured interincisal in mm. Pain scores were remeasured with the same VAS form (from 0 ± 10). Three postoperative pain groups were defined:

1. No change (0 ± 2 points of difference between pre and postoperative evaluations),
2. Improved (by more than 2 points),
3. Healed (pain score 0 or 1).

Statistical analysis

A paired t-test was used to compare differences of preoperative and

postoperative maximal mouth opening and level of pain. A Wilcoxon rank-sum (Mann-Whitney) test was used to compare the results between the two techniques.

Results

Arthroscopy

Function

The patients had a significant increase ($P<0.0001$) in mouth opening from a preoperative range of 19 ± 35 mm (mean 29.0 ± 4.8 mm) to 27 ± 44 mm postoperatively (mean 38.6 ± 4.2 mm). The mean gain was 9.6 ± 5.8 mm. Five patients (15%) experienced no improvement in function and in one patient (3%) mouth opening was reduced by 3 mm (Table 2).

Pain

The patients experienced a significant improvement ($P<0.0001$) with a range of 4 ± 8 points preoperatively (mean 5.7 ± 0.9) to 0 ± 6.5 points (mean 1.9 ± 2.4) postoperatively (scale 0 ± 10). The mean pain score improvement was 3.8 ± 2.4 . Pain was absent in 17 patients (52%), while nine (27%) reported an improvement and 7 (21%) showed no change. No patient's pain was worsened by arthroscopy (Table 3). Also, arthroscopy detected three discal perforations and one brous ankylosis.



Figure 2 ± Two needles for arthrocentesis

Function

The patients had a significant increase (P50.0001) in mouth opening from a preoperative range of 19±35mm (mean 29.0+4.8 mm) to 27±44 mm postoperatively (mean 38.6+4.2 mm). The mean gain was 9.6+5.8 mm. Five patients (15%) experienced no improvement in function and in one patient (3%) mouth opening was reduced by 3 mm (Table 2).

Pain

The patients experienced a significant improvement (P50.0001) with a range of 4±8 points preoperatively (mean 5.7+0.9) to 0±6.5 points (mean 1.9+2.4) postoperatively (scale 0±10). The mean pain score improvement was 3.8+2.4. Pain was absent in 17 patients (52%), while nine (27%) reported an improvement and 7 (21%) showed no change. No patient's pain was worsened by arthroscopy (Table 3). Also, arthroscopy detected three discal perforations and one brous ankylosis.

Table 2: ± Effects on mouth opening

	Average increase	Patients with no improvement	
33 arthroscopies	9.6+5.8mm	15% (5)	
Pain	No effect	Improvement	Complete resolution
Arthroscopy (33)	7 (21%)	9 (27%)	17 (52%)
Arthrocentesis (29)	4 (14%)	2 (7%)	23 (79%)
Patients (62)	11 (18%)	11 (18%)	40 (64%) 51 (82 %)

Arthrocentesis

Twenty-nine patients had joint lavage.

Function

The patients had a significant increase (P50.0001) in mouth opening from a preoperative range of 24±34 mm (mean 29.4+3.1 mm) to 25±42 mm postoperatively (mean 33.8+4.4 mm.). The mean gain was 4.3+4.4 mm. Nine patients (31%) had no improvement in mouth opening. No case of deterioration was seen (Table 2).

Pain

The patients experienced a significant improvement (P50.0001) with a range of 4.5±7.5 points (mean 5.6+0.8) preoperatively, and 0±7 points (mean 0.9+2.1) postoperatively (scale 0±10). The mean gain was 4.7+2.1. Twenty-three patients (79%) were completely free of pain, two (7%) improved partially and 4 (14%) noticed no difference (Table 3).

Comparison between both techniques

The improvement in mouth opening after arthroscopy (9.6+5.8 mm) was significantly

better (P50.0005) than the improvement obtained after arthrocentesis (4.3+4.4 mm). On the other hand, improvement of pain level after arthroscopy (3.8+2.4) was statistically not different (P50.13) than after arthrocentesis (4.7+2.1).

Complications

Complications were seen in four cases (6%) taken both techniques together.

In the arthroscopy group, one patient presented a transient frontal palsy (duration 3 months). One patient developed cervicofacial oedema requiring prolonged intubation of 12 h. This incident was caused by leakage of the rinsing fluid from the joint capsule into the deep cervicofascial space.

In the arthrocentesis group, two severe bradycardias (one asystole) were observed. The asystole outcome was favourable after injection of Isoprenalin. The other patient recovered spontaneously when lavage was stopped.

Discussion

Seven hundred and eight patients consulted our team with clinical features of TMS pain dysfunction. Only 62 (9%) underwent a surgical procedure. This is slightly more than the 5±7% other authors had reported (Dolwick and Dimitroulis, 1994; Fridrich et al., 1996). Comparing results published in the literature following arthroscopy and arthrocentesis is difficult. There is a bias in case selection (Nitzan et al., 1991), the studies often are not randomized, and are dedicated to only one technique (McCain et al., 1992b; Dimitroulis et al., 1995). [7]

In our series, arthroscopy was more effective than arthrocentesis with regard to increasing mouth opening. The explanation may be that during general anaesthesia and muscular relaxation, an active 'stretching' of the muscles is obtained by intubation and intra-operative manipulation. However, the improvement in mouth opening after arthrocentesis was smaller when compared with recently published results (Dimitroulis et al. 1995). [8] They showed that the difference between preoperative (24.6 mm) and postoperative (42.3 mm) opening was

17.7 mm. These results may be explained as in all our cases previous functional treatment and physiotherapy had failed and that there was no patient with acute closed lock in our series. [9]

Clinically it seemed to us that arthrocentesis was more effective than arthroscopy in relieving pain but statistical evaluation did not confirm this impression. [10] In the presence of controversial pathophysiological explanation, our experience demonstrates that both procedures are effective. Either procedure may help a patient suffering from TMJ pain dysfunction syndrome, even after unsuccessful conservative treatment. In fact, 51 (82%) of our 62 patients obtained significant pain reduction. This result is comparable to that of Fridrich et al. (1996), but less effective than other author's findings (Nitzan et al., 1991; Conway, 1992; McCain et al., 1992b; Mosby, 1993; Murakami et al., 1996). [11]

The remaining 11 patients (18%) were referred to a specialized 'pain consultation' team composed of a pharmacologist, neurosurgeon, psychiatrist and a neurologist, with variable success. [12]

No treatment other than physiotherapy was prescribed for residual limited function.

Although the technique of arthrocentesis is simple and does not require general anaesthesia, it is not without risk. The vagal reactions seen are complications potentially more serious than those encountered during arthroscopy under general anaesthesia. [13]

When compared with arthrocentesis, arthroscopy enables additional diagnoses to be made including perforation or synovitis. We now therefore prefer arthroscopy to arthrocentesis. Moreover, the experience gained by the team of physiotherapists has enhanced further the outcome of the second treatment phase. Thus the percentage of our patients undergoing a surgical procedure approaches the results of other authors. [14-17]

Conclusion

Arthroscopy and arthrocentesis are both effective in treating pain and TMJ dysfunction after the failure of conservative treatment. Arthroscopy is more efficient at improving mouth opening function and both techniques are efficient in relieving pain. However, pain and mouth opening may vary independently, and increase of function is not synonymous with pain control.

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