

Two-needle vs. single-needle technique for TMJ arthrocentesis plus hyaluronic acid injections: a comparative trial over a six-month follow up

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Arthrocentesis of the temporomandibular joint (TMJ) has emerged over the years as a useful technique to manage restricted mouth opening.

The discovery of the importance of hyaluronic acid (HA) in joint lubrication and the addition of HA injections immediately following joint lavage has allowed extending the indications to inflammatory-degenerative disorders, such as osteoarthritis. The literature findings are inconclusive regarding the best treatment protocol for each specific clinical condition and further investigations are needed.

Protocols for symptom management in larger joints provided the adoption of a cycle of five weekly HA injections immediately following arthrocentesis, and encouraging findings also emerged from long-term case series on patients with TMJ disorders.

The classical technique to perform TMJ arthrocentesis before injecting HA uses two needles, one for saline inflow and one for outflow. Several papers refer to the most suitable technique for needle placement within the joint cavity. Recently, other approaches to arthrocentesis have been proposed and reviewed.

A technique using a single needle for both fluid injection and ejection has been described and gave interesting results over a short period. The single needle approach for washing the TMJ was based on the rationale that pumping saline injection into the superior joint compartment with the patient in an open mouth position provides enough pressure to release joint adhesions and to allow fluid outflow when the patient closes their mouth. The two-needle and the single-needle techniques were compared as part of a short-term investigation comparing six protocols for performing TMJ arthrocentesis with or without additional drug injections, but there was no evidence of the superiority of one technique over the other.

In general, there is little information on the relative efficacy of the different techniques.

The aim of the study was to compare the effectiveness of five weekly two-needle arthrocentesis plus hyaluronic injections vs. the same protocol performed with a single-needle technique in patients with inflammatory-degenerative disorders of the temporomandibular joint (TMJ).

80 patients with TMJ osteoarthritis were randomly assigned to the two-needle or single-needle protocol and followed up for 6 months after treatment. Several outcome parameters, such as maximum pain at rest and maximum pain on chewing, subjective chewing efficiency, limitation in jaw function, jaw range of motion in mm, were recorded at baseline and multiple follow up assessments.

Both treatment groups recorded significant improvement with respect to baseline levels in almost all outcome variables. The rate of improvement was not significantly different between the treatment protocols in any of the outcome variables (p-values between 0.143 and 0.970).

No between-group differences emerged for the perceived subjective efficacy (p = 0.321) and the treatment tolerability (p = 0.783).

The present investigation did not support the existence of significant differences in the treatment effectiveness for inflammatory-degenerative TMJ disorders of a cycle of five weekly injections of arthrocentesis plus hyaluronic acid injections performed according to the classical two-needle or the single-needle technique



Fig. 1. Two-needle arthrocentesis.



Fig. 2. Single-needle arthrocentesis



Fig. 3 Under pressure physiological saline injection.



Fig. 4. The fluids get off the same injection needle.

Table 1. Baseline values for the outcome variables. Comparison between patients undergoing the two-needle (TN) and single-needle (SN) protocols.

Outcome parameters	TN protocol (N= 40)	SN protocol (N= 38)	Significance
Chewing efficiency (0–10)	6.1 ± 1.7	6.4 ± 1.6	0.406
Maximum pain at chewing (0–10)	6.4 ± 2.5	5.9 ± 2.2	0.326
Maximum pain at rest (0–10)	3.8 ± 3.3	2.9 ± 2.6	0.681
Functional limitation (0–4)	2.2 ± 0.7	1.9 ± 0.6	0.093
Mouth opening (mm)	37.0 ± 8.4	40.2 ± 7.8	0.086
Right laterotrusion (mm)	6.8 ± 2.4	7.8 ± 2.2	0.070
Left laterotrusion (mm)	7.4 ± 2.8	7.8 ± 3.1	0.526
Protrusion (mm)	6.4 ± 2.3	7.4 ± 2.4	0.094

Table 2. Percentage changes at the end of the follow up period with respect to baseline values for the subjective variables (chewing efficiency, pain levels, functional limitation). Comparison between patients undergoing the two-needle (TN) and single-needle (SN) protocols. The expected sign for improvement is given in parentheses.

Outcome parameters	TN protocol (N= 40)	SN protocol (N= 38)	Significance
Chewing efficiency (+)	41.6 ± 72.1	33.5 ± 37.0	0.539
Maximum pain at chewing (-)	-63.6 ± 43.9	-56.2 ± 46.8	0.471
Maximum pain at rest (-)	-39.1 ± 62.4	-40.7 ± 59.8	0.909
Functional limitation (-)	-51.6 ± 43.3	-43.4 ± 46.7	0.423

Table 3. Changes at the end of the follow up period with respect to baseline values for the jaw range of motion (values in mm). Comparison between patients undergoing the two-needle (TN) and single-needle (SN) protocols. The expected sign for improvement is given in parentheses.

Outcome parameters	TN protocol (N= 40)	SN protocol (N= 38)	Significance
Mouth opening (+)	4.0 ± 5.6	4.0 ± 6.7	0.970
Right laterotrusion (+)	1.6 ± 2.6	1.3 ± 2.2	0.553
Left laterotrusion (+)	1.5 ± 3.2	1.7 ± 2.9	0.847
Protrusion (+)	1.3 ± 2.5	0.4 ± 2.4	0.142

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