



EFFECT OF ARTHROSCOPIC ETHANOLAMINE OLEATE INJECTION IN RETRODISCAL FIBERS ON INTERNAL DERANGEMENT WITH REDUCTION OF TEMPROMANDIBULAR JOINT

Yousef Mohamed El-Maghraby ^{*1}, Bahaa Eldin AbdRabbo Tawfik ², Ahmed Mohamed Mostafa El-far ³

ABSTRACT

Objectives: The purpose of the present study was to evaluate arthroscopic injection of ethanolamine oleate as sclerosing solution in treatment of temporomandibular joint disorder disc displacement with reduction. **Subjects and methods:** Eight patients were involved in the study, with a mean age of 25.7 years. Under general anesthesia, using a scalpel to make an opening in the skin. Sharp trocar then blunt trocar 3- washing the joint with a salt solution to clear the vision, locating the retrodisical fibers and sclerosing agent be injected, by using one c.c. tuberculin plastic syringe with 26 gauge and 1.5 inch bevel steel needle was used, the needle filled with 0.2 ml of ethanolamine oleate 5% and 0.1 ml of local anesthetic without vasoconstrictor, mepivacaine hydrochloride 2%. Postoperative medication, Patient were instructed to take a postoperative medical regimen. Patients were evaluated after 6 months for radiographic evaluation in pain score, inter incisal distance, muscles tenderness, lateral movement, clicking, maximum protrusion, and bite registration anterior and posterior. **Results:** There was statistically significant change in pain score, inter incisal distance, muscles tenderness, lateral movement, clicking, maximum protrusion, and bite registration anterior and posterior, but There was not statistically significant change in radiographic evaluation. **Conclusion:** The concept of injection retrodisical fibers with sclerosing agent for treat the disc displacement with reduction of TMJ has been developed to optimize treatment strategies.

KEYWORDS: TMJ, internal derangement, arthroscopic, ethanolamine oleate.

INTRODUCTION

Anatomical, epidemiological and clinical studies have shed light on the ultimate fate of the dislocated disc ⁽¹⁾. Traditionally, an internal TMJ disorder has been described as a progressive disorder with a natural history that can be divided into four consecutive clinical stages ⁽¹⁻³⁾: Stage 1 was described as

disc displacement with reduction, stage two as disc displacement with reduction and intermittent locking, level three as intervertebral disc displacement without reduction (closed locking) and level four as intervertebral disc displacement without reduction and with perforation of the intervertebral disc or the posterior attachment tissue (degenerative joint disease).

1. Masters Candidate, Oral and Maxillofacial Surgery Department , Faculty of Dental Medicine, Al-Azhar University, Egypt
2. Assistant Professor of Oral and Maxillofacial Surgery, Faculty of Dental Medicine, Al-Azhar University, Egypt
3. Lecturer of Oral and Maxillofacial Surgery, Faculty of Dental Medicine Al-Azhar University, Egypt

• **Corresponding author:** elmaghrabyousef@gmail.com

An internal derangement of the temporomandibular joint (TMJ) can be defined as a disorder within the internal aspects of the temporomandibular joint in which the intervertebral disc has shifted from its normal state ⁽⁴⁾.

Functional relationship to the mandibular condyle and the joint area of the temporal bone. Farrar has estimated that up to 25% of the general population have an internal derangement that is usually treated initially with non-surgical methods⁽⁵⁾. If these methods proved unsuccessful, surgical methods such as meniscectomy, disc repositioning procedures, and condylotomy are often followed⁽⁶⁾. More recently, studies using magnetic resonance imaging suggest that the articular disc is displaced in 35% of asymptomatic subjects ⁽⁷⁾.

The recent development of TMJ arthroscopy - a minimally invasive procedure - appears to have closed the clinical gap between failed non-surgical treatment and open arthrotomy. In the past decade, arthroscopic surgery, and more recently arthrocentesis have been used with increasing frequency to treat internal temporomandibular joint disorders that do not improve after an appropriate course of nonsurgical therapy ⁽⁸⁾.

In a position paper on TMJ arthroscopic surgery, the American Association of Oral and Maxillofacial Surgeons outlined the indications for surgical (operative) arthroscopy⁽⁹⁾. Surgical arthroscopy is indicated for selected joint diseases that presented a disability to the patient and to which he was refractory to medical treatment and that required internal structural changes. Israel has established further indications: The patient has significant pain or dysfunction, resulting in disability and poor quality of life. Appropriate nonsurgical treatment for a reasonable period of time has failed. TMJ is the source of pain or dysfunction. In arthroscopic surgery, as a diagnostic modality prior to open joint surgery, there may be therapeutic benefits. Any additional myofascial pain symptoms should be treated successfully ⁽¹⁰⁾.

There are four sub-classifications of TMJ arthropathy that can be treated with arthroscopic surgery: hypomobility due to anteriorly displaced intervertebral discs with or without reduction (adhesions), hypermobility, degenerative joint disease (osteoarthritis) and Synovitis ⁽¹⁰⁾. The purpose of the present study is to evaluate arthroscopic injection of ethanalamine oleate as sclerosing solution in treatment of temporomandibular joint disorder disc displacement with reduction.

SUBJECTS AND METHODS

Eight patients 4 males and 4 females were involved in the study, the age of which ranged from 18 to 38 years with a mean of 25.7. They were selected from the Out-Patient Clinic of the Oral Surgery Department at Faculty of Dental Medicine, Cairo-boys, Al-Azhar University, Egypt.

Inclusion criteria:

Male and female patients, patient aged 18 to 40 years old, a willingness to cooperate with the study protocol and follow program and patients indicated for TMJ disorder treatment.

Exclusion criteria:

No medical contraindication to dental treatment, pregnant women, patients with parotid gland tumors.

Pre-operative evaluations were made according to a stand form of examination. The evaluations were uniform for all patients. The examination program included the following

Intervention:

Under general anesthesia, a straight line is drawn from the medial portion of ear tragus to the lateral corner of the eye. In this line one needle insertion point is marked .it will be at a distance of 10mm from the tragus and 2mm below the canto-tragal line. This is the approximate area of the maximum concavity of the glenoid fossa. The distance is about

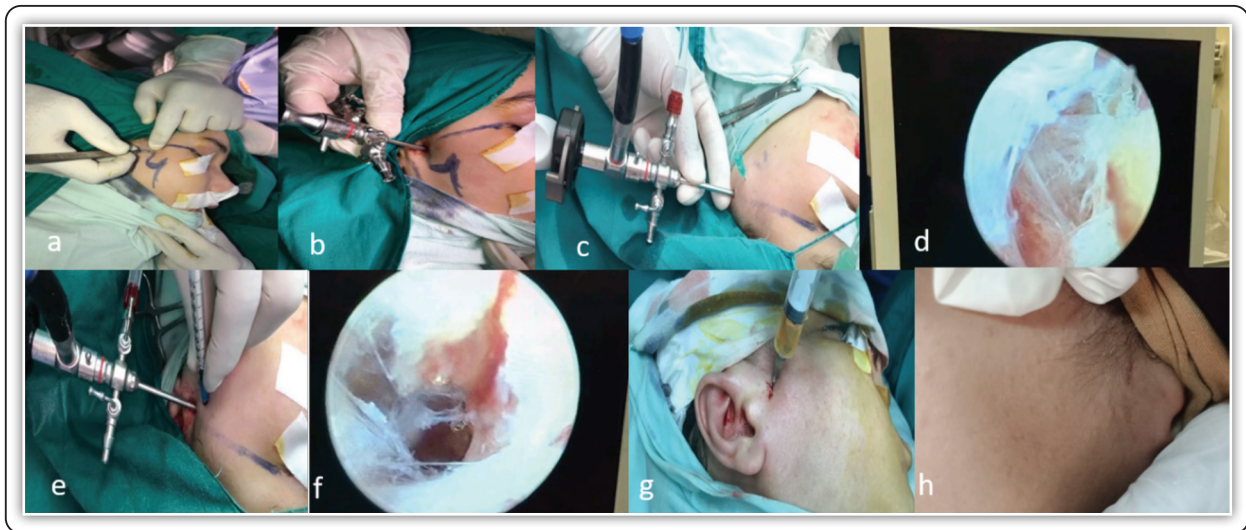


FIG (1) a), showing small incision for sharp trocar insertion, b), blunt trocar with lens, c), washing the joint with a salt solution to clear the vision, d), TMJ adhesion, e), sclerosing agent syringe, f), needle inserted in retrodiscal fibers, g), PRP injection, and h), healing after 6 months.

25mm from skin to the center of the joint space. Using a scalpel to make an opening in the skin. Sharp trocar then blunt trocar 3- washing the joint with a salt salutation to clear the vision, locating the retrodiscal fibers and sclorsing agent be injected, by using one c.c. tuberculin plastic syringe with 26 gauge and 1.5 inch bevel steel needle was used, the needle filled with 0.2 ml of ethanolamine oleate 5% (Egyptian International Pharmaceutical Industries Co.,10th of Ramadan City, Egypt) and 0.1 ml of local anesthetic without vasoconstrictor, mepivacaine hydro-chloride 2% (Mepivacaine L of Alexandria Co. for Pharmaceutical Alexandria, Egypt), Figure (1).

Postoperative medication, Patient were instructed to take a postoperative medical regimen. Patients were evaluated after 6 months postoperative for radiographic evaluation in pain score, inter incisal distance, muscles tenderness, lateral movement, clicking, maximum protrusion, and bite value of anterior and posterior teeth.

Statistical analysis of the data:

Data were fed to the computer and analyzed using IBM SPSS Corp. Released 2013. IBM PSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. Qualitative data were described using number and percent. Quantitative data were described using mean, standard deviation for parametric data after testing normality using Shapiro–Wilk test. Significance of the obtained results was judged at the (0.05) level. MC Nemar test was used to compare before and after changes in binominal variables. Stewart –Maxwell test was used to compare follow up periods for variables with more than 2 categories.

RESULTS

There was statistically significant change in pain score ,inter incisal distance, muscles tenderness, lateral movement ,clicking, maximum protrusion, and bite registration anterior and posterior, but There was not statistically significant change in radiographic evaluation (table (1, 2,3).

TABLE (1): Age of the studied cases, change of pain score and inter-incisional distance/cm. between pre-operative and after 6 months of treatment.

| Age | N=8 | % | |
|------------------------------|-------------------|-------------------|----------|
| 18-22y | 1 | 12.5 | |
| 22-26y | 2 | 25.0 | |
| 26-30y | 1 | 12.5 | |
| 30-34Y | 2 | 25 | |
| 34-38Y | 2 | 25 | |
| Pain score (TMJ area) | Pre-operative (%) | After 6 months(%) | P |
| No | 12.5 % | 50.0 | 0.058 |
| Mild | 37.5 | 25.0 | |
| Moderate | 25.0 | 12.5 | |
| Severe | 25.0 | 12.5 | |
| Inter-incisional distance/cm | | | |
| | 2.587±0.59 | 2.825±0.437 | 0.34 |
| Lateral movement | | | |
| Left | 0.537±0.141 | 0.675±0.183 | 0.045* |
| Right | 0.486±0.110 | 0.890±0.11 | p<0.001* |

TABLE (2): Change of tenderness of Temporalis, Masseter, Lateral pterygoid, and Medial pterygoid between pre-operative and after 6 months of treatment.

| Muscles tenderness | Pre-operative (%) | After 6 months (%) | P |
|--------------------|-------------------|--------------------|--------|
| Temporalis | | | |
| No pain | 4(50.0%) | 7(87.5%) | 0.083 |
| Slight pain | 4(50.0%) | 1(12.5%) | |
| Masseter | | | |
| No pain | 4(50.0%) | 6(75.0%) | 0.317 |
| Slight pain | 4(50.0%) | 2(25.0%) | |
| Lateral pterygoid | | | |
| No pain | 0(0.0) | 1(12.5%) | 0.008* |
| Slight pain | 2(25.0%) | 5(62.5%) | |
| Moderate pain | 4(50.0%) | 2(25.0%) | |
| Sever pain | 2(25.0%) | 0(0.0) | |
| Medial pterygoid | | | |
| No pain | 1(12.5%) | 4(50.0%) | 0.008* |
| Slight pain | 3(37.5%) | 2(25.0%) | |
| Moderate pain | 2(25.0%) | 2(25.0%) | |
| Sever pain | 2(25.0%) | 0(0.0) | |

TABLE (3) Open clicking, closed clicking, Nature of clicking, Maximum protrusive diameter, Bite value for anterior and posterior teeth changes, between pre-operative and after 6 months of treatment.

| Open clicking | Pre-operative (%) | After 6 months (%) | P |
|-------------------------------|-------------------|--------------------|--------|
| No | 3(37.5%) | 8(100.0%) | 0.062 |
| Yes | 5(62.5%) | 0(0.0%) | |
| Closed clicking | | | |
| No | 3(37.5%) | 8(100.0%) | 0.062 |
| Yes | 5(62.5%) | 0(0.0) | |
| Nature of clicking | | | |
| No | 1(12.5%) | 8(100.0%) | 0.015* |
| Soft | 3(37.5%) | 0(0.0) | |
| Loud | 4(50.0%) | 0(0.0) | |
| Maximum protrusive diameter | | | |
| | 0.505±0.177 | 0.684±0.165 | 0.001* |
| Bite value of anterior teeth | | | |
| | 1.26±0.46 | 1.74±0.36 | 0.001* |
| Bite value of posterior teeth | | | |
| | 2.51±1.20 | 4.25±0.63 | 0.001* |

DISCUSSION

A variety of treatments have been suggested to manage disc displacement because of the conservative approaches: patient education (such as explaining DDWR and orienting to avoid excessive open mouth), exercise, relaxation techniques, and occlusal splints⁽¹¹⁻¹³⁾. Hyaluronic acid (HA) has been suggested as an alternative therapeutic agent for treating internal temporomandibular joint disorders. Basterzi et al. treated 20 patients with DDWR with click complaints with intra-articular hyaluronic acid (HA) injections (at weekly intervals for 3 weeks)⁽¹⁴⁾.

At one year there was a significant reduction in joint noise, but there was no control group without intervention. Korkmaz et al. compared the effectiveness of a single HA injection, double HA injection, and splint therapy for the treatment of DDWR. The results of this study indicated that HA injection and stabilization splint are acceptably successful treatment modalities for alleviating the

clinical signs and symptoms of DDWR (double HA injection seems to be superior), especially in reducing TMJ clinking^(14,15).

Arthroscopic Intervention, the effectiveness of repositioning open discs in internal derangement has been questioned, but was once the mainstay of surgical treatment with success rates of around 85%⁽¹⁶⁻¹⁸⁾. Arthroscopic repositioning can be achieved by performing an anterior release and contracting the posterior fixture with either a laser or a suture maneuver. In comparison to open arthroplasty with sutures, there seems to be no difference. Successful repositioning of the disc that was retained over time has not been reported. When using a laser, there is no claim to bring the disc into the normal position, but this combination technique has proven successful in a prospective study⁽¹⁷⁾.

It is worth remembering that success relies on returning to normal function with minimal pain, rather than the preconceived notion of restoring normal anatomical position. Arthroscopic suturing is technically difficult and requires a high level of specialist knowledge. It is therefore used by very few surgeons⁽¹⁹⁾. In the present study, a sclerosant (ethanolamine oleate) was injected into retrodiscal fibers using the arthroscope, as described by McCain⁽²⁰⁾. There was a statistically significant change in the pain core, interincisal distance, muscle sensitivity, lateral movement, click, maximum protrusion, and bite registration anterior and posterior, but there was no statistically significant change in the radiographic evaluation of disc repositioning.

CONCLUSION

Injection retrodiscal fibers with sclerosing agent for treating the disc displacement with reduction of TMJ has been change in pain score, inter incisal distance, muscles tenderness, lateral movement, clicking, maximum protrusion and bite value of anterior and posterior teeth, but there was no statistically significant change in radiographic evaluation.

REFERENCES

- Okeson JP. Management of Temporomandibular Disorders and Occlusion. St. Louis: Mosby, Inc; 2003.
- De Leeuw R, Klasser G, editors. Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management. 5th ed. Chicago: Quintessence Publishing Co., Inc; 2013.
- Ahmad M, Hollender L, Anderson Q, Kartha K, Ohrbach R, Truelove EL, et al. Research diagnostic criteria for temporomandibular disorders (RDC/TMD): Development of image analysis criteria and examiner reliability for image analysis. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2009;107:844-60.
- Dolwick MF, Katzberg RW, Helms CA. Internal derangements of the temporomandibular joint: fact or fiction? *J Prosthet Dent* 1983; 49:415-8.
- Farrar WB. Myofascial pain dysfunction syndrome. *J Am Dent Assoc* 1981; 102:10-1.
- Ribeiro RF, Tallents RH, Katzberg RW, Murphy WC, Moss ME, Magalhaes AC. The prevalence of disc displacement in symptomatic and asymptomatic volunteers aged 6 to 25 years. *J Orofac Pain* 1997; 11:37-47.
- Katzberg RW, Westesson PL, Tallents RH, Drake CM. Anatomic disorders of the temporomandibular joint disc in asymptomatic subjects. *J Oral Maxillofac Surg* 1996; 54:147-53.
- Israel H. Arthroscopy of the temporomandibular joint. In: Peterson L, Indresano T, Marciani R, Roser S, editors. Principles of oral and maxillofacial surgery. Philadelphia: J.B. Lippincott, 1992. p. 2015-40.
- American Association of Oral and Maxillofacial Surgeons: position paper on TMJ arthroscopy 1988. In: Thomas M, Bronstein S, editors. Arthroscopy of the temporomandibular joint. Philadelphia: WB Saunders, 1991. p. 347-50.
- Sanders B, Buconcrisiani RD. Surgical arthroscopy. In: Sanders B, Murakami K, Clark GT, editors. Diagnostic and surgical arthroscopy of the temporomandibular joint. Philadelphia: WB Saunders, 1989.
- Lalue-Sanches M, Gonzaga AR, Guimarães AS, Ribeiro EC. Disc displacement with reduction of the temporomandibular joint: the real need for treatment. *J Pain Relief.*;4(5):2-5,2015.
- Gil-Martínez A, Paris-Alemany A, López-de-Uralde-Villanueva I, La Touche R. Management of pain in patients with temporomandibular disorder (TMD): challenges and solutions. *J Pain Res.*;11(1):571-87,2018.

13. Au AR, Klineberg IJ. Isokinetic exercise management of temporomandibular joint clicking in young adults. *J Prosthet Dent.*;70(1):33-9,1993.
14. Basterzi Y, Sari A, Demirkan F, Unal S, Arslan E. Intraarticular hyaluronic acid injection for the treatment of reducing and nonreducing disc displacement of the temporomandibular joint. *Ann Plast Surg.*;62(3):265-7. ,2009
15. Korkmaz YT, Altıntas NY, Korkmaz FM, Candırlı C, Coskun U, Durmuslar MC. Is hyaluronic acid injection effective for the treatment of temporomandibular joint disc displacement with reduction? *J Oral Maxillofac Surg.*;74(9):1728-40,2016.
16. Zeitler DL, Porter BT. A retrospective study comparing arthroscopic surgery with arthrotomy and disk repositioning. In lark GT, Sanders B, Bertolami CN, et al.: *Advances in diagnostic and surgical arthroscopy of the temporomandibular joint*, Philadelphia, 1993, Saunders, p 61.
17. Undt G, Murakami K, Rasse M, et al. Open versus arthroscopic surgery for internal derangement of the temporomandibular joint: a retrospective study comparing two centers' results using the jaw pain and function questionnaire, *J Craniomaxillofac Surg* 34:234, 2006.
18. Dolwick MF, Dimitroulis G. A re-evaluation of the importance of disc position in temporomandibular disorders, *Aust Dent J* 41:184, 1996.
19. Hall HD, Indresano AT, Kirk, et al. Prospective multi-center comparison of four TMJ operations, *J Oral Maxillofac Surg* 63:1174, 2005.
20. McCain JP. Arthroscopy of the temporomandibular joint, *J OralMaxillofac Surg* 46:648, 1988.