



Evaluation of the effect of arthrocentesis with different drug combinations for intra-joint treatment of temporomandibular joint disorders

Thesis

Submitted to the Faculty of Dentistry Ain Shams University in partial fulfillment of the requirements of Master degree in Oral and

Maxillofacial Surgery

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B.D.S (2007)

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(2014)

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بسم الله الرحمن الرحيم

{ يرفع الله الذين آمنوا منكم والذين
أونوا العلم درجات }

صدق الله العظيم

سورة المجادلة : 11

Acknowledgement

*First, I wish to express my deep thanks and sincere gratitude to **ALLAH**, who always helps me, care for me and granted me the ability to accomplish this thesis.*

*I would like to express my deepest gratitude, thanks and gratefulness to **Prof.Mohamed Diao Zein Elabdeen** Professor of Oral and Maxillofacial Surgery Faculty of Dentistry, Ain Shams University, for his enthusiastic support, continuous encouragement and great help through out of the accomplishment of this work,*

*My sincere thanks to **Ass.Prof.Khaled Abdelmonem**, Associate Professor of Oral & Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University, for his kind and meticulous supervision, support, help, valuable guidance through the work,*

*My sincere thanks to **Dr.Heba Abdelwahed Sleem** Lecturer f Oral & Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University, for her kind and meticulous supervision, support, help, valuable guidance through the work,*

*Special thanks to Both **Dr.Moustafa Taha** lecturer Oral & Maxillofacial Surgery, Faculty of Dentistry, Ainshams University , and **Dr.Amr Amin** lecturer Oral & Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University for their meticulous help and support during the clinical work of my thesis .*

Words can never express my sincere thanks to my family for their generous support and continuous encouragement.

I would like to express my over lasting gratitude to all my dear friends, colleagues in Ain Shams University and in oral and maxillofacial surgery department who offered me help, encouragement wishing them the best of all.

Tamer Houssef Abdelaleem Gessa

Dedication

To My Parents

- My Father
- My Mother

To My Family

- My Wife
- My Twins Fares and Adam

To My Brothers and Sister

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LIST OF ABBREVIATIONS

TMJ	: Temporomandibular joint
TMDs	: Temporomandibular joint disorders
ID	: Internal derrangement
VAS	: Visual Analogue Scale
MRI	: Magnetic resonance imaging
DDwR	: Anterior disc displacement with reduction
DDwoR	: Anterior disc displacement without reduction
RDC/TMD	: Research diagnostic criteria for temporomandibular disorders
SH and HA	: Sodium hyaluronate and Hyaluronic acid
PO	: Post-operative

Introduction

The Temporomandibular joint disorders (TMDs) are important oral health problems. It has been estimated that approximately 10% to 15% of the adult population will experience TMDs. The common signs and symptoms include facial and jaw pain which can be aggravated by jaw movements, TMJ noises (clicking or crepitus), and restriction of mandibular movements.¹

There have been many remedies to treat TMDs. Initially, non-surgical methods are used which include diet modification, physiotherapy, drug therapy and occlusal appliance therapy. However, few of the conservative managements have gained well-pleasing curative effects. Failure of non-surgical protocols in producing patient improvement has lead to the use of more sophisticated surgical interventions. However it has been the role of clinicians to identify and implement the least invasive and most predictable treatments.²

Arthrocentesis or joint lavage has gained a large popularity as it seems to meet the requirement of minimally invasive surgical procedure and a few adverse effects.³

In the literature arthrocentesis have been carried independently or followed by injection of various therapeutics such as corticosteroids and Sodium Hyaluronate, however there is a controversy regarding which is the best drug combination to be used and hence, we carried this study to evaluate various drug combinations commonly used with arthrocentesis.⁴

Review of literature

The temporomandibular joint (TMJ) is one of the complex joints of the body that plays a great role in speech, mastication and swallowing. The TMJ has been technically considered a ginglymo-arthroidal joint; hence it provides for both hinging (ginglymoid) and translatory (arthroidal) movements. The TMJ is composed of both bony and soft tissue components, Fig(1).

The bony components are the mandibular condyle, the glenoid fossa and the articular eminence of the temporal bone. The mandibular condyle is wide mediolaterally and narrow anteroposteriorly. The posterior roof of the glenoid fossa is thin and considered a non-stress bearing area, whereas the articular eminence provides a thick bony area that can tolerate large forces. The articular surfaces of both the mandibular condyle and the temporal bone are covered by thick fibrocartilage to help in tolerating the high forces which fall on them. Deep to the fibrocartilage, particularly on the condyle, is a proliferative zone of cells that may develop into either cartilaginous or osseous tissue. Most change resulting from function is seen in this layer.⁵

The soft tissue components consist of the articular disc, fibrous tissue capsule and various ligaments. The articular disc is biconcave in shape, composed of dense fibrous connective tissue. It is devoid, for the most part, from blood vessels or nerves.⁶

The articular disc is positioned between the glenoid fossa above and the mandibular condyle below (at 12 o'clock position) dividing the joint into upper and lower compartments.⁷

In the sagittal plane, the disc can be divided into three regions according to thickness: intermediate, anterior, and posterior zones. The central part is the thinnest and is called the intermediate zone. The disc becomes considerably thicker both anterior and posterior to the intermediate zone with the posterior border is generally slightly thicker than the anterior border. The articular disc is attached posteriorly to the glenoid fossa by a region of loose connective tissue that is highly vascularized and innervated which is called retrodiscal tissue or posterior attachment. The retrodiscal in turn is divided into superior and inferior retrodiscal laminae.⁸

The TMJ ligaments are classified into main and accessory ligaments. The main or principle TMJ ligaments are the capsular and temporomandibular ligaments which protect the joint by maintaining stability and relationship between the different intra-articular components which is needed for optimum function.⁹

The capsule has two components: an outer fibrous layer and inner synovial layer. The TMJ capsule defines the anatomic and functional boundaries of the TMJ. The thin, loose fibrous capsule surrounds the articular surface of the condyle and blends with the periosteum of the mandibular neck. On the temporal bone, the articular capsule completely surrounds the articular surfaces of the eminence and fossa. Anteriorly, the capsule is attached in front of the crest of the articular eminence; laterally, it adheres to the edge of the eminence and fossa; and posteriorly, it extends medially along the anterior lip of the squamotympanic and petrotympanic fissure. The medial attachment runs along the sphenosquamosal suture.⁹

The synovial layer secretes synovial fluid which is needed mainly for lubrication and nutrition. Laterally, the capsule is reinforced by another main

ligament called lateral temporomandibular ligament which is made of outer oblique fibers and inner horizontal ones.⁹

The accessory ligaments include the sphenomandibular ligament and the stylomandibular ligament. These ligaments prevent excessive protrusive movements of the TMJ, even though they are not closely associated with articulation.¹⁰

This unique construction of the TMJ facilitates a mouth opening of 40-60 mm as measured between the upper and lower incisors where the free rotation of the condyle enables a mouth opening of 15-25 mm as measured between upper and lower incisors. Then, in the upper compartment, the free sliding of the condyle with the disc along affords a mouth opening of 40-60 mm as well as lateral movements of up to 10 mm, protrusive movements of up to 9mm and retrusive movements of 1mm.¹¹

To conclude, TMJ is a complex highly adaptive organ which constantly adjusts to the functional demands by remodeling and it is really difficult to comprehend every fine detail in it. That's why it is not strange to accept that the diseases that affect the TMJ are difficult to diagnose and thus to treat.¹²

Bell¹³ was the first to propose TMDs as a medical term which has rapidly gained popularity. This term includes both articular and muscular disturbances of the masticator system.

TMDs are very common and in fact they affect 10% of the general population with high prevalence in young females.¹⁴

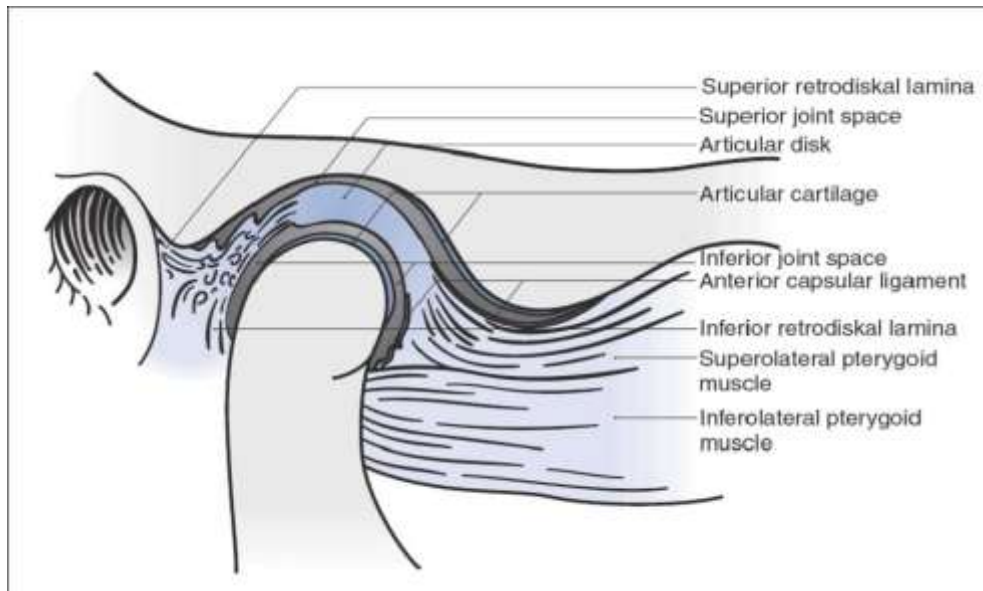


Fig (1) Anatomy of the TMJ adopted from Bell WE. Temporomandibular disorders: classification, diagnosis and management. 2nd ed. Chicago (IL): Yearbook Medical Publishers; 1986. p. 16–62

The TMDs is classified into muscular and articular disorders. The muscular disorders include myofascial pain dysfunction syndrome, myospasm, protective muscle co-contraction, and local muscle soreness. The articular disorders include internal derangement (ID), structural incompatibility of the articular surfaces as adhesions, subluxation, dislocation as well as inflammatory TMJ disorders as arthritis, capsulitis, retrodiscitis and osteoarthritis.¹⁵

The diagnosis of TMDs depends mainly on assessing patient's history including (personal, dental, and medical history) and the history of the patient chief complain (pain, clicking, and limitation) including onset, duration, and predisposing factors. This is followed by clinical examination of the patient which is divided into both inspection (jaw movements,