



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



MONA MAGHRABY

Arthrocentesis versus Arthroscopy in Treatment of Anterior Disk Displacement with Reduction of the Temporomandibular Joint: Systematic Review.

Thesis

*Submitted to Oral & Maxillofacial Surgery Department, Faculty
of Dentistry, Ain Shams University in Partial Fulfillment of the
Requirements of Master Degree in Oral & Maxillofacial Surgery.*

By

Fatma Mohamed Mohamed

B.D.S. 2011

Faculty of Dentistry, Ain Shams University.

Supervisors

Prof. Dr. Marwa Abdel Wahab El-Kasaby

Professor of Oral and Maxillofacial Surgery

Faculty of Dentistry, Ain Shams University

Assoc. Prof. Dr. Amr Amin Ghanem

Associate Prof. of Oral and Maxillofacial Surgery

Faculty of Dentistry, Ain Shams University

Faculty of Dentistry
Ain-Shams University
2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سببناك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

Acknowledgment

First, I would like to express my sincere gratitude to all the staff of Oral & Maxillofacial department, Ain Shams University for the continuous support of my Master degree study and related research, for their patience, motivation and immense knowledge. Their guidance helped me in all the time. Their help and support was truly unlimited and no words are enough to thank them enough.

Secondly, I want to thank:

***Dr. Rami Gaber**, Lecturer of Oral and Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University*

***Dr. Yasser el-Hadidi**, Lecturer of Oral and Maxillofacial Surgery, Faculty of Dentistry, Ain Shams University*

For their effort on helping in writing this study, for giving me much of their time teaching. Helping and supporting over the last few years, I spent at the department.

Fatma Mohamed

List of Contents

Title	Page No.
List of Tables	5
List of Figures	6
List of Abbreviations.....	7
Introduction	1
Review of Literature	3
Anatomy of the temporomandibular joint	3
Joint biomechanics:.....	6
Temporomandibular disorders and internal derangement:	8
The role of muscle incoordination as a causative factor in ID: ..	27
Treatment of internal derangement	37
Temporomandibular joint arthroscopy.....	43
Temporomandibular joint arthrocentesis	53
Open surgical procedures	56
Treatment dilemma	58
Aim of the Study	60
Material and Methods	61
Results	64
Study selection:	64
Characteristics of the studies included:	67
Risk of bias within studies:	71
Maximal inter-incisal opening (MIO):	71
Assessment of publication bias:	73
Discussion	74
Summary	86
Conclusion	88
Recommendations	89
References	90
Arabic Summary	—

List of Tables

Table No.	Title	Page No.
Table (1):	For ARCOPY paper.....	68
Table (2):	For ARSIS articles:.....	69
Table (3):	Data extracted from included studies	70
Table (4):	Risk bias in the studies	70
Table (5):	Statistical analysis for ARCOPY studies regarding MIO and VAS	71
Table (6):	Comparison between statistical result of ARCOPY group and ARSIS group regarding MIO and VAS.....	72

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Dr. Mark Piper's Classification.....	21
Figure (2):	Arthroscopic instruments.	48
Figure (3):	Arthroscopic instrument for joint puncture.....	50
Figure (4):	Landmark for arthrocentesis needle puncture.	56
Figure (5):	Study selection process.	65
Figure (6):	Strategy of illegibility.....	66
Figure (7):	Characteristics of the studies included.	67
Figure (8):	Comparison between ARCOPY and ARSIS regarding VAS.....	72
Figure (9):	Comparison between ARCOPY and ARSIS regarding MIO.	73

List of Abbreviations

Abb.	Full term
<i>ARCOPY</i>	<i>Arthroscopy</i>
<i>ARSIS</i>	<i>Arthrocentesis</i>
<i>CCT</i>	<i>Controlled clinical trail.</i>
<i>CRPS</i>	<i>Chronic regional pain syndrome</i>
<i>DDnR</i>	<i>Disk displacement with no reduction</i>
<i>DDwR</i>	<i>Disk desplacement with reduction</i>
<i>Djd</i>	<i>Degenerative joint desease</i>
<i>EMG</i>	<i>Electrommyography</i>
<i>ID</i>	<i>Internal Dranagement</i>
<i>MIO</i>	<i>Maximum interincisal opening</i>
<i>MS</i>	<i>Muscle</i>
<i>OA</i>	<i>Osteoarthritis</i>
<i>TMD</i>	<i>Temporomandibular disorder</i>
<i>TMJ</i>	<i>Temporomandibular joint</i>
<i>VAS</i>	<i>Visual analogue scale</i>

The temporomandibular joint (TMJ) is an integral part of the masticatory system and one of the most complicated joints in the human body. The TMJ is bilateral diarthroglymo-arthroidal synovial joint. This means that it allows hinge movement to occur in one plane and gliding movement in another plane. There are several disorders that affect TMJ and may cause pain and dysfunction. Temporomandibular disorders (TMDs), is a medical term, first proposed by Bell in 1982, and includes all the disorders, which affect the masticatory system. Temporomandibular disorders can be divided into two main categories; articular disorders and population with high prevalence in young females.

Internal derangement (ID), can be defined as abnormal positional relationship between articular disc and condyle which is associated with pain, joint sound and irregular jaw function. Internal derangement is not a new pathology, regarding the prevalence of ID, it is considered the most common subgroup of the articular disorders. It has been estimated that up to 25% of the entire population has ID, although of course, some of them are not aware of the condition. Treatment of ID had been shifted from open surgical procedures to the less aggressive ARSIS and ARCOPY and conservative treatment in certain cases that had been witnessed in the last decade.

Although, these techniques became very popular, their treatment efficacy had not been proved yet. This may be due to the fact that the effectiveness of these modalities have not been correlated with a specific clinical and etiology based diagnosis and thus their use continue to be based on numerous factors including cost, risk-benefit ratio, prior experience, and clinician's best judgment.

The majority of publications regarding ARSIS and ARCOPY are case series studies, with small sample sizes, the presence of control groups are exceptional, and standardized assessment methods are generally lacking. These flawed methodologies have made the potential for bias in these studies significance instead of providing preliminary evidence of treatment efficacy. Considering these premises, the need for evidence based medicine, which has introduced well-defined rules for the critical evaluation of medical data based on explicit inclusion and exclusion criteria in addition to conducting well designed studies is overdue to reach answers that may benefit patients with ID therefore, conducting a systematic review to study effect of both ARSIS and ARCOPY as a treatment of ADDwR regarding mouth opening and pain aiming it could be of added a scientific value to help clinicians and provide information based on sound scientific evidence.

Anatomy of the temporomandibular joint

The masticator system is the functional unit of the body primarily responsible for chewing, speaking, and swallowing. The system is made up of bones, joints, ligaments, and muscles. In addition, a complex neurologic controlling system regulates and coordinates all these components together. The masticator system is a complex and highly refined unit. The TMJ is an integral part of the masticatory system and is one of the most complex joints in the body. Actually, it is very unique and different than any other joint as it is the only ended joint in our body (ended by occlusion), so occlusion diseases affecting our joint severally. ⁽¹⁾

The TMJ is also the only bilateral joint where functional problems affecting one side, usually affect the other by time (due to biomechanical disturbance of whole area of head and neck. Also, its articular surface consists of fibrocartilage not hyaline cartilage so it has a great capability for adaptation and self-healing that gives a good chance for conservative treatment rather than other body joints that consist of hyaline cartilage with poor capability for repair so limited role of conservative treatment and wide role of interventional treatment, and finally it provides two types of movements: rotation and translation movement. ⁽²⁾

The TMJ is formed by the mandibular condyle fitting in the temporal bone i.e. by two articulating bones. The TMJ provides for hinging movement in one plane and therefore can be considered a ginglymoid joint. At the same time it also provides for gliding movement and therefore can be considered an arthroidal joint. Thus TMJ has been technically considered a ginglymo-arthroidal joint. ⁽³⁾

Anatomically, the TMJ is made of bony structures and soft tissue structures. The bony structures include the mandibular condyle, glenoid fossa, and articular eminence of the temporal bone. The condyle is wide mediolaterally and narrow antro- posteriorly. The articulating surface of the temporal bone is made of concave glenoid fossa and convex articular eminence. The posterior roof of the glenoid fossa is thin indicating that this area is a non-stress bearing area. However, the articular eminence consists of thick bone and thus is more likely to tolerate large forces. The articular surfaces of both the mandibular condyle and the glenoid fossa are covered by thick fibrocartilage to help in tolerating the high forces which fall on them. ⁽⁴⁾

The relation between the condyle and the articular eminence and disc is called centric relation, and any disturbance in this relation affects mechanics of the whole area of head and neck and initiates occluso-muscular diseases and functional problems in both joint as well. ⁽⁵⁾

The TMJ soft tissue structures include ligaments and articular disc that divides the joint into two compartments (superior and inferior joint space). The articular disc is biconcave in shape, composed of dense fibro-cartilaginous tissue, devoid- for the most part- from blood vessels or nerves. ⁽⁵⁾

Laskin ⁽⁶⁾ has described the functional condyle disc relationship as follows: when the mandible is at rest, the disc is located between the antrosuperior aspect of the condyle and the posterior aspect of the eminence with the posterior region of the disc is at twelve o'clock position. 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 a region of loose connective tissue that is highly vascularized and innervated which is called retrodiscal tissue or posterior attachment. ⁽⁶⁾

The TMJ ligaments can be classified into main and accessory ligaments. The capsular and temporomandibular ligaments are considered to be the main or principle TMJ ligaments which protect the joint by maintaining stability and spatial relationship between the intraarticular components which is needed for optimum function. The capsule is attached superiorly to the circumference of the glenoid fossa and the articular eminence and inferiorly is attached to the condylar. The capsule has two components: an outer fibrous layer and inner synovial layer which 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, there are two additional accessory ligaments playing an important role in the function of the TMJ: the sphenomandibular ligament and the stylo-mandibular ligament. These ligaments prevent excessive protrusive movements of the TMJ, even though they are not closely associated with articulation. ⁽⁷⁾

This unique construction of the TMJ facilitates a mouth opening of 40-50 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