

**Comparative Study Between the
Outcome of Intra-articular Injection of
Platelet Rich Plasma Versus
Hyaluronic Acid in Arthroscopic
Management of Temporomandibular
Degenerative Joint Diseases: A
Randomized Clinical Trial**

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Introduction

The temporomandibular joint (TMJ) is known as ginglymo-arthrodial joint and is mainly formed by articulations between the mandibular condyle and the glenoid fossa of the temporal bone. The joint articular disc is formed of dense avascular fibrous connective tissue lying between the condyle and the glenoid fossa this position splits the joint cavity into superior and inferior joint spaces. (**Zhang and Yu, 2012**)

Temporomandibular disorders (TMD) is a group of pathologies affecting the TMJ and masticatory muscle system which include internal derangement (ID), arthralgia, osteoarthritis, myofascial pain. most of those disorders have similar symptoms include pain, joint sounds and limited mouth opening. (**McNeill, 1997**)

Internal derangement (ID) of the TMJ is a disruption within the joint with a progressive displacement of the disc from its normal position in relation to the condyle and the articular portion of the temporal bone. When there is a tear in the retrodiscal ligament, the articular disc may be displaced forwards. Anterior disc displacement with reduction refers to an unnatural forward movement of the disc during opening, which reduces on closing, Anterior disc displacement without reduction is an unnatural forward displacement of the articular disc, which does not reduce when the mouth is closed. (**Okeson, 2019**)

Osteoarthritis (OA) is a progressive degenerative disease associated with damage to the cartilage and surrounding tissues. Which is characterized by stiffness, pain, and loss of function. Temporomandibular joint osteoarthritis is a common disorder among the population, is more prevalent in females than in males. Biological and mechanical events including bruxism, overloading, and unilateral chewing, as well as genetic factors and internal derangement are causative factors in the development of TMJ OA. Temporomandibular joint OA causes not only focal degeneration of the joint cartilage, but also osseous erosion, flattening, sclerosis, and osteophyte formation at the joint margins. (**Kiliç et al., 2015**)

Wilkes first established a classification correlating clinical and radiologic signs with operative findings now it is the most commonly used classification system that consists of five stages varying from asymptomatic slight forward displacement of the disc to excessively degenerative arthritic changes with sever clinical symptoms.

(Wilkes, 1989)

Primary goals of the treatment for TMJ internal derangement are to increase the range of motion and relieve the functional pain. The current conservative methods suggested for ID include patient behavioral education, resting the jaw, soft diet, pharmacological therapy, splint therapy and physical therapy. Usually, TMJ arthroscopy is considered as a treatment of choice after failure of conservative treatment methods.**(Rajapakse et al., 2017)**

Prior to the early 1970s, Surgery was the commonly used method for treatment of internal derangements of the temporomandibular joint (TMJ), Surgical treatment involving repair and restoration of the articular disc to its normal position (discoplasty) or removal of the disc (discectomy). The introduction of arthroscopic examination of the temporomandibular joint was first described by Ohnishi. Initially, it was described as a diagnostic technique with simple lysis, lavage and medicament insertion, This new technique has revolutionized primary management of painful and restricted joints. **(Ohnishi, 1975)** Now arthroscopy is widely used for both examination and treatment of TMD which is considered feasible, safe and minimally invasive with marked reduction in the number of open TMJ surgery.**(Zhu et al., 2012)**

The therapeutic management of degenerative joint disease (DJD) is focused on establishing normal range of mandibular motion and improving the functional pain. Conservative non-invasive modalities are the first line of treatment, For patients with persistent symptoms and more sever degeneration , minimally invasive treatments may be applied, such as arthrocentesis, arthroscopic lysis and lavage with injection of corticosteroids, hyaluronic acid, and platelet-rich plasma.**(Bousnaki et al., 2018)**

Hyaluronic acid (HA) is a high molecular weight glycosaminoglycan produced naturally by synovial cells and is the principal component of the synovial fluid, Although the mechanism of action of HA is not fully explained, most of authors consider that the therapeutic effects of exogenous HA are related to an

increase in the quality of the synovial fluid, especially in joints undergoing degenerative processes. (**Escoda Francolí et al., 2010**)

Platelet-rich plasma (PRP) is a biological therapy based on the use of the patient's own plasma with a cocktail of cytokines and proteins; although the mechanism of action of PRP is not well known, it is considered that growth factors participate in cell activation and secretion processes that accelerate and promote the regeneration of damaged tissue. Recent clinical studies have demonstrated the beneficial role of the injection of PRP, especially in degenerative articular pathologies such as osteoarthritis of the knee, showing improved clinical outcomes compared with HA. (**Vaquerizo et al., 2013**)

Aim of Work

The aim of this study is to evaluate the efficacy of intra-articular injection of platelet rich plasma versus hyaluronic acid following diagnostic arthroscopy in the management of patients suffering from degenerative temporomandibular joint (TMJ).

Patients and Methods

All the regulations of the ethical committee of the faculty of medicine in Sohag university will be followed. Each patient will have private file with non-disclosure policy at data presentation where all presented data do not contain any personal information specifying the identity of any of the patients.

This is a prospective randomized study of 20 patients with TMJ degenerative joint diseases Wilkes IV, V.

Patients will be divided into two groups;

Group A: will be treated with operative arthroscopy plus intra-articular platelet rich plasma.

Group B: will be treated with operative arthroscopy plus intra-articular hyaluronic acid.

Inclusion criteria

- All patients with reduced mouth opening and/or painful maximum mouth opening.
- Joint pain.
- Patients with radiological evidence of DJD.
- Patients with unsuccessful medical conservative treatment for at least two months.
- Unilateral or bilateral TMJ involvement.
- Wilkes stages IV and V

Exclusion criteria

- Patients with bony ankylosis .
- Patients with advanced resorption of the glenoid fossa.
- Patients with infection or tumors around joint area
- Patients unfit for intervention medically.
- Patients who refused to share in the study.

Patients assessment:

pre-operative:

- Full medical, dental and operative history.
- Complete head, neck and physical examination .
- Full TMJ evaluation including masticatory muscles system, clicking, deviation of the mandible, range of motion including maximal interincisal opening in millimeters and pain using visual analogue scale from (0-100) With filled standardized charts.
- Routine laboratory investigations
- Relevant radiological evaluation as MRI or CT scan.
- Informed consent.

Post-operative assessment:

Anti-inflammatory drugs routinely prescribed for 2 weeks with soft diet for 6 weeks. Exercises will be explained to the patient to improve mouth opening immediately after surgery.

Follow up:

follow up assessments will be at 1 week ,3 weeks , then every month afterwards till 6 months

Primary outcomes will include maximal interincisal opening (MIO) in millimeters and a 100 -point visual analogue scale (VAS) for the assessment of pain intensity, with 0 as the absence of pain and 100 as the worst pain imaginable.

Ethical consideration:-

Informed consent will be taken from all cases.

Ethical approval will be taken from the scientific ethics committee.

Statistical analysis:-

The collected data will be statistically analyzed using Statistical Package for the Social Science (SPSS version 16, Chicago, USA) program and expressed in tables and charts. All results will be discussed, and then conclusions and recommendations will be suggested based on the results.

List of abbreviations:-

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|------------------------------|-----|
| Temporomandibular Joint | TMJ |
| Temporomandibular Disorders | TMD |
| Osteoarthritis | OA |
| Internal Derangement | ID |
| Degenerative joint disease | DJD |
| Hyaluronic Acid | HA |
| Platelet Rich Plasma | PRP |
| Maximal Interincisal Opening | MIO |
| Visual Analogue Scale | VAS |

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