Efficacy of Eminectomy in Internal Derangement of Temporomandibular Joint

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Abstract

Background: The purpose of this study is to study the effectiveness of Eminectomyin the management of the TMJ pain and dysfunction in patient with internal derangement of Temporo-mandibular joint using Mandibular Function Impairment Questionnaire And Clinical Dysfunction Index.

Methods: All the patients with internal derangement of temporomandibular joint having anterior disc displacement without reduction with complaints of pain and limited opening of mouth, of all age group reporting to the Department of Oral & Maxillofacial Surgery, RUHS College of Dental Sciences, Jaipur were included in the study. All the patients were examined using magnetic resonance imaging and diagnosis of TMJ internal derangement was confirmed with MRI. The duration of the study took over from Jan 2019– Dec. 2020. 22 patients were included in the study who were subject to assessment using Mandibular Function Impairment Questionnaire and Clinical Dysfunction Index.

Results: There was significant improvement in symptoms of pain and reduced mouth opening at 3 months follow up as revealed in their evaluation with Mandibular Function Impairment Questionnaire (MFIQ) and Clinical Dysfunction Index (CDI). TMJ clicking was absent in all the patients at 3 months follow up.

INTRODUCTION

Temporomandibular joint (TMJ) is a ginglymoarthroidal joint, it is the only mobile joint in the entire maxillofacial region and is a part of craniomandibular articulation. It is unique because of the fact that both the joints need to move simultaneously for proper functioning and the force per unit area is much larger than most weight bearing joints of the body.

The presence of the disc in the joint capsule prevents the bone-on-bone contact and the possible higher wear of the condylar head and the articular fossa. The bones are held together with ligaments. These ligaments completely surround the TMJ forming the joint capsule. A steep articular eminence is reported to be a predisposing factor for development of disc displacement.

Internal derangement of the temporomandibular joint (TMJ) may be defined as a disruption within the internal aspects of the TMJ in which there is a displacement of the disc from its normal functional relationship with the mandibular condyle and the articular portion of the temporal bone.

Patients with TMJ internal derangement often complain of limited function and pain additional to the clicking. [1] Patients can also have pain or tenderness to palpation within the external auditory canal or to the lateral condylar pole, in addition to limited jaw opening. Headache, neckache earache and tenderness of the masticatory muscles may also be signs and symptoms that accompany the problem.

The aim of this prospective clinical study is to present the clinical experience of using Eminectomy in the surgical management of Non-Reducing type of Internal derangement to return the patient to a regular diet, with some limitations, and to establish an adequate functional range of motion of mouth opening. The procedure preserves the articular tissue, it permits normalization and regeneration of synovium, and a restoration of the articular relations to permit the joint structures to adapt and function through an adequate range of motion[7].

MATERIAL & METHODS

Study Site: The study was conducted in the Department of Oral & Maxillofacial Surgery, RUHS College of Dental Sciences& Hospital, Jaipur, Rajasthan.

Study Subjects: All the patients with internal derangement of temporomandibular joint having anterior disc displacement without reduction with complaints of pain and limited opening of mouth, of all age group reporting to the Department of Oral & Maxillofacial Surgery, GDC Jaipur were included in the study.

Exclusion Criteria:

1. Refused consent
2. Medical contraindication for surgery
3. The patients with TMJ conditions that affect outcomes like arthritis, congenital anomalies
4. Patients with damaged articular disc.

Equipment used:

Basic oral and maxillofacial surgical instruments

Clinical Work-up:

Examination of each patient was done in the following order-

I. Inspection

Clinical examination included the following:

- Joint noise and its relation to jaw movements
- Pain and tenderness in relation to the joint, muscles of mastication, and jaw movement
- Movements of the jaw on opening, protrusion, and any deviation.

Extra oral examination was carried out to look for

- Facial deformity
- Chin deviation
- Facial nerve function

Intraoral inspection was done for:

- Deviation of midline
- Mouth opening (from incisal edge of maxillary central incisor to incisal edge of mandibular central incisor)
- Mid incisor shifting
- Side to side movement
- Occlusion
- Missing teeth
- Faulty restoration, faulty prosthesis etc.

II. Palpation

Both affected and non affected side TMJ were palpated at rest as well as during function for Joint tenderness and Clicking sounds.

Chin deviation was measured on mouth opening and without mouth opening from midline considering as a guide line.

ASSESSMENT WITH INDICES

After thorough clinical evaluation of patients, they were subject to assessment with following indices-

MANDIBULAR FUNCTION IMPAIRMENT QUESTIONNAIRE (MFIQ):

The MFIQ is a 17-item questionnaire divided into masticatory and non-masticatory activities. Each item is in the form of a 5-point scale on which the patients indicate to what extent they had difficulties in doing that particular mandibular task. The MFIQ reliably assesses the degree of impairment of specific jaw functions without measuring symptoms and signs causing the functional impairment.

CLINICAL DYSFUNCTION INDEX:

The clinical dysfunction index is an objective measure of TMJ disorders based on evaluation of 5 common clinical symptoms, each judged on 3-point scale of severity using 0, 1, or 5 points. No symptoms mean 0 points, mild symptoms 1 and severe symptoms 5. The 5 symptoms are impaired range of mandibular movements, impaired TMJ function, joint sounds, deviation and restriction of movements with locking or luxation or both, TMJ pain with lateral or posterior or lateral palpation and tenderness of number of masticatory muscles sites.

Radiological examination

All the patients were examined using magnetic resonance image diagnosis of TMJ internal derangement was confirmed with MRI.

MRI imaging provides an important modality for the evaluation of TMJ internal derangements because it is non-invasive and accurate. Furthermore, MR imaging provides a method in which bilateral examinations can be readily performed.

Photographs: Preoperative, intra-operative and postoperative photographs were taken forComparison and to visualize gradual changes at follow up period.

Pre anaesthetic evaluation: All patients undergoing surgery have undergone pre anaesthetic evaluation using routine blood profile, renal function test, liver function test chest radiograph ECG, HBSAg, HIV, Serum electrolytes and other relevant investigations as the particular case required.

Anaesthesia: All the patients were operated under Local aesthesia with 2% xylocaine with adrenaline.

ARMAMENTARI

Surgical Technique for Eminectomy:

The patient is prepared for operation in the usual fashion with local anesthesiawith 2% xylocaine with adrenaline The preauricular hair were be shaved to a height of 1–2 cm above the ear. The initial incision, 2–3 mm deep, begins in the shaved area above the ear in the shape of a hockey stick following the technique of Al-Kayat and Bramley. The incision extends down in front of the ear to be continuous with a suitable skin crease and should not be extended beyond the level of the attachment of the lobe of the ear, as described by Rowe. Superiorly, the incision is deepened down to the temporal fascia and the superficial temporal vein is identified and

either retracted, tied off, or cauterized. Blunt dissection at the level of the temporal fascia is carried downwards and forwards to a point about 2 cm above the zygomaticarch where the temporal fascia splits in two. Beginning at the root of the zygomatic arch, an incision is made at 45° upwards and forwards through the outer layer of the superficial temporal fascia only to create a fatty tissue pocket. The periosteum of the zygomatic arch may then be incised horizontally and turned forward as one flap with the outer layer of the temporal fascia and superficial fascia containing the zygomatic and frontal branches of the facial nerve and skin. The periosteum along the infero-lateral margin of the zygomatic arch within the fatty pocket is reflected forwards and downwards and into the articularfossa and over the articular eminence so that the joint space itself is not entered. The reflection is carried medially to expose these structuresfully, the condylar head having been pulled forward by opening the jaw. Working at a sub-periosteal level, above the superior joint space minimizes disruption of these structures. The eminence is cut awaywith piezoelectric device to a depth not exceeding that of the articular fossa. The articularem4inence is completely removed to its medial margin and contoured anteriorly to produce a shallow angled eminence with meticulous smoothing of the surface and copious irrigation. Disc movement was shown intra-operatively by jaw movement and confirmed postoperatively by clinical examination. Before closure, the wound was meticulously checked for any bleeding points and thoroughly irrigated. Closure of the wound is of extreme importance, for, if done in a carefully layered fashion with taut periosteal closure, the benefits of ligament ligation, disc fixation and lack of the need for a drain are obtained. The skin is closed with interrupted 5–0 monofilament sutures. Drains were not used in this study. All patients were given a loading dose of an antibiotic on induction, followed by a five-day therapeutic course. Non-steroidal anti-inflammatory drugs were used for postoperative pain control and patients were usually discharged on the second postoperative day. The skin sutures were removed five days postoperatively.

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Criteria of assessment

Assessment of patients was done at the end of seven days, and three month interval under following parameters:

1. Mandibular function impairment questionnaire
2. Clinical Dysfunction index

Follow-up

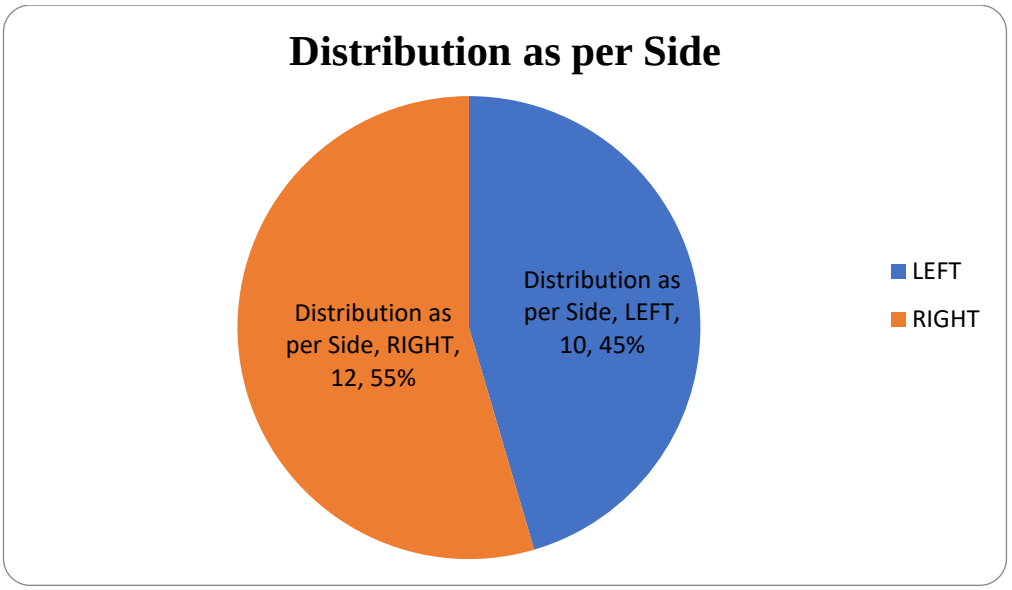
Patients were recalled for regular check up at an interval of seven days and, three month interval.

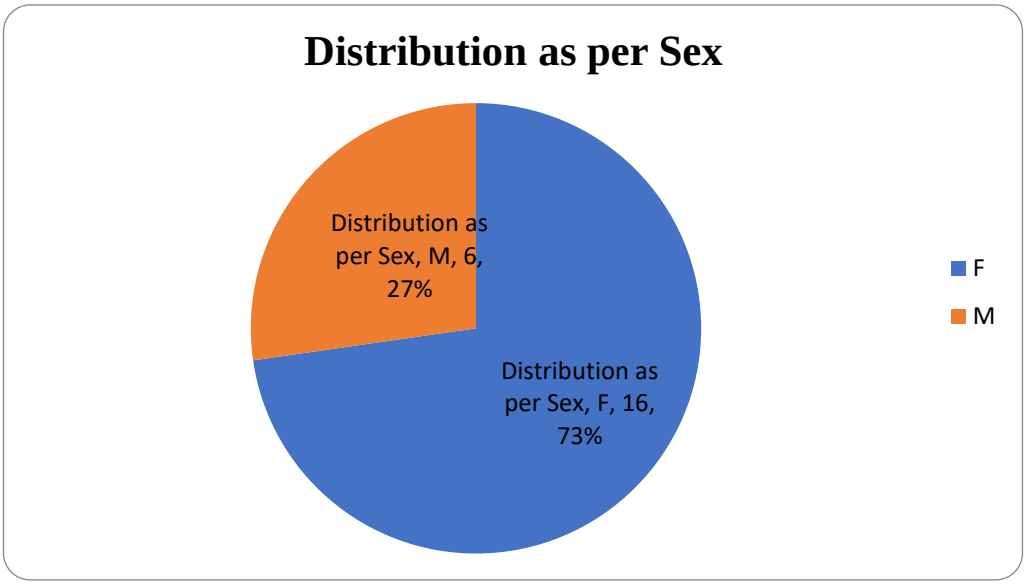
On follow up facial nerve function was checked. Photographs were also taken for comparison. Maximum follow up period was 3 months. The results were recorded on a set format for comparison and subjected to statistical analysis.

OBSERVATIONS AND RESULTS:

22 patients with Internal derangement of temporomandibular joint having anterior disc displacement without reduction with complaints of Noise &/or pain on opening mouth and limited opening of mouth were selected. Patients underwent Eminectomy under local anesthesia. Patients were assessed for relief in symptoms and lifestyle by surgical intervention using the mandibular function impairment questionnaire and clinical dysfunction index.

In our study, out of 22 patients 16 (72. 7 %) patients were female and 6 (27. 3%) patients were male. Age of participants was in between 16 -48 years.



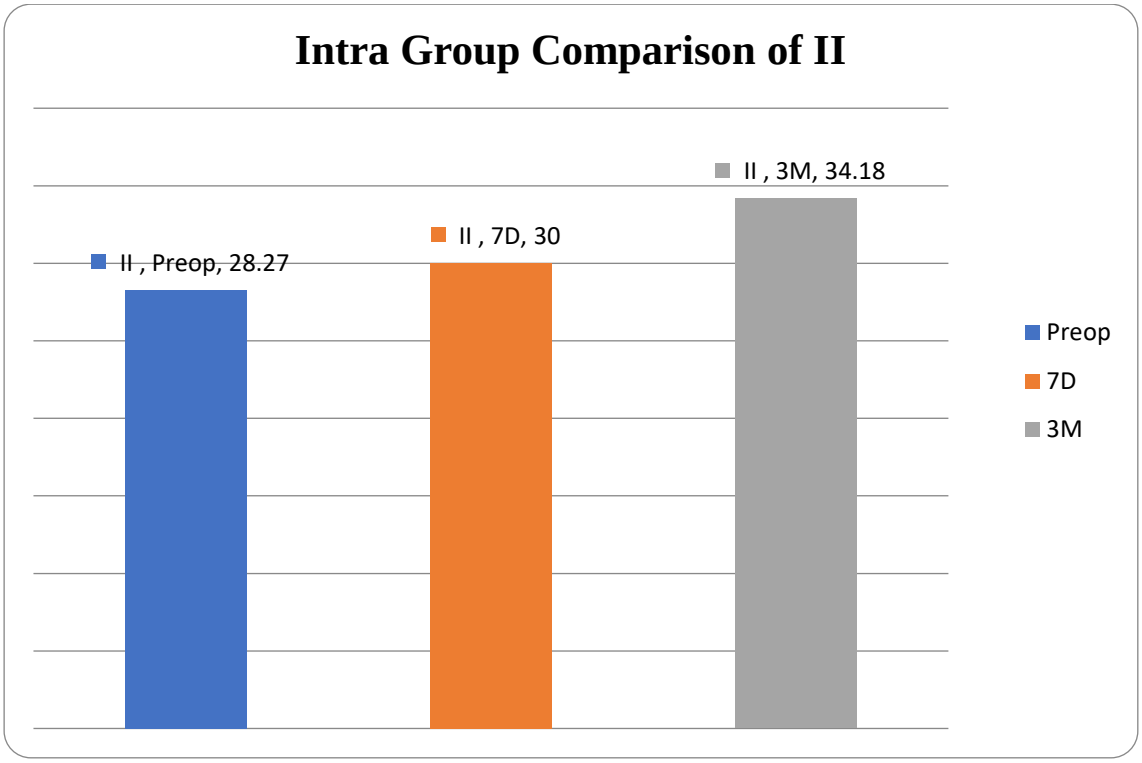


Fisher's Exact Test value = 0. 489, p=0. 646 (NS)

There was a statistically non significant difference seen for the frequencies between the groups (p>0. 05)

Preoperative inter-incisal mouth opening mean was 28. 27 with standard deviation 9. 331.

Inter-incisal mouth opening at three month postoperative follow up mean was 34. 18 Chart shows improvement in mouth opening.



					95% Confidence Interval for Mean					
		Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum	F value	p value of RM ANNOVA
CDIS	1	8. 55	3. 997	. 852	6. 77	10. 32	1	16		
	2	6. 14	4. 291	. 915	4. 23	8. 04	1	16	16. 630	. 000**
	3	2. 36	2. 036	. 434	1. 46	3. 27	0	8		
	Total	**5. 68**	**4. 361**	**. 537**	**4. 61**	**6. 75**	**0**	**16**		
FIS	1	4. 18	1. 006	. 215	3. 74	4. 63	3	5		
	2	2. 77	1. 378	. 294	2. 16	3. 38	1	5	60. 827	. 000**
	3	. 50	. 913	. 195	. 10	. 90	0	3		
	Total	**2. 48**	**1. 883**	**. 232**	**2. 02**	**2. 95**	**0**	**5**		
II	1	28. 27	9. 331	1. 989	24. 14	32. 41	12	48		
	2	30. 00	4. 731	1. 009	27. 90	32. 10	22	38	4. 288	0. 018*
	3	34. 18	5. 712	1. 218	31. 65	36. 71	24	45		
	Total	**30. 82**	**7. 222**	**. 889**	**29. 04**	**32. 59**	**12**	**48**		

DISCUSSION

The first-line management for TMJ dysfunction according to most authors is conservative[6]. Many researchers accept that the majority of TMJ pain is associated with the presence of internal derangement. Although medical treatment may help to alleviate the pain caused by inflammation, it cannot be expected to reverse internal derangement and is only aimed at symptomatic relief. However, surgical procedures are not devoid of complications. Dolwick has stated that: "Surgery of TMJ is best undertaken by surgeons who maintain the philosophy that surgery should aim to avoid further harm to the joint and also consider more

conservative surgical procedures whenever possible."

In our study the diagnosis of the internal derangement (Disc displacement) was confirmed by MRI study. **Roberto E, Sanchez-Woodworth** also showed the role of MRI in evaluation of internal derangement of TMJ. **Andre L. F. Costa et al** also concluded that temporomandibular joint MRI could be helpful for diagnostic classification and treatment follow up as we had used in our study[4].

A steep articular eminence is reported to be a predisposing factor for development of disc displacement[5]. Among the techniques used on the open joint, Eminectomy is considered to be an extra-capsular procedure. The aim is to improve the potential joint dimension and so result in free movement of the disc. The intra-capsular methods include discoplasty or discectomy, with or without interpositional graft replacement[9]. Finally, a combination of intra-capsular and extra-capsular procedures is also being widely used. This concept was supported by Miloro et al in 2017 who stated: "a definitive combined surgical approach, following the failure of non-surgical and minimally-invasive therapy, could reduce the treatment time, the expenditure, the complications from multiple procedures as well as patient discomfort". Eminectomy, and discectomy with or without disc replacement, are therefore now accepted surgical techniques in the management of internal derangement of the TMJ when conservative management and minimally-invasive procedures, such as arthrocentesis and arthroscopy, have failed to improve function and reduce pain[15].

In our study, 22 patients were treated with Eminectomy. There was significant improvement in symptoms of pain and reduced mouth opening at 3 months follow up as revealed in their evaluation with Mandibular Function Impairment Questionnaire (MFIQ) and Clinical Dysfunction Index (CDI).

At 3 months follow up, mean MFIQ score was 0. 5 as compared to preoperative mean score of 4. 18 and mean CDI score at 3 months was 2. 36 as compared to preoperative mean of 8. 55. Mean preoperative Inter incisal opening was 28. 27 and at 3 months it was 34. 18. This reveals significant improvement in functional capacity and dysfunction related to internal derangement in the patients.

TMJ clicking was absent in all the patients at 3 months follow up.

In conclusion, The dimensions of the bony anatomy of the TMJ are variable. Depending on the posterior surface slope to the eminence, the anatomy is described as high fossa or low fossa, and the angle varies from 89◦to 16◦. Eminectomy will reduce this angle, increase the intra-articular space, and release the restriction of the condylar translation. Stassen and Currie showed that Eminectomy alone can reverse internal derangement and facilitate disc mobility[11].

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