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THE EFFICACY OF HIGH CONDYLECTOMY IN INTERNAL DERANGMENT OF THE TEMPOROMANDIBULAR JOINT

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Abstract

Background: Temporomandibular joint (TMJ) is a giglymoarthroidal Joint; it is the only mobile joint in the entire maxillofacial region and is a part of craniomandibular articulation.

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, GDC Jaipur were included in the study.

Results: At one month follow up out of 20 patients 13 patients were not satisfied and at 6 month follow up 2 patients were not satisfied at all.

Conclusion: We conclude that surgical treatment for internal derangement of the TMJ is required; this technique is effective to improve pain and mouth opening without complications. Although this study has a short follow up period and small sample size.

Keywords: Mandible, Maxilla, TMJ.

Introduction

Temporomandibular joint (TMJ) is a giglymoarthroidal 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.

To facilitate ease in motion the joint consists of fibro articular disc, synovial fluid, ligaments and capsule. It is a dual compartment structure. The condyle articulates with the temporal bone in the mandibular fossa. These two bones are separated by articular disk, which divides the TMJ into superior and inferior compartment. But as the forces of mastication overcome the resistance of these structures, TMJ is subjected to many disorders commonly called as TMDs (Temporomandibular joint disorders) such as TMJ hyper mobility, hypo mobility, internal derangement, degenerative joint disease. Among these Internal derangement and TMJ osteoarthritis are the commonest disorders.

Internal derangement was first described by Hey Davis in 1814 as localized mechanical fault interfering with the smooth action of a joint.[1]

Internal derangement of the temporomandibular joint (TMJ) can be defined as an abnormal relationship of the disc to the condyle , fossa and articular eminence.[2] The disc is usually displaced anteriomedially. Internal derangement is a common problem of the TMJ. **Black wood** reported that anterior disc displacement was a common finding at autopsy, with the displacement being accompanied by either thinning or tearing of the posterior attachment tissue.[3]

Anterior displacement of the disc results in abnormal mandibular function, and it is characterized by reciprocal clicking of the joints(click on opening followed by click on closing).The clicking is the result of the thick posterior band of the disc initially being located anterior to its normal position when the mouth is in closed position. Upon opening of the mouth, the condyle pushes against the posterior band of the disc instead of rotating under the thin intermediate zone; the posterior band thus functions as a mechanical obstruction. The click that occurs on opening is the result of the condyle moving under the posterior band in to the posterior zone (normal relation). The closing click occur when the condyle moves behind the posterior band and the disc slips anteriorly. In the closed lock form of internal derangement the disc is displaced anteriorly and remains anterior to the condyle during entire cycle of opening and closing. Consequently jaw opening is usually limited. This is the most severe form of the disease.

Patients with TMJ internal derangement often complain of limited function and pain additional to the clicking. The pain is the result of the condyle articulating against the bilaminar zone. This zone is not designed to function as an articular area because it contain blood vessels and nerves and pain is felt as the condyle presses against it.[6] 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. Typically, these patients have a prolonged history of clicking that gradually becomes painful followed by a cassation of clicking and the onset of mandibular dysfunction. Crepitus occur as the disease progresses, and this is usually the result of fraying or perforation of the disc or retrodiscal tissue. Patient with internal derangement of the temporomandibular joint have a high incidence of osseous abnormalities; the most common being the osteoarthritis. [7] Internal derangement requiring clinical attention can, be further defined as a condition that produces pain and significant limited range of motion. For purpose of this discussion ID is classified according the Wilkes System.[8]

Stage I Early reducing disc displacement
Stage II Late reducing disc displacement
Stage III Non reducing disc displacement—acute/ sub acute
Stage IV Non reducing disc displacement—chronic
Stage V Non reducing disc displacement—chronic with osteoarthrosis

According to Annandale, Sir Astley Cooper was the first to suspect the existence of altered condyle disk-fossa relation.[9]

Later the term *internal derangement* was adopted to describe any pathologic entity that interfered with the smooth function of the TMJ. The term is currently used exclusively to describe alterations in disk-fossa relations. Historically, clinicians have recognized that surgery for internal derangements should be reserved for patients with pain or dysfunction that is severe and disabling and is refractory to nonsurgical management. These conditions still form the basic indications for surgery. Open surgery of the TMJ for primary disease has undergone a complete metamorphosis as a result of the research and clinical results of surgical arthroscopy. At one time only a handful of surgeons professed the viability of function with a displaced disk and argued against surgical repositioning. Only if the mechanical obstruction is felt to be the primary etiology behind the symptoms is surgery indicated. The surgical management of a collection of sign and symptoms without a clear definition of the pathology is risky at best.[10,11]

The clinical management of TMDS often convoluted in its intertwining of medical, occlusal, physical therapeutic, and some time psychological methods.

Even if surgery is indicated, ignorance of these contributing factors- however minor – may lead to clinical failure ; thus surgeon must weigh and investigate all these factors when deciding whether surgery is necessary. [12]

Material and Method

Study Site:

The study was conducted in the Department of Oral & Maxillofacial Surgery, Government Dental College & 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. Internal derangement of TMJ with osteoarthrosis, terminal joint disease
4. Recurrent cases or previously surgically treated cases

Results

The present study comprises 20 cases of TMJ internal derangement operated in the Department of Oral and Maxillofacial Surgery, Govt. Dental College & Hospital, Jaipur in the duration of Dec. 2010 to Nov. 2011. In this study only the patient with internal derangement having pain in the involved joint and limited mouth opening were included. All cases were operated by removal of only the articulating surface of the condyle “High condylectomy”. Thus there is increase in the joint space and no interference of the disc to the condyle. So there was no pain during movement of the joint.

All patients were referred from general dental practiceners who had previously treated non-surgically. These treatments included various drugs, splint therapy, physiotherapy, multiple steroid injections to the involved TMJ.

The most common reason for patient seeking treatment was pain; dysfunction was the second most common reason.

Table 1: Distribution of Participants According to Age and Sex

Age	Male		Female		Total	
	No.	%	No.	%	No.	%
18-20	3	15.00	0	0.00	3	15.00
21-30	2	10.00	5	25.00	7	35.00
31-40	2	10.00	5	25.00	7	35.00
41-50	0	0.00	3	15.00	3	15.00
Total	7	35.00	13	65.00	20	100.00

Chi-square = 0.879 with 1 degree of freedom; P = 0.348
In our study, out of 20 patients 13 (65 %) patients were female and 7 (35%) patients were male.
Age of participants was in between 18 -50 years. In the age range of 18-20 yr. 3 patient (15 %) ,21-30yr.7 patient (35%), 31-40 yr. 7 patient (35%), 41-50 yr. 3 patient (15 %)

Table 2: Distribution of Study Participants According to Site and Sex

Site	Male		Female		Total	
	No.	%	No.	%	No.	%
Right	6	30.00	8	40.00	14	70.00
Left	1	5.00	5	25.00	6	30.00
Total	7	35.00	13	65.00	20	100.00

Chi-square = 0.377 with 1 degree of freedom; P = 0.539
Out of 20 operated joints 14 joints 70 % are of right side and 6 joints 30% are of left side.

Table 3: Pre & Post Operative Mouth Opening (in mm.)

	N	Mean	Std Dev	'T' Value	'P' Value*
Pre Operative	20	18.65	4.452	12.659	0.000
Post Operative 1 Month	20	31.85	3.937		
Pre Operative	19	17.32	6.092	10.352	0.000
Post Operative 6 Month	19	32.89	8.711		
Pre Operative	18	15.06	8.355	6.913	0.000
Post Operative 12 Month	18	29.41	14.4		

*Paired't' test
Preoperative inter-incisal mouth opening mean was 18.65 with standard deviation 4.452.
Inter-incisal mouth opening at one month Postoperative follow up mean was 31.85,and **Post Operative 6 Month** was 3.89 and at 12 month follow up mean inter incisal mouth opening was 29.41.Table 3 shows improvement in mouth opening. On comparison pre and post operative mouth opening there was significant difference.

Table 4: Pre & Post Operative Pain

	N	Mean	Std Dev	'T' Value	'P' Value*
Pre Operative	20	9.4	0.9403	6.658	0.000
Post Operative 1 Month	20	3.8	3.488		
Pre Operative	19	8.842	2.34	12.293	0.000
Post Operative 6 Month	19	0.8947	1.629		
Pre Operative	18	8.333	3.162	11.126	0.000
Post Operative 12 Month	18	0.1111	0.4714		

*Paired't' test
Pre operative pain mean value was 9.4 with standard deviation 0.9403 and at one month follow up 3.8 at 6 month was 0.8947 and 12 month follow up was 0.1111. Table 4 shows decrease in pain as compared to pre operative and postoperative follow up.

Table 5: Pre & Post Operative Deviation

	N	Mean	Std Dev	'T' Value	'P' Value*
Pre Operative	20	2.35	2.412	4.728	0.000
Post Operative 1 Month	20	0.35	0.8751		
Pre Operative	19	2.368	2.477	4.110	0.000
Post Operative 6 Month	19	0.1053	0.4588		
Pre Operative	18	2.222	2.463	3.743	0.002
Post Operative 12 Month	18	0.08333	0.2572		

*Paired't' test
Pre operative deviation mean value was 2.35 and at one, six, and 12 months follow up was 0.35, 0.1053, 0.08333 respectively shows improvement in deviation as shown in table 5

Table 6: Distribution of Study Participants According to Deviation

Deviation	Pre Operative	Post Operative 1 Month	Post Operative 6 Month	Post Operative 12 Month
Absent	7	17	18	16
Present	13	3	1	2
Total	20	20	19	18

Chi-square = 24.139 with 3 degrees of freedom; P = 0.000

Table 7: Distribution of Study Participants According to Occlusion

Occlusion	Pre Operative	Post Operative 1 Month	Post Operative 6 Month	Post Operative 12 Month
Abnormal	0	0	0	0
Normal	20	20	19	18
Total	20	20	19	18

Post operative occlusion was normal in all cases
No occlusion adjustment was necessary in any case.

Table 8: Distribution of Study Participants According to Facial Nerve Functions

Facial Nerve Functions	Pre Operative	Post Operative 1 Month	Post Operative 6 Month	Post Operative 12 Month
Altered	0	2	0	0
Normal	20	18	19	18
Total	20	20	19	18

Facial nerve weakness was noted at one month follow up in two patients, but no facial nerve weakness was present at six month follow up and later.

Table 9: Distribution of Study Participants According to Satisfaction of Patients

Satisfaction	Post Operative 1 Month	Post Operative 6 Month	Post Operative 12 Month
Absent	7	1	1
Present	13	18	17
Total	20	19	18

Chi-square = 8.552 with 2 degrees of freedom; P = 0.014
At one month follow up out of 20 patients 13 patients were not satisfied and at 6 month follow up 2 patients were not satisfied at all.

Discussion

Orofacial pain including TMDs is a common problem that if miss diagnosed or improperly treated, may lead to chronic pain and major personal crises for the patient. The potential complexity of these disorders can make traditional assessment and management of patient difficult. The variability of pain within and among individuals in terms of description, severity, location, and

progression, which is frequently coupled with behavioral or psychosocial factors, may lead to diagnostic confusion in the clinician. Furthermore, symptoms such as tinnitus, parasthesia and sensitive teeth which are occasionally associated with orofacial pain also lead to misdiagnosis. Thus the frequently overlapping signs and symptoms exhibited by orofacial pain patient can be confusing, often resulting in multiple or vague diagnoses instead of a more specific differential diagnoses.

Several possible contributory factors such as bruxism, postural habbits, or emotional factors may also complicate patient evaluation and if neglected can lead to inadequate or transient treatment outcome. If orofacial pain continues without resolution, emotional and psychosocial problems such as depression, anxiety and lifestyle disturbances may also occur. Failure to consider each of these factors during the diagnostic process can lead to incorrect diagnoses, inadequate treatment regimens and development of a pain syndrome.

Internal derangement of TMJ is one of the important cause of TMJ pain dysfunction .There are various nonsurgical and surgical procedures and methods for treatment of pain and dysfunction due to Internal derangement of TMJ.

In our study Male patients were 35 % and Female patients were 65 % indicating higher prevalence in females.

In our study the diagnosis of the internal derangement (Disc displacement) was confirmed by MRI study. **Roberto E [13], Sanchez-Woodworth** also showed the role of MRI in evaluation of internal derangement of TMJ.

The study of **P.Banks, I.Mackenzie [14]** demonstrated that with the condylotomy procedure 91% cases were cured or improved. Their study also shows that 32.2 % patients subsenquently developed pain in the contralateral joint after unilateral condylotomy.

L. George Upton [15] reported that condylotomy is superior to the traditional disc repositioning procedures in outcome such as reduction in pain, clicking, catching, and locking as well as muscle pain. Development of malocclusion is major criticism directed toward condylotomy. In our study using high condylectomy no malocclusion was developed in any of the cases.

Study of **L. George Upton [15]** also demonstrated that 17.2 % cases of disc repositioning require 2nd surgery whereas in the condylotomy group only 5.1 % required reoperation.

According to **Sadako Kai [16]** and others after the non surgical treatment in non-reducing anterior disc displacement, the clinical signs and symptoms improved significantly, although the prevalence of osteo-arthrotic findings increased.

Long term follow up study of **Samuel J. McKenna [17]** stated the role of modified conylotomy in internal derangement of TMJ and stated that modified conylotomy can frequently reverse an internal derangement and seems to protect against the natural progression of osteoarthrosis.

Robert V. Walker, Sabah Kalamchi [18] treated the patients of internal derangement by a surgical technique in which 2-4 mm of the top of the condyle was removed and disc was sutured to the top of the condyle and lateral capsule. Their results have shown that the patient's preoperative signs and symptoms were resolved with no recurrence and no occlusal adjustment or appliance was necessary in any case.

Similarily in our study no occlusal adjustment or appliance was necessary in any of the cases and most of cases at follow up of six to 12 month improved regarding pain and mouh opening.

According to study of **H. David Hall [19]** modified condylotomy is a safe and effective operative procedure for treating pain and diminished function of TMJ with non-reducing disc displacement. T he mean rate of favorable outcome was 87%.

In our study using high condylectomy most of patients become pain free and their mouth opening was increased at follow up of 6-12 months.

Sidey L. Bronstein[20], also concluded that good relief of pain and dysfunction symptoms and reversal of internal joint derangement using modified condylotomy.

In our study 20 patients were treated with high condylectomy through preauricular approach. At one month follow up period mean pain score was 3.8 as compared to preoperative pain score that was 9.4, so, there was a significant improvement in pain. Pain was the main problem of the patients. The Mouth opening mean at preoperative time was 18.65 which increased to 32.89 at 6 month follow up, shows a good improvement in mouth opening.

Occlusion of all the patients was normal at one month, six month, and 1 year follow up period, no occlusal adjustment was done in any of the cases, also no intermaxillary fixation was done in any case. This is also an advantage of our procedure. Facial nerve function was normal in all the cases at follow up of 6 months and 12 months. Out of 20 patients only two patients had facial nerve weakness at one month follow up and that was transient. Deviation from mid line did not occur after surgery in any patient and deviation present prior to surgery was improved in most of the cases. Out of 20patients of our study, 13 patients were satisfied at one month postoperative period and at 6 month follow up two patients were not satisfied.

Conclusion

We conclude that surgical treatment for internal derangement of the TMJ is required, this technique is effective to improve pain and mouth opening without complications. Although this study has a short follow up period and small sample size.

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