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"Management of Chronic Recurrent TMS Dislocation; Evaluation of Functional Outcomes and MRI Findings of As theorocenses and ABI into Joint space"

Dr. Prashant Punde1 Reader, Dr. Kumar Nilesh2 Reader, Dr. Pankaj Patil3
Reader Dept of Oral and Maxillofacial Surgery of School of Dental Sciences, Karad.

School of Dental Sciences, Krishna Institute Of Medical Sciences, "Deemed To Be University", Karad (Dist. Satara), Maharashtra, India-415110

Abstract
The oral and maxillofacial surgeon faces a problem when it comes to treating dislocation of the TMJ, a pathophysiologic joint ailment. When a person has a TMJ dislocation, the condyle moves to a position in front of a specific eminence on a broad mouth opening. This condition can be brought on by irregular joint form, ligament looseness, or decreased muscle tension (Hasson O, Nahlieli O., 2001). TMJ dislocation is a complex condition, and its pathophysiology can involve myospasm, trauma, abnormalities in masticatory movements, capsular weakening, ligamentous laxity, and unusual eminence size (morphology or projection).

A unique junction between the mandible and the temporal bone of the skull is called the temporomandibular joint (TMJ). In a concavity called the glenoid fossa, the condyle of the jaw articulates bilaterally.

TMDs are a broad category of clinical diseases and functional alterations affecting the TMJ, masticatory muscles, and other parts of the maxillofacial region. Due to the psychological stress in our contemporary environment, there are more patients with TMDs today (Tvrdy P, Heinz P, Pink R., 2013 and Antczak-Bouckoms A, 1995).

Keyword: Temporomandibular, condyle, mandible articulates, glenoid fossa

Introduction

Acute, chronic, and recurrent TMJ dislocations are the three forms that are generally recognised. People who have chronic dislocations frequently encounter them as a result of daily activities like excessive jaw opening and yawning. Acute dislocations begin as an acute condition and proceed to a chronic stage if untreated. It can become physically and emotionally upsetting and cause major hindrance in a patient's daily life. 1.8% of the general population has it (Kuttenberger J, Hardt N, 2004). Injuries to the disc, capsule, and ligaments may result from untreated, advancing disease and may hasten the internal derangement of the TMJ and the arthritic joint (Kuttenberger J, Hardt N, 2004). The literature describes numerous surgical and non-surgical methods for treating patients with

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persistent recurring TMJ dislocations. Condylar mobility beyond the articular eminence is intended to be restricted by surgical treatments that create a mechanical blockage along the condylar route. The following surgical procedures are also included: condylectomy, lateral pterygoid myotomy, scarification of the temporalis tendon, and reduction or augmentation of the articular eminence.

Hospitalization, general anaesthesia, access to the TMJ region, and a complex open surgical TMJ procedure are all prerequisites for the surgical procedures. Due to the complicated anatomy of the TMJ, surgical intervention for treating TMJ is extremely important and necessitates precise dissection. They come with a risk of complications, including damage to the facial nerve, altered feeling, swellup, discomfort, and infection. Additionally, surgical management may be harmful to people who already have poor health.

Over the past few decades, conservative treatment for chronic, recurring TMJ dislocation has gained popularity. The use of sclerosing medications, such as alcohol, sodium tetradecyl sulphate, sodium psylliate, and sodium morrhuate sodium, as well as the immobilisation of the jaw with arch bars and ligature wires/intermaxillary fixation (IMF), are some of the therapy options for conservative care (Caminiti M, Weinberg S., 1964). The procedure's many side effects, such as allergic reaction to sclerosing agents and botox, postoperative edoema, and infection, limit the adoption of these procedures on a large scale.

An innovative therapeutic strategy for chronic recurring TMJ dislocation is autologous blood injection (ABI). In 1964, Brachmann made the first mention of it. In 1973, Schultz also documented the use of ABI to treat patients with recurring TMJ dislocations. ABI was applied to the afflicted TMJ twice weekly for three weeks as part of the therapy procedure, which was then followed with intermaxillary fixation for four weeks. When treating individuals with TMJ dislocation, Jacobi Hermanns et al. (1981) described their experience. The procedure called for intermaxillary fixation for two weeks after a single ABI session. Although there were positive reports regarding the use of ABI for the treatment of TMJ dislocation, this method was not employed for a long time after that. In order to treat TMJ dislocations that occur repeatedly, Hasson once more introduced ABI in 2001.

The goal of ABI is to limit mandibular movement by injecting blood into the TMJ and causing fibrosis in the upper joint area, pericapsular tissues, or both. There is no risk of an allergic response or postoperative infection with this conservative procedure because the patient's own blood is used to inject the TMJ. Blood pumped into the joint area aids in the TMJ fibrosis process. In order to treat recurrent TMJ dislocation, arthrocenthesis is

followed by an injection of autologous blood into the joint space. This study also examines the MRI results after the injection of autologous blood into the temporomandibular joint space.

Aims and Objectives

In order to manage chronic recurring TMJ dislocation, the study's objective is to assess the functional outcome and MRI results of artherocentsis followed by ABI into the joint space. The following strategies will be used to achieve this Objectives:

(i) To evaluate efficacy and safety of ABI in treating patients suffering from chronic recurrent TMJ dislocation.

(ii) To evaluate the results after ABI in and around the TMJ for the treatment of chronic recurrent TMJ dislocation.

(iii) Investigate the MRI changes in TMJ after ABI.

Review of Literature

Brachmann F (1964) was "the first to successfully treat 60 patients suffering from recurrent TMJ dislocation using ABI in TMJ".

Schultz S (1973) reported "treatment of 16 patients suffering from recurrent dislocation of the TMJ by ABI. The protocol of treatment included injection of autologous blood to the affected TMJ two times a week for 3 weeks followed by intermaxillary fixation for 4 weeks. Of the 16 patients, ten patients were symptom free after 1 year of follow-up, seven patients after 2 years of follow-up, and five patients after 5 years of follow-up".

Hasson O and Nahlieli 0 (2001) reported their "experience about ABI into the TMJ for treatment of recurrent dislocation of the TMJ for three patients. They reported that all of their cases showed good result after ABI with no complications. Only one patient, who had bilateral eminectomy previously, reported one episode of unilateral subluxation of the condyle 18 months after the procedure".

Kato et al. (2007) reported "a case of recurrent TMJ dislocation, which was treated with ABI into the articular cavity. Although the patient experienced subluxations over the next several days postoperatively, she was able to reduce the jaw herself. The subluxations finished after several days. Because the patient was able to close her mouth and perform her daily activity such as feeding, authors did not perform further any treatment".

Machon et al. (2009) reported "their experience about use of ABI in treatment of chronic recurrent TMJ dislocation. Of the 25 patients, who participated in their study, 9 patients after 1 week and one patient after 4 weeks experienced re-dislocation. These patients were scheduled for reinjection. Of these ten patients, five reported re- dislocation at their

follow-up. The remaining five patients were treated for the third time but continued to dislocate, and they were selected for open TMJ surgery. Considering all the patients who received one, two, or three injections, 20 patients (80 %) did not experienced re-dislocation at their 12-month follow-up. The average postoperative maximal mouth opening was decreased to 35 mm (range, 31–41). None of the patients reported any complications during the follow-up periods".

Daif ET (2010) assessed "the ABI technique in treatment of patients suffering from chronic recurrent TMJ dislocation. In his study, 30 patients were randomly divided into two equal groups. Group A was treated by injection of 2 ml autologous blood into the superior joint space (SJS), and group B received ABIs to the SJS (2 ml) and an additional 1 ml of blood in pericapsular tissues (PT). He found that injection of the blood into the SJS and PT gives a higher success rate (80 %) than its injection only into the SJS (60 %). In his study, the maximal mouth opening was decreased significantly in both groups after the injection with a higher rate in group B. At 1-year postoperative period, the digital radiographic evaluations showed that the condylar head was placed posterior to the articular eminence during mouth opening in group B, while it was placed. This finding was not seen in group A. There were no serious complications or destructive changes to the bony components of the joint during the follow-up periods".

Candirli C et al. (2012) evaluated "the pathophysiology of ABI using clinical findings and MRI. In their study, MRI images were taken preoperatively and 1 month postoperatively. During the follow up period (4 weeks after ABI) no dislocations were reported. In the second month after the procedure, one of the patients reported recurrent dislocation. In addition, two patients mentioned that the incidence of dislocation had reduced but not completely resolved. ABI was repeated for these patients, and good results were achieved. During the evaluation of the preoperative MRI images, no articular cartilage degeneration, disc displacement, or osteoarthritis were seen. During the preoperative evaluation, it was identified that the patients had unilateral or bilateral condyles anterior to the particular eminence in the open mouth position, while the postoperative MRI images revealed that the condyles were either at the apex of the articular eminence or posterior to it".

Hegab AF (2013) "conducted a prospective, randomized, controlled clinical trial to evaluate treatment of recurrent dislocation of the TMJ with ABI alone, intermaxillary fixation alone, or both together. Six patients in the ABI-alone group showed recurrences after the first injection. These patients were treated with repeated injections, and two patients reported redislocation. After the third injections for these two patients, no further recurrence was reported. In inter maxillary fixation (IMF)- alone group, only three patients reported redislocation 2 weeks after IMF removal. These patients were treated

by IMF for an additional 2 weeks, and no further recurrence was reported after this period of time. No recurrence was reported in the combined group. He mentioned that IMF as an adjunctive to ABI can help the formation of mature fibrous tissue because excessive mouth opening can disturb the integrity of the fibrosis, resulting in recurrent dislocation".

Oshiro N et al. (2014) conducted "a study to investigate MRI findings following ABI for habitual TMJ dislocation. Fourteen consecutive patients (4 males, 10 females) diagnosed with habitual TMJ dislocation were included in this prospective study. Mean age at the time of presentation was 57.0 years (range, 17 to 82 years). Six cases involved left-side TMJ dislocation, and 8 cases were right-sided. Mean duration of symptoms was 32.6 months. All patients underwent ABI to the TMJ. All procedures were performed by the same surgeon, in the same hospital, and following the same protocol. They examined the number of dislocation episodes and duration of symptoms in a medical interview. MRI was performed one hour and four and twelve weeks after ABI, revealing three types of significant findings. The first type was similar to hematoma and/or joint effusion in the articular capsule of the TMJ (type I). The second showed sporadic and diffuse T2 emphasis around the TMJ capsule (type II). The third involved a decreased range of condyle movement compared to before ABI (type III). Furthermore, they analyzed the three types of significant MRI findings. At one hour after ABI, type I was Grade 0 in 0 of 14 patients, Grade 1 in 8, Grade 2 in 2, and Grade 3 in 4. Type II was seen in 9 of the 14 cases and type III in 8. After twelve weeks, all cases of type I were Grade 0, no type II cases were evident, and type III was seen in 11 cases. Injecting autologous blood into surrounding TMJ tissues is an important factor in ABI. Minimally invasive treatment for habitual TMJ dislocation using ABI around the TMJ capsule appears to represent a very effective and safe treatment".

Varedi P and Bohluli B (2015) reviewed the "literature on the efficacy and safety of ABI in treating patients suffering from chronic recurrent TMJ dislocation. A literature search was performed using PubMed, Medline, and Ovid Medline databases to identify articles reporting on the ABI for treatment of chronic recurrent dislocation of TMJ. Seven studies meeting the inclusion criteria were reviewed. The selected articles included four prospective clinical trials and three case report articles. Reviewing of the literature showed that there are successful results about this modality, but there are still some concerns about it in terms of the effect of the injected blood on the articular cartilage and formation of fibrous or bony ankylosis".

Koparal M (2016) conducted "a study on conservative treatment of recurrent TMJ dislocation with ABI. This study included patients had a long history of 3 or more episodes of dislocation during daily activities (e.g. eating, drinking, laughing, and

ISSN 2515-8260 Volume 09, Issue 07, 2022

yawning), rejected undergoing surgery, and had no history treatment due to this complaint. Of these, 23 patients with TMJ dislocation underwent ABI to TMJ. At 1- year follow-up, no complication was observed in any patient and the complaints resolved in all but 2 patients".

Materials and Methods

The Department of Oral and Maxillofacial Surgery of the School of Dental Sciences at Krishna Institute of Medical Sciences Deemed University, Karad, carried out the current study with the proper consent of the Institutional Ethical Committee. The following inclusion and exclusion standards are in effect:

Inclusion Criteria

1. Patients between 18 to 55 years of age group.
2. Patient with at least two episodes of TMJ dislocation in the past 6 months.
3. Patients willing to participate in the study and provide written informed consent for the procedure.

Exclusion Criteria

1. Patients with blood dyscrasias.
2. Patients who were not willing for follow up visits.
3. Patients with degenerative joint disorders.
4. Edentulous patients with bilateral missing molars.

The preoperative assessment included:

a) Case history
b) Clinical TMJ examination
c) Laboratory investigation (Complete haemogram)
d) Orthopantomogram
e) TMJ view (Closed and open mouth position)
f) MRI of TMJ

A thorough history and clinical examination was performed and recorded based on the case history Performa (Annexure I). The patients were diagnosed with recurrent TMJ dislocation based on clinical and radiological findings, which included:

1) History of recent episodes of recurrent TMJ dislocation, with minimum of 2 episodes in past 6 months.
2) Radiographic evidence of condylar head anterior to articular eminence in open mouth position.
3) Pre-operative MRI with evidence of TMJ hypermobility.

ISSN 2515-8260 Volume 09, Issue 07, 2022

All of the study participants received a thorough explanation of the process, any potential side effects, and the required follow-up time. Patients who agreed to participate in the procedure and follow-up visits were given a place in the trial. All patients provided written consent after being fully informed.

Methodology

Ten patients diagnosed with recurrent TMJ dislocation based on clinical and radiological findings were selected for this study.

Clinical Procedure of Artherocentesis and Autologous Blood Injection

(i) Skin painting and Local anaesthesia

Povidone-iodine solution (10% W/V) was used to clean and sanitise the preauricular area and the ear. Sterile drapes were placed over the area surrounding the surgery site. With sterile cotton palliate, the external auditory meatus was occluded. Using local anaesthesia (2% lidocaine with 1:100,000 epinephrine), an auriculotemporal nerve block was administered on both sides. The TMJ condyle was felt with the index finger as the patient opened and closed their jaws for the auriculotemporal nerve block. Then, with the patient's mouth wide open, the finger was guided inferiorly along the condyle's contour until it reached the neck of the condyle, which is positioned roughly 1 to 1.5 cm below the tragus. At a depth of roughly 13 mm posterior to the jaw, the needle was entered, and the solution was administered.

(ii) Markings for artherocentesis of TMJ

From the tragus's centre to its lateral canthus, a straight line was formed. 10 mm from the tragus's centre and 2 mm below the line, the Point A was situated along the canthotragal line. The Point B was situated 10 mm below it and 10 mm above it along the line. These skin-surface marks point to where the articular fossa and TMJ eminence are located.

(iii) Artherocentesis of TMJ

A second 18-gauge needle was put into Point B to allow fluid to leave during the lavage. Point A was used to introduce the lavage solution. Approximately 10 mL of lactated Ringers solution was progressively pumped into the joint. The second needle from Point B was removed following the conclusion of lavage. The patient's anticubital fossa was used to obtain three millilitres of blood after the arthrocenthesis surgery. In the UJS, two millilitres were injected, and one millilitre was injected surrounding the capsule. The identical steps were done on the other side of the body.

(iv) Post Operative Care

ISSN 2515-8260 Volume 09, Issue 07, 2022

The patients were given detailed instructions following the treatment to direct their postoperative rehabilitation and develop a controlled mouth opening. Among the postoperative instructions are:

- Oral Antibiotic: Each patient received a prescription for 5 days worth of cap. amoxicillin (500mg; 8 hourly). A 5-day prescription for analgesic Tab.Diclomol (Diclofenac 50 mg + Paracetamol 500 mg) was written.
- During the first week, patients were instructed to adhere to a diet consisting solely of soft foods and wear head coverings at all times to keep their mouths open to no more than 20 mm.
- The patients began receiving jaw rehabilitation exercises in front of a mirror at 2 weeks. These exercises were gradual and regulated. They were told to just wear the head covering while they slept and to change their diet as tolerated.

(v) Parameters evaluated

The parameters evaluated included:

A) Clinical Parameters

- Pain: It was assessed (for presence or absence) during opening and shutting the TMJ both before surgery and one week later. 4 week and 3 month time frames.
- Maximum inter-incisal opening (MIO): It was measured (in mm) from the incisal edge of 11 to 41, in the maximum mouth opening posture, before surgery and three months after surgery.
- TMJ dislocation frequency was assessed before surgery as well as one week, four weeks, and three months thereafter.
- Facial nerve injury: It was assessed one week after surgery and again at four weeks and three months afterwards.

- Clicking sound: The presence of clicking sounds during mouth opening and closure was graded by the operator using the following scale: 1 for low, 2 for mild, 3 for intense, and 4 for severe. It was assessed before the operation as well as at 4 and 3 weeks afterward.

B) MRI evaluation

Preoperative and three months after surgery, TMJ MRIs were performed.

(i) Angle between condylar head and TMJ disc was one of the variables under investigation.

(ii) Condyle to external auditory canal separation (EAC).

(iii) Condyle placement.

ISSN 2515-8260 Volume 09, Issue 07, 2022

Observations and Results

This study evaluated "the functional outcome and MRI findings of artherocentsis followed by ABI into the joint space for management of chronic recurrent TMJ dislocation. Total 10 patients (both male and female) with chronic recurrent TMJ dislocation participated. The age of patients included in this study ranged from 21 years to 55 years, with mean of 28.90±10.027. Total 6 males (60%) and 4 females (40%)".

Aetiology for TMJ dislocation found in was unknown in 3 (30%) patients was due to occlusal disharmony in 1 (10%) patient, dental procedure (Surgical extraction) in 2 (20%) patients, dental procedure (Root canal treatment) in 2 (20%) patients and trauma in 2 (20%) patients.

The type of TMJ dislocation found in this study was, unilateral in 1 (10%) patient and bilateral in 9 (90%) patients. Duration of TMJ dislocation was 3 months in 3 (30%) patients, 4 months in 2 (20%) patients, 5 months in 1 (10%) patient, 6 months in 2 (20%) patients, 8 months in 1 (10%) patient and 12 months in 1 (10%) patient. Duration of TMJ dislocation was minimum of 3 and maximum of 12 months, with mean 5.40±2.836.

Method for reduction of TMJ dislocation was self reduction in 8 (80%) patients, reduction by son in 1 (10%) patients and reduction by brother in 1 (10%) patient.

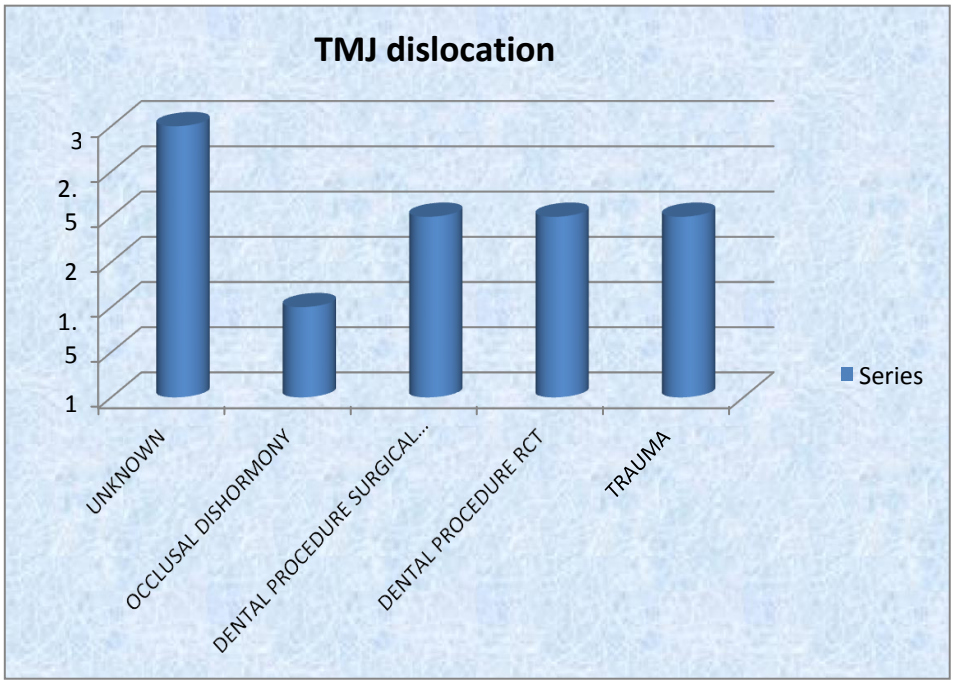
A. Clinical Parameter

(i) Pain: "It was evaluated (for presence or absence) during opening and closing the TMJ preoperatively and post operatively after 1 week, 4 weeks and 3 months periods. Pre-operatively pain was present in 7 (70%) patients and absent in 3 (30%) patient. Post operatively after 1 week pain was present in 6 (60%) patients and absent in 4 (40%) patients, after 4 weeks pain was present in 2 (20%) patients and absent in 8 (80%) patients, after 3 months pain was present in 2 (20%) patients and absent in 8 (80%) patients. Comparison of pain over the four time intervals showed statistically significant difference (p value- .041; Kruskal Wallis Test)".

(ii) Maximum inter-incisal opening: "It was measured (in mm) from incisal edge of 11 to 41, in maximum mouth opening position at pre-operatively and 3 months post operative period". "Pre-operatively MIO was 45 mm in 1 (10%) patient, 47 mm in 2 (20%) patients, 48 mm in 2 (20%) patients, 50 mm in 2 (20%) patients, 51 mm in 1 (10%) patient, 52 mm in 1 (10%) patient, 58 mm in 1 (10%) patient. Minimum pre-operative MIO was 45 mm and maximum MIO was 58 mm with mean of 49.60±3.627. Post-operatively after 3 months MIO was 27 mm in 1 (10%) patient, 34 mm in 2 (20%) patients, 39 mm in 2 (20%) patients, 40 mm in 1

(10%) patient, 42 mm in 1 (10%) patient, 47 mm in 1 (10%) patient, 50 mm in 1 (10%) patient and 51 mm in 1 (10%) patient. Minimum MIO was 27 mm and maximum 51 mm with mean 40.30±7.573. Difference between pre-operative and post-operative MIO was minimum 0 mm and maximum 21 mm with mean 9.30±.219".

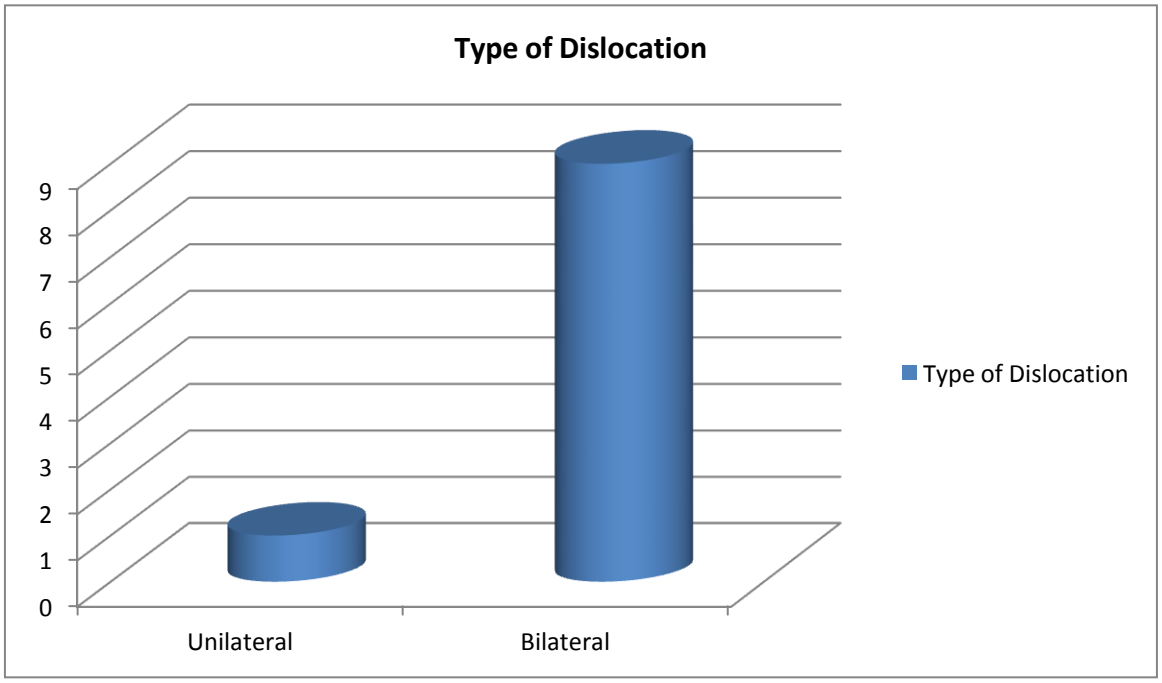
Figure 1: Frequency Distribution of etiology for TMJ dislocation



(iii) Frequency of TMJ dislocation (per week): "It was evaluated pre-operatively and at 1 week, 4 weeks and 3 months post operative period. Frequency of TMJ dislocation pre-operatively was found 1 in 4 (40%) patients and 2 in 6 (60%) patients. Post operatively (after 1 week) it was not seen in any patients, after 4 weeks it was not seen in 3 (30%) patients but 1 episode of dislocation was found in 4 (40%) patients and 2 episodes was found in 3 (30%) patients and after 3 months it was not seen in 8 (80%) patients but still 2 episodes was found in 2 (20%) patients".

ISSN 2515-8260 Volume 09, Issue 07, 2022

Figure 2: Frequency Distribution of type of TMJ dislocation



Comparing frequency of dislocation at 4 times intervals that showed statistical significant difference (p value- <.001; Kruskal Wallis Test).

(iv) Facial nerve injury: "It was evaluated at 1 week, 4 weeks and 3 months post operative period". No facial nerve injury was seen in any patients at all the operative intervals.

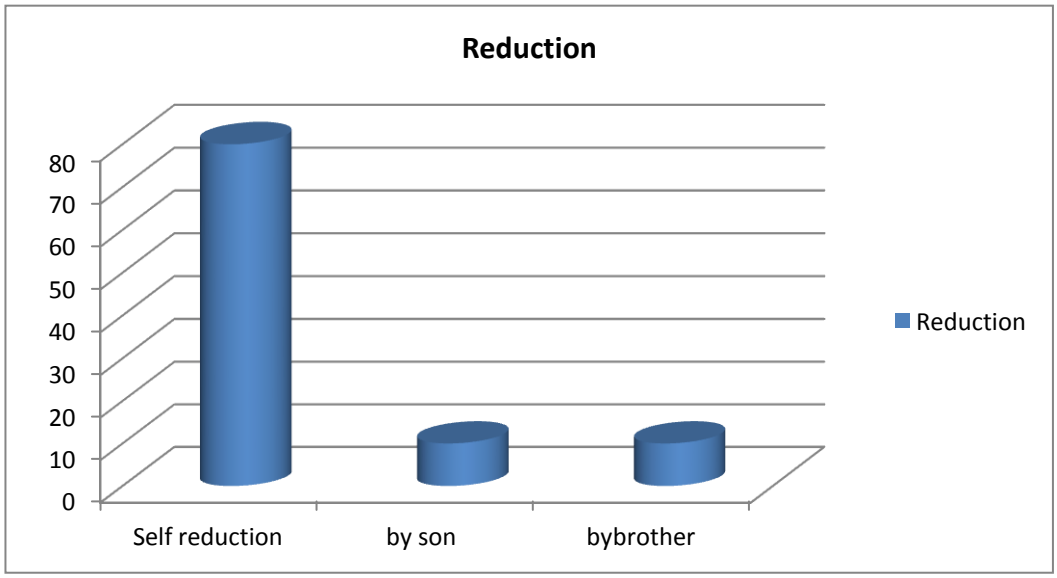
(v) Clicking sound: "Presence of clicking sounds during mouth opening and closing was rated by operator as follows: 1 = low, 2 = mild, 3 = intense, and 4 = severe. It was evaluated pre-operatively and at 4 weeks and 3 months post operative period". Clicking sound evaluated pre-operatively, "showed no sound present in 1 (10%) patient, mild sound present in 3 (30%) patient, intense sound present in 5 (50%) patients and severe sound present in 1 (10%) patient. Post- operatively after 4 weeks, no sound was present in 5 (50%) patients, mild sound was present in 3 (30%) patients, intense sound was present in 1 (10%) patient and severe sound was present in 1 (10%) patient. After 3 months, no sound was present in 6 (60%) patients, mild sound was present in 2 (20%) patients, intense sound was present in 1 (10%) patient and severe sound was present in 1 (10%) patient".

ISSN 2515-8260 Volume 09, Issue 07, 2022

Table 1: Frequency Distribution of type of TMJ dislocation

	Frequency	Percent	Valid Percent	CumulativePercent
Unilateral	1	10.0	10.0	10.0
Bilateral	9	90.0	90.0	100.0
Total	10	100.0	100.0	

Figure 3: Frequency Distribution of Reduction of TMJ dislocation



B. MRI Evaluation

1) Parameter 1: [Angle between condylar head and TMJ disk]

Measurement of angle between condylar head and TMJ disk pre-operative showed value of minimum 36o and maximum 80o on right side (with mean 55.70±14.221) and minimum 29o and maximum 74o (with mean 55.50±14.393) on left side. Post-operatively (after 3 months) it was minimum of 16o and maximum 50o on right side (with mean 25.50±13.015) and minimum 11o and maximum 54o (with mean 22.40±12.103) on left side.

Table 2: Descriptive Statistics for angle between condyle and TMJ disk for bothsides

Descriptive Statistics	N	Minimum	Maximum	Mean	*Std. Deviation*
RTPREOP	10	36	80	55.70	*14.221*
LTPREOP	10	29	74	55.50	*14.393*
RT POST OP	10	16	50	25.50	*13.015*
LFT POST OP	10	11	54	22.40	*12.103*
Valid N (listwise)	*10*				

Comparing before and after values of this parameter that, "showed pre- operative versus post-operative right TMJ with mean 30.20±21.581 which showed statistically significant difference (p value- 0.002 Paired t Test) and pre-operative and post-operative left TMJ with mean 33.10±21.581 which showed statistically significant difference (p value- 0.001 Paired t Test)".

Table 3: Comparing before and after values for angle condyle and TMJ disk forboth right and left sides by Paired t Test

	Mean	**Std. Deviation**	**Std. Error Mean**	**95% Confidence Interval of the Difference**		**t value**	**df**	***P value***
				Lower	Upper			
Pre op Right Vs post OP Right	30.20	21.581	6.824	14.762	45.638	4.425	9	***.002***
Pre op Left Vs post OP Left	*33.10*	*21.820*	*6.900*	*17.491*	*48.709*	*4.797*	*9*	***.001***

2) Parameter 2: [Distance between condyle and EAC]

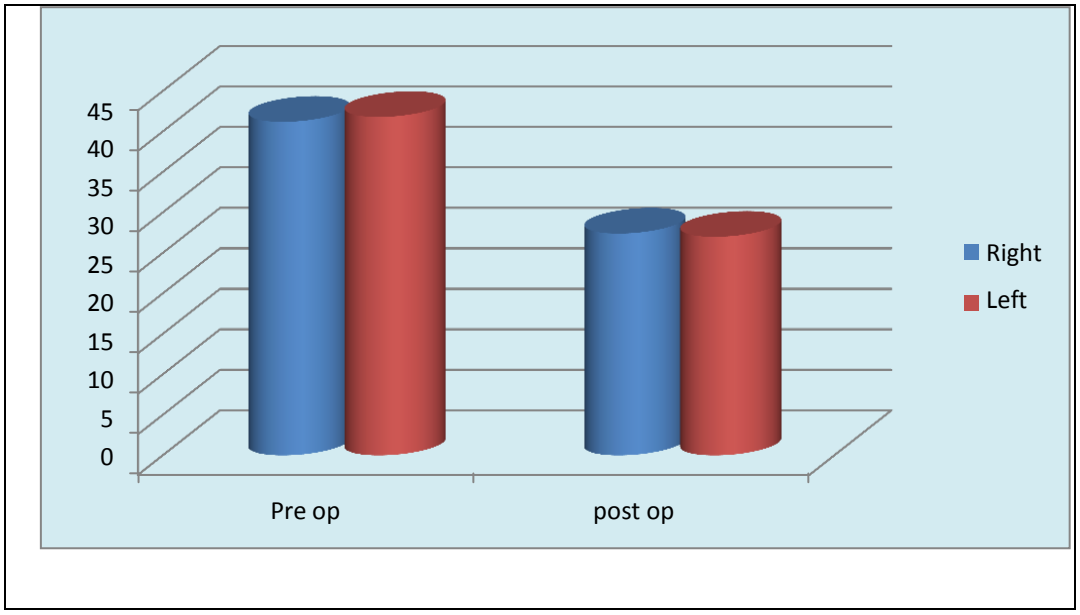
Pre-operatively "the distance between condyle and EAC on right side ranged from 28 mm to 48 mm (with mean 41.20±5.613) on left side from 34 mm to 47 mm (with mean 41.80±3.882). Post-operative (at 3 months) right TMJ showed minimum 14 mm and maximum 47 mm (with mean 27.40±9.204) and left TMJ showed minimum 11 mm and maximum 41 mm (with mean 27.00±8.537)".

Table 4: Descriptive Statistics for Distance from condyle to EAC for both sides

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
RT PRE	10	28	48	41.20	5.613
LFT PRE	10	34	47	41.80	3.882
RT POST	10	14	47	27.40	9.204
LFT POST	10	11	41	27.00	8.537

ISSN 2515-8260 Volume 09, Issue 07, 2022

Figure 4: Descriptive Statistics of distance from condyle to EAC for both sides



Comparing before and after values of "this parameter showed pre-operative and post-operative change in right TMJ with mean 13.80±7.671, which was statistically significant (p value- <.001 Paired t Test) and pre operative and post-operative difference of left TMJ, with mean 14.80±8.728 which was statistically significant (p value- <.001 Paired t test)".

Table 5: Comparing before and after values for EAC values for both right and leftsides by Paired t Test

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t value	df	P value
				Lower	Upper			
Pre op Right Vs post OP Right	13.800	7.671	2.426	8.312	19.288	5.689	9	**<.001**
Pre op Left Vs post OP Left	14.800	8.728	2.760	8.556	21.044	5.362	9	**<.001**

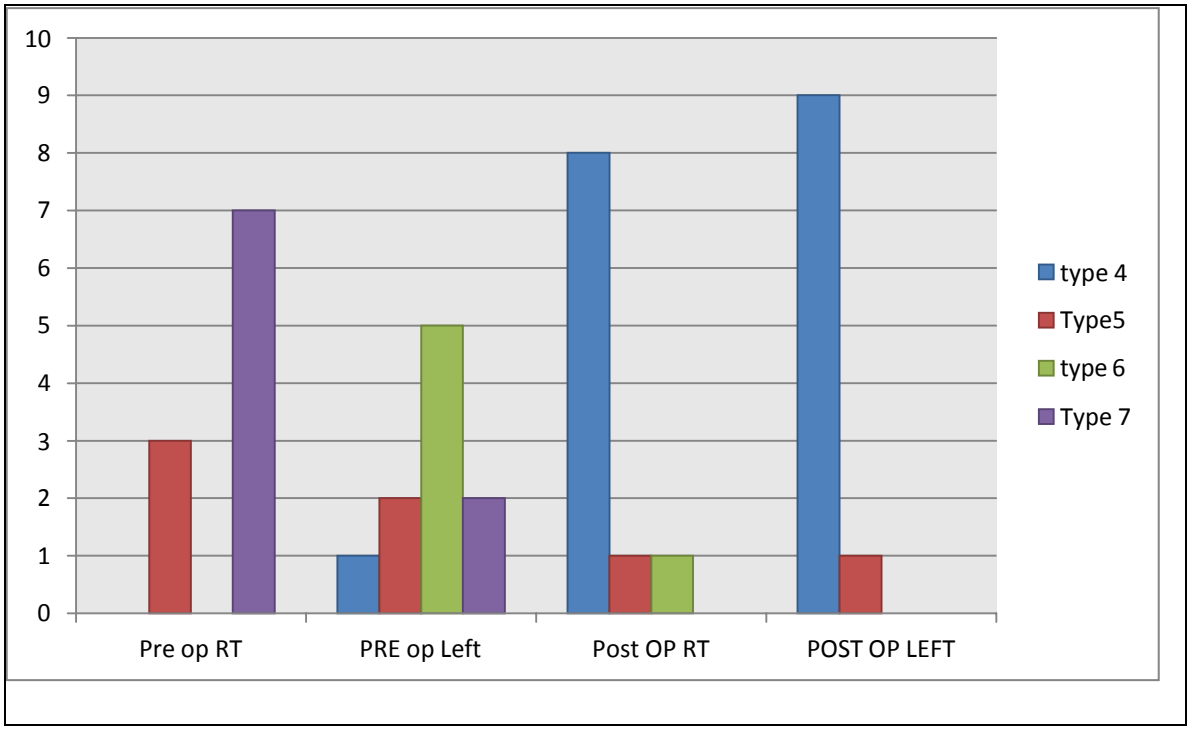
3) Parameter 3: Type of the condyle position

Type of condylar position in pre-operative MRI showed, "right pre-operative TMJ type 4 in 0 (0%) patient, type 5 in 3 (30%) patients, type 6 in 0 (0%) patient, type 7 in 7(70%) patients and left pre-operative TMJ type 4 in 1 (10%) patient, type 5 in 2(20%) patients, type 6 in 5 (50%) patients and type 7 in 2 (20%). Post -operative after 3 months right TMJ showed Type 4 in 8 (80%) patients, type 5 in 1 (10%) patient, type 6 in 1 (10%) patient and type 7 in 0 (0%) patient and left TMJ showed type 4 in 9(90%) patients, type 5 in 1 (10%) patient, type 6 in 0(0%) patient and type 7 in 0(0%) patient".

Table 6: Frequency Distribution for condylar position

Type	Pre Op RT	Pre Op LefT	Post Op RT	Post Op Left
4	0(0%)	1 (10%)	8(80%)	9(90%)
5	3(30%)	2(20%)	1(10%)	1(10%)
6	0(0%)	5(50%)	1(10%)	0(0%)
7	7(70%)	2(20%)	0(0%)	0(0%)
Total	10(100%)	10(100%)	10(100%)	10(100%)

Figure 5: Frequency Distribution for condylar head relation type among both sides



Comparing before and after values of type of condylar position pre-operative and post-operative, right TMJ that showed statistically significant difference (p value- .008 Wilcoxon Signed Ranked test) and pre-operative and post- operative type of left TMJ that

showed statistically significant difference (p value- 0.10 Wilcoxon Signed Ranked test). [Table 18]

Table 7: Comparing before and after values type of condyle position for both rightand left sides by Wilcoxon Signed Ranked test

Test Statistics[a]	TYPE LFT PRE - TYPE LFTPOST	TYPE RT POST - TYPE RT PRE
Z	-2.588[b]	-2.640[c]
Asymp. Sig. (2-tailed) p value	**.010**	**.008**

Table 8: Frequency Distribution of Pain at four intervals of Duration

Pain	Pre Op	1week	4 week	3months
Absent	3(30%)	4(40%)	8(80%)	8(80%)
present	7(70%)	6(60%)	2(20%)	2(20%)
Total	10(100%)	10(100%)	10(100%)	10(100%)

Figure 6: Frequency Distribution of Pain at four intervals of Duration

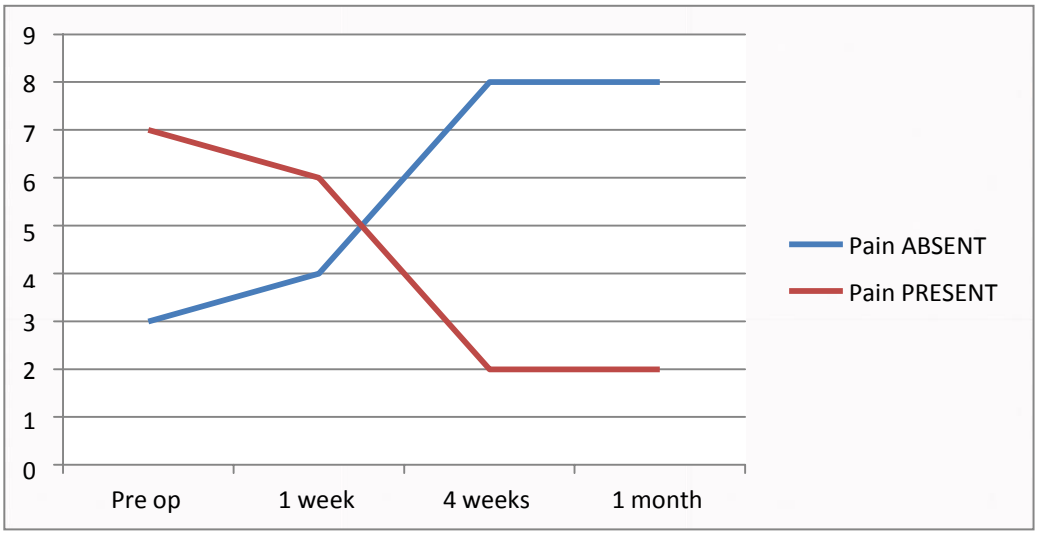


Table 9: Frequency Distribution of Pre-operative and Post-operative MIO

PREOP MIO	Frequency	Percent	Valid Percent	Cumulative Percent
45	1	10.0	10.0	10.0
47	2	20.0	20.0	30.0
48	2	20.0	20.0	50.0

50	2	20.0	20.0	70.0
51	1	10.0	10.0	80.0
52	1	10.0	10.0	90.0
58	1	10.0	10.0	100.0
Total	10	100.0	100.0	

POST OPMIO	Frequency	Percent	Valid Percent	CumulativePercent
27	1	10.0	10.0	10.0
34	2	20.0	20.0	30.0
39	2	20.0	20.0	50.0
40	1	10.0	10.0	60.0
42	1	10.0	10.0	70.0
47	1	10.0	10.0	80.0
50	1	10.0	10.0	90.0
51	1	10.0	10.0	100.0
Total	10	100.0	100.0	

Table 10: Descriptive Statistics of Pre and Post operative MIO

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
PREOP MIO	10	45	58	49.60	3.627
POST OP MIO	10	27	51	40.30	7.573

Table 11: Frequency Distribution for TMJ dislocation over 4 intervals time period

Frequecy of TMJ dilocation	Pre Op	1week	4 week	3months
0	0(0%)	10(100%)	3(30%)	8(80%)
1	4(40%)	0(0%)	4(40%)	0(0%)
2	6(60%)	0(0%)	3 (30%)	2(20%)
Total	10(100 %)	10(100%)	10(100%)	10(100%)

ISSN 2515-8260 Volume 09, Issue 07, 2022

Figure 7: Frequency Distribution for pain at four interval of duration

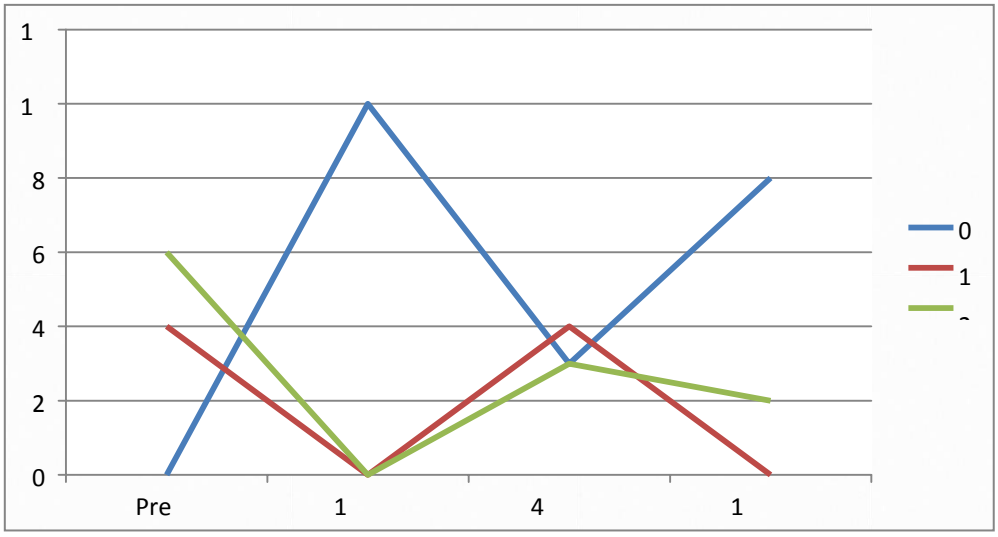
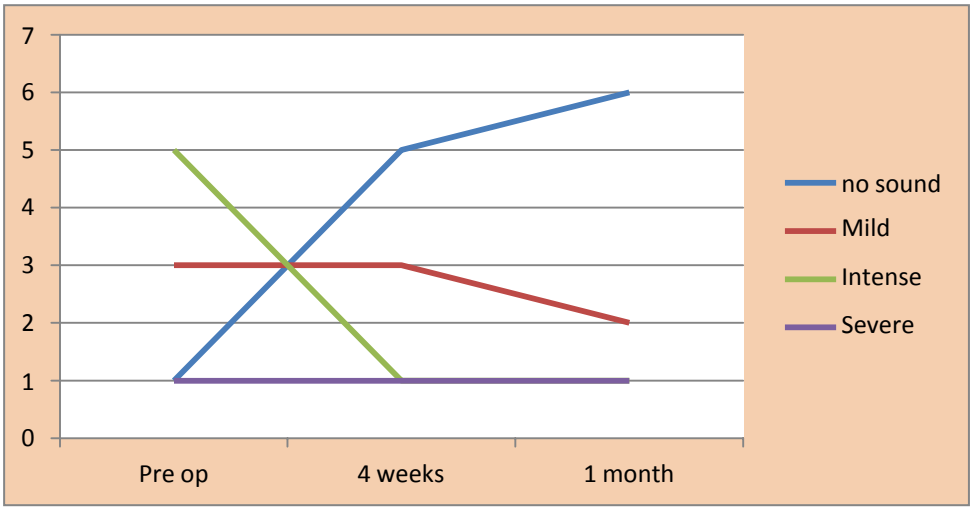


Table 12: Frequency Distribution of TMJ Dislocation over 3 intervals time period

Frequecy of TMJ dilocation	Pre Op	4 week	3months
NO SOUND	1(10%)	5(50%)	6(60%)
MILD	3(30%)	3(30%)	2(20%)
INTENSE	5(50%)	1(10%)	1(10%)
SEVERE	1(10%)	1(10%)	1(10%)
Total	10(100%)	10(100%)	10(100%)

Figure 8: Frequency Distribution of clicking sound at four interval of duration



ISSN 2515-8260 Volume 09, Issue 07, 2022

Discussion

A troubling issue, TMJ dislocation makes it difficult to close the jaw and is frequently accompanied by discomfort and muscular spasm. TMJ dislocation is referred to be chronic recurrent when it happens frequently.

TMJ dislocation can result from structural problems or an imbalance in neuromuscular activity. "Laxity of the capsular ligament and the articular disc, as well as spasm of the lateral pterygoid muscles and chronic internal derangement, all contribute to changes in neuromuscular function. The glenoid fossa, zygomatic arch, and squamotympanic fissure all undergo morphological changes as a result of structural deficit (Güven O. 2005 and Vasconcelos BC, Porto GG, Neto JP, Vasconcelos CF, 2009). Arthritic changes in the condyle, such as flattening or narrowing, a reduction in the height of the articular eminence, and changes in the Other reasons of TMJ dislocation include overuse, such as yawning, laughing, vomiting, convulsions, dental procedures (such having a third molar extracted), endotracheal intubation, laryngoscopy, and trans oral fibre optic bronchoscopy, as well as laryngoscopy and endotracheal intubation (Sharma NK, Singh AK, Pandey A, Verma V, Singh S., 2015) TMJ dislocation is another side effect of several antipsychotic drugs". TMJ dislocation is a symptom of a few syndromes, including the Ehlers-Danlos syndrome, orofacial dystonia, and the Mar fan syndrome. Age-related changes in the dentition, such as missing molars and high spots in the occlusion after tooth repair and replacement, also significantly contribute to dislocation (Sharma NK, Singh AK, Pandey A, Verma V, Singh S., 2015).

Conclusions

Use of different sclerosing agents, such as alcohol, sodium tetradecyl sulphate, sodium psylliate, and sodium morrhuate, is part of the conservative approach to treating TMJ dislocation. It has been suggested that ligature wires/IMF with elastic bands and elastic rubber traction with arch bars will help with the decrease. ABI, botulinum toxin A, and platelet-rich plasma injections into the joint area are some newer conservative techniques (Sharma NK, Singh AK, Pandey A, Verma V, Singh S., 2015).

Brachmann applied ABI for the "first time in 1964 to treat recurrent chronic TMJ dislocation. ABI was used to treat individuals with TMJ dislocation who had it happen repeatedly, according to Schultz's 1973 publication. Jacobi Hermanns et al. described how they used ABI to treat patients with chronic recurring TMJ dislocation".

A new, minimally invasive alternative method that can be done and repeated as necessary is the injection of autologous blood in the TMJ. Through the formation of a bed of loose fibrous tissue, blood injections into the TMJ mimic the pathophysiology of bleeding in

joints throughout the body. Because of this, it becomes difficult to dislocate the TMJ and it gets rigid.

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