

ORIGINAL RESEARCH

A Novel Technique for Surgical Reduction of Long-standing Temporomandibular Joint Dislocation

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ABSTRACT

Introduction: The dislocation of the temporomandibular joint (TMJ) typically occurs when the mandibular condyle becomes displaced out of the glenoid fossa. Long-standing TMJ dislocation may rarely be treated by conventional methods of closed reduction, thus needing surgical intervention ranging from various indirect traction techniques to direct exposure of the TMJ.

Aim: This article aimed at bringing into attention of the scientific community a new surgical technique for the management of long-standing TMJ dislocation.

Materials and methods: A surgical technique of reducing long-standing TMJ dislocation dubbed as the "Shabani maneuver" has been described. The technique utilizes an externally applied force by physician/surgeon at the mandibular notch which is accessed through a preauricular incision. After making the incision, the mandibular notch is accessed and a Warwick-James elevator is then directed at the notch. An inferiorly directed force is applied once the instrument is secured around the notch and with a combination of conventional method, the condylar head is reduced back to the glenoid fossa.

Results: A total of 20 patients with long-standing TMJ dislocation were treated using the technique described. Out of those, 19 patients (95%) were successfully treated. The age range of the patient was between 19 and 81 years with a mean age of 37.75 ± 18.12 years. Yawning was the common cause for dislocation (65%). The mean duration of dislocation was 3.6 months, with the commonest reason for delay in treatment seeking being poverty.

Conclusion: This invasive surgical technique is useful where conventional approaches have been tried and proved futile in multiple attempts to reduce long-standing cases of TMJ dislocation.

Clinical significance: By describing a new and novel surgical technique for the reduction of long-standing TMJ dislocation, this study promotes its use in clinical practice, especially in settings of developing countries where due to low socioeconomic status, accessibility to operating theater is limited.

Keywords: Long-standing dislocation, Surgical reduction, Temporomandibular joint.

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INTRODUCTION

The TMJ, also known as the mandibular joint, is an ellipsoid variety of the right and left synovial joints forming a bicondylar articulation. The common features of the synovial joints exhibited by this joint include a fibrous capsule, a disk, synovial membrane, fluid, and tough adjacent ligaments.¹ The TMJ is the only joint in the human body that is lined by a fibrous cartilage.

The dislocation of the TMJ typically occurs when the mandibular condyle becomes displaced out of the glenoid fossa beyond and anterior to the articular eminence, although rare reports also describe posterior, lateral, and superior dislocations.² A true dislocation (or luxation) is a condition in which a joint is displaced from its articulations and requires manipulation by another individual to return to its normal position, while subluxation is a self-reducing, incomplete dislocation of a joint in which the patient is able to close his or her mouth without assistance.³ Temporomandibular joint dislocation can occur as sporadic, recurrent, or chronic recurrent.⁴

A dislocation of the TMJ represents 3% of all reported dislocated joints.⁵ The pathogenesis of chronic recurrent dislocation of the TMJ has been attributed to trauma, abnormal chewing movements, laxity of TMJ ligaments and capsule, disorders of masticatory muscles, drugs, such as phenothiazine, or neurological disorders causing muscular hyperactivity. Others include yawning, anesthetic procedures, psychiatric disorders, and connective tissue disorders.^{3,4} Majority of cases are nontraumatic and are often precipitated by yawning, eating, dental treatment, endoscopic procedure, or oral intubation.⁵

The TMJ dislocation is often associated with changes in facial profile presenting as an open bite, severe discomfort due to overstretching of the muscles and ligaments around the joint with intraarticular effusion, and difficulty with speech and mastication due to muscle

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spasms and joint pain.⁶ Palpation in the preauricular region reveals an empty joint fossa and may reveal the condyle anterior to the joint.⁷

The dislocation can be classified into acute (most common), habitual, recurrent, and long-standing or chronic.² No clear guidelines or standards have been set to define a duration distinguishing chronic from acute dislocation.^{2,8} Some literature suggests that chronic dislocation be defined as acute dislocation left untreated or inadequately treated for 72 hours or more,^{2,8,9} and there is consensus that if the situation persists for more than a month, then it is chronic dislocation.^{3,10,11}

According to Akinbami,¹² the TMJ dislocation can be classified, based on the relationship of the head of mandibular condyle with the articular eminence seen on clinicoradiological evaluation, into three types:

1. Type I: The head of the condyle is directly below the tip of the eminence.
2. Type II: The head of the condyle is in front of the tip of the eminence.
3. Type III: The head of the condyle is high up in front of the base of the eminence.

A long-standing TMJ dislocation may be defined as any dislocation existing for more than a month, and it is seldom treated successfully by conventional methods and needs surgical intervention ranging from various indirect traction techniques to direct exposure of the TMJ.⁸

The long-standing dislocation of TMJ is rare and its management is still controversial.⁹ The aim of this article is to present the authors' experience of managing long-standing dislocation of the TMJ and to bring into attention of the scientific community a new technique for the management of long-standing TMJ dislocations.

MATERIALS AND METHODS

Materials

Equipment/Armamentarium

The equipment required includes:

- #3 knife handle
- #15 blade
- Halsted mosquito fine curved artery forceps
- Warwick-James root elevator or any heavy, blunt, and curved instrument
- Needle holder
- Suture
- Local anesthesia
- Diazepam

Methods

Investigations ordered prior to the procedure include full blood count and radiological investigation (orthopantomogram). Additionally, all patients undergoing

reduction of the TMJ dislocation must be given a detailed explanation of the procedure and then only an informed consent is obtained.

The patient is placed in a dental chair with the back rest slanted about 85°. The procedure for reducing the long-standing TMJ dislocation is then carried out using local anesthetic agent. Intravenous diazepam is also used to aid in sedation and relaxation of muscles.

A venous access line is placed prior, through which diazepam is injected at a dosage of 0.3 mg/kg. Then, the skin of the facial region is surgically prepared using an antiseptic solution of choice and the patient is draped in sterile clothing. Local anesthesia is then injected around the preauricular region on the site of dislocation, and then infiltrated to the masseters at levels below the zygomatic arch.

A preauricular skin incision is made after which a blunt dissection is done in the direction of an arbitrary line drawn between ear tragus and angle of mouth. The blunt dissection is done subcutaneously to avoid violating capsule of the parotid gland.

While advancing with dissection subcutaneously, a finger is placed intraorally and the anterior border of ramus is palpated. This helps to locate the position of the coronoid process and assure that the instrument will correctly access the coronoid notch. The tip of the curved forceps is then turned medially and the masseter is pierced bluntly in a superoinferior motion following the alignment of masseter muscle fibers to minimize the chances of injury to the buccal branch of facial nerve, until the lateral border of ramus is reached.

Upon hitting the ramus, the forceps is advanced upward until the sigmoid/mandibular notch is felt. The forceps is then removed and a Warwick-James root elevator is introduced following the same route created by blunt dissection to the mandibular notch. Care is taken to avoid sliding of the instrument into infratemporal fossa which may cause injury to the deep-seated vessels in the area.

Repeat the same procedure in contralateral site in case of bilateral dislocation. Once the elevator has been secured in site, using controlled force, the elevator is pushed downward and at the same time, another physician stands in front of the patient and applies bimanual intraoral force on the mandibular molars of the patient in an inferior and then posterior direction by conventional method, hence reducing the dislocated condyle back into the glenoid fossa.

Upon reduction, the site of incision is closed in layers using absorbable sutures 2.0 for deeper tissues and non-absorbable sutures 3.0 or 4.0 for skin closure. To avoid dislocation again due to muscle activity, a crepe bandage commonly, however, in some cases, maxillomandibular fixation, may be done.

RESULTS

Over the period of 2 years, from June 2014 to March 2017, a total of 20 cases of long-standing TMJ dislocation have been treated in the Department of Oral and Maxillofacial Surgery of Muhimbili University of Health and Allied Sciences. Out of these cases, female patients accounted for 60% (n = 12) with a male-to-female ratio of 1:1.5. The age distribution of the patient was between 19 and 81 years and the mean age was 37.75 ± 18.12 years. The mean age of the male patients was 31.75 ± 8.88 years, while that of female patients was 41.75 ± 21.75 years. The most frequently affected age groups were 20 to 29, 30 to 39, followed by the age group 50+ years. The difference in the occurrence of TMJ dislocation between males and females in different age groups was, however, statistically insignificant ($p = 0.064$) (Table 1).

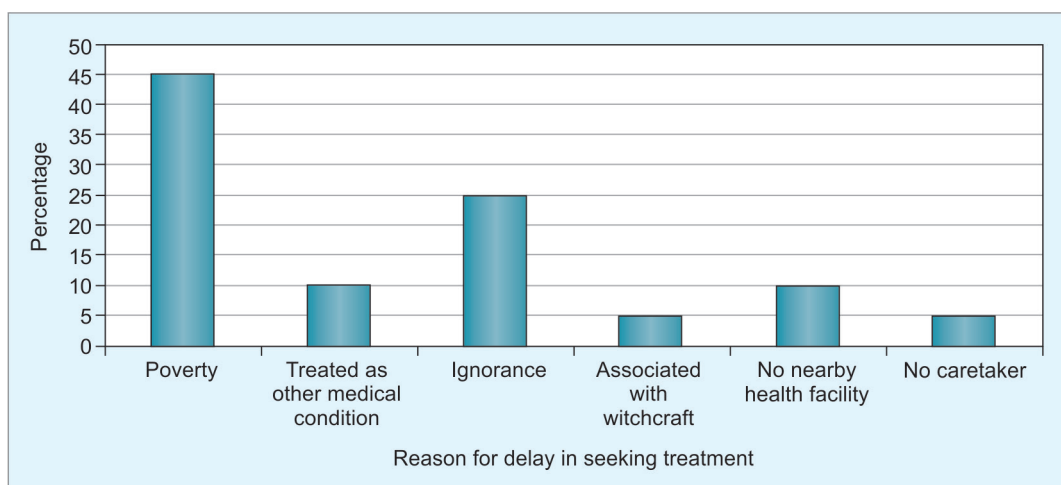
The common cause for dislocation was yawning (65%). Other causes encountered included: Dislocation

Table 1: Distribution of patients with TMJ dislocation according to sex and age group

| Age group of the patients | Sex | | Total (%) |
|---------------------------|------|--------|-----------|
| | Male | Female | |
| 10–19 | 1 | – | 1 |
| 20–29 | 2 | 4 | 6 |
| 30–39 | 2 | 4 | 6 |
| 40–49 | 3 | – | 3 |
| 50+ | – | 4 | 4 |
| Total | 8 | 12 | 20 |

Table 2: Distribution of the patients with TMJ dislocation according to cause, sex, and age group

| Sociodemographic characteristics of patients | | Cause of dislocation | | | | | |
|--|--------|----------------------|-----------------------|--------|-------|------------|------------|
| | | Yawning | Psychiatric condition | Trauma | Sleep | Extraction | Alcoholism |
| Sex | Male | 4 | – | 2 | 1 | – | 1 |
| | Female | 9 | 2 | – | – | 1 | – |
| Age group | 10–19 | – | – | 1 | – | – | – |
| | 20–29 | 6 | – | – | – | – | – |
| | 30–39 | 3 | 2 | – | 1 | – | – |
| | 40–49 | 1 | – | 1 | – | – | 1 |
| | 50+ | 3 | – | – | – | 1 | – |



Graph 1: Percentage distribution of the reasons for the delay in seeking treatment among patients

of the TMJ during tooth extraction, dislocation in sleep, and alcoholism. Yawning was the predominant cause of TMJ dislocation in females and in patients in the age group 20 to 29 years (Table 2). All the patients who had been treated with this technique had bilateral dislocation, with anteriorly displaced condyle.

The time elapsed since the dislocation to reduction using the procedure ranged from 1.5 to 22 months and the mean time of 3.6 months. The commonest reason for the delay in seeking treatment after dislocation of TMJ among the patients included poverty (45%), followed by ignorance (25%) (Graph 1).

A total of 20 attempts have been made by using the described technique after failure to reduce by conventional methods. Of these cases, 19 were successful, giving a success rate of 95%. For the case that could not be managed by the described method, condylectomy was done under general anesthesia.

For the patients who had the dislocation reduced by the described method, a weekly follow-up was done for 1 month and none had reported to have experienced the episode of dislocation again.

DISCUSSION

The diagnosis of TMJ dislocation is often clinically based and confirmed by the aid of radiograph. Typical signs and symptoms seen in patients with TMJ dislocation include

mandibular pain, an inability to occlude the teeth, preauricular depressions, protrusion of the mentalis (chin), spasm and tension in the masticatory muscle, excessive salivation, and difficulty in speech.^{5,7,11}

Dislocation can be classified into acute, habitual, recurrent, and long-standing or chronic.² Interestingly, patients with recurrent dislocation present earlier than those in either the acute or chronic category.⁶ Ideally, acute mandibular dislocation requires immediate effective reduction, which can usually be accomplished with a manual closed technique described centuries ago by Hippocrates¹¹ by applying bimanual intraoral force on the mandibular molars of the patient in an inferior and then posterior direction.¹³

In the current study, of the total 20 patients who had been diagnosed with chronic TMJ dislocation, majority were women. A higher prevalence of TMJ dislocation in females was also reported by Marqués-Mateo et al.¹¹ Unlike the findings of this study, a higher prevalence in male patients was reported in other studies.^{6,13} The difference between these studies can be attributed to the types of study, geographical location, and social factors. Generally, epidemiological studies have documented a greater frequency and severity of TMJ disorders in females, attributing these differences to behavioral, psychosocial, hormonal, and constitutional factors.¹⁴ It might as well be speculated that the same factors may have a role in the TMJ dislocation.

In this study, the etiology for dislocation included yawning, psychiatric disorders, trauma, tooth extraction, yelling, dislocation in sleep, and alcoholism. Similar causes for dislocation have been documented in various other studies and case reports.^{3,8,11-13,15}

The time elapsed since dislocation to reduction using the procedure was very long. Reasons for the delay included poverty, no nearby health facility, ignorance, absence of escort to health facility, and being treated by traditional healers. Similar reasons have also been reported by Saikia.¹⁰

Unlike the acute dislocation, in long-standing dislocations, manual reduction is usually not easy, unless local anesthesia and muscle relaxants are used. After 2 weeks following dislocation, spasms and shortening of the temporalis and masseter muscles occur and reduction becomes difficult to achieve manually.¹²

The aim of any surgical intervention of long-standing TMJ dislocation should be the following: Complete reduction, restoration of adequate jaw movement, minimal morbidity to intra- and periarticular tissue, and minimizing the chance of recurrence.⁸ There are many surgical methods for the management of prolonged dislocation of the TMJ that have been described in literature, such as surgical closed reduction (traction procedure),

mandibular swing procedure by median mandibulotomy, condylotomy, condylectomy, inverted L-shaped osteotomy, oblique bilateral osteotomy, and eminectomy.^{3,7,8,12,15}

The purpose of any surgical technique for the management of prolonged dislocation of the TMJ is to return the condylar head to its anatomical resting position. This has been demonstrated by our method. The ultimate result with our treatment approach was the accurate reduction of the dislocation, restoration of occlusion, and lastly, patient satisfaction and well-being.

Generally, the simplest method of treating any medical condition and attaining favorable results with minimum complications is the best method. Methods may vary with age and general state of health of the patient, with the training and ability of the surgeon, and with the facilities and circumstances under which the patient is to be treated.¹⁶

The technique we described is simple that requires no sophisticated equipment, having minimum probability of major complications if all precautions are taken into account. It can be easily used in settings where the supply of surgical materials is limited. It is cost-effective since it cuts the cost of treating the patient under general anesthesia. Moreover, through this technique, a success of more than 95% has been achieved.

For the case of long-standing TMJ dislocation that could not be reduced by the technique we described, fibrosis of retro- and peridiscal tissue can be the contributing cause. It has been documented that delays in the treatment of dislocated TMJ can lead to spasm of the masticatory muscles as well as fibrosis and scarring of the retro- and peridiscal tissue due to intra- and extra-articular hemorrhage in posttraumatic cases.¹¹

Due to the presence of vital structures, such as blood vessels, nerves, and glands together with their excretory ducts in head and neck region, none of the procedures being performed in head and neck region are novel,¹⁷ and this fact should always be in the back of mind of surgeons when operating. As with any procedure, the technique described, carries minimum risk of complications if care is taken. These anticipated complications include: Pain, bleeding, trauma to the facial nerve and to the parotid duct, surgical site infection, and many others.

In all cases of long-standing TMJ dislocation treated using the described technique, the authors have never encountered any major complications because great care is usually taken. Pain postreduction is anticipated and is manageable by use of nonsteroidal anti-inflammatory drugs.

The only setback of this procedure is that it is a three-pronged maneuver, hence, requiring at least three operators at any given time, one working on each joint while the third aiding with the conventional method. Despite

that, this technique is worth using, especially in settings of developing countries where due to low socioeconomic status, accessibility to operating theater is limited.

CONCLUSION

A described new technique has shown a high success rate and warrants to be used as a minimal invasive surgical technique for long-standing TMJ dislocation. This technique can be useful where nonsurgical conventional approaches of reducing the long-standing TMJ dislocation have been tried and proved futile in multiple attempts.

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