Management of Temporomandibular Joint Dislocation: Review of literature

Dr. GIRISH KATTI
PRINCIPAL, HOD & PROFESSOR, Department Of Oral Medicine & Radiology, Al-Badar Dental College and Hospital, Gulbarga, Karnataka (INDIA)

Dr. SYED SHAHBAZ
Sr. LECTURER, Department Of Oral Medicine & Radiology, Al-Badar Dental College & Hospital, Gulbarga, Karnataka (INDIA)

Dr. SHASHI SHANKER CHAUBEY
PG STUDENT, Department Of Oral Medicine & Radiology, Al-Badar Dental College & Hospital, Gulbarga,

Dr. MD. MUNNAWARULLA KHAN
PG STUDENT, Department Of Oral Medicine & Radiology, Al-Badar Dental College & Hospital, Gulbarga, Karnataka (INDIA)

ABSTRACT
Dislocation of the temporomandibular joint (TMJ) is the dislodgement of the head of the condyle from its normal position in the glenoid fossa. Subsequently, the facial profile changes while the ligaments around the joint often stretch with intra-articular effusion, causing severe discomfort and difficulty with speech and mastication from muscle spasms and joint pain. Although manual reduction is the primary choice of treatment, patients presenting with recurrent or prolonged dislocations require conservative and/or surgical methods. Though there is a plethora of causes resulting in TMJ dislocation its management still remains an enigma. The aim of this review is to project a comprehensive understanding of the incidence, symptoms and management of all types of TMJ dislocations. This paper also intends to highlight the importance of diagnosis for successful management of these disorders in the light of literature review.

Introduction
The temporomandibular joint (TMJ) is the only movable joint of the massive cranio-facial structure, helps to unite the base of the skull to the mandible. Dislocation of the TMJ occurs when one or both mandibular condyles are displaced in front of the articular eminence. It may be reducible when it returns spontaneously to the glenoid cavity (subluxation), or irreducible when one or two condyles remain dislocated (luxation). In this position, the mouth remains open due to the action of the elevator muscles with or without lateral deviation, depending on whether the dislocation is unilateral or bilateral. It can also be acute, chronic protracted or chronic recurrent; anterior-medial, superior, medial, or posterior dislocation.

Etiopathogenesis
Dislocation of TMJ is generally of unknown origin, however it often occurs in context of yawning, and less frequently after a burst of laughing or relatively mild facial trauma (slap, punch on the chin). Cases of iatrogenic TMJ dislocation has also been mentioned earlier probably due to anesthesiologist’s manipulation during surgical procedures or others like transesophageal echocardiography, orotracheal intubation and laryngeal mask airway placement. Cases of spontaneous dislocation of the TMJ have been reported during sedation. TMJ dislocation in a lady during stressful labour is also reported. Several theories have been put forward to explain the onset of TMJ dislocation. It is commonly associated with poor development of the articular fossa, laxity of the temporomandibular ligament or joint capsule, and excessive activity of the lateral pterygoid and infrayoid muscles due to drug use or disease. Additionally some disorders of collagen metabolism such as ligamentous hyperlaxity and Ehler-Danlos syndrome may also be related.

Incidence
TMJ dislocation represents 3% of all dislocations throughout the body. Spontaneous anterior TMJ dislocation is not a common condition, with a reported annual incidence of 5.3 per 100,000 patients presenting to the emergency department. A female predominance is found in the literature, and would be linked, according to some authors; due to hormonal imbalance. The anterior subtype is most common. On the contrary, posterior, superior, or lateral dislocations of an intact condyle are very rare. The rarity of these dislocations can be attributed to the varying anatomy of the condyle, the direction of pull of muscles attached to the condyle and low incidence of skull base fractures from an indirect blow.

Clinical presentation
Many patients function well with this condition for years and have no functional disorder as a result of the dislocation. Dentulous patients may complain of a malocclusion when it first occurs, but those without teeth may never do so. TMJ dislocation may cause joint locking, and limited TMJ motion which limits the performance of daily activities, e.g., eating and speaking. Other signs and symptoms include mandibular pain, an inability to occlude the teeth, pre-auricular depressions, and a prominent mandibular head anteriorly (anterior variant). Acute dislocation of the TMJ is a condition where the condyle moves suddenly anterior to the articular eminence and gets locked. Chronic recurrent dislocation is characterized by a condyle that slides beyond the eminence and then returns to the fossa. Clinical presentation of anterior TMJ dislocation after anesthesia can vary significantly. In other cases, however, the presentation can be subacute, mouth opening less obvious and pain less impressive, so the diagnosis can be easily missed. Facial nerve damage might accompany lateral displacement of the intact ramus/condyle because the degree of displacement will usually result in traction on the facial nerve. This neuropaedia resolves within 6 to 9 months. Usually, whenever the signs, symptoms, and clinical course are atypical to a common mandibular fracture an unusual condyle dislocation should be considered. In such unusual cases it is always better to advise CT scans and in particular 3D CT.

Diagnosis
The diagnosis of these dislocations is based on the clinical features. However confirmation can be achieved by radiological im-
Management of TMJ dislocation: It can be broadly categorized as below

**Conservative approach**

**Occlusal splint/occlusal device/orthotics**: It can be made to cover the occlusal surfaces of maxillary or mandibular teeth and can be fabricated from many different materials, giving it a hard, soft, or intermediate feel. It is beneficial for masticatory muscle pain, TMJ pain, restricted jaw mobility, and TMJ dislocation.1,4,15

**Elastic rubber traction**: Elastic rubber traction with arch bars and ligature wires with elastic bands are useful to achieve reduction in chronic protruded dislocation. Prior to the use of elastic bands, acrylic blocks or impression compound spacer can be placed in between upper and lower teeth to depress the condyle and mandible open up the bite posteriorly, this helps displace the condyle downwards, the elastic bands that are applied front backwards helps to push the mandible-condyle backwards into the fossa after removing the spacer in about 72 hrs to 1 week. Exartrusion of the teeth has been reported and it is corrected with bite plate.3

**Reduction**: This can be accomplished by 2 method

**Manual reduction**: It can be accomplished by several methods

Nélaton manoeuvre:- operator places the pads of his thumbs on the molars of the patient with his fingers hooked around the mandibular angle. After obtaining a sufficient relaxation of the patient, the operator exerts a gentle and steady pressure directed downward and exaggerates mouth opening. It thus facilitates the maneuver by gently pushing the mandible backward to re-integrate the heads in the condylar glenoid.1 This intraoral approach has disadvantages including potential bite wound for the practitioner, difficulty overcoming strong masticatory muscle contractions, and inability of the patient to tolerate the procedure due to pain without local or general anesthesia.12

The Hippocratic method (fig 2A) is the most frequently described and involves the examiner standing in front of the patient and placing gloved thumbs at the apex of the meniscus with fingers inside the mouth on the occlusal surface of the mandibular molars. A superior force is applied through the thumbs and inferior pressure with the fingers with a “pivoting” motion occurring at the wrists until the reduction is made.6

The extraoral method requires the examiner to apply a postero-inferior force to the coronoid process with the thumbs and has the advantage of reducing the risk of accidental human bite injury to the examiner (fig 2C).4

The combined ipsilateral staggered technique involves the reduction of each TMJ separately. The examiner uses one thumb intraorally to exert inferior pressure to the occlusive surface of the lower molars while simultaneously applying further postero-inferior pressure to the ipsilateral coronoid process extraorally (fig 2D). The maneuver is repeated on the contralateral side to complete the reduction.9

**Reduction methods. (A) Hippocratic (B) wrist pivot (C) extraoral (D) combined**

TMJ automobilization:- It involves approximately 3-seconds-long incisal bite on an improvised compressible wedge (3cm thick created by rolled washcloth) placed between patients incisors. The wedge is compressed to approximately 5–10 mm in thickness, causing the patient’s mouth to be near occlusion. Repeat the procedure with a 6 cm thick wedge: compressing it to approximately 1–2 cm.12

Manual manipulation can also be done under local anesthesia, sedation, or general anesthesia with the use of muscle relaxants.18 Masseteric nerve block, deep temporal nerve block, and lateral joint infiltration are used to reduce pain and spasms during manual reduction of a luxated mandible. This technique is quick, safe, and easy to implement.17 The post-reduction care typically involves dietary control, use of anti-inflmmatory medications, immobilization of the mandible for a short period and mouth-opening training.10

**Exercise Program**: “Rocabado’s ‘666 exercise protocol” is designed to restore neuromuscular control, improve TMJ mobility, and improve cervical spine and upper back postural impairments thought to increase TMJ stress. It includes 6 exercises that are to be performed 6 times each at a frequency of 6 sessions per day for 6 weeks(Table 1).12

<table>
<thead>
<tr>
<th>Exercise name</th>
<th>Exercise description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recl position of the tongue</td>
<td>Tip of tongue on anterior palate, jaw protruded to upper front teeth (recl position)*, perform ‘chewing’ sound, patients diaphoretic breathing through the nose during exercises (avoid use of accessory respiratory muscles).</td>
</tr>
<tr>
<td>CanTMJ reduction</td>
<td>Conducted opening of mouth in a lingual fashion. Tongue in recl position, open mouth maintaining tongue or anterior palate to avoid anterior coronoid translocation.</td>
</tr>
<tr>
<td>Cervical joint mobilization</td>
<td>Upright posture,dexchi hands behind cervical spine for stabilization of C2-C7. Patient head extension.</td>
</tr>
<tr>
<td>Axial cervical extension</td>
<td>Upright posture, perform cervical extension exercise moving the head back while maintaining neck and head level (upper cervical flexion and lower cervical extension).</td>
</tr>
<tr>
<td>Stabular grille relaxation</td>
<td>Upright posture, rest and depress shoulder blades while maintaining proper cervical spine posture.</td>
</tr>
</tbody>
</table>

Sclerosing Agent:- The various sclerosing agent, like alcohol, rivanol (aethacridine), 5% sodium psylliate (sylnasol), sodium morrhuate, 3% sodium tetradeyl sulfate have been injected.

aging such as orthopantomograph and 3D CT scan.
in to the joint cavity. This procedure is used in chronic recur-
rent; is easy to perform and it causes no foreign body reaction.
The advantages are no requirement of dissection, few or no post
operative complications such as facial nerve injury, loss of sensa-
tion, swelling, infection and pain, no necessity to stay in hospit-
əl.3

Autologous Blood Injection (ABI)-: ABI in the treatment of chronic
recurrent TMJ dislocation had advantages such as no require-
ment of dissection, few or no post operative complications such
as facial nerve injury, loss of sensation, swelling, infection and
pain, no necessity to stay in hospital, and easiness of administra-
tion under local anesthesia.2

Botulinum A Toxin -: It produces dose-related weakness of skel-
etal muscle by impairing the release of acetylcholine at the neu-
romuscular junction. In a study of 5 recurrent TMJ dislocation
patients, injections of BTX-A 25–50 units/muscle at two sites
were given after reduction of the dislocation by manual repo-
sitioning of the condyle. In these cases one injection in lateral
pterygoid was found to be enough.19

Surgical Interventions
The suboptimal efficacy of these relatively conservative ap-
proaches led to the concept of surgical interventions for altera-
tion of TMJ ligaments, musculature and bony components.

These include:-

Ligament Alterations-:
Capsular plication-: wedge of the capsule is excised and the tis-
ue repaired with the goal of restituting and reinforcing the lax
 capsule, in situations where the eminence is low, it can be aug-
mented or reconstructed with screws, plates or implants to im-
prove the height.3

Ligamentorrhaphy-: involves surgical fixation of the lateral liga-
ment of the capsule to the peristeum of the overlying zygomatic
arch, followed by Maxillo-mandibular fixation for 1 week.8

Muscular Alterations-:
Ligating coronoid to zygomatic arch-: ligation is done by either
wire or animal tendon of slow absorbability. A variation involves
drilling small holes into the extracapsular portion of the condy-
lar neck and through the zygomatic arch just anterior to articu-
table tubercle.3 Limitation of forward movement can be done by
tying a length of fascia lata or Mersilene (Dacron ) to zygomatic
arch and around Condylar neck.16

Scarification of temporals tendon/temporals myotomy:- Majority of tendinous fibers are stripped from the ramus and su-
tured to the reflected periosteum and oral mucosa in a fashion
that creates tissue disorientation and subsequent scar formation
which will lead to horizontal scar: may tighten the tendon and
limit the range of motion.4

Bony Alterations-:
Bone Hook:- It is used to apply traction via the sigmoid notch.
Traction with wires is also possible through holes drilled in the
angle of the mandible.3

Condylectomy:- Delay in reduction induces fibrosis of the gle-
roid fossa, resulting in imperfect or unsuccessful reduction. Un-
successful or imperfect reduction induces fibro-osseous ankylo-
sis of the TMJ; such conditions necessitate condylectomy with
or without arthroplasty. However, the resulting pseudoarthrosis
may limit the range of mandibular movement.8

Ramus Osteotomies:- An oblique or vertical ramus osteotomy is
used to reposition the mandible thereby restoring vertical ramal
height, reestablishing normal occlusion & correction of open

bite.18 However it may cause impingment of the coronoid on
the condylar processes unlike the inverted L-shaped osteotomy
where such encroachment is avoided due to retention of the rel-
ative positions of condylar and coronoid processes.20,21

Eminoplasty-: It can be done either by reducing eminence or by
increasing the eminence. Eminectomy/ arthroscopic eminoplas-
ty-: They involve removing a portion of the eminence to allow
the condyle to move freely. One of the most frequent complica-
tions after eminectomy is TMJ noise.21

Total joint replacement:- It should be considered when all treat-
ments fail in chronic protracted cases especially those with as-
degenerated degenerative diseases.3

Discussion
Dislocation of TMJ is an infrequent disease but still almost spec-
tacular. The goal of treatment of any dislocation is the return of
the condyle to its original physiologic position. It is extremely
important that exact etiology which caused the dislocation be
analysed. It is also equally important that the signs and symp-
toms be correctly diagnosed so that the treatment can be car-
ried out as quickly as possible without further delay. After dis-
location occurs, spasms of the masseter and pterygoid muscles
may worsen over time, causing the mandible to contract into the
dislocated position, therefore making the reduction proce-
ure more difficult. If left untreated for longer than 14 days, fi-
brosis and even fractures become increasingly apparent.2

Certain interesting associations have been noted in literature
which makes this seemingly easy diagnosis a diagnostic di-
lemma. In one case, the first manifestation of the metastasis of
a primary lung cancer was a non-reducible dislocation of the
mandible.22 TMJ dislocation due to dystonia following a single
dose of aripiprazole22 & two cases of acute pure PPL toxicity as-
associated with bilateral TMJ dislocation as a complication has
also been reported.22 A Correlation between fracture/fracture-
dislocation of the condyle and onset of Frey’s syndrome (due to
the intimate anatomical relationship between the auriculotem-
poral nerve and TMJ) has been suggested. With this in mind,
such dislocations need to be addressed with extreme caution
(i.e., the condyle should not be allowed to snap back into the
glenoid fossa, but rather should be “guided” into the fossa—in
a direction opposite to that of muscle pull) to avoid possible
ATN injury.23 With the types of dislocation we face the proper
management should be opted considering the risk and benefits.
Postoperative long-term followup is, however, germane in the
routine management of these cases, since TMJ problems reap-
pear, irrespective of type.9

Conclusion:-
TMJ dislocation can considerably affect the psychological level
of the patient, as there is always a fear of dislocation in recur-
rent cases while jaw movement. The more complex and invasive
method of treatment may not necessarily offer the best option
and outcome of treatment, therefore conservative approaches
should be exhausted and utilized appropriately before adopting
the more invasive surgical techniques which should be done af-
ther thorough assessment and treatment planning. In the scien-
tific community dislocation with astonishing etiologies are being
reported with time. Lack of proper treatment protocol of TMJ
dislocation is a dilemma which needs to be worked out in the
future.
REFERENCES