

TEMPOROMANDIBULAR JOINT DISORDER MANAGEMENT

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INTRODUCTION

The temporomandibular joint (TMJ) is formed by the mandibular condyle inserting into the mandibular fossa of the temporal bone. Muscles of mastication are primarily responsible for movement of this joint.¹ A temporomandibular disorder (TMD) is a musculoskeletal disorder within the masticatory system. TMD is often viewed as a repetitive motion disorder of the masticatory structures.² TMD is the second most common musculoskeletal condition (after chronic low back pain) resulting in pain and disability. Pain related TMD can impact the individual's daily activities, psychosocial functioning, and quality of life.³

About 60–70 per cent of the general population harbour at least one sign of a temporomandibular disorder (TMD) and yet only about one in four people with signs are actually aware of, or report, any symptoms.⁴ Population-based studies show that TMD affects 10% to 15% of adults, but only 5% seek treatment. The incidence of TMD peaks from 20 to 40 years of age; it is twice as common in women than in men and carries a significant financial burden from loss of work.¹ TMD also contributes to a high proportion of socioeconomic costs, which are usually associated with comorbidities, such as depression and other psychological factors.⁵ Research suggests that only a small proportion of individuals with TMDs actually seek treatment and that females are more likely to present to a healthcare professional in an attempt to alleviate their symptoms.⁶

The temporomandibular joint (TMJ) may be affected by inflammatory, traumatic, infectious, congenital, developmental, and neoplastic diseases, as seen in other joints. However, the most common affliction of the TMJ and masticatory apparatus is a group of functional disorders with associated pain and was previously known as the TMJ pain dysfunction syndrome.⁷

Disorders of the Temporomandibular joint (TMJ) have an adverse effect on jaw function so that patients may present with limited mouth opening or difficulty chewing because of pain and locking in the TMJ. In the general dental practice setting, patients may complain of cramp like pain in their masticatory muscles or painful clicking in their temporomandibular joints (TMJ) which may have been exacerbated by lengthy dental procedures. While most patients recover with simple measures such as jaw rest and soft diet, others require professional care that may involve any combination of conservative therapy, occlusal splint therapy, medications and surgery.⁴

The diagnosis and management of the most common cause of non-dental pain in the maxillofacial region, namely temporomandibular disorders (TMD), remains a challenge for clinicians to this day. This is because TMD is a broad term comprising of different conditions with complex aetiologies, with symptoms that vary in intensity. Intriguingly, some signs and symptoms resolve spontaneously even without treatment, whereas others persist for years despite all treatment options having been exhausted. Numerous treatment modalities have been proposed over the years, with some becoming obsolete while others are gaining in popularity. Nevertheless, it

seems that there is no single solution for every case as many different symptoms are included in TMD. Controversies exist in the literature regarding the diagnosis and the management protocol for TMD, hence the selection of treatment modality may often be largely influenced by the expertise of the treating healthcare provider.⁸

Similar to other repetitive motion disorders, TMD self-management instructions routinely encourage patients to rest their masticatory muscles by voluntarily limiting their use, i.e., avoiding hard or chewy foods and restraining from activities that overuse the masticatory muscles (e.g., oral habits, clenching teeth, holding tension in the masticatory muscles, chewing gum, and yawning wide). The self-management instructions also encourage awareness and elimination of parafunctional habits (e.g., changing teeth clenching habit to lightly resting the tongue on top of the mouth or wherever the tongue is most comfortable) and keeping the teeth apart and masticatory muscles relaxed.²

While occlusal splint therapy is pivotal to the management of most TMD, it is unfortunate that some dental practitioners have a poor appreciation of the small but important role of surgery in the management of TMD. As far as the surgical management of joint disease is concerned, TMJ arthrocentesis appears to be the panacea for all disorders regardless of how significant the joint disease may be.⁴

The aim of this article is to provide a general overview of the etiology, sign and symptoms, diagnosis, clinical features and mainly the **current treatment strategies** involved in dealing with disorders of the TMJ. This article will briefly discuss non-surgical treatment strategies, pharmacological, occlusal splint therapy and surgical treatment.

HISTORY

The first report of TMD was by a British surgeon in 1887, who published an article describing surgical management of disc displacements in the TMJ.⁹ After initial studies in 1934, Costen proposed that patients suffering from auricular pain, pressure and fullness in the ear and swallowing problems (Costen syndrome) improve by occlusion correction. In the 1960s, the quality of clinical examinations and scientific studies improved; the importance of occlusion in TMD etiology in 1970 was studied. Methods including tomography, arthrography, computed tomography (CT) scan and magnetic resonance imaging (MRI) lead to improvements in examination of intracapsular structures. Today the information in this field show that patients with orofacial pains may suffer from disorders such as systemic, neuromuscular, vascular, and mental or a combination of disorders associated with TMD; some headway in pain mechanism, neurology, physiology and neuropharmacology have been made. Different studies demonstrated that TMD treatment has changed based on the diagnosis of the etiology and stage of the disorder.¹⁰

AETIOLOGY⁶

Clinically, it is **multifactorial** and biopsychosocial, with predisposing, precipitating and prolonging factors all playing a part.

- **Predisposing factors** include structural, metabolic, or psychological conditions, which may cause an increased risk of developing TMDs by adversely affecting the masticatory complex.
- **Precipitating factors** include trauma, either as a result of direct injury to the head and neck region, or due to repetitive loading through parafunction.
- **Prolonging factors** include psychosocial problems, which may perpetuate an existing TMD problem.

Exact cause and effect relationships have been difficult to establish, particularly because it is difficult to establish controls for all variables.⁹

CLASSIFICATION OF TMD (table 1) Adapted from the guidelines of the American Academy of Orofacial Pain.⁷

TABLE 1- Classification of TMD

<p>ARTICULAR DISORDERS</p> <p><i>Congenital or developmental</i></p> <ul style="list-style-type: none">• First and second branchial arch disorders: hemifacial microsomia,• Treacher Collins syndrome, bilateral facial microsomia• Condylar hyperplasia• Idiopathic condylar resorption (condylysis) <p><i>Disk-derangement disorders</i></p> <ul style="list-style-type: none">• Displacement with reduction• Displacement without reduction (closed lock) Perforation <p><i>Degenerative joint disorders</i></p> <ul style="list-style-type: none">• Inflammatory: capsulitis, synovitis, polyarthritides (rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, Reiter's syndrome, gout)• Noninflammatory: osteoarthritis <p><i>Trauma</i></p> <ul style="list-style-type: none">• Contusion• Intracapsular hemorrhage• Fracture <p><i>TMJ hypermobility</i></p> <ul style="list-style-type: none">• Joint laxity• Subluxation• Dislocation <p><i>TMJ hypomobility</i></p> <ul style="list-style-type: none">• Trismus• Postradiation therapy fibrosis• Ankylosis: true ankylosis (bony or fibro-osseous), pseudoankylosis <p><i>Infection</i></p> <p><i>Neoplasia</i></p> <p>MASTICATORY MUSCLE DISORDERS</p> <ul style="list-style-type: none">• Myofascial pain disorder• Local myalgia• Myositis
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SIGNS AND SYMPTOMS ⁶

Temporomandibular joint (TMJ) syndrome include:

- Jaw pain.
- Headaches.
- Earaches.
- Pain in the neck or shoulders.
- Difficulty opening your mouth wide.
- Jaws that "lock" in the open- or closed-mouth position.
- Clicking, popping, or grating sounds in the jaw joint when opening or closing your mouth.
- A tired feeling in your face.
- Difficulty chewing.
- Tinnitus, or ringing in your ears.
- Changes in the way your teeth fit together.
- Swelling on the side of your face.
- Tooth pain.

DIAGNOSIS¹

The diagnosis of TMD is based largely on **history, clinical examination** and appropriate **investigations** that will supplement the data required to confirm the diagnosis.

The RDC/TMD index has a **dual axis approach**:

- **Axis 1** concentrating on the clinical examination and
- **Axis 2** assessing the psychosocial aspect of TMDs.

The **Research Diagnostic Criteria** for TMDs (RDC/TMD) was developed in 1992, and is currently being updated. Its primary purpose was to facilitate research into TMDs based on well-defined homogeneous sub-groups that could be identified reliably using operationalized criteria. It has shown fair to good reliability and is the most widely used diagnostic system for research into TMDs.⁶

Axis 1 follows a standardized protocol for clinical examination and can result in multiple diagnoses being given according to three main groups of common conditions. **Axis 2** of the RDC/TMD comprises a self-administered questionnaire, giving further information on the patient's complaint and the disability, depression and non-specific pain associated with it.³

*TABLE 2- Research Diagnostic Criteria for TMDs*³

Main Grouping	Sub-Group	Key Findings from Clinical Exam and History to Support Diagnosis
MYOFASCIAL PAIN	– Myofascial pain with limited opening	*Painful muscles and limited movement
	– Myofascial pain without limited opening	*Painful muscles
TMJ DISC DISPLACEMENTS	– Disc displacement with reduction	Reproducible clicking
	– Disc displacement without reduction with limited opening	Limited opening with no clicking
	– Disc displacement without reduction without limited opening	History of previously limited opening – imaging needed to confirm disc displacement
TMJ ARTHRITIDES	– Arthralgia	*Painful TMJ, no crepitus
	– Osteoarthritis	*Painful TMJ with crepitus
	– Osteoarthrosis	Non painful TMJ with crepitus

❖ **HISTORY**⁴

The chief complaint may include orofacial pain, joint noises, restricted mouth opening or a combination of these, in addition to other less specific problems such as headache and tinnitus.

- A visual analogue scale from 0 to 10 with 10 being the most intense pain ever experienced by the patient is a useful guide to how much of an impact the TMD has on the patient. The visual analogue scale can similarly be used for chewing ability.

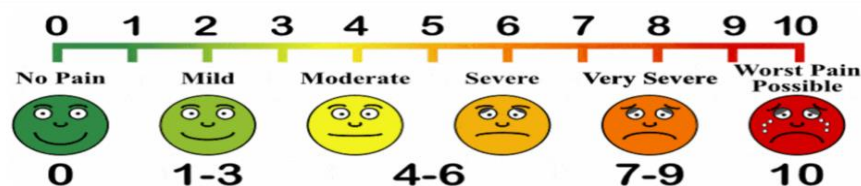


FIGURE 1- Visual analogue scale

- More specifically, pain which is centred immediately in front of the tragus of the ear and projects to the ear, temple, cheek and along the mandible is highly diagnostic of a temporomandibular joint disorder.
- A history of limited mouth opening which may be intermittent or progressive is also a key feature of temporomandibular joint disorders.⁴

❖ **CLINICAL EXAMINATION**

It may include but are not limited to abnormal mandibular movement, decreased range of motion, tenderness of masticatory muscles, pain with dynamic loading, signs of bruxism, and neck or shoulder muscle tenderness.¹

- **Palpation** - placing the finger tips in the preauricular region, patient asked to open their mouth and the finger tip will fall into the depression left by the translating condyle. Pain specifically localised to the pre-auricular area is a good sign of actual joint pathology.⁴



Figure 2- Palpation of tmj. A) mouth closed. B) mouth fully opened

- Joint sounds and their location during opening, closing and lateral excursions of the mandible may be either palpated or detected with a stethoscope placed over the pre-auricular area.
- Mandibular function evaluated by noting line of vertical opening
 - straight and smooth or
 - deviates with jerky movements, which indicate joint pathology.
- The **range** of painless maximal **vertical opening** (normal range is **40–55 mm** interincisal distance) should be recorded.
 - inter-incisal opening less than 40 mm - considered limited, and
 - below 30 mm - requires urgent attention and referral.⁴



Figure 1- Measuring the opening mandibular range of motion.

- A clicking, crepitus, or locking of the TMJ may accompany joint dysfunction. A single click during opening of the mouth may be associated with an **anterior disk displacement**. A second click during closure of the mouth results in recapture of the displaced disk; this condition is referred to as **disk displacement with reduction**. When disk displacement progresses and the patient is unable to fully open the mouth (i.e., the disk is blocking translation of the condyle), this condition is referred to as **closed lock**.
- Crepitus is related to articular surface disruption, which often occurs in patients with **osteoarthritis**.
- Reproducible tenderness to palpation of the TMJ is suggestive of **intra-articular derangement**.
- Tenderness of the masseter, temporalis, and surrounding neck muscles may distinguish myalgia, myofascial trigger points, or **referred pain syndrome**.
- Deviation of the mandible toward the affected side during mouth opening may indicate anterior **articular disk displacement**.¹

❖ INVESTIGATIONS

- **Plain radiographs** of the temporomandibular joint- high level orthopantomograms and transcranial projections, useful as baseline investigations for detection of any gross pathological, degenerative or traumatic changes in the mandibular condyle
- **Magnetic resonance imaging** - investigation of the status of the articular disc to determine if there is internal derangement of the temporomandibular joint.
- **Cone-beam CT-scans** - more cost effective and accessible to many Dental Practitioners and are extremely useful in showing high resolution, multiplanar images of the condylar head that clearly shows the presence of condylar pathology such as osteoarthritis.⁴
- **Ultrasonography** is a noninvasive, dynamic, low-cost technique to diagnose internal derangement of the TMJ when magnetic resonance imaging is not readily available.²

❖ DIAGNOSTIC INJECTIONS

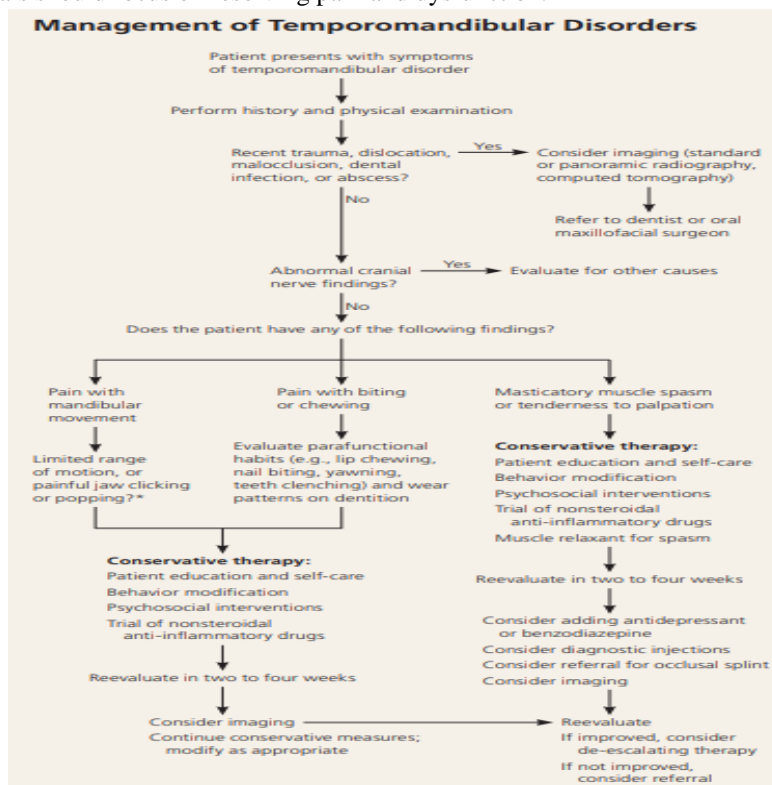
Injections of local anesthetic at trigger points involving the muscles of mastication can be a diagnostic adjunct to distinguish the source of jaw pain. This procedure should be performed only by physicians and dentists with experience in anesthetizing the auriculotemporal nerve region.¹

DIFFERENTIAL DIAGNOSIS

Conditions that sometimes mimic TMD include: dental caries or abscess, disorders of the ears, nose and sinuses, neuralgias, headaches oral lesions (e.g., herpes zoster, herpes simplex, oral ulcerations, lichen planus), conditions resulting from muscle overuse (e.g., clenching, bruxism, excessive chewing, spasm), trauma or dislocation, maxillary sinusitis, salivary gland disorders, trigeminal neuralgia, postherpetic neuralgia, glossopharyngeal neuralgia, giant cell arteritis, primary headache syndrome, and pain associated with cancer.^{1,4}

TREATMENT^{1,2,4&6}

Only 5% to 10% of patients require treatment for TMD, and 40% of patients have spontaneous resolution of symptoms. In a long-term follow-up study, 50% to 90% of patients had pain relief after conservative therapy. Initial treatment goals should focus on resolving pain and dysfunction.



NON-SURGICAL MANAGEMENT/ CONSERVATIVE THERAPY

Include jaw rest, soft diet, moist warm compresses, and passive stretching exercises. TMJ immobilization has shown no benefit and may worsen symptoms as a result of muscle contractures, muscle fatigue, and reduced synovial fluid production.¹

1. **Explanation and reassurance** is the first step in the management of temporomandibular disorders is to explain to the patient the cause and nature of the disorder they present with, and to reassure them of the benign nature of the condition. Many patients will benefit from the reassurance that the symptoms of the temporomandibular disorder they are experiencing is not a “cancer”.⁴
2. **Physical Therapy** There is evidence— albeit weak—that supports the use of physical therapy for improving symptoms associated with TMD. Techniques may be active or passive (e.g., scissor opening with fingers, use of medical devices) with the goal of improving muscle strength, coordination, relaxation, and range of motion.
3. **Specialized physical therapy** options such as ultrasound, iontophoresis, electrotherapy, or low-level laser therapy have been used in the management of TMD, despite the lack of evidence to support their use. Treatment of underlying comorbid conditions results in greater likelihood of success in the management of TMD.
4. **Acupuncture** Acupuncture is used increasingly in the treatment of myofascial TMD. Sessions typically last 15 to 30 minutes, and the mean number of sessions is six to eight. Two systematic reviews suggested that acupuncture is a reasonable adjunctive treatment for short-term analgesia in patients with painful TMD symptoms.¹
5. **Biofeedback** A Cochrane review supports the use of cognitive behavior therapy and biofeedback in both short- and long-term pain management for patients with symptomatic TMD when compared with usual management. Include **patient education and self-care** where patients is counseled on behavior modifications such as stress reduction, sleep hygiene, elimination of parafunctional habits (e.g., teeth grinding, pencil or ice chewing, teeth clenching), and avoidance of extreme mandibular movement (e.g., excessive opening during yawning, tooth brushing, and flossing). Patient is encouraged to promote rest or immobilisation of muscular and articular structures. Hence, the patient is advised to maintain a soft diet and avoid foods where a considerable amount of chewing is involved. Massage of the affected muscles with application of moist heat will help soothe aching or tired muscles by promoting muscle relaxation. Patients should also be advised to identify the source(s) of stress, and try and change their lifestyle accordingly. Lengthy dental appointments often exacerbate the TMD so the Dentist must allow the patient to intermittently rest their jaw during their appointment. The use of a mouth prop to hold the jaw open may be useful.^{1&4}
6. **Physiotherapy-** The aim is to restore normal mandibular function by a number of physical techniques that serve to relieve musculoskeletal pain and promote healing of tissues. It may also use adjunctive measures such as **dry needling**, **TENS** (transcutaneous electrical nerve stimulation) and **pulsed ultrasound therapy** to help relieve muscle pain. Physiotherapy is especially useful in the management of myofascial pain and TMJ closed lock and is essential following TMJ surgery.⁴

PHARMACOLOGIC MANAGEMENT

Pharmacologic treatments for TMD are largely based on expert opinion.

1. **NSAIDs** - are **first-line agents** typically used for **10 to 14 days** for initial treatment of acute pain. Patients with suspected early disk displacement, synovitis, and arthritis benefit from early treatment with NSAIDs. Only **Naproxen** (Naprosyn) has proven benefit in reduction of pain.
2. **Muscle relaxants-** prescribed with NSAIDs if there is evidence of a muscular component to TMD.
3. **Tricyclic antidepressants**—most commonly amitriptyline, desipramine (Norpramin), doxepin, and nortriptyline (Pamelor)—are used for the management of chronic TMD pain.
4. **Benzodiazepines** - are also used, but are generally **limited to two to four weeks** in the initial phase of treatment. Longer-acting agents with anticonvulsant properties (i.e., diazepam [Valium], clonazepam [Klonopin], gabapentin [Neurontin]) may provide more benefit than shorter-acting agents.

5. **Opioids - not recommended** and if prescribed, should be used for a **short period** in the setting of severe pain for patients in whom non-opiate therapies have been ineffective but should be **used cautiously** because of the **potential for dependence**.¹

OCCLUSAL SPLINT THERAPY

Also referred to as a bite raising appliance, occlusal appliance or bite guard. The idea is to protect the teeth from abnormally high loads in clenched and grinders and also to reduce the maximum loads on the TMJ, particularly in patients with nocturnal clenching/grinding. By distracting the occlusion, maximum contraction of the masticatory muscles is also prevented which theoretically reduces muscle pain.⁴

➤ The two most commonly used splints are:

- **Soft splints** are usually made of flexible polyvinyl of 2 mm thickness and are full coverage splints.
- **Stabilization splints** (also known as **Michigan or Tanner appliances**, depending on whether they are fitted to the upper or lower teeth) are also full coverage splints, most commonly made of hard acrylic.⁶



Figure 3 Occlusal splint



Figure 4 Patient wearing occlusal splint

Generally, we recommend patients wear splints only for sleeping, although a few patients with occlusal instability wear their stabilization splint full-time with frequent adjustment needed by the dentist, usually on a two-week basis, until a stable occlusion has been created on the splint. To avoid patients becoming over-reliant on the splint they should be encouraged to wean themselves off daily use within six months.⁶

SURGICAL TREATMENT

About 5–10 per cent of all patients undergoing treatment for temporomandibular disorders require surgical intervention. While surgery is often considered as an option of **last resort**, there are instances where surgery is the definitive and sometimes the only treatment option such as in rare cases of TMJ ankyloses and tumours. surgery is used to restore and repair damaged tissue or remove tissue that cannot be salvaged. Surgery is also used to promote healing of tissues by replacing missing tissues with grafts.⁴ The common TMJ surgeries are: Arthrocentesis, Arthroscopy, Disc – repositioning surgery, Condylotomy, Arthroplasty and Total joint displacement.¹⁰

Indications for TMJ Surgery :-¹²

Absolute indications:

- 1 Ankylosis – eg. Fibrous or osseous joint fusion
- 2 Neoplasia – eg. Osteochondroma of the condyle
- 3 Dislocation – ie. Recurrent or chronic
- 4 Developmental disorders – eg. Condylar hyperplasia

Relative indications:

- 1 Internal derangement
- 2 Osteoarthritis
- 3 Trauma

A. General indications

- Disorder not responding to non-surgical therapy
- Where the TMJ is the source of pain and dysfunction
 - Pain localised to the TMJ
 - Pain on functional loading and movement of the TMJ
 - Mechanical interference with TMJ function

B. Specific indications

- Chronic severe limited mouth opening
- Advanced degenerative joint disease with intolerable symptoms of pain and joint
- Confirmation of severe joint disease on CT scan or MRI

Risks and contraindications associated with TMJ surgery:- ¹²

1. Poor patient selection

- a. Patient is an unreliable historian
 - i. Secondary gain
 - ii. Compensation seeking
- b. Patient has unrealistic expectations of surgical outcome
- c. Significant medical history
- d. Psychiatric history

2. Inexperienced clinician

- a. Poor diagnostic skills
- b. Limited surgical experience
 - i. Bleeding
 - ii. Infection and wound breakdown
 - iii. Scarring

3. Surgical mishaps

- a. Facial nerve paresis
- b. Deafness
- c. Malocclusion
 - i. Condylar resorption
 - ii. Overzealous arthroplasty
- d. Severe trismus (arthrogenous)
 - i. Adhesions
 - ii. Fibrosis
 - iii. Ankylosis

4. Persistent symptoms

- a. Failure to continue supportive non-surgical therapy
- b. Poor patient compliance – cannot follow instructions
- c. Misdiagnosis – chronic pain syndrome, myofascial pain, normal joint

❖ **MINIMALLY INVASIVE OPTIONS/ CLOSED TMJ SURGICAL PROCEDURES** ⁴

1. ARTHROCENTESIS-

- useful for cases of acute onset closed lock
- provides a more effective approach to the management of chronic (>3 months) or recalcitrant cases of closed lock
- simple and cost effective technique for lubricating the joint and introducing various medicaments such as steroids and hyaluronic acid directly into the superior joint space.
- It involves the use of two 19 gauge needles inserted directly into the superior joint space where one needle acts as the inlet for irrigation fluid and medicaments and the second needle provides the outlet to prevent fluid build-up in the joint.
- widely practiced and is the treatment of choice of OM Surgeons who otherwise have limited experience in TM surgery.

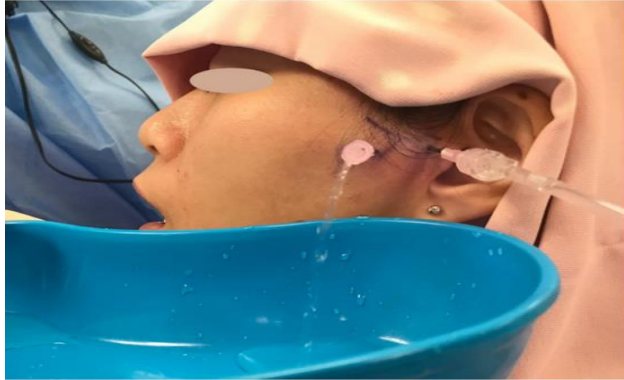


Figure 2- Arthrocentesis performed under local anaesthesia

2. ARTHROSCOPY

- Sophisticated version of arthrocentesis that involves the use of highly sophisticated equipment and requires a more advanced skill. ⁴
- A small cannula is placed into the superior joint space, followed by insertion of an arthroscope with a light source.
- The end of arthroscope is connected to a TV and a video monitor which allows perfect visualization of all aspects of the joint including glenoid fossa and joint disc.
- joint space can be washed and pathologic adhesions can be lysed.
- One cannula is used for visualization, where as instruments are placed through the other one
- possible for disc displacement, disc attachment release, posterior band cautery, and suture techniques. ¹⁰



Figure 3- Arthroscopy of TMJ

3. INTRA-ARTICULAR INJECTIONS- ⁴

- intra-articular injection of corticosteroids is a simple and very effective treatment, which may be attempted prior to arthrocentesis.
- different pharmacological agents including hyaluronic acid, corticosteroid, analgesics, and platelet-rich plasma.
- currently no consensus regarding which intra-articular injection agent is superior over the others.



Figure 4- Intra-articular injection

❖ **OPEN JOINT SURGERY**

- Often referred to as **arthrotomy**, involves the surgical exposure of the TMJ via an incision in front of the ear, permits a wide range of surgical procedures ranging from disc repair and repositioning to discectomy, or removal of the entire disc that is beyond repair.
- Arthrotomy is used when the joint itself is damaged through trauma, degenerative, or inflammatory disease which fail to respond to other measures such as medication and occlusal splint therapy.
- Repair or removal of diseased joint components is facilitated by direct surgical exposure of the TMJ through a carefully made preauricular incision that is cosmetically placed in front of the ear and avoids damage to vital structures such as the upper branches of the facial nerve.
- tissue grafts may be required to replace joint components which cannot be salvaged and a recovery period of about 2 weeks before returning to work.
- TMJ surgery should be routinely followed up with a rehabilitation program of physiotherapy and jaw exercises.
- In extreme cases, where all the TMJ components are beyond salvage, the condylar head of the mandible is resected.
- in most cases where the whole TMJ must be sacrificed, a prosthetic total joint replacement is required to maintain lower facial symmetry and to preserve the existing occlusion.
- current TMJ prostheses are made of biocompatible metals and plastic which are secured to the remaining jaw and skull bones with miniature bone screws
- Recovery from TMJ total joint replacement is usually 3–4 weeks with jaw physiotherapy an essential component of the rehabilitation process.

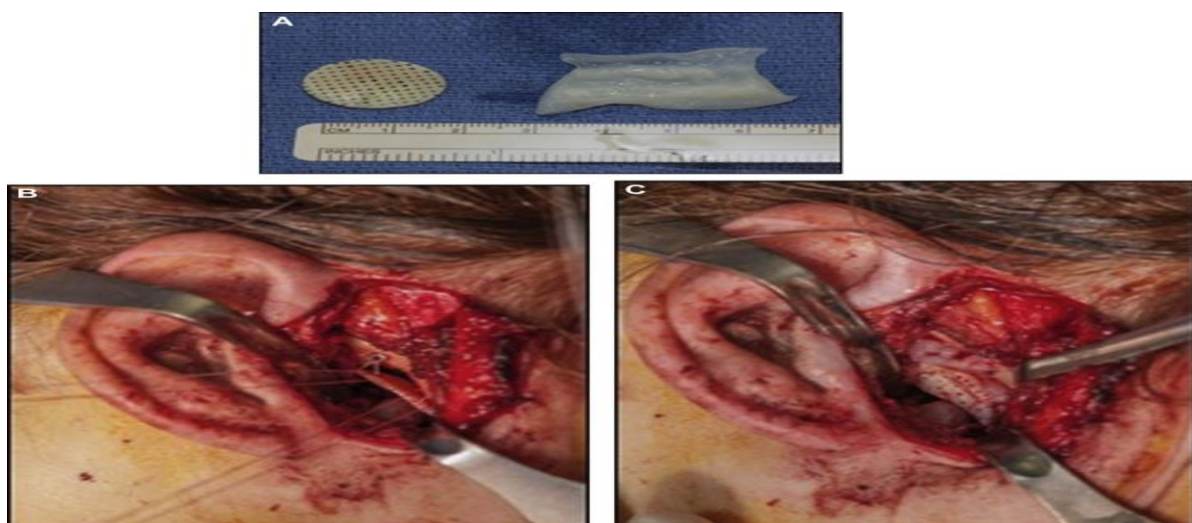


Figure 5- Open joint surgery

Temporomandibular joint replacements ^{10&12}

Where there is **end-stage joint disease**, tumour or severe trauma, and none of the components of the TMJ can be salvaged, then both disc and condyle must be resected. This leaves patients with the dual physical handicaps of lower facial asymmetry and malocclusion, unless the joint is reconstructed with either autogenous grafts or alloplastic joints.

Joint replacement materials :

In **young patients**- autogenous grafts (costochondral rib graft), secured to the ramus of the mandible with wires or screws.

In **older patients**- alloplastic prosthesis consisting of a metal condyle articulating against a high molecular weight polymer fossa prosthesis.

Early prosthetic joint replacements met with little success but more recent prosthetic joints, including both off-the-shelf varieties as well as custom-made prostheses, have benefited from the technological advances and extensive experience of our orthopaedic colleagues. ¹²

RISKS	BENEFITS
<ul style="list-style-type: none"> • facial nerve palsy and scarring, malocclusion, restricted mouth opening and deafness • inexperienced surgeon with poor diagnostic skills- result in poor patient selection and suboptimal surgical technique. 	<ul style="list-style-type: none"> • experienced surgeon with good patient skills- identify patients compliant with treatment regimes, have a good understanding of their disorder, and do not harbour unrealistic expectations for treatment outcomes.

CONCLUSION

Temporomandibular disorders remain a frequent cause of visits to primary care physicians, internists, and pediatricians. ⁷ Chronic TMD is a complex musculoskeletal disorder with multifactorial etiology. Physical, behavioral and emotional factors overlap and interact in TMD. ⁹ In the past, focus has been placed on the physical origins of TMD, but an at least equally significant psychosocial factor is now well-recognized. ⁸

The new DC/TMD protocol is a necessary step toward the ultimate goal of developing a mechanism and etiology based DC/TMD that will more accurately direct clinicians in providing personalized care for their patients. ³

Substantial improvements have been made in our diagnostic and imaging capabilities, and some treatment advances have been helpful in the long-term management of these common disorders. Future efforts in the fields of genetics, pain research, and arthritis offer the possibility of better defining this heterogeneous group of disorders and providing more focused and effective treatment strategies. ⁷

Reassuring patients that TMD is self-limiting and is benign in nature is extremely important. ¹³ In most patients, the initial management is conservative and reversible in nature, can effectively be delivered in practice and involves explanation of the condition, prescribing, home physiotherapeutic exercises, a splint (preferably full coverage) and appropriate analgesia. ⁶ Though open joint surgery is rare nowadays and is reserved for specific situations, we may be in the midst of a changing paradigm which favours early minimally invasive procedures. ⁸ Ongoing research into the genetic basis for TMDs may give vital information to aid management of TMDs in individuals susceptible to this problem. ⁶

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