

# Assessment and Initial Management of Temporomandibular Joint Disorders



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**T**emporomandibular joint (TMJ) problems are a common cause of morbidity in general and ENT practice. Around 30% of the population will complain of problems related to the joint at some stage during their life, with around 10% of the population having one or more TMJ symptom or sign at any one time. Differential diagnosis can be confusing and patients are often considered to have 'earache' and referred for ENT advice. The following article will aim to aid the general practitioner and ENT surgeon in diagnosing TMJ disorders and in primary management, with advice when onward referral for maxillofacial surgery advice is appropriate.

## History of TMJ disease

The primary symptoms to be elicited from the history are:

1. Pain
2. Joint noises
3. Locking
4. Restriction of opening
5. Other joint disorders particularly rheumatological and hypermobility

aching on the side of the face which is not well localised but often in the region of the ramus of the mandible or lateral cheek below the zygomatic process or into the temple may be myofascial pain. This tends to be worse in the mornings, due to clenching or grinding the teeth at night, or after particularly 'stressful' situations (for example a long drive through heavy traffic or around exam times).

## Pain

Pain from TMJ disorders may be from the joint itself (TMJ pain) or the related muscles of mastication (myofascial pain). It is important from the history and examination to distinguish these two in terms of secondary care management, although initial care is the same for both.

Pain localised just in front of the tragus of the ear, which can be localised with a finger, is likely to be TMJ pain. It is often made worse by function (eating and yawning), and may radiate to surrounding structures.

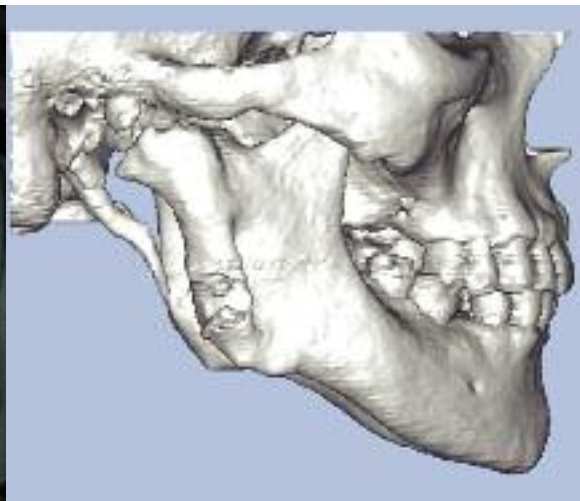
Less well defined pain, 'numbness' and

## Joint noises

Clicking or cracking of the joint are common. Clicking is related to anteromedial displacement of the disc of the TMJ (ADD) repositioning itself over the joint and can predispose to joint disease. In itself it does not warrant any treatment other than reassurance that it will soften with time and does not lead to or indicate 'arthritis of the joint'. Cracking or crepitus again does not warrant treatment but suggests 'scarring' within the joint. Again without any other symptoms the patient can be reassured.

Illustration 1: (below left)  
Usual Surgical Approaches to the TMJ  
1. Preauricular  
2. Retromandibular  
3. Submandibular

Illustration 2: (below right)  
3D CT scan of patient for joint replacement  
(Previous costochondral graft failure).



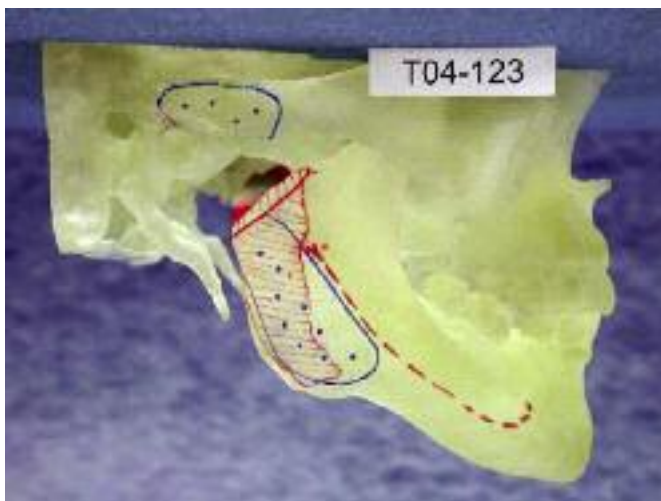


Illustration 3:  
3D bone model of patient with surgical excisions marked in red and proposed prosthesis marked in blue. Inferior alveolar canal also marked in red.



Illustration 4:  
Prosthesis constructed and fitted to model.

### Locking

Locking is the inability to either fully open or fully close the joint. Inability to fully open the joint will often be overcome following massage with a click or crunch restoring full opening. This has been considered to be due to disc displacement with reduction (ADDR), although it may be due to acute muscle spasm of the lateral pterygoid muscle, which attaches to the anterior portion of the disc, or any of the other muscles of mastication (secondary to myofascial spasm). Inability to fully close over a period of time is due to a joint effusion (synovial fluid) or blood (haemarthrosis). Both may be secondary to trauma although the former may also be secondary to acute synovitis.

### Restriction of opening

Normal range of mouth opening for an adult is above 35mm inter-incisal distance (with upper and lower dentures in if present). An opening greater than 55mm suggests hypermobility.

Muscle spasm and disc displacement can both cause restriction. Opening less than 25mm in a young adult suggests anchored disc phenomenon, due to loss of joint lubrication. This should be managed

urgently by a maxillofacial specialist with an interest in TMJ disorders who will consider early arthrocentesis (joint washout under pressure) which is usually curative. Significant delay may lead to a permanent restriction.

### Other joint disorders

The TMJ can be affected by rheumatoid joint diseases and hypermobility. Rheumatoid disease often presents with pain and ultimately can lead to joint collapse with a disturbance in the way the teeth bite together (occlusion). Ankylosing spondylitis may lead to joint ankylosis with pain and restriction of opening. Psoriatic arthropathy also may cause pain, restriction and occasionally joint collapse.

Hypermobility can lead to joint dislocation. This occurs when the condyle of the mandible is displaced anterior to and above the articular eminence. Reduction may be achieved by firm pressure downwards in the region of the molar teeth with the thumbs, with upward pressure from the fingers under the chin whilst standing behind the patient with his/her head against the doctor's abdomen. It tends to occur in two age groups – young adults with generally hypermobile joints and the

elderly who have lax ligaments and overclosure of the jaw due to lack of teeth.

### Clinical examination

The aim of clinical examination is to determine the sites of tenderness and the degree of disorder present. The examination comprises:

1. Palpation of the joint laterally and posteriorly for tenderness and noises/crepitus with the mouth both closed and open.
2. Palpation of the masseter muscles for tenderness and areas of muscle tightness.
3. Palpation of the temporalis muscles for tenderness and areas of muscle tightness.
4. Measurement of inter-incisal mouth opening in mm.
5. Observation of the opening path of the mandible in relation to the maxillary centreline.
6. Interdigitation of the teeth (dental occlusion).

### Palpation of the joint

The TMJ is palpated just in front of the tragus of the ear. Movement of the joint consists of rotation in the lower joint space

*The distance between the upper and lower incisors during maximal mouth opening gives a reliable and reproducible measure of loss of function and outcome*



Illustration 5:  
TMJ Concepts total joint replacement in situ.

and glide from the upper joint space over the articular eminence at the base of the zygomatic arch. Tenderness may be elicited over the lateral aspect of the joint whilst stationary or in motion. The posterior aspect of the joint can only really be felt in wide opening by palpating between the back of the joint and the tragal cartilage. Tenderness over a joint indicates inflammation in the joint related structures of capsule, synovium and bone.

Noises may be palpated and heard such as a click or crepitus (crunching). Often, due the close relation of the joint to the ear, the patient will complain of noises which are either intermittent or cannot be palpated or heard by the examiner. Assume

the noise is present if the patient complains of it. Tinnitus is not a symptom of TMJ disease.

#### Palpation of the masseter and temporalis

The masseter muscles lie over the vertical ramus of the mandible up to the base of the zygomatic arch. The temporalis lies above the zygomatic arch, extending behind and above the ear and onto the forehead below the hairline. Tenderness in the muscle during clenching or the palpation of tight bands of muscle indicates myofascial spasm and pain.

It is relatively difficult and impractical to determine areas of tenderness in the

other muscles of mastication and the author does not feel this is necessary in non-specialist practice.

Headaches may be a symptom of TMJ disorder when there is associated muscle or joint tenderness.

#### Measurement of inter-incisal opening

The distance between the upper and lower incisors during maximal mouth opening gives a reliable and reproducible measure of loss of function and outcome. Ninety-seven percent of the population have an opening of greater than 35mm and this provides a useful distance to aim to achieve in management. Some patients with opening greater than this will have subjective restriction and others with opening less than this will be normal. Improvement in opening following treatment gives a good measure of outcome.

#### Observation of opening path

Mouth opening tends to deviate towards the side of pathology. The early phase of opening is a rotation of the condyle of the mandible against the disc in the lower joint space. From about 25mm opening continues with glide between the disc-condyle complex and the glenoid fossa of the temporal bone in the upper joint space. This latter causes the joint to move away from the side of the gliding. As much of the joint pathology causing restriction is related to upper joint space problems, muscle spasm restricting disc movement or muscle or joint pain restricting movement, the loss of glide is most common outcome and therefore the 'normal' joint glides causing the jaw centreline to deviate towards the other side. Looking for this loss of function aids confirmation of the side and site of the problem.

#### Interdigitation of the teeth (dental occlusion)

The way the teeth bite together can be altered by joint collapse. If one joint collapses the fulcrum on that side moves superiorly causing the posterior teeth to meet prematurely on that side and the centreline to deviate towards that side. If both sides collapse the front teeth will not meet, when the patient reports they previously did.

Conversely if there is an effusion or haemarthrosis the joint space increases lowering the fulcrum, preventing the posterior teeth on the side the effusion from meeting.



**Table 1: When to refer for maxillofacial advice.**

Acute severe restriction of opening
Failure of simple conservative measures in conjunction with dentist over 2 months
Associated rheumatological disease
Recurrent dislocation of the joint
Disturbance of the dental occlusion

### Initial management

The primary management of most TMJ disorders initially is reassurance that there is unlikely to be a significant underlying condition, it is unlikely to precede arthritis and the majority of patients can be managed with non-surgical treatment. A significant proportion of patients will have some psychological input to their disease process, whether this is a primary cause or a secondary effect, and the reassurance will go some way to improving their symptoms. Also the placebo effect should produce a 'cure' in around 40%.

Explanation of the disease process along the lines of a 'sprain' of the joint with consequent joint pain due to inflammation and resultant muscle spasm will help to empower the patient and reduce the risk of following internet mis-advice. Initial rest with avoidance of chewy foods such as chewing gum, sticky toffees and tough foods (steaks and crusty bread) and restriction of wide mouth opening (occasionally the pain may have been induced by a long dental visit) will improve symptoms, but this regime must be persisted with for several weeks. The addition of topical non-steroidal anti-inflammatory gels applied to the area of the joint four times daily for four weeks will give additional benefit in terms of pain relief and reduction of joint inflammation. Paracetamol as a simple analgesic can additionally be used. Joint exercises may have been prescribed by the patient's dentist. These seem to be rarely beneficial over and above a placebo effect and should not be encouraged.

The patient's dental practitioner should be asked to provide a lower soft full occlusal coverage splint to wear at night. This helps to reduce the load on the muscles and joint overnight, particularly in those patients who have a clenching habit. It also will help to eliminate the habit. It may take a few nights for the patient to get used to the splint and it may take a few weeks for symptoms to start to improve. There has been no benefit shown to adjustment of the way the teeth bite together (tooth grinding or occlusal adjustment), although some dentists may

feel this is the case. A Cochrane study<sup>1</sup> has shown that doing nothing is just as effective and is much less harmful.

Although physiotherapy may be beneficial in the short term there is no evidence of its long-term efficacy. Steroid injections to the joint should be avoided and left to a maxillofacial surgeon to decide whether these are indicated as they may cause joint collapse.

Following a two month trial of these treatments, if there has been no significant improvement, or if the above measures cannot be instituted, or if there is acute severe restriction in opening then referral to a maxillofacial specialist, preferably with an interest in TMJ disorders should be considered (Table 1).

### Maxillofacial management

Most maxillofacial surgeons will reiterate the advice of rest, reassurance, NSAIDs and a bite splint. For those patients in whom there has been some initial improvement persistence with this therapy is worthwhile for up to six months.

Earlier intervention by means of therapeutic arthroscopy (examination and washout of the joint) or arthrocentesis (joint washout) is indicated in patients with restricted opening who fail to improve or in those with persistent locking. Around 80% will improve with this procedure. Additionally arthroscopy under GA gives a good idea of how much of the restriction is due to muscle spasm and pain and also whether there is any intra-articular damage (opening improves with the muscle relaxation of general anaesthesia). Follow-up physiotherapy gives added benefit.

Where there has been no improvement following arthroscopy, the joint was normal and mouth opening improved during anaesthesia. It is assumed that the majority of the problem is due to muscle spasm and a muscle relaxant medication may be suggested. Commonly a low dose tricyclic such as amitriptylene or dothiepin is used with doses starting at 10mg and potentially rising to 75mg titrated to symptoms and side-effects. These medications take

around three weeks to become effective and doses should be increased on a monthly basis until full pain relief is achieved or side-effects prevent a further increase in dose. The pain relieving dose is maintained for six months and then the patient weaned off, according to recurrence of symptoms, over the next few weeks. Alternative therapy currently under investigation is the injection of Botulinum toxin into the areas of muscle spasm, which is effective in around 70% of patients.

Where arthroscopy has shown intra-articular problems these may be addressed with open joint surgery if symptoms do not improve. A variety of techniques have been used along orthopaedic principles with ultimately joint replacement as the final option. The latter is not to be considered lightly and in the UK at present fewer than 100 total joints are carried out each year by less than 10 recognised joint replacement surgeons. National guidelines have suggested when these may be indicated.<sup>2</sup>

### Conclusion

TMJ disorders are commonly seen in primary care and ENT practice. History and examination of the joint is a simple addition to the routine ENT examination and should be included in any patient with a facial pain. It is important to remember that a lump and pain or associated facial palsy should be investigated as a parotid malignancy in the first instance. Simple conservative management can usually deal with most TMJ problems and it is rare that open surgery will be required as a therapeutic option. Arthroscopy is increasingly used therapeutically with good success rates by a suitably trained surgeon. ■

### References

1. Koh H, Robinson PG. Occlusal adjustment for treating and preventing temporomandibular joint disorders. *Cochrane Database Syst Rev.* 2003;(1):CD003812.
2. Sidebottom AJ. Guidelines for the replacement of the TMJ in the UK. *Br J Oral Maxillofac Surg.* 2008;46:146-7.

### Additional reading

- Dimitroulis G. Temporomandibular disorders: a clinical update. *BMJ.* 1998;317:190-4.
- Cox KW. Temporomandibular disorder and new aural symptoms. *Arch Otolaryngol Head Neck Surg.* 2008;134:389-93.