

## Leading article

# Current thinking in temporomandibular joint management

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## Abstract

The management of temporomandibular joint (TMJ) disorders in secondary care has progressed through the 1990s from a condition dealt with by generalists to one with an increasing number of surgeons with a subspecialist interest. Within this latter group there is a subgroup of those with a specific training towards joint replacement surgery.

Increasingly patients who previously had surgery for pain are being managed with non-surgical options. Alternative pain management regimens with the introduction of botulinum toxin as well as tricyclic medication have reduced the need for any invasive management. The surgical management of the TMJ has been revolutionised by the introduction of arthroscopy in the late 1970s. The use of arthroscopy and arthrocentesis has led to a reduction in indications for open joint surgery. There is no longer a perceived need to correct internal derangement with disc repositioning surgery. The primary management of acute restriction of opening and joint pain is now with arthrocentesis and arthroscopy.

Degenerative and ankylotic conditions of the joint can be safely treated by the use of alloplastic joint replacement, which has less morbidity and more predictable outcomes than costochondral grafting, with the latter still the method of choice in children.

The revolution continues with the introduction of national guidelines and databases supported by BAOMS.

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## Introduction

During the 1990s the management of temporomandibular joint (TMJ) disorders moved forward from a series of treatments provided by non-specialist maxillofacial surgeons towards an increasingly sub-specialist lead practice. With the collection of cases under the care of an individual surgeon has come the realisation that open joint surgery for the correction of pain and dysfunction is not necessarily the best option.

In the following article I will try to provide a brief overview of the developments within the management of TMJ problems based on the literature, with a personal view on the future of this sub-speciality.

## Conservative management

Any discussion on the management of TMJ disorders is incomplete without consideration for the management of the majority of patients. More than 80% of patients presenting to secondary care can be adequately treated by a combination of conservative techniques including rest, reassurance, non-steroidal anti-inflammatory (NSAID) medication and bite-splints. This is not a panacea and the use of therapeutic arthroscopy when indicated early in the disease process should also be considered, particularly for acute “closed lock”.

It seems logical to suggest that an injured joint requires rest, yet there still seems to be a significant number of prescribers to the use of retrusive exercises for the painful joint. While these may be a solution to the management of restriction and internal derangement, pain in a joint implies inflammation and therefore our orthopaedic colleagues would suggest rest is the primary management.

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Cochrane assessment<sup>1</sup> shows no evidence for the use of occlusal modification in TMJ disorders—indeed the premise of “first do no harm” seems to imply that destruction of sound dental structures should be contra-indicated.

The use of NSAIDs is indicated for joint pain which is secondary to inflammation. Topical NSAIDs have been shown to be as beneficial for superficial joints as systemic medication, with fewer side-effects, and I recommend their use regularly four times a day for a 4-week period in the first instance, based on two BMJ meta-analyses.<sup>2,3</sup>

Cochrane analysis<sup>4</sup> again shows that no bite splint is better than any other, which suggests that more time-consuming repositioning or stabilisation splints should not be used in the first instance, with the simple lower soft splint providing a good alternative.

Physiotherapy is non-harmful and reversible. There is no good evidence that it is beneficial in the long term, but it may be of use in the short-term management of restriction of opening and following arthroscopy or open surgery.

### **Pain management techniques**

Simple analgesics and NSAIDs provide the initial management of TMJ pain. It is important to distinguish this pain, associated with joint line tenderness, from masticatory myofascial pain, which occurs in the masticatory muscles and is diagnosed by the palpation of trigger spots within the muscles and areas of muscle spasm. Both may cause restriction of opening.

Pain over the joint implies inflammation and this pain can be diagnosed and temporarily relieved by an injection of local anaesthetic into the joint. Injection of more than 2 ml of this substance under pressure over a period of minutes may also provide a degree of joint distension and hydro-dissection more commonly achieved by arthrocentesis. It may temporarily relieve an acute anchored disc causing an “acute closed lock”. The author does not routinely recommend steroid injections unless there has been arthroscopically proven evidence of inflammatory change which has not responded to the arthrocentesis.

Pain and muscle spasm can likewise be relieved by needling the area with local anaesthesia and it is felt that long-term relief is due to the release of endogenous endorphins in the area of needling. Recently the use of botulinum toxin injection into these areas of muscle spasm has been shown to be beneficial. The author’s unit has presented these findings with approximately one third of patients gaining long-term relief, one third gaining temporary relief or an improvement in pain and one third gaining little or no benefit.<sup>5,6</sup> Increasing refinement of the technique has led to improved outcomes, although repeat injections do not carry the same improvements.<sup>7</sup>

More traditional methods of management of myofascial pain include the use of low-dose tricyclic medication. Some pain clinics have suggested the use of gabapentin and

similar medication, but no trials to date have shown significant benefit in TMJ and masticatory muscle myofascial pain. The author would not recommend these medications in first-line management without the involvement of the pain team.

### **Arthroscopy/Arthrocentesis**

Ohnishi first described the use of arthroscopy of the TMJ in 1976.<sup>8</sup> Since that time the technique has been refined and expanded such that arthroscopic surgery can be performed in some cases with success rates similar to those achieved with open surgery. The advantages include less risk of long-term arthritis and the potential for day-case, even local anaesthetic, procedures. The disadvantages include limited access and restricted view of the lower joint space and length of the procedure.

The majority of restricted opening is secondary to upper joint space problems, particularly anchored disc phenomenon, where arthrocentesis is particularly beneficial.<sup>9</sup> The lower joint space tends to be more affected by degenerative disorders and therefore access for the management of these conditions is less essential as management of synovitis can be achieved through the upper joint space, and osteophyte removal from the condyle usually requires an open procedure.

The debate continues about whether arthrocentesis alone is sufficient for the management of TMJ disorders. There is no evidence that arthroscopy gives additional therapeutic benefit over arthrocentesis; however, the whole point of arthroscopy is to aid in diagnosis as well as therapy and the author is repeatedly surprised by findings on arthroscopy which were not expected from clinical and radiological investigation. The number of joints with unexpected disc tears and synovitis which could not be diagnosed and managed promptly and appropriately suggests that most patients over the age of 20 or with a history of direct trauma to the joint should have arthroscopy.

International outcome studies show that less than 10% of patients presenting to a TMJ clinic go on to need arthroscopy. Around 70% are “cured” by this procedure, with a further 10% requiring subsequent open joint surgery. For anchored disc phenomenon (acute severe restriction in a young adult suggests this diagnosis), beneficial outcome following arthrocentesis is closer to 90% cure if performed early in the disease process.

### **Open joint surgery**

Through the 1970s and 80s management of unresponsive TMJ pain and internal derangement was with open surgery. Many cases where this was carried out had successful outcomes, but we are now seeing the effects of that surgery used indiscriminately. A proportion of these patients have

gone on to develop secondary degenerative disease. While this may have been the ultimate outcome without surgery, it is unlikely that patients in their 20s and 30s would develop degenerative arthritis and yet there are numbers of patients in this age group who have had prior open joint surgery with subsequent gross degeneration and pain. Others get prolonged dysaesthetic pain which is recalcitrant to many pain relieving solutions. The evidence suggests there is now little place for disc repositioning surgery, particularly in the absence of joint pain or marked restriction. Arthroscopy can adequately deal with the majority of these cases associated with pain and restriction, and the presence of a click alone is not an indication for any intervention other than explanation of the pathophysiology and reassurance.

Eminoplasty (the modification of the shape of the articular eminence), the preferred term to eminectomy, which is never fully achieved, has been popular for the management of pain, restriction and joint noises. The logic behind this procedure lies in its decompression of the joint while remaining “outside the joint”. Even in the best hands, damage to the intra-articular structures occurs and subsequent arthroscopy invariably shows anterior compartment scarring as a minimum. There is no conclusive evidence that it is better than any other procedure in the management of TMJ pain and restriction. For a more thorough review of the recent literature on this subject, the two articles by Dimitroulis provide a good overview.<sup>10,11</sup>

Condylar shave aims to either reduce the growth plate when used for condylar hyperplasia or to reduce osteophytes and remodel the joint surface in degenerative disease. Additionally it will decompress the joint, but inevitably causes joint surface damage. While the outcomes for condylar hyperplasia are good, there are no long-term studies showing that this does not ultimately lead to degenerative arthritis in this condition. When performed for degenerative disease it should be explained to the patient that ultimate joint replacement may be required.

Discectomy is indicated for the grossly deranged and damaged disc which is irreparable. Any large disc perforation will not heal as the disc is avascular and disc should be removed. Whether the disc should be replaced is debatable as a number of Scandinavian studies have shown the long-term benefits with and without replacement with an interposition graft. The placement of a hemi-arthroplasty is another consideration although it is becoming apparent that this likewise will lead to joint remodelling and the long-term outcomes do not seem to be significantly different to discectomy alone. Ultimately the only alternative will be a total joint replacement when symptoms return due to joint failure.

Decompression of the joint by means of a condylar neck osteotomy (including subsigmoid osteotomy) provides a good deal of relief for internal derangement associated pain. This could be due to the rest provided by the enforced period of intermaxillary fixation required to

maintain the occlusion as well as the resultant condylar sag.

### Joint replacement surgery

The total replacement of the TMJ was developed during the 19th century. Our current prostheses follow on from the early joints produced in the 1960s by Christensen. The vogue changed away from joint replacement in the 70s and 80s with the failures of the Kent proplast-Teflon based prosthesis, the latter of which caused gross bony erosion. During the 90s the long-term success of the Christensen prosthesis permitted the possibility that total joint replacement of the TMJ was a reasonable option. Currently there are three prostheses used in the UK market.

The Christensen prosthesis has been modified from acrylic on cobalt-chrome (used until 1999), which wore down to the cobalt-chrome peg, to metal-on-metal cobalt-chrome alloy. Around 10% of these have been shown to develop a foreign body reaction, possibly due to material allergy.<sup>12</sup> The follow-up on the former prosthesis is the longest and showed good outcomes up to 20 years until the acrylic wore out.

Concepts (formerly Techmedica) have up to 17 years follow-up, again with 90% success rates.<sup>13</sup> These are custom-made prostheses following a CAD-CAM model from a 3-D CT scan. The joint surface is cobalt-chrome on high molecular weight polyethylene fossa. The fossa is bonded to titanium. The condylar component head is cobalt-chrome alloy, but may be hardened titanium for patients with allergy to the cobalt-chromium alloy. The remainder of the body is titanium which is attached to the ramus of the mandible with eight screws.

Lorenz make a stock prosthesis with similar options and components to the Concepts prosthesis. The long-term follow-up on this prosthesis is in the order of 10 years.

Total replacement of the joint is the final stage in the pathway of management of the TMJ. The guidelines for replacement are somewhat stricter than for all other joints and were summarised in this journal.<sup>14</sup> The relatively small number of joints that require replacement (less than 100 per year in the UK) means that only a few surgeons should be carrying out this complex procedure—this is not a procedure for the occasional TMJ surgeon. The risks associated with this operation are magnified with multiply operated joints and the outcomes for these patients are inferior to those who have had two or less previous procedures. It is important that patients are therefore referred early on in the process of their disease to determine whether a lesser procedure is appropriate or whether this will compromise the ultimate outcome of joint replacement. As experience with these joints grows so too will the indications and contra-indications and it is therefore prudent that the UK TMJ surgeons group are establishing a national database of all patients who have joint replacement to determine long-term outcomes and whether the benefits outweigh the risks.

## Summary

TMJ surgery is not just a process of operating on patients with pain and dysfunction of the joint. The TMJ surgeon should have a full armamentarium of conservative approaches aiming to prevent surgery. Appropriate referral to the pain management services should be considered rather than clutching at a surgical option.

Should conservative measures fail and an appropriate diagnosis which can be surgically managed be made then a surgical solution may be sought. The long-term outcomes of the various procedures should be carefully assessed and the best way for this to occur is with multi-centre randomised trials. At present there are very few of these published for conservative measures, let alone for surgical options. To achieve this will require the close cooperation of the whole of the oral and maxillofacial surgical team.

National guidelines for TMJ replacement have been established at the request of BAOMS. Ultimately we should aim to follow these up with other guidelines for surgery, arthroscopy and conservative treatments and revise the guidelines in the light of audited data of outcome. The formalised establishment of a UK TMJ surgeons study group will facilitate this process.

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