

Appropriate Management of Temporomandibular Disorders in the Elderly

Benjamin R. Davis, BSc, DDS, FRCD(C), Department of Oral and Maxillofacial Surgery, Queen Elizabeth II Health Sciences Centre, Halifax, NS.

Temporomandibular disorders (TMDs) are common and can be divided into either muscular or intra-joint conditions. With advancing age, the craniomandibular complex undergoes changes that are similar to other musculoskeletal structures. Many of these changes may explain the decrease in incidence of TMDs seen in the older population. Conservative treatment is usually effective at decreasing TMD pain and improving function. A small percentage of patients will benefit from surgery when appropriate conservative measures have failed, and an intra-joint etiology has been definitively established.

Key words: temporomandibular disorders, aging, facial pain, temporomandibular joint surgery.

Introduction

The ability to comfortably chew, swallow, speak and perform facial movements is dependent upon an asymptomatic craniomandibular complex. The normal function of this intricate complex is dependent upon the precise interplay between the paired muscles of mastication, the bilateral temporomandibular joints (TMJs) and the dental occlusion. The most frequently used term to collectively define the clinical problems involving these structures is temporomandibular disorder (TMD).¹ The American Academy of Orofacial Pain has defined TMD as being characterized by pain in the muscles of mastication, the preauricular region and/or TMJ that is usually aggravated by function or manipulation.² A limited range of mandibular motion or asymmetric motion is frequently seen, as are joint sounds or "jaw locking".

Inadequate training of health care providers in TMD management is widespread. Furthermore, appropriate management depends upon correct diagnosis which can be difficult due to frequently complex and confusing patient symptomatology. Thankfully, the majority of TMDs are self limiting and easily managed by conservative means. However, surgery does have a

small but important role, as approximately 5% of patients presenting with TMD will not have resolution of their symptoms with conservative means alone. This paper will discuss the appropriate management of those conditions affecting the temporomandibular joint in the older patient.

Classification of Temporomandibular Disorders

Numerous classification systems have been devised to categorize the diverse causes of facial pain. The constellation of TMDs is one of the most frequent causes of facial pain, but many non-TMD-related reasons for facial pain exist (Table 1). Most often, TMDs are separated into joint disorders and masticatory muscle disorders (Table 2). In our tertiary care facility, most patients present with a combination of both joint and masticatory muscle pain. However, masticatory muscle disorders are more prevalent in the general population.

No difference in pain severity or duration appears to exist between pure masticatory muscle pain and intra-joint pain. However, patients suffering from masticatory muscle pain seem to demonstrate more dysfunctional behavioural profiles and suffer significantly higher psychological distress than those suffering intra-joint pain.³

Age-related Changes in the Craniomandibular Complex

Numerous changes occur in the craniomandibular complex with increasing age, most of which mimic changes seen elsewhere in the body. A significant reduction in the cross-sectional area and densities of both the masseter and medial pterygoid muscles has been noted with advancing age.⁴ This explains why masticatory muscle performance is lower in older patients and may also account for Bader, *et al.*'s observation that the incidence of sleep bruxism, considered a precipitating factor for TMD, decreases among older patients.⁵

Age-related changes also have been noted in the TMJ disc (meniscus) and retrodiscal tissue. An examination of 106 cadaveric human TMJ discs demonstrated some degree of either thinning or perforation in 38% of individuals aged 65–85 years.⁶ A decrease in vascularity and number of fibroblasts and an increase in dense connective tissue also have been observed in the retrodiscal tissue of older individuals.

The articular surface of the mandibular condyle also undergoes age-related changes that are similar to other load-bearing articular surfaces. Radiographic cortical plate irregularities and flattening of the condylar head are frequently noted with advancing age. Macroscopically, surface erosions and cartilage denudation is repeatedly seen.

Incidence

It has been estimated that 13% of the population will, at some point, experience pain at rest or during function in the craniomandibular complex.⁷ The exact prevalence of TMDs in the elderly is unknown, but one study suggested a low incidence of TMJ problems in an older institutionalized population.⁸

TMDs seem to be at least twice as prevalent in women, who are also more likely to seek treatment. Pain onset tends to occur after puberty and peaks during the reproductive years, with the highest prevalence in the 20–40 year age group and the lowest prevalence being among children, adolescents and the elderly.⁹

The societal costs of TMDs are significant. MacFarlane, *et al.* demonstrated that up to 17% of individuals with orofacial pain in a U.K. community missed work.¹⁰ Patients suffering from a TMD have been shown to use significantly more health care services and have mean costs up to 1.6 times higher for all services, with outpatient visits accounting for about 40% of the difference in mean costs.¹¹ A relationship

between clinical evidence and subjective complaints of TMJ pain and dysfunction and high rates of depressive symptoms also has been determined.¹²

The radiographic incidence of TMJ abnormalities is significantly greater than the incidence of patients presenting with TMD. Disc displacement, often clinically present as “clicking”, has been found on magnetic resonance imaging (MRI) examination in at least 33% of asymptomatic patients.¹³ Studies also have concluded that it is not possible to predict the development of orofacial pain based solely on the radiological signs of TMJ osteoarthritis.¹⁴ However, Emshoff, *et al.* have demonstrated a fair diagnostic agreement between the presence of clinically evident TMJ pain with limited mouth

opening and the MRI diagnosis of disc displacement without reduction and osteoarthritis.^{15,16}

Management of Temporomandibular Disorders

Numerous conditions, some life threatening, can mimic the common signs and symptoms of a TMD. A thorough history and clinical examination of the entire maxillofacial region by a health care provider experienced in facial pain diagnosis and management is therefore of paramount importance. Initial plain film imaging of the mandibular condyles and glenoid fossa is required. More advanced imaging with computed tomography or MRI is required in select cases.

Most TMDs follow a natural course of decreasing pain and improving function independent of the treatment provided. As a result, the primary role of the clinician should be to provide pain management and supportive care. The identification and, where possible, elimination of etiological factors is essential, including gross malocclusions, ill-fitting dentures, loss of intra-arch vertical dimension, life “stressors”, parafunctional habits and/or ongoing trauma.

Initial conservative management usually involves the initiation of a soft diet, physiotherapy, bite plane therapy, stress reduction and pharmacotherapy. Non-steroidal anti-inflammatories, muscle relaxants, analgesics and, when required, antidepressants are routinely prescribed. Close follow-up is necessary.

Surgical Interventions

The majority of patients will improve with conservative measures, but roughly 5% will eventually require surgical intervention. Improvements in diagnosis and surgical techniques have enabled us to better define the role of surgery in managing TMJ disorders. However, due to the persistent limitation in our understanding of the precise pathological processes causing joint pain and dysfunction, there is still debate over the exact role of surgery in the management TMD.¹⁷ The proce-

Table 1

Differential Diagnosis of Orofacial Pain

Conditions and structures to consider when diagnosing orofacial pain:

Intracranial Pain Disorders

- neoplasm, aneurysm, infection, hematoma, edema, inflammation

Headache Disorders

- migraine (and its variants), tension type, cluster headaches and chronic paroxysmal hemicrania

Neurogenic Pain Disorders

- Paroxysmal neuralgias
 - trigeminal, glossopharyngeal, superior laryngeal neuralgias

Continuous pain disorders

- deafferentation pain syndromes (peripheral neuritis, post-herpetic neuralgia, post-traumatic and post-surgical neuralgia)

Sympathetically maintained pain

Intraoral Pain Disorders

- conditions affecting the dental pulp, periodontium, mucogingival tissues, tongue

Temporomandibular Disorders

- masticatory muscle disorders, temporomandibular joint disorders

Associated Orofacial Structures

- conditions affecting the eyes, ears, nose, paranasal sinuses, throat, lymph nodes, salivary glands, neck

Axis II, Mental Disorders

Somatoform disorders

Pain syndromes of psychogenic origin

Modified from Okeson JP, 1996.

Temporomandibular Disorders

dures presently performed include arthrocentesis, arthroscopy, vertical ramus osteotomy, arthrotomy and joint reconstruction.

The acknowledged indications for surgery include neoplasia involving the TMJ, ankylosis, recurrent condylar dislocation ("open lock") and TMJ disease causing maxillofacial growth disturbances. Otherwise, surgery is considered only in those cases for which conservative measures have not resolved the patient's symptoms and an intra-joint etiology is suspected. The American Association of Oral and Maxillofacial Surgeons published parameters of care for TMJ surgery in 1992. This

evolving document states: "in cases of internal derangement or arthritic conditions, surgical intervention is indicated only when pain is moderate to severe in nature, or when dysfunction is moderate to severe. Surgery is not indicated for preventative reasons in patients without pain and with satisfactory function."¹⁸

Arthrocentesis and Arthroscopy

Arthrocentesis and arthroscopy are the least invasive TMJ surgical techniques and involve a lavage of the superior joint compartment and instilling a medication, usually a corticosteroid. These procedures have numerous indications, with the most accepted being in cases of acute limited mouth opening ("closed lock"). A retrospective review of 405 arthrocentesis procedures in 298 patients demonstrated a statistically significant reduction in TMJ pain with over 90% of the patients finding the procedure beneficial.¹⁹ A similar outcome with arthroscopy has been noted with the additional benefit of allowing visualization of the superior joint compartment. Unfortunately, approximately 20% of those patients who underwent TMJ arthroscopic surgery required further TMJ procedures, ranging from repeat arthroscopy to open joint arthrotomy.²⁰

Arthrotomy

The most common indication for TMJ arthrotomy is in symptomatic patients who have arthroscopic or radiographic evidence of disc perforation, displacement or osteoarthritic mediated damage to the articular surfaces of the TMJ. Discectomies, disc plications, eminectomies and condyloplasties can all be performed via arthrotomy. Ericksson and Westesson have demonstrated that 85% of their patients who underwent discectomy for painful TMJ disorders had a good result as indicated by no to mild pain and a mouth opening of greater than 35mm.²¹ The principal concern with the arthrotomy procedure is that a small, but significant, percentage of patients actually

have a worsening of their symptoms following surgery.

Condylotomy

The condylotomy, or vertical ramus osteotomy, was developed following the observation of William Campbell, a radiologist, who noticed that patients who suffered mandibular condyle fractures frequently had complete resolution of their pre-existing TMJ pain and dysfunction. This procedure allows the lateral pterygoid muscle to slightly displace the condyle antero-medially. This unloads the retrodiscal tissue and often results in a more favourable condyle/disc relationship. The most frequent indication for this procedure is a symptomatic anteriorly displaced disc that normally presents as painful "clicking" on opening. Success rates with this procedure have been reported to be as high as 93%.²² The procedure does require a period of intermaxillary fixation and is therefore relatively contraindicated in partially or completely edentulous patients. For obvious reasons, this procedure is not well tolerated by debilitated patients.

TMJ Reconstruction

Reconstruction of the TMJ is indicated only in those symptomatic patients who have significant destruction of the condyle or fossa. This can be seen in older patients with longstanding osteoarthritis involving the TMJ. Alloplasts, such as metal condyles and fossa, or autogenous bone, usually costochondral grafts, can be used. Donor site morbidity and the need for intermaxillary fixation are the disadvantages of autogenous grafts. Cost and implant failure, with possible foreign body reaction, are the disadvantages of using alloplasts.

Conclusions

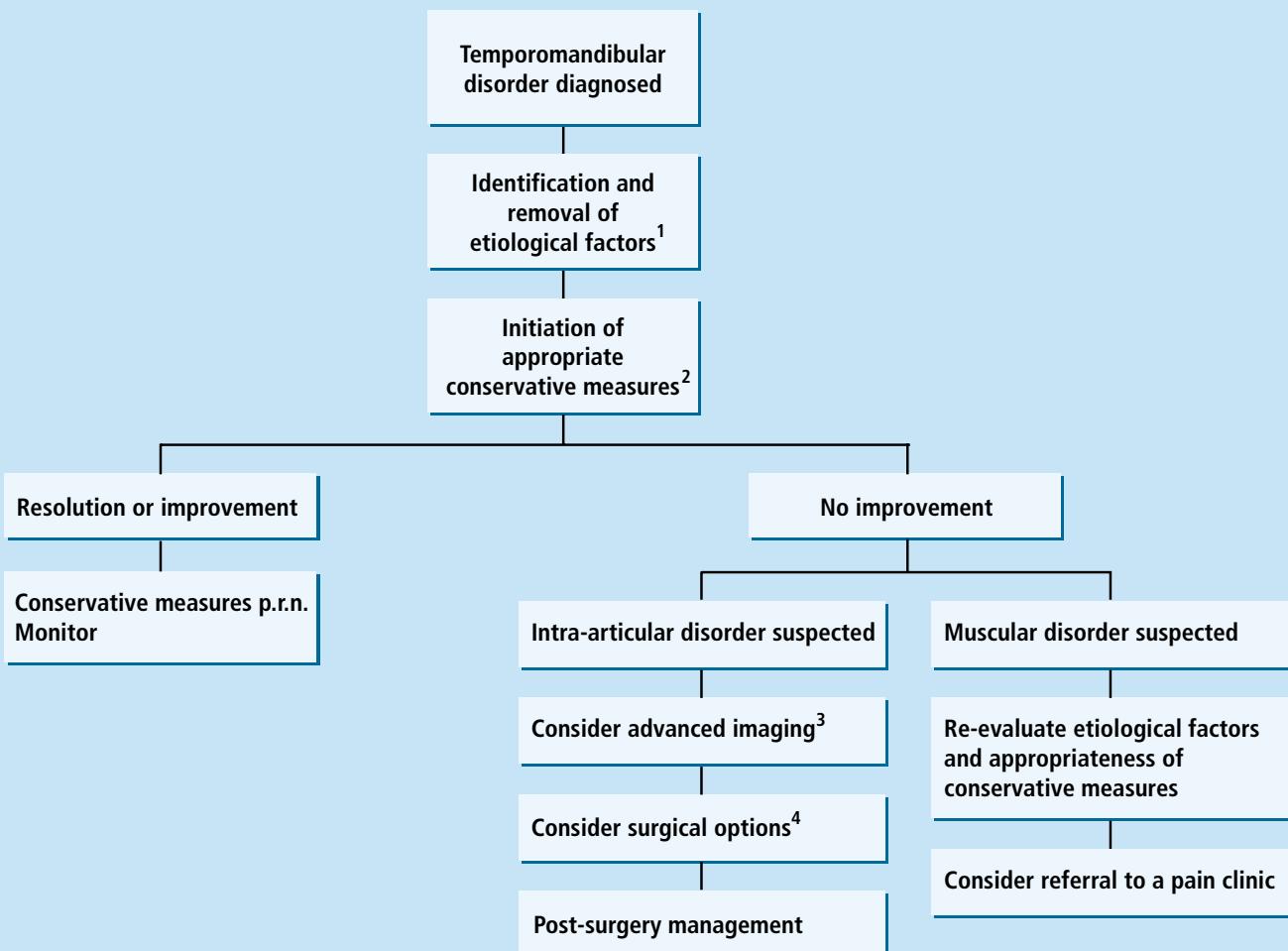
Temporomandibular disorders encompass a wide range of ailments. The incidence does seem to decrease with advancing age, with the lowest frequency being noted in the very young and old. The usual age-related changes seen in the craniomandibular complex

Table 2

Classification of Temporomandibular Disorders

| Temporomandibular Joint Disorders |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Congenital or developmental disorders |
| Disc derangement disorders <ul style="list-style-type: none">– disc displacement with reduction– disc displacement without reduction |
| Mandibular condyle dislocation |
| Trauma |
| Ankylosis |
| Arthritides <ul style="list-style-type: none">– inflammatory– non-inflammatory– infectious– metabolic– traumatic |
| Neoplasm |
| Masticatory Muscle Disorders |
| Myofascial pain |
| Myositis |
| Myospasm |
| Fibromyalgia |
| Neoplasia |

Suggested Sequencing of Temporomandibular Disorder Management



¹ Parafunctional habits, ongoing trauma, psychosocial factors.

² Patient education, diet modification, pharmacotherapy (NSAIDs, muscle relaxants, analgesics, anxiolytics, antidepressants, corticosteroids), physiotherapy, bite plane therapy.

³ Magnetic resonance imaging should be considered when soft tissue intra-joint pathology is suspected with the usual indication being to assess the position and health of the TMJ disc. Computed tomography should be considered when hard tissue pathology, such as degenerative changes or ankylosis, is suspected.

⁴ Surgery should only be considered when an intra-joint etiology is suspected and significant pain or dysfunction still exists after an appropriate course of conservative measures.

may partially explain this decrease in incidence. In those patients in whom TMD is suspected, appropriate conservative management by an individual trained in the diagnosis and treatment of these conditions is usually sufficient to improve the individual's symptoms. A small percentage of patients, however, will require surgical intervention as

they will continue to have significant intra-joint pain and/or dysfunction. A suggested sequencing of TMD management is shown in the accompanying Figure. Age and comorbidities do play a role in the surgical decision-making process, with arthroscopy being the least invasive and most easily tolerated procedure. However, no single surgical

procedure is appropriate for all conditions or patients. ♦

No competing financial interests declared.

References

1. McNeill C. History and evolution of TMD concepts. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997;83:51-60.

Temporomandibular Disorders

2. Okeson JP, editor. Orofacial pain: guidelines for assessment, diagnosis and management. Chicago: Quintessence Publishing Co., 1996.
3. Lindroth JE, Schmidt JE, Carlson CR. A comparison between masticatory muscle pain patients and intracapsular pain patients on behavioral and psychosocial domains. *J Orofac Pain* 2002;16:277-83.
4. Newton JP, Yemm R, Abel RW, et al. Changes in human jaw muscles with age and dental state. *Gerodontology* 1993;10:16-22.
5. Bader G, Lavigne G. Sleep bruxism; an overview of an oromandibular sleep movement disorder. *Sleep Med Rev* 2000;4:27-43.
6. Stratmann U, Schaarschmidt K, Santamaria P. Morphometric investigation of condylar cartilage and disc thickness in the human temporomandibular joint: significance for the definition of osteoarthritic changes. *J Oral Pathol Med* 1996;25:2000-5.
7. Locker D, Slade G. Prevalence of symptoms associated with temporomandibular disorders in a Canadian population. *Community Dent Oral Epidemiol* 1988;16:310-3.
8. Milstein L, Rudolph MJ. Oral health in an institutionalized elderly Jewish population. *SADJ* 2000;55:302-6.
9. Warren MP, Fried JL. Temporomandibular disorders and hormones in women. *Cells Tissues Organs* 2001;169:187-92.
10. MacFarlane TV, Blinkhorn AS, Davies RM, et al. Oro-facial pain in the community: prevalence and associated impact. *Community Dent Oral Epidemiol* 2002;30:52-60.
11. White BA, Williams LA, Leben JR. Health care utilization and cost among health maintenance organization members with temporomandibular disorders. *J Orofac Pain* 2001;15:158-69.
12. Vimpari SS, Knuutila ML, Sakki TK, et al. Depressive symptoms associated with symptoms of the temporomandibular joint pain and dysfunction syndrome. *Psychosom Med* 1995;57:439-44.
13. Katzberg RW, Westesson P-L, Tallents R, et al. Anatomic disorders of the temporomandibular joint disc in asymptomatic subjects. *J Oral Maxillofac Surg* 1996;54:147-53.
14. Engel E, Lachmann S, Axmann-Krcmar D. The prevalence of radiologic TMJ findings and self-reported orofacial pain in a patient group wearing implant dentures. *Int J Prosthodont* 2001;14:120-6.
15. Emshoff R, Innerhofer K, Rudisch A, et al. The biological concept of "internal derangement and osteoarthritis": a diagnostic approach in patients with temporomandibular joint pain? *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002;93:39-44.
16. Emshoff R, Rudisch A, Innerhofer K, et al. Temporomandibular joint internal derangement type III: relationship to magnetic resonance imaging findings of internal derangement and osteoarthritis. An intraindividual approach. *Int J Oral Maxillofac Surg* 2001;30:390-6.
17. Hoffman DC, Schneider RE. Surgery of the Temporomandibular joint. In: Pertes RA, Gross SG, editors. Clinical management of temporomandibular disorders and orofacial pain. Chicago: Quintessence, 1995.
18. AAOMS. Parameters of care for oral and maxillofacial surgery. *J Oral Maxillofac Surg* 1992;50(2 Suppl):121S-43S.
19. Kunjur J, Anand R, Brennan PA, et al. An audit of 405 temporomandibular joint arthrocentesis with intra-articular morphine infusion. *Br J Oral Maxillofac Surg* 2003;41:29-31.
20. Abd-Ul-Salam H, Weinberg S, Kryshalsky B. The incidence of reoperation after temporomandibular joint arthroscopic surgery: a retrospective study of 450 consecutive joints. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002;93:408-11.
21. Ericksson L, Westesson P-L. Discectomy as an effective treatment for painful temporomandibular joint internal derangement: A 5 year clinical and radiographic follow up. *J Oral Maxillofac Surg* 2001;59:750-8.
22. Nickerson JW, Veaco NS. Condylotomy in surgery of the temporomandibular joint. *Oral Maxillofac Surg Clin North Am* 1989;1:303-12.