MANAGEMENT OF CHRONIC OROFACIAL PAIN:

SURGICAL TREATMENT OF CHRONIC OROFACIAL PAIN

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SUMMARY

There are many conditions in which chronic orofacial pain is a major diagnostic and therapeutic problem. It is generally accepted that surgical treatment for these chronic pain problems should be resorted to only when more conservative treatments have been ineffective. Literature concerning selected orofacial pain problems is reviewed and the indications for surgical management are discussed.

Key words: chronic pain, trigeminal neuralgia, glossopharyngeal neuralgia, atypical facial pain, temporomandibular joint

INTRODUCTION

Chronic pain in the orofacial region may be produced and influenced by many structures, each with a different function and innervation. The task of diagnosis and the decision regarding appropriate treatment is complicated by the anatomic setting and special significance of the face. The orofacial area is one of the most complex of all the regional areas in terms of identification of pain, and depending upon the clinicians particular viewpoint, attention is inclined to be directed toward only certain aspects of this complex phenomenon.[1-3] Chronic pain may involve the structures of the eyes, ears, nose, paranasal sinuses, jaws, neck, and throat, and thus it is of interest to a variety of clinical practitioners, each group having its own particular concepts of etiology and treatment.

There are a diversity of conditions in which chronic orofacial pain is a major diagnostic and therapeutic problem. Many different classification systems for facial pain have been published,[1,4-11] some based on specific diagnoses and others on the particular system thought to be involved. Gregg and Ghia,[7] in a summary of experiences of the multidisciplinary University of North Carolina Pain Clinic, have reported their diagnoses and frequency of occurrence in a series of patients with head and neck pain (Table 1). Previous treatments included dental extractions, occlusal adjustments, splint or prosthesis construction, pharmacologic therapy with minor tranquilizers, narcotics and anti-convulsants, neurectomy or alcohol block, temporomandibular joint surgery, and intracranial neurolysis or rhizotomy.

TABLE 1
Head and Neck Pain
(U.N.C. Multidisciplinary Pain Clinic Diagnoses)

Myofascial pain dysfunction	39%
Atypical neuralgia (occipital neuralgia and periodic maxillary migrainous neuralgia)	24%
Post-traumatic neuralgia	11%
Psychogenic pain	6%
Rheumatoid or degenerative arthritis	6%
Tic douloureux	5%
Migraine	4%
Temporomandibular joint arthralgia	3%
Post-herpetic neuralgia	2%

It is generally accepted that surgical therapy for most chronic orofacial pain problems should be resorted to only when more conservative methods have proved to be ineffective.[1,12-22] Listed in Table 2 are selected chronic orofacial pain diagnoses for which surgical therapy has been proposed. The following is a review of the scientific basis for, and experimental and clinical evidence for the efficacy of these selected surgical techniques. Not included are chronic pain diagnoses related to nasal, sinus, and dental pathology for which specific surgical therapies are widely used and accepted.

TRIGEMINAL NEURALGIA

Trigeminal neuralgia (tic douloureux) is a disorder of unknown cause characterized by intense, short duration, paroxysmal facial pain. It may involve any of the three divisions of the trigeminal nerve, and there is usually a well-localized specific trigger zone which when touched precipitates the paroxysms of pain. Trigeminal neuralgia is almost always unilateral and confined to a single division of the trigeminal nerve. The neurological examination is normal and

TABLE 2

Selected Chronic Pain Conditions

Trigeminal neuralgia

Glossopharyngeal neuralgia

Atypical facial pain

Temporomandibular joint pain
> TMJ-MPD syndrome
> Arthritis
> Internal derangement

most patients are symptom-free between the paroxysms of pain.

As a result of the lack of total understanding of the pathophysiology of trigeminal neuralgia, many varied surgical therapies have been suggested. The most successful current medical treatment for trigeminal neuralgia is the anticonvulsant drug carbamazepine (Tegretol), which provides sustained relief from pain in 60 to 80 percent of patients.[8,20,23] Diphenylhydantoin (Dilantin) therapy also has been demonstrated to be effective in management of patients with trigeminal neuralgia, but it is less effective than carbamazepine.[24]

For patients who fail to improve, or who experience recurrence of pain while on drug therapy, some type of surgical procedure may be needed to control pain. Surgical therapy for trigeminal neuralgia is a controversial subject among neurosurgeons; the procedures currently most commonly used include peripheral nerve injections, peripheral neurectomies, percutaneous radio-frequency trigeminal neurolysis, and microvascular decompression.

Local anesthetic injections into the area of peripheral branches of the trigeminal nerve provide temporary relief from pain and also aid in diagnosis. Alcohol injections produce neurolysis distal to the injection site and anesthesia of structures supplied by the nerve distribution. In most patients, however, nerve regeneration occurs within 6 to 24 months following alcohol block, and pain returns. Repeated alcohol blocks are less successful, probably due to fibrosis and scarring in the area injected.[25]

Peripheral neurectomies, which interrupt flow of afferent impulses to the trigeminal ganglion, have been shown to be effective in relief from pain. Total anesthesia initially results, but nerve regeneration occurs with return of pain, usually within 24 to 36 months.[26-28] Repetitive peripheral neurectomies may provide extended periods of relief from pain and are indicated in patients in whom a more invasive surgical procedure such as a craniotomy is contraindicated because of age or presence of significant systemic medical complications. Quinn and Weill, in a review of 88 patients treated by peripheral neurectomy of the mental, inferior alveolar, lingual, or in-

fraorbital nerves, reported the median pain-free period to be 41 months.[27]

Thermocoagulation within the trigeminal ganglion has emerged as one of the most effective surgical procedures for control of trigeminal neuralgia. Radiofrequency electrodes placed percutaneously through the foramen ovale are used to produce selective lesions in the trigeminal root, with the goal of selectively destroying the small unmyelinated pain fibers and preserving the more heavily myelinated touch fibers. High initial success has been reported.[28-31] The thermocoagulation procedure may be repeated for those patients who experience recurrence of pain. The disadvantages associated with thermocoagulation within the ganglion include mild loss of sensation, which is expected, and the possibility of corneal anesthesia, anesthesia dolorosa or severe dyesthesia, motor root impairment, and unintentional anesthesia of adjacent division of the trigeminal nerve.[29,30,32,33] Radiofrequency thermoneurolysis of peripheral nerves has also been reported in a small group of trigeminal neuralgia patients.[34] This peripheral procedure is suggested as an alternative to more invasive surgical techniques. Although 25 percent of the patients treated in this manner had recurrence of pain within one year, a further suggestion is that the peripheral neurolysis procedure may be useful as a test to identify those patients who may experience anesthesia dolorosa.

Another popular neurosurgical technique for management of trigeminal neuralgia is microvascular decompression, or the Janetta technique.[35] Tortuous branches of cerebellar arteries that compress the trigeminal root are repositioned via a suboccipital craniotomy, with reported initial high success rates.[29,35-37] Microvascular decompression results in relief of trigeminal neuralgia pain without the altered sensation and possibility of anesthesia dolorosa and severe dyesthesia associated with the thermocoagulation procedures. Followup studies of the microvascular decompression technique have indicated that incidence of recurrence of pain may be less than with the other commonly used methods of treatment.[29,35,37]

A recently introduced treatment concept is that of curettage of bony cavities located within the jaws, which are thought to represent a dental etiology for trigeminal neuralgia.[38-41] Reports of management of trigeminal neuralgia patients by this technique have been in small patient populations, or in populations inconsistent with the overall greater incidence of trigeminal neuralgia in females. Followup periods in one study of 17 patients ranged from 9 years and 8 years in two patients to a mean of 11.8 months (range, 2-33 months) in the remaining patients.[41] The bony curettage technique shows promise but needs additional evaluation.

Of the surgical techniques currently available for treatment of patients with trigeminal neuralgia who do not respond to or experience sustained relief from

drug therapy, both percutaneous radiofrequency trigeminal neurolysis and microvascular decompression appear to offer the best long term success. These are increased potential risks with microvascular decompression, but the complications seen with thermocoagulation, such as altered facial sensation, corneal anesthesia, and anesthesia dolorosa do not occur. The ideal surgical technique for treatment of trigeminal neuralgia would result in long-term pain relief without producing a neurologic deficit. Of the available procedures, the microsurgical decompression of the fifth nerve root area comes closest to this ideal. The ultimate decision of surgical technique depends upon the medical and psychological status of the patient, and the experience of the surgeon.

GLOSSOPHARYNGEAL NEURALGIA

Glossopharyngeal neuralgia has been described as tic douloureux of the ninth cranial nerve.[8] It is characterized by paroxysmal, unilateral pain in the tonsillar area, soft palate, and auditory meatus, and is frequently precipitated by swallowing. Often there is no localized trigger point, although this may be due to the inability of patients to localize pain accurately in the deep structures of the mouth, pharynx, and ear.[42] Application of 5 percent cocaine to the affected side of the pharynx will relieve the pain temporarily in a high percentage of patients with glossopharyngeal neuralgia, and supports the diagnosis. A common cause of glossopharyngeal neuralgia is neoplastic invasion of the oropharynx or base of the skull, and this possibility must be ruled out by appropriate tests.

For patients with idiopathic glossopharyngeal neuralgia, carbamazepine, phenytoin, and recently baclofen have been effective in suppressing the attacks of pain. For patients who do not respond to these medications, or who experience recurrence of pain while on drug therapy, surgical treatment may be effective. One difficulty encountered in attempting to assess the efficacy of any treatment of glossopharyngeal neuralgia is the finding that patients with this disorder commonly experience a spontaneous remission of pain, some lasting five years or more.

The currently used surgical methods for treatment of glossopharyngeal neuralgia are intracranial sectioning of the ninth nerve at the jugular foramen, microvascular decompression (also through a suboccipital approach) and percutaneous thermocoagulation.[43]

Rushton has reported a series of 217 cases of glossopharyngeal neuralgia.[42] Surgical treatment, consisting of intracranial sectioning of the glossopharyngeal nerve alone, or combined with sectioning of the upper three to four rootlets of the vagus nerve, was performed in 129 patients. Pain relief was obtained in 100 of these patients. The most common reported postoperative complication was difficulty in swallowing, which occurred in 25 of 129 patients.

No information was given concerning incidence of recurrence of pain, or duration of the time these surgically treated patients remained free from pain.

Microvascular decompression of the glossopharyngeal nerve has been reported to be successful in a small number of patients.[44] This procedure appears promising but long-term followup of greater numbers of patients is needed to assess efficacy and incidence of recurrence of pain.

There are also several reported cases of percutaneous thermocoagulation for treatment of glossopharyngeal neuralgia.[45,46] In all three cases reported with idiopathic glossopharyngeal neuralgia, the unwanted complication of interference with speech and swallowing due to vagal nerve injury was encountered. A third study of radiofrequency thermocoagulation performed on three patients with idiopathic glossopharyngeal neuralgia reported selective percutaneous thermocoagulation rhizotomy in the petrous ganglion of the glossopharyngeal nerve with pain relief achieved without injury to other nerves at the jugular foramen.[43] This procedure appears to have promise as an alternative to the more widely used intracranial surgical procedures.

ATYPICAL FACIAL PAIN

The term atypical facial pain is often used when the clinician is unable to determine the source of a painful condition. It may include a variety of facial pain problems, ranging from undiagnosed organic disease to functional or psychogenic disorders. Diagnoses such as trigeminal neuropathy and atypical trigeminal neuralgia are included by some under the term atypical facial pain, while they are excluded by others.[6,8,42] Most authors recognize a diversity of etiologic factors, including emotional causes.[9,42]

The results of both surgical and drug treatments are disappointing.[47] Percutaneous trigeminal ganglion rhizotomy has been used, but like all surgical treatments for atypical facial pain, generally yields less than satisfactory results.[48] Two recent reports indicate that curettage of jawbone cavities may give relief in more than half the patients diagnosed as having atypical facial pain, but those patients treated successfully may have had focal dental lesions and should probably not have been classified as atypical facial pain patients.[40,41]

Although a small percentage of patients with atypical facial pain may respond to surgical procedures, the majority of patients are intolerant of the sensory loss that occurs from most neurosurgical procedures. It is important to remember that in management of patients with atypical facial pain, surgery is not indicated merely because the patient does not respond to more conservative treatment. Even more important, the surgical procedures recommended to treat atypical facial pain are not directed specifically at the pathophysiology of the disorder, primarily because the pathologic cause usually cannot be determined.

TEMPOROMANDIBULAR JOINT PAIN

The temporomandibular joint-myofascial dysfunction syndrome (MPD) as described by Laskin includes any of a broad set of symptoms, including pain in the ear or preauricular area, masticatory muscle pain and tenderness, clicking in the temporomandibular joint, and limitation of mandibular function.[49] The syndrome also includes two negative findings: absence of organic changes in the temporomandibular joint, and lack of tenderness of the joint to palpation. The muscles of mastication rather than the joint structures themselves are identified as the site of the problem.

Due in part to lack of thorough understanding of MPD syndrome and to controversy about etiology and diagnosis, therapy often is inconsistent. Frequently, treatment of MPD syndrome takes the form of dental procedures to correct malocclusion or other dental problems, although these conditions have not been established as the cause of the syndrome. The controversy that affects treatment selection for patients with MPD syndrome has been discussed in a recent article by Greene and Laskin.[50] They report that long-term success rates of 80 to 90 percent are achieved with a wide variety of reversible and irreversible treatment methods. Study of treatment methods for MPD syndrome is also complicated by the fact that MPD often exhibits remissions and exacerbations.[51] Another complicating factor is the strong psychological and emotional component associated with the syndrome; failure to combine psychological therapy with other treatments will also affect the ultimate success or failure.

Despite controversy over appropriate treatment for MPD syndrome, it appears to be accepted by most practitioners that surgical procedures are never indicated in management of this disorder.

ARTHRITIS

Arthritic processes involving the temporomandibular joint may result in the symptoms of pain, tenderness, and limitation of motion. The temporomandibular joint may be involved as part of a systemic arthritic disease, rheumatoid arthritis, or by a localized process, such as osteoarthritis (degenerative joint disease) or infectious arthritis.

Rheumatoid arthritis is a systemic disease process, characterized by periods of exacerbation and remission, leading to joint destruction and deformity. The process usually begins with inflammation of the synovial tissues and ultimately results in destruction of the articular surfaces. In those cases which involve the TMJ, radiographically there is erosion and flattening of the condyle, and clinically limitation of mandibular movement and pain may occur. When rheumatoid arthritis occurs in a growing child, there may be interference with normal condylar and mandibular growth. There is wide variation in the reported incidence of temporomandibular joint involvement in patients with rheumatoid arthritis, ranging

from less than one percent to as high as seventy percent.[51-53] Symptoms tend to be mild or transient, and to lessen with time, so that temporomandibular joint involvement may be easily overlooked.

In most reports, osteoarthritis (degenerative joint disease,) represents the majority of all arthritic disease involving the temporomandibular joint. Development of osteoarthritis has been shown to be related to many factors, including aging, heredity, and trauma, but the most significant factor is thought to be chronic irritation due to abnormal stresses and strains on the joint. Toller, describing 130 cases of osteoarthritis of the temporomandibular joint, reported that the disease usually runs a course of one to three years, followed by a natural regression of symptoms, and ends with little permanent disability.[54] Frequently, the signs of osteoarthritis may be present without associated pain, but even if pain accompanies the disease a high percentage of patients with osteoarthritis can be kept comfortable during the course of the disease by conservative or nonsurgical means.[55]

Surgical treatment may be indicated in patients with arthritic involvement of the temporomandibular joint who have persistent pain which is refractory to conservative treatment,[56-58] or who have developed severe functional problems such as ankylosis or open bite. When temporomandibular joint involvement is part of a systemic arthritis, it is necessary to keep in mind that management should first involve treatment of the underlying illness.

Surgical techniques which have proved effective in treatment of the painful temporomandibular joint are arthroplasty and high condylectomy, which also may improve insertion of an alloplastic implant.[16,58-61] Since erosion of the glenoid fossa is only rarely noted,[61] in most instances the meniscus and upper joint space, as well as the condylar neck and surrounding tissue attachment, should be preserved. Routine use of the articular eminence prosthesis[62] appears to be inconsistent with the reports of infrequent involvement of the glenoid fossa in arthritic patients.

The objective of surgery in patients with arthritic involvement of the temporomandibular joint should be to remove tissue showing pathologic changes, to relieve abnormal pressures on the articular disk and its posterior neurovascular attachments, and to restore function. Surgery is indicated only if pathologic changes have been clearly demonstrated, pain is persistent, and conservative treatment has been unsuccessful. Arthritic joint involvement is often coexistent with MPD syndrome and its associated psychological component. The surgical procedure will only address the organic components of the condition.

INTERNAL DERANGEMENT

The diagnostic term, internal derangement of the temporomandibular joint, has been used to describe a variety of organic changes which may occur within

the joint itself.[10,63-65] The term internal derangement in this discussion will be used to refer only to the condition which also is referred to as disc dysfunction, anterior dislocation of the meniscus, anterior disc displacement, and disc derangement; it is defined as the clinical situation in which the articular disc (meniscus) is located anterior to the condyle in the closed position, allowing the condyle to articulate on the posterior attachment of the meniscus. The problem of internal derangement of the temporomandibular joint with associated pain and limitation of mandibular motion has been recognized for almost one hundred years. Annandale first reported on a surgical procedure to correct excessive mobility of the meniscus in 1889, and Pringle, in 1918, described anterior and medial diplacement of the meniscus, which he treated by eminectomy.[66,67]

Sicher, in 1955, reviewed the anatomy of the temporomandibular joint and pointed out that the loose connective tissue between the meniscus and the posterior portion of the capsule is an area of low resistance and therefore is the most susceptible region for mechanical damage in the temporomandibular articulation. He recognized that anterior displacement of the meniscus would allow impingement of the condyle on this well-innervated tissue and cause pain.[68] Positioning of the meniscus ahead of the condyle also may restrict translatory movement of the condyle. As noted by Mercuri, extra-articular conditions may refer symptoms to the temporomandibular joint which are identical to those seen in internal derangement: preauricular pain, joint sounds, limitation of motion, and tenderness of the masticatory muscles to palpation.[69] The technique of temporomandibular joint arthrography has proved extremely useful in differentiating between internal derangement and the other conditions with similar signs and symptoms.

Reported incidence of occurrence and recognition of internal derangement varies from 5 percent of all patients with temporomandibular joint complaints[70] to 25 percent when more advanced diagnostic techniques are used.[71] Even though the presence of pain, limitation of motion, and positive findings of meniscus displacement on the arthrogram are felt by some to primarily indicate surgical intervention,[10,72] other authors have recommended the use of mandibular repositioning therapies, and report that these may be successful in many cases.[1,16,71,73] Such treatments include mandibular repositioning prostheses, followed if necessary by restorative dental treatment and orthodontics.

Appropriate splint therapy may allow the meniscus to return to its normal position without surgical intervention. Most reports of surgical treatment of internal derangement fail to mention what, if any, alternative treatment methods were tried prior to surgery, and post-surgical followup tends to be of short duration. The surgical techniques of meniscus plication and eminectomy have been shown to be effective in relief of pain in patients who have not responded to other forms of therapy, but surgery should not be the primary treatment for internal derangement.

CONCLUSIONS

Surgical treatment has a definite but limited place in the management of many chronic orofacial pain problems, and should be resorted to only when accepted conservative treatment methods have proved to be ineffective. Practitioners managing patients with chronic pain problems must be aware of the psychological component in chronic pain syndromes, which frequently becomes more important than the pathophysiologic disease process. The illness behavior of the chronic pain patient often is significantly out of proportion to the underlying or precipitating pathologic process.

Selection of appropriate surgical therapies is further complicated by the relative lack of clinical longitudinal studies comparing different treatments with regard to their long-term results. Many types of surgical procedures have been attempted, but currently there is no consensus about the efficacy, indications for, and limitations of various methods.

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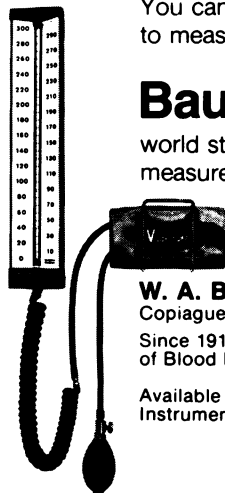63. Bellinger DH. Internal derangements of temporomandibular joint. J Oral Surg 10:47-57, (1952).

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