Buccal Separators for relief of TMJ Pain and Symptoms

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A case report and extended discussion of a simple technique that is effective in relieving TMJ symptoms in some cases. The many questions raised by the clinical response to insertion of separators between some buccal teeth demonstrate the complexity of TMJ problems and the limitations of present understanding.

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A 17-year-old female presented for orthodontic consultation with a chief complaint of nonpainful clicking in the right TMJ and persistent slight to moderate headaches in the midfrontal area for the past year. Orthodontic examination revealed a class II skeletal and dental relationship, generalized anterior spacing, and an acceptable yet slightly full and convex profile. Her dental history (aside from the TMJ complaint) was nonremarkable, other than third molar extractions two years previously and minor restorative work, and her medical history was also nonremarkable except for an allergy to penicillin.

Clinical examination revealed unilateral (right) early reciprocal clicking noises of slight to moderate intensity. Palpation of head and neck areas was negative for tenderness. Mandibular opening was full and unimpeded. There was no evidence of midline shift on opening or closing, and lateral and protrusive excursions were free of deviation or interferences. All movements were without pain. Radiographic findings were negative.

Treatment

A heavy (S-2) separating AlastiK™ was placed between the upper right first bicuspid and first molar. The patient experienced immediate partial relief of both her frontal headache and the clicking noises. Had her symptoms become worse, the elastic could have been quickly removed. As there was some improvement, this separator was left in place and a second separator placed between the upper right first and second molars.

The patient experienced complete relief from the headaches and clicking. Her first comment, as she had been feeling the pain for an entire year, was "have you hypnotized

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me?" Both separators were left in place, and she was scheduled to be seen in two weeks, with instructions to call if there was substantial return of symptoms.

She did not call, and when she was seen again two weeks later, her symptoms were still completely gone. Although not instructed to do so, she had removed both of the separators several days after placement, because of soreness in the teeth. That soreness disappeared after removal of the separators.

She stated that at no time during the two-week interval had her original TMJ clicking or frontal headaches reappeared.

Four months later, this patient was still asymptomatic. Because the original TMJ symptoms were not severe, it was decided to proceed with her nonextraction orthodontic treatment plan. Had her complaints been more acute or severe, orthodontic treatment would have been delayed further.

— Philosophy —

Healing is the goal of the health sciences and health care professionals. Pain is a signal in biologic systems that pathology is present and operative. The elimination of pain is usually a first step in the healing process, and this is our initial obligation to our patients.

Of the many cyclical and multifactorial symptoms and etiologies claimed in TMJ dysfunction, the most ubiquitous symptom is pain. This is often what finally motivates patients to seek professional care.

Despite the fact that pain is only a sign of pathology, it must be ameliorated to allow optimal unimpeded healing. Abatement of this acute phase is paramount in creating an environment in which the natural forces of somatic repair can progress.

Among the many proposed etiologies for TMJ dysfunction are stress, parafunctional bruxing, clenching habits, muscle spasms, occlusal prematurities, balancing interferences, freeway space aberrations, distalizing mandibular forces, etc. . . . These entities may initiate, perpetuate or intensify the pain signal. Many of these symptoms may only represent the body's efforts to self-correct and avoid more serious pathology and pain.

Some observers, including this Author, consider the psychosomatic or stress reactions to be the most intractable in terms of cure and primary in terms of etiology. In a high-tech mega-trend, mega-trauma society, psychosomatic illness accounts for a myriad of medical complaints that are amenable to relief through various relaxation and pain control techniques.

These pain relieving methods constitute a major portion of today's health market. Ulcers, colitis, back and neck spasms, type A heart syndrome, constitutional infections, aggravation and protraction of organic diseases, are often cited as representative of psychosomatic energy run rampant. Some TMJ dysfunction symptoms and sequelae can probably be added to this list.

Some TMJ problems are perhaps more organically based, and care must be exercised in differential diagnosis. Some of the conditions to by ruled out include rheumatic and osteoarthritic degenerations, trauma and cicatrix, infections, anachoresis, ear pathology, neoplasms, congenital malformations, Bell's Palsy, and neurologic lesions.

As orthodontists, we are charged at the very least with alleviating the patient's immediate pain symptoms within the bounds of our treatment modalities. Abating the acute phase can allow natural healing to proceed.

Once an acute episode is controlled, treatment plans aimed at longer-term relief may be developed and applied where appropriate.

Before embarking on a well-intended orthodontic treatment regimen, it is often

advisable that the patient be referred to a qualified stress management professional. The techniques and treatment modalities for handling phychosomatic stress are varied and numerous.

A prudent rule-of-thumb for severe TMJ problems is to defer definitive orthodontic mechanotherapy until the patient has been asymptomatic for at least one year. To subject a highly-stressed patient to two years of active orthodontic treatment, even with remission of the acute phase, could risk recurrent psychosomatic episodes.

Procedure

The procedure described here has proven to be a simple and effective method for alleviating pain for many TMJ patients. Immediate pain relief is possible at the first office visit. It may be applied to acute or chronic TMJ conditions, as well as to orthodontic cases who suddenly develop symptoms during the course of treatment.

Once TMJ dysfunction has been appropriately diagnosed, the following procedure for pain and symptom control may be applied.

Place a heavy (S2) separating AlastiK between the second bicuspid and first molar in the maxillary quadrant exhibiting the most acute pain or joint symptoms. The patient is then asked whether the pain feels better or worse. *This same question is posed every time that a separator is either placed or removed.* If the patient response is "worse," the separator is removed and placed in the next contact area distally. If the patient responds "better," then that separator is left in place and another placed in the next contact distally.

Continue this process, progressing distally, until complete pain relief is achieved. At the abatement of pain, terminate the placement of separators.

The goal is to relieve all symptoms completely, and going further would risk adding new variables with unpredictable effects.

The range of pain symptoms that might be targeted for separator treatment is broad, and can include (but is not limited to) headaches in the temporal, orbital, retro-orbital, midfrontal, and auricular areas, or pain in the external TMJ capsule. Painful spastic or trismic muscles of mastication, particularly the external pterygoids, TMJ clicking and popping noises, and TMJ pain from post-surgical distalization forces may also be relieved.

Treat each affected quadrant in the manner described. Maxillary treatment alone is usually sufficient, but mandibular symptoms may occasionally be considered for amelioration using the same regimen in the affected mandibular quadrants. Such symptoms may include muscle spasm and pain in the submandibular, gonial, cervical, suprahyiod, and neck muscle areas.

Immediate relief can be observed with just one separator, or in more severe cases it could require as many as three in a quadrant. On some occasions it might be necessary to place an additional separator between the first and second bicuspid.

On some tight contacts it may be necessary to use smaller separators, and in cases where the contacts are so tight that the separators have lost their force effectiveness in placement, it may be necessary to use brass ligature wire to achieve adequate force values. In general, the larger separators seem to work best and stay in place longer, with less possibility of subgingival migration.

Patients should be cautioned that any or all separators can typically cause soreness for up to a week. This soreness is expected, and should not be confused with the TMJ symptoms.

Patients with restricted opening should be reminded that the return of TMJ associ-

ated noises is not a negative sign when that condition has been alleviated by the use of separators. TMJ noises that may have disappeared with restricted opening can reappear as the freedom to open wider is regained.

Patients are asked to return for examination and repetition of separator treatments every two weeks unless there is a substantial return of symptoms. The two-week time span seems appropriate and adequate with mild return of symptoms. In most cases, two or three visits are sufficient to render the patient completely symptom-free.

Orthodontic Patients

For active orthodontic patients who suddenly develop TMJ symptoms, the same separator technique can be applied. One treatment is often enough.

Before instituting this regimen, there is an orthodontic treatment maneuver that might solve the same TMJ problems and thus obviate the need for the separator treatment. Replace the maxillary arch wire with an .016″ round stainless steel wire. Keeping all first- and second-order bends of the removed arch wire, add an exaggerated toe-in bend mesial to first molar on the affected quadrant. The exaggerated bend should add about 25° of extra rotational action in a mesiobuccal–distolingual direction to the first molar. In many cases, this maneuver can yield the same type of immediate relief as is encountered with the separator treatments.

— Discussion —

Success of separator treatment clearly demonstrates the sensitivity of the neuromuscular system and the need for much more study of the mechanisms involved. Several hypotheses may be considered concerning the underlying principles.

1. Microscopic changes in the vertical dimension of freeway space. In many instances no vertical alterations are necessary for separators to effect relief, which can occur even before the patient's mouth is closed.

   It has been held that TMJ splints function by altering the freeway space macroscopically and/or by facilitating a "recapturing" of the disc. If the above hypothesis is to be considered credible, then it seems that the importance of macro changes in the freeway space, and the relevance of freeway space per se, along with the assorted techniques for its manipulation, are subject to review.

2. Nonphysiologic and altered proximal contact contours as encountered with multiple restorations can degrade the continuity and integrity of the elastic periodontal fiber complex. The separators may serve to re-establish the stretch equilibrium of the periodontal fibre network, and thus reverse the negative net cumulative effect of multiple iatrogenic alterations in contact contours.

   This hypothesis is corroborated by the fact that separators relieve symptoms immediately upon placement. The relief is experienced before vertical freeway and occlusal forces come into play. Additional evidence for this phenomenon is revealed in the distal bend manuever described above. Here again, relief is obtained immediately before other forces have an opportunity to exert an impact.

   Sound restorative technique dictates the importance of duplicating original anatomy. It seems that this concept must be underscored in the contact areas.

3. Microanatomic and nonphysiologic compression of the condyle in the glenoid fossa may also be a factor. The net combined effect of the separators initially is to extrude and sagittally wedge the teeth. The extrusive and distal wedging component forces (however small) cause an initial microscopic mandibular deflection

where inter-arch antagonism exists, decompressing the condyle in the fossa. This minute change may be sufficient to diminish abrasion and relieve inflammation within the TMJ. It is also suspected that disc "recapture" may be faclitated by these same microdynamics.

This hypothesis overlaps the contact hypotheses in that deficient or overcontoured contact areas of the buccal teeth could cumulatively contribute to mandibular deflections by changes in overall arch length.

This does not explain the effects produced before the mouth is closed, and in either case, freeway space is involved in a less than macroscopic way, if at all.

4. The magnitude of the movements involved using separating elastics are so small that one must consider whether some subliminal acupressure type of dynamic might be operating within the periodontal membrane and fiber complex.

   Could microscopic changes in mandibular position, or small changes in contact areas, or small changes in periodontal stretch perception, be responsible for the morbid severity of myriad TMJ dysfunctions, derangements, and associated sequelae? If the seemingly negligible movements exerted initially by a separating elastic are sufficient to reverse these effects, then one wonders whether some proprioceptive mechanism might not be the common denominator.

5. Counter-irritancy concepts may also be considered. Perhaps the separators produce sufficient subliminal proprioceptive, pain, or pressure stimuli that the TMJ pain cannot be perceived concomitantly.

6. Psychosomatic or stress elements can certainly initiate, intensify, and perpetuate many TMJ-related problems and symptoms. It appears that this hypothesis reflects a sign of our times and is a primary consideration if for no other reason than its role in nocturnal parafunctional bruxing.

7. Teleologic considerations may offer hypothetical clues to separator treatment success. Ancient diets were much more abrasive than the highly refined modern diets of recent years. Hypothetical formulae for balanced masticatory proprioceptive equilibrium contrasting ancient versus modern may be as follows:

   A. Ancient coarse and gritty diet → Hypertrophic muscles of mastication → Flattened tooth contacts → Decreased arch length.

   B. Modern soft refined diet → Hypotrophic muscles of mastication → Rounded virgin contacts → Greater arch length and associated arch length discrepancies.

   Proprioceptive imbalance and associated TMJ sequelae may result from the presumably incompatible elements of the following formula:

   C. Modern soft refined diet → Hypotrophic muscles stressed by parafunctional bruxing and/or compromised restorative procedures of proximal surfaces → Altered interproximal contacts → Altered arch length → TMJ imbalance.

   The incompatibility of the elements in the above formula lies in the fact that instead of adaptation to low muscle activity and retained rounded contacts, iatrogenic restorative procedures and/or stress-induced bruxing mechanisms have operated to flatten the contacts.

   In essence, a proprioceptive imbalance may result from this combination of

modern masticatory musculature with increased function and resultant ancient type decreased arch length, with an end result of TMJ-related problems.

It could be that the sagittal wedging effect of the separators is sensed as an increase in arch length and restored fiber tension and thus a restored proprioceptive equilibrium.

In terms of TMJ derangements, the most resistant features in virtually all studies dealing with the treatment of MPD syndrome are disc displacements and joint sounds. One might describe such problems as a conflict between the abduction and adduction muscle systems of the mandible.

The chewing, attritional, closing muscle forces become adversarial to the discluding or opening muscular forces. In a deranged state the synchrony of these normally reciprocally acting sets of muscles is disturbed, creating an escalating conflict.

This may be simulated by trying to open and close the mandible simultaneously in the same instant; the result will likely be some degree of disc displacement. During this period of dysfunction it is the weakest link, the disc, that yields to the pressure and becomes displaced. Should this situation persist, the disc could become permanently degraded by the chronic abrasive insult.

The same hypothesis can be applied unilaterally on the working side during lateral excursive movements. It may be that any treatment modality that simulates a mandibular opening mode, whether real or sensed proprioceptively (occlusal equilibration, splints, separator, etc.), can impart some effect on TMJ derangements by disrupting the pattern of conflict between opposing muscle groups.

Advantages of using separators as a first line of defense for TMJ signs and symptoms may be summed up as follows:

- Separators are quick and easy to insert or remove.
- Separator-induced tooth movements are essentially reversible, so any untoward responses may be quickly resolved.
- Immediate first visit relief of pain and symptoms can be observed.
- Reduced reliance on TMJ splints and subsequent orthodontic procedures targeted at postsplint therapy. These options are still available where this less invasive modality does not succeed.
- Separator theory provides an increased awareness and an inquisitive view of iatrogenic and stress elements as etiologic ingredients.
- Separators provide a conservative and reversible first line TMJ treatment modality, particularly in postsurgical TMJ cases where destructive distalizing muscle spasms threaten the surgical result.

Disadvantages include:

- Limited applicability; appears to be most effective for muscle-induced symptoms.
- Little or no effectiveness for patients who have recently worn TMJ splints.
- Low effectiveness where contiguity of arch contacts has been compromised, as in various mutilated configurations.