A Retrospective Evaluation of the Impact of Temporomandibular Joint Arthroscopy on the Symptoms of Headache, Neck Pain, Shoulder Pain, Dizziness, and Tinnitus

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ABSTRACT: Forty-three patients who underwent arthroscopic surgery for arthrogenous TMD were polled concerning the effect of surgery on the symptoms of headache, neck pain, shoulder pain, dizziness and tinnitus. Statistically significant levels of symptom reduction were recorded for all symptoms polled. This indicates that a substantial number of significant symptoms are produced by the influence of temporomandibular joint pathology on central neural processes. A model for the affect of temporomandibular joint pathology on cervical and masticatory musculature is proposed. This data implies that we cannot use muscle tenderness, hypertonicity and/or pain to differentiate arthrogenous from myogenous temporomandibular disorders. The characteristics of a population of whiplash onset TMD patients were compared to other TMD populations. The results indicate that whiplash induced TMD may differ from insidious onset TMD and even other trauma onset TMDs by prevalence of neck pain, intensity of neck pain and probability of concurrence of neck pain, shoulder pain, headache and jaw pain. These symptoms resolved within 24 hours of arthroscopic temporomandibular joint surgery indicating that the temporomandibular joint pathology was the perpetuating force behind, if not the cause of, these symptoms.

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A variety of symptoms have been attributed to temporomandibular disorders (TMD). A partial list of these symptoms includes: Jaw pain, painful clicking and/or locking in the temporomandibular joints, headache, neck pain, upper shoulder muscle pain, tinnitus and dizziness. An understanding of which symptoms may be attributable to temporomandibular joint-specific pathology would be useful in developing maximally effective treatment programs. This information would also be valuable to other health care providers who are faced with these symptoms on a regular basis. This may in fact result in TMD diagnoses being made earlier in the pathogenesis of the disorder.

Temporomandibular joint pain, painful clicking in the temporomandibular joints and joint locking with reduced capacity for mandibular function are readily accepted as symptoms of temporomandibular joint-specific disorders, although these symptoms have also been attributed to myogenous disorders. Headache, neck and upper shoulder muscle pain, dizziness and tinnitus are not usually thought of as directly produced by arthrogenous TMDs. Clinical observation of remission of these symptoms following joint-specific surgical procedures has been reported however, and retrospective studies documenting reduction in these symptoms following
temporomandibular joint surgery has pointed to a more direct relationship than has been generally accepted. Vallerand and Hall\(^6\) and Montgomery, et. al.\(^2\) both noted that patients received substantial relief from headache, neck pain, and upper shoulder muscle pain following temporomandibular joint surgery. Vallerand and Hall noted that 73.3% of 50 patients polled reported substantial improvement in neck and upper shoulder muscle pain following temporomandibular joint surgery. They also noted that only 31.8% of a simultaneously studied group of patients who were treated with oral orthotics and other conservative measures reported this result. Danzig et al.\(^6\) investigated the relationship between temporomandibular joint pathology and neck/shoulder pain by administering unilateral temporomandibular joint injections to TMD patients who manifested multiple symptom expressions. They noted that head, neck and upper shoulder muscle pain was reduced in 20 of 23 persons injected. They noted that the reduced muscular pain and tenderness was ipsilateral to the injected joint in six of the cases, bilateral in nine of the cases and contralateral in five of the cases. This carries implications of a central component associated with the joint-specific pathology. Mosby\(^7\) reported that tenderness of the upper trapezius, sternocleidomastoid and splenius capitis decreased substantially following temporomandibular joint surgical procedures. In their study 27 patients reported moderate to severe (2 or greater on a 0-3 scale) tenderness of the sternocleidomastoid muscles while only two patients maintained this finding following surgery. They noted as well that there was moderate to severe tenderness of the upper trapezial musculature reported by 37 of the patients preoperatively while only six patients exhibited this finding following surgery. Reduction in tenderness of the masseter and temporalis musculature was also noted, although not as frequently or as substantially. It was noted as well by House, et al. that the non-pain symptoms of vertigo and tinnitus were reduced in a substantial number of patients following temporomandibular joint implant surgery.\(^8\)

The purpose of this retrospective analysis of temporomandibular joint arthroscopy cases was to investigate the prevalence of specific symptoms in a population of arthrogenerous patients and their response to surgical intervention.

Materials and Methods

Data for this study was taken from a serial population of operated patients rather than from a group which fit a specific profile. The patient base represents that of a clinic which treats predominantly trauma onset cases. The majority of patients in this study (n = 35) could identify a specific onset for their disorder. The specific onset group (SOG) developed symptoms following trauma which involved simultaneous injury to multiple body parts. The traumas which led to the TMDs investigated in this study included whiplash incurred during a vehicular collision with and without skull/facial contact (n = 33) and slip/trip and fall with and without skull/facial contact with the floor and/or other solid object (n = 2). Characteristics of the SOG patients, the nonspecific onset group, and the overall group were compared.

Fifty consecutive patients who had undergone arthroscopic surgical intervention were mailed a questionnaire concerning their pre and post surgical symptom expression. The questionnaire asked the patients to mark their pain level on a numerical scale gauged from 0 to 10 with the words “no pain” printed under the number 0 and the words “most intense pain imaginable” printed under the number 10. Seven specific questions as well as a visual analog scale were also included which addressed mandibular function. Mandibular function responses will be addressed in a separate paper. Overall, improvement in mandibular function was consistent with results reported in other temporomandibular joint arthroscopy outcome assessment studies.\(^9,10\)

Forty-three (84%) of the 50 patients (86 operated joints) returned the questionnaire. Consistent with other studies, 76% of the respondents were female. The ages of the patients ranged from 19 to 58 years (average 34 years). Thirty-five of the respondents were in the SOG. The demographics of the SOG did not differ significantly from the overall group of respondents (p > 0.05). The questionnaire was filled out by the patients from one week to 104 weeks post surgery (mean 7.14 months).

All patients were operated on by the same surgeon. Various arthroscopic surgical techniques were used. Techniques included lysis and lavage, manual disc reduction, holmium YAG laser assisted procedure, disc suturing, anterior capsular release, posterior attachment cautereization, synovectomy and corticosteroid injection. Techniques were chosen according to patient presentation with technique complexity directly proportional to the pathology observed during initial arthroscopic observation. In some instances techniques used represented the evolution of available technology, e.g., holmium YAG laser. The overall surgical model was that of reducing biochemical irritation, reducing proliferated inflamed synovium, trimming degenerative cartilage, improving disc mobility, and, when indicated by history and architecture, restoring disc position. While all patients had jaw pain as part of their presentation, many of the patients considered headache, neck pain, upper shoulder muscle pain, dizziness and/or tinnitus to be the symptoms they
were most interested in resolving. In the SOG, surgery was performed from eight weeks to 192 weeks following the trauma (mode 24 weeks). All patients received extensive conservative care prior to surgery, but remained symptom expressive to a level they considered unsatisfactory. Conservative measures used included physiotherapy, oral orthotic support, medication, biofeedback, and chiropractic or physical therapy management of associated spinal/paraspinal disorders. Many of these patients had been treated by multiple practitioners prior to being seen by this author. Treatment protocol was then adjusted so that all of the patients received at least one month of the same conservative management program that was used in their postoperative rehabilitation. This addresses the question raised by Vallerand and Hall as to whether it was the postoperative treatment that reduced the headache and neck/upper shoulder muscle pain reported by their patients.

The standard TMD clinical tests of history, range of motion, auscultation, palpation, mandibular tracking, and tissue provocations were applied to all patients. Corrected tomography was performed on all patients. Preoperative objective tests included various combinations of MRI, cinearthrography, limited osseous scintigraphy (S.P.E.C.T.) and intraarticular Marcaine injections. Radiology and special tests will be addressed in a separate paper on the impact of the surgeries on mandibular function.

Results

The three pre-surgical clinical findings which were common to all operated patients were:

1. When the temporomandibular joints were palpated with the mandible latero-truded to the opposite side, condyle tenderness was equal to or more pronounced than the most tender areas of the ipsilateral superficial masseter and temporalis musculature for all operated joints. Capsule tenderness was equal to or greater than a measurement of two on a 0-3 scale for these joints.

2. Temporomandibular joint noises were detectable by stethoscopic auscultation and/or limited mandibular translation was noted for all operated joints.

3. Tenderness of the sternocleidomastoides bellies and/or upper trapezial region was reported as two or greater on a 0-3 scale at least unilaterally in the entire SOG group.

Clinical findings numbers 1 and 3 were not present at the time of dismissal from care for the patients who reported control of the symptoms polled on their questionnaires. Most patients continued to have some joint noise, however few had limited capacity for mandibular translation.

Symptoms polled include self-assessments of overall pain, headache, neck pain, shoulder pain, tinnitus, and dizziness. The average level for all pain variables was 8.42 on the 0-10 scale. Student's t-test for matched pairs (unequal variances) was used to evaluate differences (at 95% confidence) in pre- and post surgical symptom levels. There was a statistically significant reduction in the level of intensity of all symptoms polled (p < 0.001) (Table 1). Forty-one of the forty-three respondents (95%) reported an overall decrease in symptoms. There was no statistically significant difference in outcome relative to age at the time of the surgery or time from surgery to filling out the questionnaire (1-104 weeks). While there was no statistically significant difference in outcome relative to time from onset to surgery in the SOG, the majority were operated within one year of the onset of symptoms (mode 24 weeks). The percentage of improvement (61%) did not vary between the overall group and the SOG. Eighty-four percent of the SOG had pain at the 8/10 or greater levels compared to a prevalence of 58% for the nonspecific onset group. The nonspecific onset group was too small to make meaningful statistical comparisons for this prevalence. The prevalence noted in the SOG was of particular interest, however, when compared to the studies of Vallerand and Hall, Montgomery et al., and Mosby, as these studies all reported a lower percentage of patients with this level of neck pain (e.g., Vallerand

<table>
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<tr>
<th>Table 1</th>
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<tr>
<td>Mean Intensity Scores for Symptoms</td>
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<tr>
<td>Self-Reported Before and After Surgery</td>
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<tr>
<td><strong>Mean Intensity (10 Maximum)</strong></td>
</tr>
<tr>
<td><strong>Pain</strong></td>
</tr>
<tr>
<td>Pre-surgery</td>
</tr>
<tr>
<td><strong>Ringing</strong></td>
</tr>
<tr>
<td>Pre-surgery</td>
</tr>
<tr>
<td><strong>Dizziness</strong></td>
</tr>
<tr>
<td>Pre-surgery</td>
</tr>
<tr>
<td><strong>Headache</strong></td>
</tr>
<tr>
<td>Pre-surgery</td>
</tr>
<tr>
<td><strong>Neck Pain</strong></td>
</tr>
<tr>
<td>Pre-surgery</td>
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<tr>
<td><strong>Shoulder Pain</strong></td>
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<tr>
<td>Pre-surgery</td>
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and Hall: 58%). In the SOG, only one of 35 respondents did not report headache, neck pain, and shoulder pain coexisting as a symptom complex prior to surgery.

In the entire group (n = 43) the percentage of patients who reported improvement for each individual symptom category was: Overall pain 98%, headache 93%, neck pain 88%, shoulder pain 93%, tinnitus 94%, and dizziness 97% (Table 2). The average decrease in symptoms (Figure 1) was 61% and was not significantly different (p > 0.01) between any of the pain variables. There was no relationship, as estimated by the Pearson correlation coefficient, between the amount of improvement for any of the variables when the data from the entire patient base was analyzed. The SOG did exhibit significant (p < 0.01) correlation between improvement in overall pain and headache as well as between neck and shoulder pain (Table 3). Figures 2 and 3 illustrate regression analysis of relationships between neck pain and shoulder pain and between overall pain and headache.

Sixty-seven percent of those persons who reported dizziness as part of their clinical presentation (n = 30) reported 100% resolution of this symptom. Thirty-two percent of the patients who reported tinnitus as part of their symptom expression (n = 33) reported 100% resolution of this symptom. This report of 100% resolution of these symptoms was somewhat paradoxical as on another part of the questionnaire some of these patients reported these symptoms continuing while indicating 100% resolution on the numerical scale. When we eliminated these paradoxical responses the mean improve-

**Table 2**

Self-Report of Symptom Change Following Arthroscopy

<table>
<thead>
<tr>
<th></th>
<th>Pain</th>
<th>Ringing</th>
<th>Dizziness</th>
<th>Headache</th>
<th>Neck Pain</th>
<th>Shoulder Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Reporting Improvement:</td>
<td>98%</td>
<td>94%</td>
<td>97%</td>
<td>93%</td>
<td>88%</td>
<td>93%</td>
</tr>
<tr>
<td>Number Responding:</td>
<td>41</td>
<td>33</td>
<td>30</td>
<td>42</td>
<td>42</td>
<td>40</td>
</tr>
<tr>
<td>Number Reporting Improvement:</td>
<td>40</td>
<td>31</td>
<td>29</td>
<td>39</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>Number Reporting No Improvement/Worse:</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

**Figure 1**

Self-report of symptom intensity (mean of responses from entire group) before and after treatment.

**Table 3**

Pearson Multiple Product Moment Correlation Coefficients Between Subjective Variable Improvement in Specific Onset Group

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Pain</th>
<th>Ringing</th>
<th>Dizziness</th>
<th>Headache</th>
<th>Neck Pain</th>
<th>Shoulder Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ringing</td>
<td>0.581</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>0.514</td>
<td>0.511</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td>0.832</td>
<td>0.428</td>
<td>0.392</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck Pain</td>
<td>0.617</td>
<td>0.313</td>
<td>0.296</td>
<td>0.503</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Shoulder Pain</td>
<td>0.685</td>
<td>0.447</td>
<td>0.657</td>
<td>0.564</td>
<td>0.837</td>
<td>1.000</td>
</tr>
</tbody>
</table>
ment for tinnitus was 75% and the mean improvement for dizziness was 55%.

Five patients failed to realize improvement in neck pain following arthroscopic surgery. This included one patient whose cervical complaints increased following this procedure. Four of these patients had disc lesions documented on cervical MRI, and we suspect that the one patient whose symptoms increased suffered aggravation of this cervical lesion due to positioning of the head and neck during surgery. All of the patients who experienced substantial relief in the neck and shoulder muscle regions also demonstrated marked objective reduction of tenderness and hypertonicity of the sternocleidomastoideus (SCM) bellies and upper trapezial musculature. These cervical signs and symptoms were generally not present when the patient awoke or at most, disappeared within one day of surgery. We found this immediate relief of pain, tenderness and muscle hypertonicity to be quite remarkable as these patients had manifest these symptoms and signs for weeks to months prior to surgical intervention. In the SOG group for example, one patient had documented hypertonicity, pain and tenderness in these regions for 192 weeks following the onset of the disorder.

Eighteen of the respondents underwent bilateral temporomandibular joint intraarticular injections with 1 cc of 0.5% Marcaine solution as a diagnostic test prior to surgery. Intraarticular injections were used rather than auricolotemporal anesthetic blocks, as we felt that this would more profoundly affect the neurology of the
proposed surgical site. Marcaine, rather than a shorter acting anesthetic, was used to assist the patient in evaluating their experience of symptom relief. Individual injections (right versus left) were staged to rule in/out bilateral impact on symptom expression. Seventeen of these patients reported 70%+ relief in their neck and upper shoulder muscle pain and demonstrated a similar degree of reduction in tenderness and hypertonicity of the SCM, upper trapezial and intrinsic cervical muscles during re-examination 30 minutes following the injection. One patient reported 50% reduction in these signs and symptoms. Sixteen of the eighteen (89%) patients subsequently realized 70%+ relief in their neck and shoulder muscle pain as a result of arthroscopic intervention. There were two false positives for the anesthetic temporomandibular joint injections. One patient reported 50% relief and the other 100% relief with injection, but neither realized relief following surgery. The cervical MRI of one of the two patients (50% reduction) demonstrated moderate C5-6 disc protrusion and the other (100% relief) was considered an overall arthroscopic failure and scheduled for arthrotomy. Bilateral arthrotomy subsequently relieved the cervical signs and symptoms of the patient who initially reported 100% resolution with anesthetic injection, but failed to improve with arthroscopy. Overall then, the temporomandibular joint Marcaine injections were 94% (17 of 18) accurate in predicting cervical response to temporomandibular joint surgery (arthroscopy/arthrotomy). Review questionnaires received after completion of this study show that this trend continued to be accurate.

Masticatory muscle tenderness was also reduced albeit less dramatically than cervico-trapezial tenderness. This was consistent with Mosby’s findings.

Discussion

Temporomandibular disorders are a group of musculoskeletal disorders whose symptoms are produced by the muscles, ligaments, tendons and joint structures of the craniomandibular region. In an attempt to link the pathomechanics and pathophysiology of the craniomandibular region with expressed symptoms, TMDs are usually classified as intracapsular and extracapsular. These classifications are then broken down into specific diagnostic subcategories. Intracapsular disorders include capsulitis, synovitis, retrodiscitis, symptom expressive internal derangement, disc/retrodiscal perforation, ankylosis and symptomatic hypermobility. Extracapsular disorders include myofascitis, myositis, myospasm and tendinitis. Muscle splinting is a unique diagnosis in that it implies a protective muscular response to pathology which may be intracapsular or extracapsular.

This diagnostic subclassification system represents an attempt to trace symptoms back to the most probable source. This is not an easy task as the clinical findings of limited range of motion, joint noises, muscle tenderness, joint tenderness and altered mandibular tracking are found in the nonsymptomatic population. Radiographic signs of joint remodeling are also found in the nonsymptomatic population and may not be accurate indicators of an active TMD. Past history of or predicted future onset of TMD is also not predictable radiographically. It seems clear, however, that specific combinations of these signs coupled with associated symptoms identify patients with TMD and that these symptoms emanate from specific tissues. A clear delineation of which symptoms represent primary expressions of arthrogenous temporomandibular joint pathomechanics and/or pathophysiology has not been thoroughly developed, however.

Developing an index of suspicion that specific symptoms emanate from a particular region or tissue is important not only to the practitioners treating the disorder, but also to the portal of entry doctors whose job it is to rule in or out the probability of a particular disorder. This is true for both the chronic and the acute onset symptom complex. Nowhere is this more evident than in the instance of an injury which produces damage to multiple body parts simultaneously such as whiplash. Certain areas injured during whiplash can produce similar symptoms. Areas known to be injured during whiplash include, but are not limited to, the neck, brain, and temporomandibular joints. Common symptoms following whiplash include headache, neck pain, shoulder pain, tinnitus, and dizziness. Various combinations of these symptoms have been observed in patients with cervical injury, closed head injury, and TMD. This overlap makes differential diagnosis and appropriate case planning difficult. The results of delay in diagnosis of TMD following whiplash include less satisfactory response to treatment, protracted treatment of the neck and other areas mistakenly suspected of symptom production and the development of chronic pain presentations.

While the symptoms of headache, neck pain, shoulder pain, tinnitus, and dizziness are not generally considered classic expressions of intraarticular temporomandibular joint pathology, our findings challenge this view and are similar to those of Vallerand and Hall, Montgomery et al., and Mosby. That is, the data from these studies is consistent with our observation that muscular response by hypertonicity with associated pain and tenderness in the cervical and upper shoulder muscle regions occurs in response to temporomandibular joint pathology. This is in contrast to statements made by Bell, Okeson.
and Block. 27

According to these findings the potential for arthroge-

nous stimulation of muscle tenderness and hyper-
tonicity should be considered when we establish

inclusionary criteria for subcategories of TMD. That is,

as long as we use muscular tenderness to establish a

diagnosis of a myogenous disorder, we may misinterpret

the true nature of the disorder. If this is true, then studies

which have attempted to ascribe specific patient charac-
teristics to subcategories of arthrogenous and myogenous

TMDs may be misleading. The data presented in this

study suggests that we cannot rule out an arthrogenous

disorder because of muscle pain, tenderness and/or

hypertonicity. This includes both the masticatory and

cervical regions. The parallel implications are that we

cannot rule in a myogenous disorder based on these

findings and we cannot even rule in a mixed myogenous/

arthrogenous disorder as the entire muscular component

could be secondary to joint-mediated central excitation.

The data in this paper suggest, however, that condyle

tenderness which is measured at a level of 2 or greater on

a 0-3 scale and which is equal to or greater than tender-

ness of the ipsilateral masseter and temporalis muscu-

lature can rule in an arthrogenous disorder, but cannot rule

out a concurrent myogenous disorder. While this was an

accurate inclusionary criterion in this population of

patients and is consistent with other studies of condyle

tenderness and surgical outcome,26 it remains to be seen if

symptomatic individuals can be distinguished from non-
symptomatic individuals using this method.

The following sequence of events may explain the

phenomenon of temporomandibular joint pathology pro-
ducing cervical and other extraarticular symptoms,

including muscular reaction in the masticatory and cer-
vical-trapezial musculature. Inflammatory pain mediators

such as histamine, bradykinin, S-hydroxytryptamine and

tumor necrosis factor (TNF) have been identified in the

human temporomandibular joint and are known to stimu-
late small (group III and IV) receptors.28 These receptors

are the dominant type found in human temporomandibu-
lar joints.29 Capsular distention and deformation and/or

persistence of inflammatory mediators may then sensitize

these and other receptors30 so that nociceptors as well as

mechanoreceptors may fire even in response to non-

noxious stimuli. This sensitized neural response to other-

wise non-noxious stimuli has been noted during ex-

periments on cats by Coggeshall and Schaible.31

Temporomandibular joint nociceptive input is relayed to

the pars caudalis of cranial nerve V where release of sub-

stance P, N-methyl-D-aspartate and other excitatory

chemicals may sensitize the second order neurons.35

These second order neurons then relay information to the

thalamus and other higher order centers.36 As this sensiti-
zation spreads, excitation of other cranial nuclei as well

as the dorsal horn of the upper cervical cord may occur.37

Upper cervical dorsal horn sensitization then could affect

the intrinsic cervical muscles. Upper cervical sensitiza-
tion and stimulation of cranial nerve XI would affect the

sternocleidomastoid and upper trapezial musculature.

Once sensitization and neuroplasticity have spread

beyond the confines of the laminated trigeminal system
decussation in the upper cervical cord and possibly the

brain would explain our observations, which were similar
to those of Danzig's anesthetic injection study, specific to

cortical symptom expression. Cranial nerve XI specifically

is known to cross the central midline and would account

for this observation.38 Symptoms may be expressed locally

in the affected cervical muscles then and, by trigger point

expression, at some distance from the muscles themselves.

Referred symptoms from these muscles are known to

include head pain (frontal, temporal and occipital), neck

pain, upper extremity pain/paresthesia, facial pain, jaw

pain, ear pain and dizziness.39 Hypertonicity, tenderness

and pain in the masticatory muscles would also be expected

and has been documented.41

The prevalence of arthrogeous expression of cervical

and other peripheral symptoms in the general TMD

population is not answered in this study. This is reflec-
ted in prevalence discrepancies between our study and

Mosby's. In Mosby's study 27 of 109 (25%) patients fit

the profile for temporomandibular joint mediated SCM

reaction and 37 of 109 (34%) demonstrated trapezial

reaction. In our SOG group 100% of the respondents fit

this profile for both muscle groups at least unilaterally. It

is possible that the discrepancy in prevalence reflects the

high number of respondents in our study who developed

their symptoms following a whiplash injury. This would

be consistent with other studies which have indicated that

patients with whiplash-induced TMD have characteris-
tics, including response to treatment, which separate

them from other populations of TMD patients.41,42 One

possible explanation for this phenomena is that when

multiple body parts are injured simultaneously and these

injuries include the temporomandibular joints, cervical

region and possibly the brain (closed head injury),

common central pathways stimulated by these injuries

may become sensitized and activate other central regions

(e.g., cranial nerve XI and the upper cervical dorsal horn)

which then produce these muscular reactions according
to the pathways proposed earlier. These pathways may

then continue to generate symptoms if the effect of neural

sensitization produced by temporomandibular joint-
specific pathology persists beyond the healing of these other injured tissues. This simultaneous multiple injury affect on the central nervous system may partially explain why these symptoms, while significantly and frequently reduced, were not completely eliminated with surgery. The possibility exists, however, that injured tissue is often permanently damaged and only partially repairable. The question of residual partial symptom expression, however, remains unanswered by this study. We feel that these concepts warrant further investigation.

Of particular interest was the observation that virtually all patients who experienced relief from the symptoms polled in our study experienced this relief immediately or soon following surgery. With respect to neck and shoulder muscle pain this response not only included pain relief, but reduction in muscular hypertonicity and tenderness as well. This raises questions about the standard model of self-perpetuated myofascial pain dysfunction as these patients expressed these signs and symptoms for months (mode six months) prior to the surgical intervention. In fact, not only did the muscles relax and become nontender, but trigger points were inactivated as well possibly explaining some of the cases of immediate resolution of headache and dizziness (SCM). Nonetheless, it appears that when the noxious stimulus of temporomandibular joint mediated central excitation was removed the involved symptomatic muscles relaxed and became non-pain producing. The characteristics of muscular response to joint pathology has important clinical implications. This includes the potential for diagnostic accuracy and treatment efficiency.

Conclusion

The data reported in this paper support the position that pathomechanical and pathophysiologic disturbances in the temporomandibular joints may result in extrarticular symptoms in a certain percentage of arthrogenous TMDs. These symptoms include headache, neck pain, upper shoulder muscle pain, dizziness, and tinnitus. These symptoms are commonly seen following events which produce injury to multiple body parts simultaneously such as whiplash. Various combinations of these symptoms have been documented as expressions of cervical injury, closed head injury as well as TMD. Failure to appreciate that these symptoms can arise from temporomandibular joint-specific pathology portends for delay in diagnosis by the general practitioner and less than optimal application of therapy by the TMD treatment team.

This retrospective surgical review supports the observations of Vallerand and Hall, Mosby, and Montgomery et al., in that headache as well as neck and upper shoulder muscle pain appear to be substantially reduced following temporomandibular joint surgery. Our study also indicates that dizziness and tinnitus, when present with other signs and symptoms of an arthrogenous disorder, may also be substantially reduced post-surgically. While we recognize that the symptoms of headache, neck pain, upper shoulder muscle pain, dizziness, and tinnitus frequently occur secondary to other pathologies, it is our opinion that they should be considered potential primary symptoms of an arthrogenous TMD.

This was a retrospective study and as such depended on patient recollection for some of its basic data. A prospective study in progress, however, has produced data consistent with this study. We hope that a controlled randomized study can be developed to further investigate the issues raised in this paper. We also feel that the observation of immediate reduction in muscular hypertonicity, tenderness, and pain in the neck and upper shoulder region as well as the masticatory musculature following both anesthetic injection and surgical treatment of the temporomandibular joints warrants further investigation.

References


