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The Role of Physical Therapy in Craniofacial Pain Disorders: An Adjunct to Dental Pain Management

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Abstract

Treatment of craniofacial pain disorders is often complicated by diverse factors such as acute or chronic trauma and persistent postural changes. In addition, emotional issues and life stress often cloud the recovery process. Physical therapists, with their diverse knowledge base and highly competent treatment skills, can be quite effective in assisting dentists and physicians with management of the many difficult upper quarter and craniofacial pain syndromes. This article reviews the role of myofascial and cranosacral dysfunction, as well as the function of posture, tension, and stress in the development of these syndromes. Additionally, it provides a comprehensive overview of the many evaluative techniques and treatment options that can be provided by today's physical therapists.



Mr. Steve Heinrich has been a practicing physical therapist for 13 years and is founder of Northwest Physical Therapy Services, a private practice specializing in soft tissue pain management, myofascial release, and cranosacral therapy. He is the author of several articles on the dynamics of soft tissue pain dysfunctions and is particularly interested in the study of the emotional component to injury and the recovery process.

Overview of Treatment Rationale

Seeing the Patient as a Whole Person

It is all too easy to see our patients as a "set of symptoms" that we are called on to "fix." Not only is our training "solution oriented," but our patients reinforce the notion as well. They want relief, and hopefully as quickly and painlessly as possible. The flaw in this scenario, as I see it, is that the patient is left with little or no desire or responsibility to change.

As a physical therapist, I see my job as a facilitator for positive change. This is especially true when the problem has to do with craniofacial pain dysfunctions. There is extensive documentation in the literature to support the fact that craniofacial pain syndromes can have whole body ramifications and a high correlation to stress and psychological factors.^{1,2}

The Effect of Posture on Craniofacial Dysfunction

According to a growth and development scheme, the head position determines the position of the body.³ This results from the body's alignment and spatial response to the three primary orientation planes. These include the bipolar plane (eyes horizontal), the Otic plane (semi-circular canal's perpendicular), and the occlusal plane (transverse).⁴

Some developmental experts go so far as to say that certain postural changes such as rotoscoliosis, torsions, and spinal rotations are caused or heavily influenced by reactions to improper head position over time, and the body's attempt to orient itself to the head⁵ (much like a plant placed far from a window will turn to the light).⁶

The growth and development, which occurs within the first three years, appears to be the most critical for ultimate facial and cranial function. These factors are considered to be genetically determined, but are known to be functionally alterable.⁶ Structural development of the cranium, neck, trunk, and spine depends on a balance between soft tissue forces and their effect on bony structures.

As size and weight of the cranium and facial structures increase, the action of tissue pressure from the facial muscles and upper cervical region form and shape the skull, face, and jaw, all of which leads toward function or dysfunction.

Many diverse factors influence the development of the craniofacial complex. For example, perioral activities such as improper tongue position and certain oral habits, when combined with restricted or obstructed

nasal passages, can lead to a mouth breathing syndrome which many specialists implicate in positional changes in the craniofacial and temporomandibular complexes.⁷ Additionally, the cervical, thoracic, and lumbar regions respond to these positional adaptations by shortening and tightening the plastic component of the myofascia.⁵

The Role of Myofascial/Craniosacral Dysfunction in Craniofacial Pain Syndromes

There is mounting evidence to support the theory of myofascial dysfunction and craniosacral involvement in many occlusal and postural-related head and jaw pain syndromes.⁸

Myofascial dysfunction generally refers to a class of soft tissue syndromes characterized most readily by pain, discomfort, and restriction of motion in the musculoskeletal system. These may manifest as trigger points, adaptive fascial and muscular shortening, postural changes, referral pain, or many other soft tissue symptoms.⁹

The craniosacral system is a semi-closed hydraulic system, which is composed of, in small part, the bony structures of the cranial vault, the fluid containing ventricles in the brain, the dural tube, and the sacrum including its ileal articulations.^{10,11}

Pressure and/or tension can be transmitted throughout the cranium from restrictions in the spine, extremities, and peripheral tissues by means of tensile forces applied along the dural tube.^{5,10} This "pull on the system" can come from limitations in segmental mobility, nerve root irritation, recent or chronic trauma, or many other causes.

The dural tube is anchored firmly to the second sacral segment caudally, and as it ascends toward the cranium where it surrounds and supports the brain, it invaginates each segment of the spinal canal cradling each nerve root to the level of the spinal nerve and serving as a container for cerebral spinal fluid (among other functions).^{5,12}

Many people with longstanding head and facial pain suffer from abnormal tension in the dural membrane system. To quote Dr. John Upledger,

"... The dural membrane is a tough fibrous connective tissue. It's elastocollagenous bundles are interlaced and appear disorganized. The dural membrane is made up of two layers which are tightly adherent... When the dural membrane is subjected to abnormal stress in a certain direction over a long

period of time, the fibers within the membrane seem to organize and align themselves with the direction of tension."¹³

In a naively simple description of craniosacral theory, the craniosacral system generates a rhythm or "fluid pulse" six to 12 times per minute due to the cyclical production of cerebral spinal fluid.^{10,11} This fluid pulse, coming up through the ventricles produces a dynamic hydraulic effect which, in the presence of dysfunction, can influence facial and head pain.¹⁴

By considering the effect of long-term tension on the dural tube and its influence on such diverse membranous and osseous structures as the sacrum/coccyx, occipital base, sphenoid bone, ethmoid sinus's, falx cerebri, and tentorium cerebelli, it is possible to see that trauma or injury to the coccyx, occiput or extremities that occurred perhaps even in early childhood could have a profound long-term postural and structural effect on pain-producing structures within the spine, dural membrane system and the temporomandibular joint (TMJ) complex.¹⁵

This theory lends weight to the position that facial and head pain can be dramatically altered by changes in pressure on the dural tube, the sacrum, the occiput and to the facial/cranial bones. Negatively, as in the case of chronic poor posture, trauma, malocclusion, etc.,¹⁶ or positively, as with relief of symptoms following dental intervention,¹⁷ craniosacral therapy, or both.¹⁸

Such a picture of craniosacral function can provide the clinician with valuable clues toward analysis and treatment of many seemingly "un-diagnosable" TMJ, facial or head pain syndromes.

Effective Treatment of Contributing Factors Using Physical Therapy as an Adjunct to Dental Intervention

We must consider that dental pathology is either ruled out or diagnosed at the time of our treatment in most cases. This is not always true, but most often, causes of head and facial pain stemming from such etiology as tumor, malocclusion, internal derangement of the TMJ capsule, or other dental pathologies are already under treatment at the time of our involvement.

The areas where this is not the case are usually in head and facial trauma, or longstanding diffuse facial and head pains that have not been explained by orthopedic or neurological workups, i.e., motor vehicle

accidents or other injuries, which may reach a physical therapist prior to seeing a dentist.

Our protocol begins with the premise that the whole body is involved in head, neck, and facial pain. Using a myofascial model for evaluation, which says in effect that restrictions to the fascia, applied over time by reaction to trauma, postural deficiencies, or habitual positioning¹⁹⁻²¹ will put low grade deforming pressure on pain producing osseous and soft tissue structures leading to symptomology and eventually pathology.

We begin by a thoughtful evaluation of the history, including any childhood injuries that may be pertinent. Then we look at posture, both static and dynamic, to calculate the effect on the soft tissue and bony structures. Factors such as weakness, tightness, or restriction of motion are noted for later consideration in the treatment plan. Bony landmarks are assessed to rule out such powerful pain producers as iliac rotations, leg length discrepancies, lumbo-sacral compression, or restriction of the occipital base, to name a few.

Studies have shown that muscular firing rates in the temporalis and masseter muscles during rest and chewing activities are elevated by as little as 1/8 of an inch difference in leg length.^{22,23}

We then test the dural tube to rule out restrictions in the craniosacral complex that may be causing pain or transferring tension/pressure from other sources.^{10,14}

Finally, we assess the function of the temporomandibular joints to determine available range of motion (rotational opening, translation/side glide, etc.) and muscular tension/irritability, and to assist the dentist in dealing with internal derangements, crepitation, or joint pain.^{24,25} Depending on the findings, a treatment plan is formulated which combines such traditional physical therapy modalities as moist heat, cryotherapy, acupuncture, interferential electrical stimulation, transcutaneous electrical nerve stimulation, ultrasound, massage, and therapeutic exercise programs with highly specific myofascial and craniosacral techniques to relieve pressure on painful soft tissue and bony structures. This treatment plan is discussed with the patient and physician/dentist. My experience has demonstrated that in these types of syndromes, the best results are achieved when the patient, physician/dentist, and therapist are comfortable with a multidisciplinary approach and are willing to support a patient's taking responsibility for his/her own pain.²⁶ Often, syndromes that have both psychological and physical components respond best to self awareness and responsibility by the patient.¹ It takes a bit more time, but if the care providers are willing to kindly and gently direct the patient to examine any emotional

attachments, angers, or stress, which may have a bearing on their situation, they can have a much faster rehabilitation and achieve longer periods of pain relief from any given treatment or technique.

Appendix: A Few Specific Suggestions

Postural Considerations

Effective long-term postural change can be seen with any of a multitude of techniques and treatment rationales. In my practice we use a combination of manual therapy, mobilization, myofascial release, craniosacral therapy, and patient reinforced exercise. I gently make it clear that it is the patient's pain and that for treatment or exercise to be effective, he/she must take responsibility to build self care into his/her life.

Treatment of Soft Tissue or Bony Restrictions

The central premise of my treatment is "balance." I try to balance the pelvis, sacrum/coccyx, and lumbo sacral regions first, then address leg length discrepancies that remain with orthotics and specific strengthening exercises. Balance in the lower extremities and pelvis is of particular importance to the function of the craniomandibular mechanism in standing. The pelvis and its underlying support base provide a solid foundation against gravity, on which the spine and supportive soft tissue are formed.

I then evaluate and treat the dural tube to reduce facial restrictions that may be contributing factors. The dural tube has a natural "glide" or mobility of approximately 6 mm within the spinal canal. By reducing restrictive or compressive forces upon the dural tube, significant pain relief is often afforded the patient.

Next, I evaluate the cervical spine, the suboccipital region and both the superficial and deep muscles of the temporomandibular mechanism. I look for imbalance, and using any of my chosen techniques, try to alleviate pain, pressure, and tension on soft tissue and hence, bony articulations. The key concept here, regardless of your treatment orientation, is to reduce or eliminate the tension-producing effects of muscular contraction, myofascial restriction or internal derangement. I may use any or all of these techniques in a single treatment, or I may choose to concentrate on the one area that is most pressing, going back to the rest when the crisis is passed. By looking at the feet, pelvis, dural tube, osseous, and soft tissue components, we have found that treatments directed at re-

ducing craniofacial and craniomandibular pain syndromes "hold" over time to a much longer degree than those of a purely symptomatic nature.

Psychological Support

One of the best ways to unobtrusively and gently move patients toward self awareness of stress or anger that may be a factor in their pain profile is to give them "homework." I usually look the patient in the eye, and with a sincere tone of voice, say something like: "If you have time between now and when I see you next, you may want to think about how things are going in your life and, if there is anything you are putting off or not dealing with . . . you'd be amazed at how much stress affects head and facial pain. If you do think of anything, write it down on a piece of paper and give yourself permission to think about how it affects you physically. Then, if you want, we can talk about it at your next treatment."

This keeps them focused on a solution and gives you both an expectation of positive results. Very seldom do my patients neglect to do their "homework" and even less often is it a negative when they return. Most of the time they say something like; "I never realized how upset _____ made me feel! Since I started paying more attention to my stress level, my head, face, and jaw hurt less."

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