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Commentary

A New Management Model for Treating Structural-Based Disorders: Dental Orthopedic and Chiropractic Co-Treatment

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This paper presents a model for treating structurally based disorders through an integrated approach to patient care. The model requires close cooperation between dental orthopedic and chiropractic professionals in evaluating and treating patients, and it demands that the patient assume greater responsibility for the outcome. It holds that dental occlusion, as well as the spine, pelvis and cranium, are determining factors in the functional health of the body. Instead of treating each as an isolated segment, the jaws, cranium, spine and pelvis are considered interdependent parts of the whole body system.

The concepts of structural and functional integration and balance are not new and have appeared throughout medical and dental literature (1-7). For example, in his textbook, *Facial Growth* Donald Enlow states, "Development is a process working toward an ongoing state of aggregate, composite structural and functional equilibrium. Any change in any given part must be proportionately matched by appropriate growth changes and adjustments in many other parts, nearby as well as distant, to sustain and progressively achieve functional and structural balance of the whole (1)."

And in his text on head, neck and jaw dysfunction, David Walther states, "Changes throughout the body, often seen on a clinical basis after making changes in the masticatory system, show how the structures within the stomatognathic system are integrated with each other, and the system is related to total body activity (2)."

Physical therapists have written widely about the relationship of the jaw to postural dysfunction. Rosemary Scully and Marylou Barnes point out that, "cervical spine disorders result in signs and symptoms that may involve not only neck but entire arm and shoulder girdle as well as head and face . . . (3)." and B.L. Braun discusses postural differences in subjects suffering from temporomandibular joint dysfunction. According to Braun, "Asymptomatic women and symptomatic women . . . show postural differences consistent with the postural theories implicating head and shoulder posture in the development or perpetuation of craniofacial pain (4)." Other theorists (5-7) maintain the belief that poor cervical posture affects the posture of the mandible and the functional demands of the stomatognathic system.

The goal of this paper is to explain the operating principles behind a working co-treatment model of care developed by the authors, a chiropractor and an orthodontist, which hold that facial development and resulting dental occlusions are factors in postural alignment. Poor facial development leads to poor occlusion and jaw position. This, in turn, results in spinal compensation, which may limit full function and health. This paper is not intended to be a definitive research study, but rather to describe one approach to patient management that has proven successful for the authors and their patients.

Since the first management principles were established over 12 years ago, the model has been modified and improved numerous times until it has reached what we believe to be its present, reproducible state. As our clinical and management skills continue to improve, the model will continue to evolve. We recognize that their interpretation of successful results may be limited or incorrect. Hence, only through an open and ongoing dialogue and further research, will the actual mechanisms be elucidated.

Evolution of the Model

The co-treatment model represents a convergence of ideologies. The model evolved from early discussions between us regarding the management of temporomandibular joint (TMJ) problems in mutual patients. Initially, each focused on the joint as an isolated area, rather than as a subset of a very complex system. Over time, however, the focus of each began to widen to include a broader systems approach. While the orthodontist was looking to the neck and upper body for explanations of his findings, the chiropractor was discovering his answers in the cranium.

The orthodontist is a specialist in the areas of growth and development, responsible for correcting the results of abnormal facial growth, i.e., the malocclusion. Traditional orthodontic assumptions hold that jaw position is static—it stays where it is when the patient presents—and the length of the bony arches should not be enlarged or widened. Further, it is justifiable to extract teeth to correct bite positions and alter arch alignment if conditions warrant. If the resulting arches are smaller as a result of those extractions, this is believed to be of little consequence.

As he began to work on jaw positioning and arch expansion, the orthodontist experienced unexpected results. The search for explanations led to a study, first of the TM joint, and later to an analysis of the relationship of the mandible to the neck, the upper body and the rest of the spine. He gradually converted his practice from traditional orthodontics to one that places a heavy emphasis on functional jaw relationships. This implies that the diagnostic criteria are often located outside the oral cavity. This shift in emphasis began with adolescent patients and broadened to include adults as well.

Simultaneously, the chiropractor began to look at the spinal subluxation not only as a reduced or local event but as a by-product of structural deficiencies in other areas, primarily the cranium. He expanded his training and practice to include cranial manipulation based on Sacro-Occipital Technique (SOT) principals established by DeJarnette (8). This shift in emphasis did not minimize the role of the subluxation, but placed it within the context of the larger system. With a greater awareness of systematic influences, the chiropractor began to focus on the process of normal development as an initiator of structural competence or incompetence, not an isolated occurrence.

The chiropractor was taught that the spinal subluxation is the cause of all dysfunctions, and that identifying the subluxation and correcting it will restore health. As he practiced craniopathy in the context of the SOT category system (9), spinal function improved. He knew that the vestibular mechanism righting reflexes (of which the eyes are a major element) play a vital role in postural dynamics throughout the body (2, 10, 11). He also knew that the mandibular depressors are the head flexors and since head position has a dynamic effect on the mechanoreceptors of the spine, head and jaw position must be related to cervical corrections.

As the authors were developing these ideas on their own, their conversations about mutual patients led to a synthesis and amalgamation of ideas. They began to suspect that growth and development of the face and cranium are critical to the health of the spine and rest of the body.

Growth and Development

Craniofacial growth often is delineated in terms of the rate of growth of its various components. The vault and cranial base develop first because of their relationship to the expanding brain. This growth is complete by about 6 yr of age. In close proximity to the cranial base, the second growth area is the mid-face or maxilla. The growth in width of the maxilla is 95% complete

for males and 98% complete for females by 12 yr of age (12).

The last area of focus is the mandible. Its growth activity extends well into the 20s. While the maxilla, which is associated more closely with the growth of the basicranium, is joined to the cranium by sutures, the later developing mandible is joined to the head by a bilateral joint articulation.

The growing mandible depends on the process of intra-membranous bone formation and remodeling for the bulk of its substance. The overall mandibular remodeling and condylar growth are geared to accommodate housing for the developing teeth, to adapt to the mandibular displacement movements, and to adapt to the complex growth changes occurring throughout the whole head (1). Mandible length is not predetermined genetically (13) and the condylar cartilage is a secondary, as opposed to primary, growth site.

According to Enlow, during growth, the human mandible becomes entrapped below and behind the rotated nasomaxillary complex and the upright body posture positioning of the basicranium and cervical region. Overbite and overjet, or anterior crowding, are an evolutionary and developmental means to compensate for the vulnerable positioning of the mandible and its temporomandibular joint (1).

Since maxillary growth stops earlier, it seems to set the anterior limits of future mandibular growth. This, in turn, may play a significant role in developing malocclusions. Since displacement and remodeling are the most fundamental activities of bone growth, maxillary deficiencies or excesses will tend to prevent the mandible from reaching its "correct" Class I position. The malocclusion, therefore, is the outcome of poor growth in the craniofacial complex.

Effects of Facial Growth on Posture

If the position of the nasomaxilla complex affects the posture of the mandible, is it possible that other structures are involved as well? Assuming the intimate anatomic relationship of the mandible to the neck, and understanding the compensatory nature of the TM joints, the mandible may act to balance the superior influences of the mid-face against the demands of the cervical musculature to set head position. Therefore, a postural change of the mandible might alter the cervical anatomy or even affect sacroiliac function (14, 15).

Flexion of the head on the cervical column and flexion of the neck on the thoracic column depend on the anterior muscles of the neck. Since these muscles are located at a distance from the cervical column, they

act as a long arm of a lever (19). When these muscles act simultaneously, the mandible is lowered; but if the mandible is fixed by contraction of the muscles of mastication (the masseter and the temporalis), then the suprahyoid and infrahyoid muscles produce flexion of the head on the cervical column and flexion of the cervical column on the thoracic column while simultaneously flattening the cervical curvature. Consequently, they are very important in supporting the cervical column at rest (2, 3, 15).

According to Scully and Barnes, "The proximity of the temporomandibular joint to the pharynx and cervical region results in a uniquely interdependent relationship between these two regions. Trauma or dysfunction of one group of muscles, namely prime movers of mandible or accessory muscles such as suprahyoid or infrahyoid muscles, may adversely affect all cervical supporting musculature. Conversely, trauma to the cervical region, as in whiplash injury, may manifest as signs or symptoms of TMJ dysfunction (3)."

A person whose head is bent downward due to the contracture of the mandibular elevators must hyperextend his head to look forward, and this causes a posterior closure of the space between the occiput and atlas (16). In addition, the cervical column and thoracic column as far as T5 are flexed, resulting in a loss of the normal cervical lordosis from C3 down. In their study, Moya et al. found the use of a full-arch maxillary stabilization occlusal splint also produced significant extension of the head on the cervical spine. This, in turn, resulted in a decrease in cervical lordosis in the first, second and third cervical segments (17).

Kapandji emphasizes that the anterior apex of the anterior cervical curve is the posterior inferior border of C4. The head is in equilibrium when the eyes look horizontally (11). He describes it this way, "The head taken as a whole constitutes a lever system, the fulcrum lies at the level of the occipital condyles which is posterior to the center of gravity. A force is produced by the weight of the head applied through its center of gravity lying near the sella turcica. The posterior neck muscles are constantly counterbalancing the weight of the head that tends to tilt it forward." Kapandji further observes that the extensor muscles counteract gravity whereas the flexors are helped by gravity.

If we consider that the bite position of the mandible, i.e., the position it assumes when teeth are brought together, is relatively fixed at 10 yr of age, then it may be possible that the mandibular posture plays a role in the function of the neck. Assuming there is a relationship between the mandible and head position, how would that affect the practice of chiropractic and ortho-

dontics? This next section will explain how the authors incorporate these assumptions and observations into routine clinical practice.

The Model—Patient Evaluation and Preliminary Care

The co-treatment model entails analyzing each patient from a developmental and postural perspective. The chiropractor studies the patient's function by range of motion studies, postural observations, orthopedic tests, and SOT indicators (8). The orthodontist analyzes developmental influences on the body of poor facial development. These factors are integrated with standard chiropractic and dental histories as well as lifestyle issues, including diet.

Preliminary care patients may be in sharp debilitating pain of recent onset, or can be suffering from a long history of dull, chronic facial pain. If the pain is more chronic, then the orthodontist may delay referral until he accomplishes a complete diagnostic workup. If a patient in acute pain enters the system at the orthodontic practice, the preliminary evaluation is followed by immediate referral to the chiropractic team member. It is imperative that the dental patient learn that the immediate solution to his or her problem may lie with chiropractic, rather than dentistry, since typical dental solutions may only alleviate the pain and not address the underlying problem.

Dental solutions can be allopathic and/or invasive. The orthodontic team member tries to avoid the use of splints in the early stages of treatment. Splints work to relieve pain by changing proprioception in the cranio-mandibular complex but unless the splint is worn continuously the results are temporary or, in some cases, negative (18–21). and it is this need for continued use of the splint that often results in significant adverse dental changes that later render more definitive treatment difficult. It is much less invasive and more therapeutic to do good chiropractic at this point to relieve the acute distress and thereby eliminate the need for splints.

The patient entering the system through the chiropractic office, whether acute or chronic, is managed the same. The chiropractor first explains the concept of the interconnection between the jaw position and cranium, spine and pelvis. After examination, the patient is apprised of his or her basic dental needs and their effect on the body. An initial dental referral is given early in the relationship. The goal is to ascertain specific dental requisites that can be undertaken after chiropractic acute care or, if the patient is not acute, immediately. This dental analysis is shared with the chiropractic

office so the goals and/or limitations can be determined and presented.

In the preliminary phase of SOT, chiropractic treatment primarily is centered on controlling the diagnosed category (treatment protocol) and restoring cranial sutural motion (8, 15, 22). In Category II (sacroiliac weight bearing subluxation causing neural failure due to an inability of the body to maintain itself against gravity), blocking is done to close the sacroiliac weight bearing lesion and psoas stretching and iliofemoral range of motion adjustments are made. "Figure 8" and "stair-step" (23) adjustments are performed to enhance cervical ranges of motion. The spine is adjusted according to palpation, while sutural adjustments are made to specific areas identified by cranial ranges of motion (8, 15, 22).

Most, but not all, of the acute preliminary phase co-treated patients are Category II. Some are Category III (lumbar subluxation/discogenic syndrome involving nerve root compression or stretch syndrome). Those are treated to control the lumbar lesion identified by palpation, neurologic and orthopedic testing such as straight leg raise, Braggard's, Ely's, Hutching's and Goldthwaites' tests and the "step out/toe out" test. Those that exhibit no positive neurologic indicators (patella and Achilles tendon reflexes and dermatomal testing) are treated cranially in a manner similar to the Category II's, using cranial ranges of motion to identify the areas of dysfunction (8, 22) and then applying sutural techniques (8, 15).

The initial exam establishes baseline findings. On each subsequent adjustment, the chiropractor reevaluates the findings and compares them to the initial and the previous visit's findings. The goal is to maintain improvement from visit to visit. As the patient improves, the acute symptoms diminish but the adjustments are continued. Progress is monitored through the analysis of findings, not symptoms. This form of analysis helps in later communication with the dentist because he has objective measures for his treatment as well. Concerns of how far to go in dental correction often can be modulated against how the body is functioning as compared with its functional state at the beginning of treatment.

For those patients who have not made a definitive decision on orthodontic care, the end of the preliminary phase is a critical time. They now are out of pain and have been counselled by the chiropractic team in the benefits of orthodontics. They have had a dental evaluation and are aware of their dental needs. They have a sense of their own capacity for wellness and can make a decision, not based on the need for relief, but on a

desire for greater health. This is a positive, not a fear-based point.

Intermediate Care

At the point of intermediate care, the patient has accepted the management system philosophy and the acute or immediate problems have been resolved. The term "intermediate care" differentiates this level of care from the more "sickness" based level that precedes it. For it is in this phase of treatment that significant structural change occurs. It also is in this phase of treatment where the orthopedic dental changes are made, such as the maxillary and mandibular postural changes required for structural improvements. From a dental perspective, the chiropractor must continue to keep the patient healthy enough for the orthopedics to work.

During the intermediate care phase, chiropractic adjustments are continued until the findings stabilize, i.e., there is no significant improvement from the previous visits. At this point, the symptoms are under control and this information (the findings) now becomes the new baseline.

Wellness Care

From a dental perspective, this level of care is more differentiated than chiropractic. It is at this point that more traditional dental procedures are performed, including the placement of crowns, bridges and fixed braces to move the teeth if necessary. These procedures are performed now because the body has improved function and is ready for these definitive procedures. These procedures create the final occlusion that ultimately will hold the jaw in the new position established during the proceeding phase of treatment. This phase creates the natural orthotic that supports the result.

In standard dentistry, this treatment phase is performed without benefit of the preliminary and intermediate phases of care. Thus, it can be argued that the body is not ready, nor in the proper alignment, to accept this level of care. This presents a conceptual departure from traditional dentistry, specifically in those cases that require a form of combined therapy. In a sense, this defines functional dentistry as the type of dentistry that requires a healthy cranium and neck prior to initiating treatment.

In wellness care, the chiropractic goal is to maintain the new established baseline of functional findings, with occasional adjustments and good lifestyle counselling. The emerging improved and stabilized occlusion helps to balance the rest of the system's function. Typically, at this point the Category II's and III's have evolved

into a Category I (cranial dural subluxation), where maintenance of primary function can be sustained.

Treatment Goals and Objectives

The model (Figure 1) is built on the concepts of improved function, rather than relief from pain. This implies that there are preexisting desirable outcomes that can be reached in most cases. The treatment goals are outlined below. The operating principal is that if these goals are reached, the symptoms will be diminished greatly, if not completely. Thus, efficacy is a measure of structural change and functional improvement, not symptom relief. Table 1 notes the respective findings from the chiropractic and dental/orthodontic points of view.

Both the chiropractic and the orthodontic office pursue a clinical model focused on maximizing function.

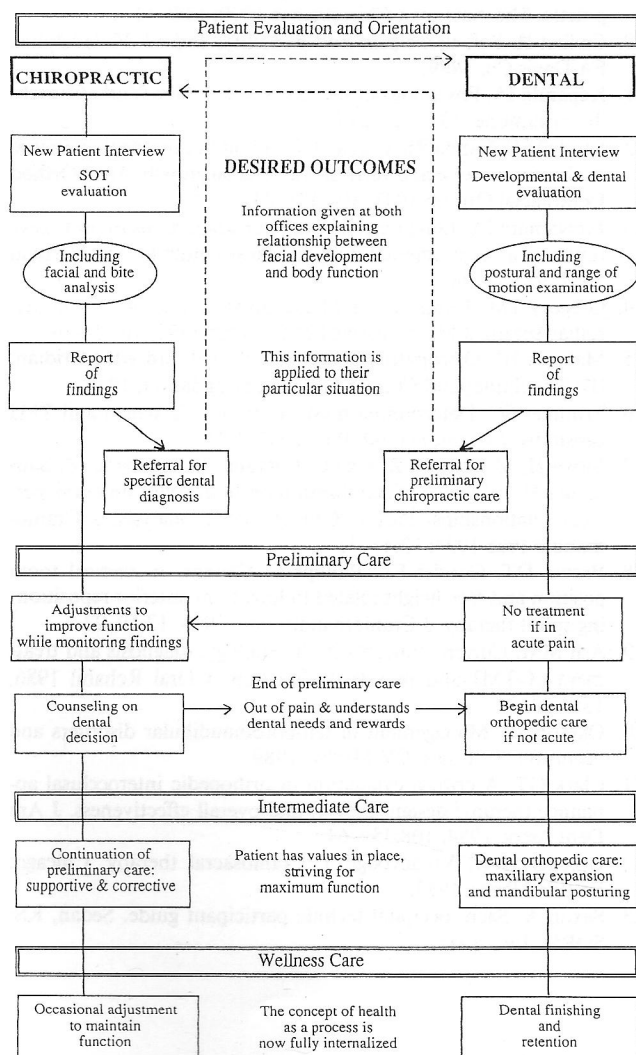


Figure 1. Co-treatment model.

TABLE 1. Respective chiropractic and dental/orthodontic points of view/findings

Chiropractic
Less resistance of cranial sutural motion
Improved head position
Improved cervical ranges of motion
Improvement of the lumbosacral angle with less disc compression and increased motion
Less anterior displacement of the thoracic spine
Better TM joint motion
Stability of the SOT Category II and Category III indicators
Dental-Orthodontic
TM joint opening, 45 mm or more
Good excursive jaw motions
Class I canine position
Full maxillary width
Corrected skeletal and dental midlines
Limited overjet and overbite

The chiropractic office uses techniques that maximize function throughout the body, while the orthodontist attempts to merge the dental correction with the chiropractic results. Often, "ideal dental goals" supported by the more traditional model may not be appropriate as overall body function improves.

Coordination often is very important to selecting the best solution for a particular problem. In these situations, the orthodontist may have to select the appropriate dental compromise. He may not have the luxury to "go by the book." Integration of care from both perspectives is more important than using blindly installed cookbook methods. The chiropractor and the dentist each work toward a negotiated result that measures its success against the improved functional findings not an idealized concept of how the mouth should look.

Behavioral Implications

Patient responsibility in this type of practice model is different from that in a more conventional approach. Here the patient assumes greater responsibility for the outcome and level of wellness attained. Upon achieving a predetermined goal, the patient and physician(s) may reevaluate and renegotiate a new, higher goal. It is this proactive patient/physician partnership that empowers the patient to achieve levels of wellness that often are unexpected. In this model, the patient must understand and own the concept and be aware that the co-treatment team will measure success by continually evaluating findings. The responsibility for diet, exercise and emotional well-being, including attitudes toward treatment and health, rests solely with the patient.

For patients not accustomed to taking charge of their health and well-being, this can be very intimidating. But for the clinician, this model can be liberating. The doctor becomes a teacher, a helper and no longer is cast in the role of rescuer. The doctor and team inform and

treat, while empowering the patient to share responsibility for the outcome.

This approach to patient management also facilitates the development of a team-based staff model, one that takes responsibility for itself and requires less hands-on supervision. The advantage of this style of management is that team members not only become good employees but also excellent role models. Their responsible attitudes toward patient care become a modeling experience for the patient.

The co-treatment model, casts the management team as a single team, comprising the doctors and staff of both offices, each linked by a common philosophy. Management techniques are developed at both offices through individual staff meetings and in combined meetings where the expertise of each office is shared and integrated. It is important that the patient have a similar experience at each office, and that the offices support one another. This high level of consistency is required to affirm the message. The patient begins to trust his or her body and the team's ability to help when he or she sees and experiences high levels of trust throughout the process.

CONCLUSION

This model of care features a high integration between the chiropractor and functional orthodontist and assumes an intrinsic connection between facial growth and development and structural competence. The degree of integration, not only in the model but also in the approach to the body, affects all levels of care and management. By working together to optimize function and foster wellness, the results have been exciting and liberating for the patients as well as the co-treatment teams.

The purpose of this commentary is not to present formal research results but to present an alternative approach to patient management and one that has proven successful for the authors. It is our hope that the concepts presented here will inspire a dialogue between other practitioners and foster an interest in controlled research studies.

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