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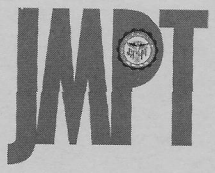

The Dental-Chiropractic Cotreatment of Structural Disorders of the Jaw and Temporomandibular Joint Dysfunction

Albert S. Chinappi, Jr., D.D.S. and Harvey Getzoff, D.C.*

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The Dental-Chiropractic Cotreatment of Structural Disorders of the Jaw and Temporomandibular Joint Dysfunction

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ABSTRACT

Objective: To present a case demonstrating the concept of integrated dental-orthopedic and craniochiropractic care for treating structural disorders of the jaw, neck and spine.

Clinical Features: A 33-yr-old woman sought orthodontic therapy for an overbite and severe crowding of the lower teeth. She reported a history of bilateral headaches and jaw popping. Orthodontic examination revealed degenerative changes in the right temporomandibular joint and restricted jaw opening. While in treatment, the patient began to experience severe temporomandibular joint pain and neck/lower back pain, which convinced her to accept chiropractic care. Initial chiropractic sacro-occipital technique (SOT) evaluation found Category II weight-bearing instability of the sacroiliac joint, specific thoracic and cervical vertebral subluxations, cranial sutural restrictions and temporomandibular dysfunction. Cervical X-rays revealed absence of the anterior cervical curve, characterized by parallel vertebral base lines.

Intervention and Outcome: In addition to orthodontic treatment, the patient also received semiweekly (then bimonthly) adjustments of the spine, neck and cranial sutures. The cotreatment approach eliminated pain while improving head, jaw and tooth position.

Conclusion: The position of the jaw and head and neck are intricately linked. The acute symptoms experienced during the initial dental treatment phase were caused by the inability of the head and neck to adapt to maxillary and mandibular changes. Chiropractic treatments enabled the body to respond positively to the dental changes. As the mandibular position improved, further improvements were indicated by physical testing and X-rays. (J Manipulative Physiol Ther 1995; 18:476–81)

Key Indexing Terms: TMJ Syndrome, Chiropractic Manipulation, Orthodontics, Cervical Vertebrae.

INTRODUCTION

Treating structural disorders of the jaw, neck and spine within a model of integrated care was discussed in detail in previous work (1). The model requires close cooperation between dental-orthopedic and cranio-chiropractic professionals in evaluating and treating patients. It holds that dental occlusion, as well as the spine, pelvis and cranium, are determining factors in the functional health of the body, and facial development and resulting dental occlusions are factors in postural alignment (2–5). Thus, poor facial development leads to poor occlusion and jaw position. This, in turn, leads to spinal compensation that may limit full function and health. In this integrated care model, the jaws, cranium, spine and pelvis are considered interdependent parts of the whole body system and not isolated segments. In such a model, the patient also assumes greater responsibility for the ultimate outcome of the treatment. In short, the patient becomes an active partner in the pursuit of his or her own health.

This clinical case is noteworthy in that it demonstrates how integrated care can significantly improve the benefit to the patient. It presents a treatment chronology for a patient who began with only facial orthopedics and then later, at repeated urgings of the orthodontist, added chiropractic care. The subsequent improvements support the concept of integrated care as an aid to improving function and health.

CASE REPORT

In November 1989, a 33-yr-old woman began orthodontic therapy to "straighten her teeth." She reported a history of years of bilateral headaches, occurring primarily in the evening, and she also complained of popping in her jaw joint. These were not her reasons for seeking orthodontic care, however.

Her malocclusion was classified as a Class II (a posterior posture of the mandible) characterized by a dental overbite and severe dental crowding of the lower teeth (Figure 1). Her temporomandibular joints exhibited a bilateral click with an opening of 37 mm (normal is > 45 mm) and her jaw opened to the right. Radiographic examination of the temporomandibular joint revealed degenerative changes in the right joint (Figure 2). Despite these findings, this patient's primary concern was with aesthetics and not with function.

Treatment began in December 1989 and was uneventful. However, by September 1990, symptoms of tightness in the neck and temporomandibular joint became sufficiently acute

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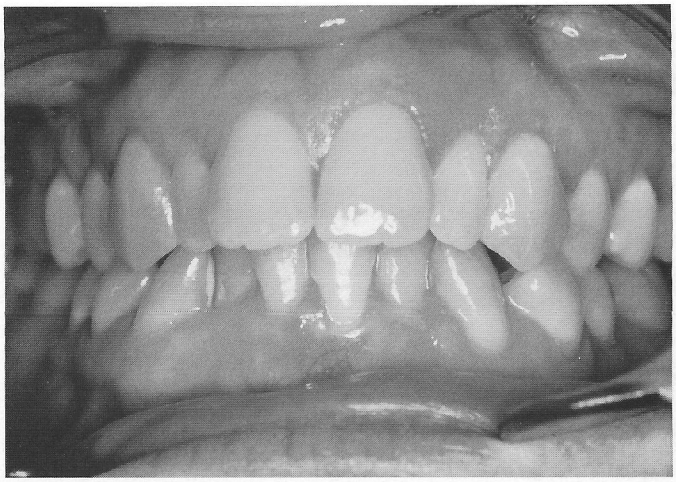

Fig. 1 *Pretreatment interoral view.*

Fig. 3 *Pretreatment, forward head position.*

that the patient accepted referral to the chiropractic member of the team. She complained of acute left temporomandibular joint pain of a 2-wk duration and the inability to open her jaw. (Contralateral pain is not uncommon when dysfunction occurs in one of two opposing joints. It seems that the body protects the damaged joint by minimizing its mobility and then compensates for that immobility through hypermobility of the opposite undamaged joint.)

The initial chiropractic sacro-occipital technique (SOT) evaluation determined that this patient was a Category II, characterized by instability of the weight-bearing sacroiliac joint, with forward head position (Figure 3). Category II also is characterized by lateral plumb line sway (6) (the body's way of compensating for the instability in the sacroiliac joint), a positive arm fossa test and left psoas muscle contraction. The arm fossa test is one of the least understood SOT procedures; basically, it involves subjecting the patient to multiple stimuli in an effort to judge the patient's pelvic stability in coordinating upper and lower motor systems. The multiple stimuli used in the arm fossa test include the resistance of the arm to externally applied pressure, an auditory command to hold the arm in position, tactile stimulation of the inguinal area and the patient's visual observation (7).

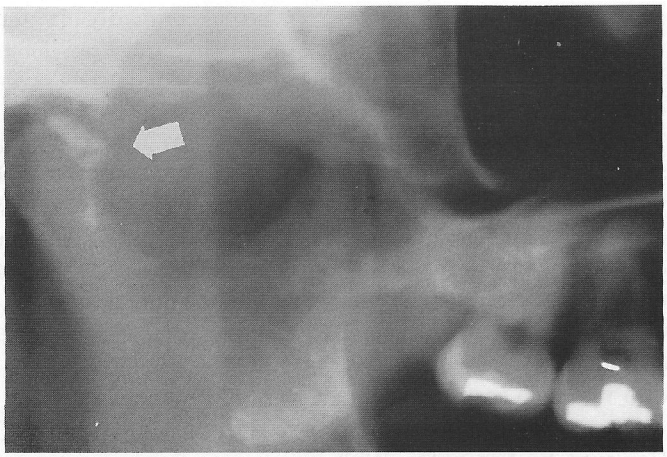

Fig. 2 *Pretreatment panoramic view showing poor contour.*

The initial examination also revealed cervical restrictions on the "stairstep" and "Figure 8" evaluations—primarily forward flexion and left rotation (65°). The "stairstep" test involves cervical translatory movements, whereas the "Figure 8" involves cervical rotational and lateral range of motion compressive movements. Both are conducted with the patient in a supine position.

The patient exhibited temporomandibular dysfunction, with bilateral temporal sutural restrictions and right malar-zygomatic, maxillary/malar sutural restriction. Sutural restrictions are characterized by limited relative motion when pressure is applied to specific cranial sutural areas. The chiropractor also performed trapezius and occipital fibers analyses to identify spinal subluxations and found an active occipital fiber in area 4, line 2, and a trapezius fiber 4 with a corresponding T6 subluxation (Table 1). Fiber analysis is used by SOT practitioners as a guide for quickly locating and identifying the type of subluxation. It is used as a guide for palpation. An occipital fiber along the tendon insertion of the cervical muscles at the posterior occiput, for example, will provide clues as to whether the subluxation is inferior or rotational and if it is viscerally related.

In addition to fiber analysis and palpation, the chiropractor took anterior-posterior (A-P) and lateral cervical X-rays. For the X-rays, the patient was instructed to stand and look directly at her own eyes in a mirror. The central ray was focused on the lateral transverse process of C1 (Figure 4). X-rays taken on October 23, 1990, revealed (Table 2) no apex of the cervical curve (George's Line), an anterior cervical curve angle of 0° (Jackson's Angle), and parallel vertebral base lines.

The patient visited the chiropractic office 2 times per wk for a month. After that, the frequency decreased to 2 times per month, and then, once a month. At the present time, the patient is seen every couple of months. The patient's initial treatment consisted of Category II adjusting protocol, including:

- supine pelvic blocking to position the sacroiliac joint for healing of the interosseous ligament,

Table 1. *Physical findings*

	Prefindings	Postfindings	
	10/23/90	3/27/92	9/6/94
Category	II	II	No active category
Plumb line sway	Lateral	No lateral sway	No lateral sway
Arm fossa	Positive	Negative	Negative
Psoas	Left psoas contraction	Negative	Negative
Cervical ROM	Restricted forward flexion and left rotation (65°)	ROM improved left cervical rotation (90°)	Normal ROM
TMJ	Posterior left TMJ misalignment bilateral click	No misalignment, no clicking	No misalignment, no clicking
Cranial	Bilateral temporal sutural restriction, right malar/zygomatic, right maxillary malar sutural restriction	Clear, no restriction	Clear, no restriction
Occipital fibers[a]	Area 4, line 2	Not tested	Not tested
Trapezius fiber[a]	4	4	4
Vertebral subluxation	T6 inferior subluxation	T6 inferior subluxation	T6 inferior subluxation

ROM = range of motion; TMJ = temporomandibular joint.
[a] With corresponding spinal palpation.

- arm fossa test monitoring,
- cervical stairstep and Figure 8 adjustments and
- right malar/maxillary sutural adjustment, which involves applied pressure in a specific direction to create sutural motion.

Specific spinal adjustments were directed by trapezius and occipital fibers analyses (primarily T6). The patient also received home care instructions for the cervical spine (7). Within a month, the patient was subjectively "doing great." The acute left temporomandibular joint pain and the inability to open her mouth had diminished significantly and she was able to continue her orthodontic work. Final positioning of the jaw and dentition proceeded to completion.

Within approximately 6–8 wk, all Category II indicators had diminished. There was no lateral sway on the plumb line and no arm fossa findings. Temporomandibular function improved and Figure 8 assessments produced fewer findings (Table 1). Overall cervical range of motion had improved and left cervical rotation had reached 90°.

As of her last appointment on October 18, 1994, the patient *had been pain free for 1 yr. Dental examination showed a* reduced overbite, symmetrical arch form and good postural position of the mandible (Figure 5). Temporomandibular range of motion had improved and both joints were quiet, with no clicking. The posttreatment X-ray of the right temporomandibular joint indicated an improved cortical contour, with a reduction of the osteophyte formation, suggesting a reversal of the earlier degenerative changes (Figure 6). Future X-rays may provide more definitive evidence of this positive reversal.

On chiropractic examination, the patient showed no weight bearing instability (no active category), improved head position (Figure 7) and the cranial findings were clear (Table 1). That is, under range-of-motion studies (8), the cranial sutures were pliable and displayed a normal range of movement. The patient's cervical range of motion was within normal limits. Only a T6 inferior scope adjustment was made, based on spinal palpation and a trapezius 4 fiber findings (Table 1). As one would expect, in the 3-yr period of treatment, there were occasions when the Category II became active again, but the fluctuations always were within normal limits and never acute.

Fig. 4 *X-rays taken October 1990.*

Table 2. *X-ray findings*

	Prefindings	Postfindings	
X-ray	10/23/90	3/27/92	9/6/94
Apex of the cervical curve[a]	No apex	C3–C4	C3–C4
Anterior cervical angle[b]	0°	11°	16°
Vertebral base lines[c]	Parallel	Posterior converging C3/C4 base lines	Continued posterior converging C3/C4 base lines

[a] George's Line, also known as the posterior vertebral alignment line and the posterior body line, measures the integrity of the posterior vertebral body alignment. The key is the alignment of one vertebra to a superior and inferior vertebra. If normal, George's Line also gives you the appearance of the anterior cervical curve.

[b] Jackson's Angle is determined by constructing measurement lines from the posterior bodies of C2 and C7. These lines ordinarily form an angle (approximately 42°) that intersects at the C4/C5 disc interspace. A decreased angle indicates hypolordosis, resulting in anterior displacement of weight bearing in the cervical curve.

[c] The lateral base lines are drawn through the plane of each vertebra, parallel to the inferior and superior epiphyseal plates. The lines should converge at a central point on the posterior lateral spine view. This is a qualitative analysis used by the physician to judge the relative loss, increase or normal function of the cervical curve. When a base line intersects with the next superior base line, this indicates fixed flexion of the inferior vertebra(e), whereas a base line that intersects with the next inferior vertebra indicates fixed extension of the superior vertebra(e). Fixed flexion or extension leads to biomechanical dysfunction with concomitant early degenerative changes.

X-rays taken on March 27, 1992 (Figure 8) and compared with initial films revealed apex of the cervical curve at the C3/C4 level, indicating a return of the cervical lordotic curve (Figure 9), an increase in the anterior cervical angle from 0° to 11° and a posterior convergence of the C3, C4 vertebral base lines.

Another lateral cervical X-ray, taken on September 6, 1994, showed a greater apex of the cervical curve, an increase of the anterior cervical angle to 16° and the continued posterior convergence of the C3, C4 vertebral base lines (Figure 10), despite the fact that the patient had completed orthodontic treatment and had received only bimonthly adjustments since March 27, 1992.

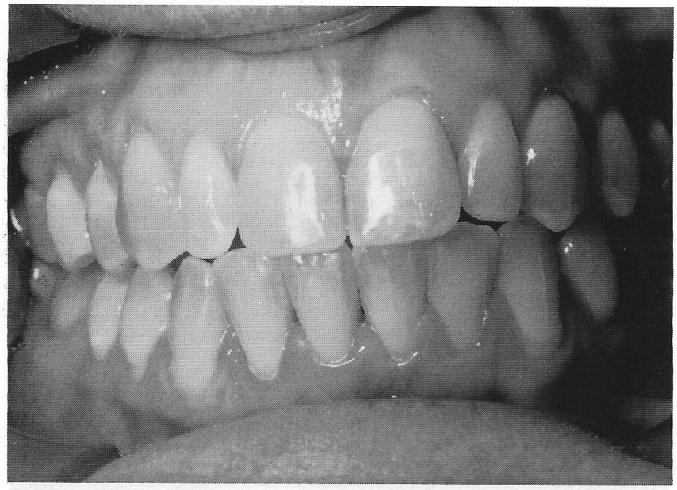

Fig. 5 *Posttreatment interoral view.*

DISCUSSION

The original dental treatment goals were first to correct the mandibular posture and then to set the dentition to that posture. This is typically accomplished by enlarging the maxilla through a process of slow remodeling, and then allowing the mandible to self-correct its posture in the face (1). This self-correction is dependent on the health of the cervical musculature and temporomandibular joint as well as the head position (6, 9, 10). The acute symptoms that the patient experienced

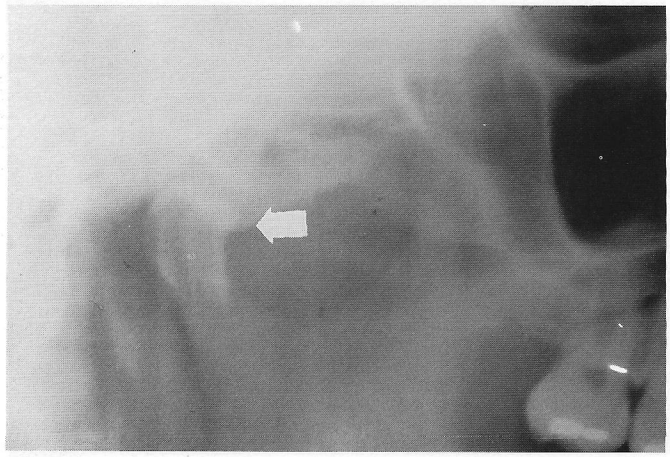

Fig. 6 *Posttreatment panoramic view showing improved contour.*

Fig. 7 *Posttreatment, improved head carriage.*

Fig. 8 *X-rays taken March 1992.*

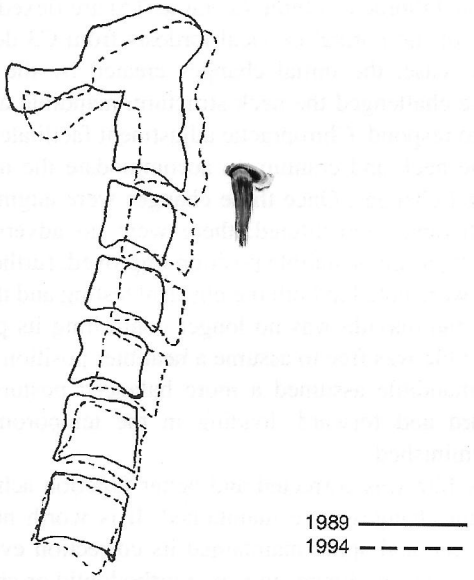

Fig. 9 *Tracings of posterior vertebral body positions relative to one another at the start of treatment in 1989 and after treatment had concluded in 1994.*

during the initial dental treatment phase were apparently caused by the inability of the head and neck position to adapt to maxillary and mandibular changes. The neck exhibited a loss of the normal anterior cervical curve (flexion) with upper cervical compensation (extension).

As stated in our earlier paper, we know that

> 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 (1). Because these muscles are distant from the cervical column, they act as the long arm of a lever (3). 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 (11). Consequently, they are very important in supporting the cervical column at rest (3, 4, 10).

A person whose head is bent downward because of the contracture of the mandibular elevators must hyperextend his or her head to look forward and this causes a posterior closer of the space between the occiput and atlas (12) and often between the atlas and axis vertebrae (13). In addition, the cervical

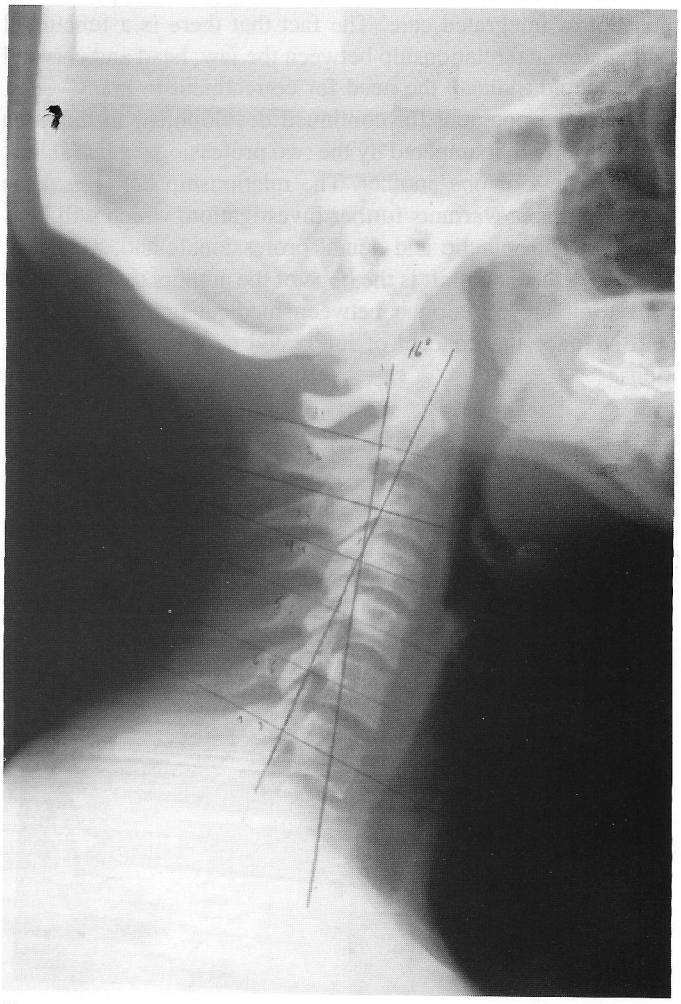

Fig. 10 *X-rays taken September 1994.*

column and thoracic column (as far as T5) are flexed, resulting in a loss of the normal cervical lordosis from C3 down.

In this case, the initial changes created by the maxillary appliance challenged the neck structure, mandible and cranial sutures to respond. Chiropractic adjustment facilitated the ability of the neck and cranium to accommodate the mandibular and dental changes. Once these changes were augmented and dental therapies reinstituted, there were no adverse effects. Ultimately, as the mandible position improved, further positive changes were noted in both the physical testing and the X-rays. Because the maxilla was no longer controlling its placement, the mandible was free to assume a healthier position (1, 2, 14). As the mandible assumed a more balanced posture, slightly downward and forward, loading in the temporomandibular joints diminished.

As the bite was corrected and better function achieved, the significant changes were maintained. It is worth noting how well the cervical spine maintained its correction even though the patient was no longer in active orthodontic or chiropractic care.

CONCLUSION

This case illustrates that orthodontic outcomes can be dependent on chiropractic intervention and gives support to the concept of integrated care. The fact that there is a functional and anatomical relationship between the jaw, head and cervical spine would indicate the need for cotreatment in many cases. To date, the potential for continued development in this area has been greatly hampered by the two professions' general lack of awareness of one another. The relationship between these two disciplines warrants further investigation, which will benefit both chiropractic and dental professionals and, more importantly, the patient. It is the hope of the authors that this work will stimulate a dialogue between medical practitioners that will advance the concept of integrated care in certain conditions.

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