CRANIAL BONE LESIONS INITIATED BY ABNORMAL FOOT MOTION

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This paper discusses the impact abnormal foot motion (See Fig. 1) has on the cranial bones. Section I describes this foot-cranial linkage in laymen's terminology. Section II describes this foot-cranial coupling in medical terminology. Section III describes an embryonic foot type that frequently is responsible for distortions in the cranial bones (hereafter referred to as cranial lesions). And Section IV describes a novel foot insole (referred to as a proprioceptive activator) which effectively reverses (in children) or stabilizes (in adults) cranial lesions.

The foot-cranial correlations presented in this paper are based on a recently concluded clinical study in Juetepec Mexico. (Statistical Study currently in peer review for publication.)

Introduction

Holistically, we know that the body's framework functions as a unit: instability in one area of the body can reverberate throughout the entire body. This understanding underpins the concept that abnormal motion within the cranial bones (hereafter referred to as cranial lesions) can be the **result of** abnormal motion within the feet. While many scientists accept the plausibility of this correlation; little or no clinical research has been published that supports this foot-cranial linkage.

Over the past several years, this author has collected clinical data that statistically suggests cranial lesions are linked to abnormal foot motion. These findings are presented below and hopefully will prove useful in treating malocclusions and TMJ dysfunction.

Section I

Two patterns of cranial lesions resulting from abnormal foot motion have been observed:

- **Left foot more pronated**

Fig. 1A
Left foot more pronated

The maxilla and mandible (upper and lower jaws) shift upwards and to the left resulting in a visual loss of vertical height between the left eye and lip (See Fig. 1A). Frequently there is a Class II malocclusion (overbite) and narrowing of the dental arch.

- **Right Foot more pronated**

Fig. 1B
Right foot more pronated

The maxilla and mandible (upper and lower jaws) shift upwards and to the right resulting in a visual loss of vertical height between the right eye and lip (See Fig. 1B). Frequently there is a Class II malocclusion (overbite) and narrowing of the dental arch.

In both cases, a torsional (twisting) strain develops in the facial bones (side to side and front to back) which can lead to a plethora of symptoms including TMJ dysfunction and/or headaches.

Section II

The study of how the foot moves during ambulation is referred to as foot biomechanics. Normal foot motion is defined in terms of hip rotation: *Internal* hip rotation directs the foot to pronate (See Fig 1C). Foot pronation occurring when the hip is *externally* rotating is, by definition, abnormal pronation. Abnormal pronation frequently is asymmetrical, e.g., one foot pronates more than the other foot.

Fig. 1C
Hip directed foot pronation

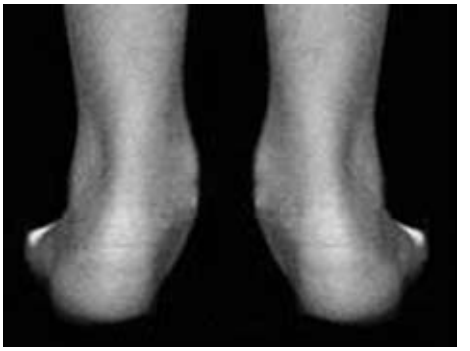

Fig. 1 - Abnormal Foot Motion

Asymmetrical abnormal foot pronation is linked to the development of cranial lesions.

In a strong gravitational field (Earth), the entire posture (including the cranium and teeth) is impacted by asymmetrical abnormal foot pronation: (1) the innominates (hip bones) are pulled forward (anteriorly) and downward, (2) the temporal bones are forced into external rotation, which (3) flexes the sphenoid and cants the maxilla (this results in a visual loss of vertical height between the outer orbit of the eye relative to the outer margin of the lip). Dentally the arch narrows, and the teeth crowd. The exact pattern of distortion depends on which foot is more pronated. The patterns described below assume there is no concomitant distortional pattern coming from the teeth.

Abnormal Foot Pronation, Left Foot ►Right Foot

Both innominates are pulled forward (anteriorly) and downward by abnormal foot pronation. The left innominate is more forward because the left foot is more pronated. This anterior rotation of the innominates externally rotates both temporal bones. The left temporal bone is more externally rotated (tip of left mastoid more cephalad, less prominent) because the left innominate is more forward. The sphenoid flexes and side bends right. The maxilla cants left which shortens the relative vertical height on the left side of

***"FOOT MOTION"* CONTINUES on NEXT PAGE**

the face. (See Fig. 1A). The teeth are crowded. The curve of Spee deepens (See Fig. 2)

Fig. 1D DORA taken on patient pictured in Fig. 1E

Dental orthogonal radiographic (DORA) analysis supports the above proposed lesion in the cranial bones. This radiographic technique was first introduced by Gerald Smith, DDS, to visualize cranial lesions resulting from occlusal lesions. Later, DORA was adapted by this author to evaluate the lesions in the cranial bones resulting from abnormal foot motion. The following anatomical landmarks are drawn on the orthogonal radiographs (See Fig. 1D):

- VRL (Vertical Reference Line): a vertical line drawn through the center of the nasion and the anterior nasal line.
- LWS (Lesser Wing of Sphenoid): a line connecting the height of the convexity of the right and left portions of the lesser wings of the sphenoids.
- AT (Apex of the Temporal Bones): a line connecting the tips of the right and left malar (zygomatic) bones.

Fig. 1E

DORA patterns typically seen in patients with abnormal foot pronation pattern of Left ►Right are as follows (See Fig. 1E):

- LWS line canted cephalad right suggesting a right side bending of the sphenoid (a low LWS on the left side of the face).
- AT line canted cephalad right suggesting a more caudal rotation of the left petrous ridge (an anteriorly rotated left temporal bone).
- ML line canted cephalad left suggesting a left cephalad cant of the maxilla (a maxilla that is shifted upwards on the left side of the face).

Abnormal Pronation, Right Foot ► Left Foot

Both innominates are pulled forward (anteriorly) and downward by abnormal foot pronation. The right innominate is more forward because the right foot is more pronated. This anterior rotation of the innominates externally rotates both temporal bones. The right temporal bone is more externally rotated (tip of right mastoid more cephalad, less prominent) because the right innominate is more forward. The sphenoid flexes and side bends left. The maxilla cants right which shortens the relative height on the right side of the face (See Fig. 1B).

The teeth are crowded. The curve of Spee deepens. DORA patterns typically seen in patients with abnormal foot pronation pattern of Right ►Left are as follows:

- LWS line canted cephalad left suggesting a left side bending of the sphenoid (a low LWS on the right side of the face).
- AT line canted cephalad left suggesting a more caudal rotation of the right petrous ridge (an anteriorly rotated right temporal bone).
- ML line canted cephalad right suggesting a right cephalad cant of the maxilla (a maxilla that is shifted upwards on the right side of the face).

Section III

Etiology of Abnormal Foot Pronation

In 2002 a paper was published in the Journal, *Bodyworks and Movement Therapy* [6(1):37-46] describing an embryological foot type in which the first metatarsal is elevated and inverted relative to the second metatarsal. In the medical literature, this foot type is referred to as the Primus Metatarus Supinatus (PMS) foot lesion.

I suggest this foot lesion results from an incomplete unwinding of the talus (a tarsal bone sitting on top of the heel bone). Clinically, this places the first metatarsal and hallux (big toe) off the ground, when the foot is placed in its anatomical neutral position. In order for the 1st metatarsal and hallux to reach the ground, the foot must roll inward and downward, e.g., abnormally pronate. Standard supportive type orthoses do not stabilize this foot

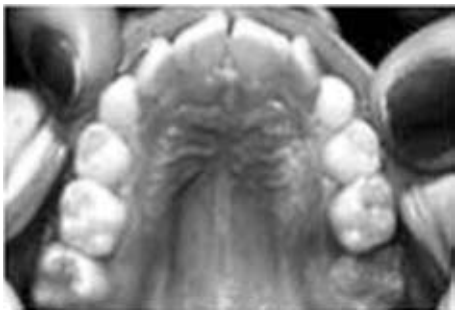

Fig. 2 - Curve of Spee

lesion. A novel type foot insole has been developed that is capable of stabilizing this foot lesion.

Section IV

Proprioceptive Activators – a Novel Insole

Fig. 3

Proprioceptive activators are non-supportive type foot insoles which incorporate a form of acupressure therapy (See Fig. 3). These insoles apply a tactile stimulation to the bottom of the foot. In theory, this tactile stimulation transmits a signal to the brain (cerebellum). Acting on this signal, the cerebellum initiates a positional correction affecting the entire body posture, including the cranial bones. The torsional rotations within the temporal bones and sphenoid are reversed. Frequently this improvement in position reduces or eliminates many of the symptoms associated with TMJ and dental dysfunctions.

Proprioceptive activators can prevent malocclusions from developing in young children. However, if a malocclusion has developed, orthodontic therapy should be considered (e.g., the Advanced Lightwire Functional appliance) to improve the functional alignment of the cranial bones and teeth. Using proprioceptive activators in combination with orthodontic therapy facilitates this realignment. 🕮

For more information regarding the Primus Metatarsus Supinatus foot lesion and Proprioceptive Activators, visit my website at: www.rothbartsfoot.bravehost.com. To purchase the insoles visit www.price-pottenger.org/links.htm and click on the MortonsFoot.com link.