# ETIOLOGY of MALOCCLUSION: Contributory Factors

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Throughout history, successful treatment of a health condition has often preceded an understanding of what caused the problem. This is surely true of malocclusion. A malocclusion of any significance is not a disease but it does represent a failure of development. Understandably, the great majority of effort by the dental profession is directed towards treating the problem and establishing satisfactory alignment of the teeth both from a cosmetic and functional standpoint. This is symptomatic treatment. Prevention, as opposed to early orthodontic treatment, has not been seriously considered by orthodontists. Something like the Myobrace system or a version of the ALF appliance may be suitable for an age group of around 5 years or so, but I think of these as interceptive appliances rather than preventive. The primary dentition is already present when these devices are used.

As an orthodontist, in a long search for answers, I have come to realise that steps towards preventing or correcting a malocclusion can be taken long before I would normally see a patient. There are three anomalies in particular which may cause malocclusion but which are not seen as an orthodontic responsibility. The first one is craniofacial displacement and trauma sustained by the infant during birth. The second is limitation of function due to soft tissue restrictions, particularly of the tongue. The third is partial or complete obstruction of the nasal and/or pharyngeal airway. This is not to ignore the relevance of heredity as a contributory factor or the effects of dietary change as seen in the work of Weston Price.

My goal is to bring attention to possibilities which might offer prevention or at least a reduction of the problem rather than wait until teeth have erupted. One of the most promising aspects of the new paradigm is that in biology there is "extreme sensitivity to initial conditions" to quote Prigogine[1], a Nobel prize winning physicist. This concept is now being used in other areas of biology including medicine. It presents a strong argument for early intervention in the oral environment.

Perinatal Causes of Malocclusion: Allopathic pediatricians estimate that about 50% of newborns have significant displacement of head shape immediately after birth. Frymann[2], an osteopath who wrote a landmark article on the successive births of 1250 newborns, reports an incidence of cranial displacement, or craniocephaly to give its proper title, of almost 90% but her criteria were much more detailed. **Figure 1** is taken from a larger illustration. It shows just a few of the many examples of dolicephaly and brachycephaly exhibited on the site. **Figure 2** shows custom-made helmets used by pediatricians where the cranial displacement has been more severe. Parents are also taught how to use exercises to help the child develop a more balanced head shape and position.

What is striking is that despite the severe facial distortion present in many of these infants prior to intervention, there is no mention of this aspect. The site is all about cranial anomalies and how to remedy them. In **Figure 1**, some of the infants who have received cranial correction also show facial improvement, but this is not commented on. There is good evidence that the action of vigorous suckling may bring the

**Partial view of a large montage of newborns with craniofacial displacements. Infants on lower right have had corrective treatment for the flattened occiput.**

facial features into better balance. If the anomaly is not severe, the facial distortion may not be considered of importance or may be overlooked altogether. However, the infant face and cranium, especially any asymmetries of the structures, offer valuable clues about what has happened and possible treatment options.

Sutherland, the osteopath who first described the various craniofacial anomalies, devoted a lifetime to studying the functional anatomy of the face and head. Unlike Angle's classification of malocclusion, which is a descriptive one, Sutherland's classification is a brilliant and logical explanation of how cranial anomalies affect facial appearance. Magoun[3], one of Sutherland's students, published a description of his findings. Angle's classification has survived mainly because orthodontists have not realised what has been available elsewhere. A series of peer-reviewed articles on this topic, by Dr Dennis Strokon and myself[4], are accessible online at www.orthodonticed.com. They provide a useful starting point for anyone wishing to understand the origins of malocclusion, or at least those aspects we can influence. Dr Darick Nordstrom, working alongside Dr Frymann has been instrumental in designing and promoting the ALF appliance. This enables a dentist to coordinate adjustments of the teeth with those of the osteopath.

This type of dental/osteopathic cooperation can now be found in the UK and Europe as well as in North America. **Figure 3** shows an osteopath using manual adjustment to balance the cranium and face. Unlike the use of helmets, this technique has the added advantage of allowing the therapist to gauge the reaction of the infant as cranial movement is stimulated or enhanced. The force used is very light as the cranium and face are so flexible. In most infants, three or four visits to the osteopath may be all that is needed to achieve a satisfactory craniofacial balance. In this way, early intervention by another discipline can create a more favourable environment for the soft tissues to influence the erupting primary teeth.

**Soft Tissue restrictions:** Another critical source of malocclusion can arise from the restrictions of soft tissue attachment, especially of the tongue. A pediatrician or nurse practitioner examining a newborn will usually check the degree of mobility of the tongue by running his or her finger under the tongue to ensure that the lingual frenum is not tethering it. In 2015, Oral Health published an excellent article by Kotlow[5] on the assessment and treatment of tongue and upper lip tie in

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Osteopath working on infant with left torsion strain. Note the infant's relaxed posture.

the middle ears. Snoring in young children, mouth breathing, and constant struggles to obtain a nasal airway are other reasons to seek an ENT surgeon's advice about the possible surgical removal of tonsils and or adenoids. It is helpful if the surgeon is aware of the dental consequences of leaving the swollen tissues in place. When taking the history of a child, I try to obtain as much information as I can from the parent about birth history, poor sleeping habits, excessive restlessness or other habits which might indicate nasal airway difficulties.

## DISCUSSION

Halfway through the last century, physicists and biologists started to examine the differences between inorganic and organic entities from a quantum aspect. One of the conclusions reached was Prigogine's comment that "a live organism has extreme sensitivity to initial conditions" Considering this in orthodontic terms, growth of the infant brain and cranium is most dramatic during the first two years of life then continues at a gradually slower pace until about nine to 10 years. For example, the three parts of the occiput do not fuse until six to seven years of age. By 10 years of age, the upper face is well developed while the mandible has a greater proportion of its growth still to come.

It follows that by the time an orthodontist considers treatment in the late mixed or early adult dentition, a considerable amount of craniofacial development has already taken place. The dentition has assumed many of its final characteristics. A pediatric dentist or the family dental practitioner has the opportunity to see a patient at a much earlier stage, but even then the primary dentition has already erupted. This means that maximum opportunity to influence growth of the craniofacial complex ( i.e. from birth to 24 months), has taken place before a dentist sees the infant. An orthodontist is even more of a latecomer as regards facial growth.

There is, therefore, a disconnect between the best time to influence facial growth namely as soon after birth as possible

and when the dental profession enters the picture. This is understandable. The organization of a dental office is not designed to meet this situation. As a profession, we have to turn to other health disciplines who have the knowledge to better identify craniofacial distortion in infants and also have skills to intervene successfully. The freeing up of soft tissue restrictions in infants is the exception to this as a knowledgeable dentist is required for tissue removal such as a frenectomy. In a sense, the prevention of a malocclusion starts at birth. Dentists should at least be able to recognize the early signs of a malocclusion and know who might assist in any intervention.

In this scenario, the dentist or orthodontist becomes one of a team whose objective is the overall well- being of the infant, not just straightening the teeth. An ideal start to such a program would be early identification of any of the contributory factors discussed previously and then intervention by an appropriate team of professionals. Pediatricians, lactation consultants, osteopaths or craniosacral therapists, orofacial myologists, physiotherapists and ENT surgeons are the most likely to provide assistance. An excellent example of an integrated approach is that of the Toronto Sick Children's Hospital Cleft Palate Unit where all the professionals involved with a particular child have a combined meeting to discuss overall management for the child. Obviously, there is serious pathology involved in such cases, but even in the orthodontic world, it is possible to create opportunities at an informal level for an exchange of ideas, information and possible integration of treatment. This requires a working relationship with professionals in other disciplines. From personal experience, it continues to be an excellent opportunity to learn about skills currently not utilised within the parameters of an orthodontic program.

If we choose, our profession, whether general dental practitioner, pediatric dentist or orthodontist, has a remarkable opportunity to become a major factor in the care of infants and young children, working closely with various other services as needed. The logic of such an arrangement and its many potential advantages for the patient suggest this will become standard practice in the near future. **OH**

## References


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