

## Dentition affects sporting performance

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**To understand how the dentition, the teeth and jaws, affects sporting performance, sporting endurance and sports injury susceptibility we need to understand some basic cranial anatomy and neurology.**

*First the anatomy.* The teeth in the upper jaw sit in four bones. Two maxillae and two palatine bones. Each maxilla has a suture with the frontal bone and they are separated at this suture by two small nasal bones. These four bones encircle the nasal airway with the maxillae comprising the majority of the encirclement.



When the upper jaw is undersized it results in crooked upper teeth and reduced nasal airway. The correct shape and size of the upper dental arch is the shape and size of the tongue. The tongue is the template. When the tongue rests in the roof of the mouth the teeth erupt around the tongue. When the tongue is in the roof of the mouth the upper jaw is pushed forwards into its correct forward position. When the upper jaw is placed forwards within the cranium in the correct position it will result in a well-developed pharyngeal airway. Good craniofacial development will result in well-developed well balanced jaws and straight teeth but - *more importantly* - it will result in a good nasal and pharyngeal airways.

The development of a good airway is essential for good ventilation of the lungs. Poor cranial development often starts in the first weeks and months of life when the nasal airway becomes blocked and the infant starts to breathe through the mouth.

When the infant breathes through the mouth it has several consequences that trigger each other. First the tongue falls from the roof of the mouth so it no longer acts as a template for the correct size of the upper jaw and no longer assists in the correct forward growth of the upper jaw. Then, as the mouth falls open the lower jaw swings down and backwards. The lower jaw grows to the position it is usually held in. Once it falls down and back that is where it remains and the other cranial bones adapt to new, incorrect position of the lower jaw. This will mean that the upper and lower jaw do not match each other as they should.

*Secondly the neurology.* It is well known that the proprioceptive system is very important in the body's adaptive mechanism for posture and locomotion. Proprioception from the teeth, jaw muscles and the temporomandibular joints contribute afferent supply to the motor nucleus of the trigeminal nerve and also to the higher centers to moderate conscious control. The upper first permanent molars have periodontal ligaments that are highly innervated by proprioceptors. The neurological response from the periodontal fibres, the jaw joints, the eyes and ears, all help to balance the muscular and postural systems.

The autonomic nervous system, the sub-conscious control, makes compensations throughout the body to balance the underdeveloped and misshaped jaws. Each individual will make a different compensation. I see many children who thrust the pelvis forwards with an increase lordosis or curvature in the spine, and further compensation with a rotation of the pelvis. Other patterns I see are hyper-flexed knees or bent knees.

When sports players make these compensations throughout the body the muscles have to support these postal compensations and will fatigue more readily. Muscle fatigue results in reduced sporting endurance which is closely associated with increased frequency of sports injury. The researchers of SportsInjuryLab are looking at the occlusion and other dental factors to assess the likelihood of sports injury in top young athletes

<sup>1</sup>Dr. John Flutter was born and raised in England. He qualified as a dentist in 1971 (London) and as part of his general dental practice has been practicing orthodontics for 47 years. After working for five years in London he moved his dental practice to Australia finally settling in Brisbane. His diagnostics focus primarily on cranial growth and development. He relates Cranial Growth and Development to breathing patterns, snoring and sleep apneas, postural patterns of the head and neck and down the body to the feet. He now works and teaches exclusively on dentofacial orthopedics. In particular Myofunctional Orthodontics. John Flutter was past chairman of the Australian Association of Orofacial Orthopedics. For the past 30 years he has given lectures in 70 countries all over the world on "Myofunctional Influences on Facial Growth and the Dentition". He also published several articles in scientific journals worldwide. For the last 10 years John Flutter is a valued advisor and researcher of SportsInjuryLab in the field of occlusopostural development. In particular, how cranial development is related to muscle injuries and sports injury susceptibility.