Clinical Perspective

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Early Intervention In Myofunctional Imbalance

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Myofunctional therapy is that term given to the "use of muscle exercises as an adjunct to mechanical correction of malocclusion." (Dorland's Illustrated Medical Dictionary, 26th Edition, 1981, W.B. Saunders Company). In today's literature and in medical practice, this term has been given a broader application. In the clinical setting, practitioners are recognizing the full spectrum of malocclusion to include deviations in the swallowing and respiratory patterns, poor spinal alignment, especially at the level of the head and neck, internal derangement of the temporomandibular joint (TMJ), imbalances in the musculoskeletal system, stress, and improper lingual positioning. Many of the aforementioned areas of dysfunction also contribute to the clinical picture of pathology in the upper quarter, such as headaches, "stiff" necks, muscular "tightness." For clarification, the upper quarter is a biomechanical functional unit which consists of the cranium, mandible, cervico-thoracic spine, and the shoulder girdle (sternum, clavicle, 1st and 2nd ribs and scapulae.)

In addressing the problems of malocclusion and upper quarter pain and dysfunction, each of these systems must be evaluated and subsequently

"ruled out" as a contributing factor of stress. Of those systems observed, the stomatognathic system warrants closer inspection from the physical therapist in appreciating the intimate mechanics which exist between it and the rest of the upper quarter.

Myofunctional imbalance is a condition whereby the muscles of the face and oral cavity (orofacial) are operating in a mechanically stressful environment. This environment is created by abnormal forces which are generated inside (intra-oral) and outside (extraoral) of the mouth by certain predisposing features. The most dominant of these features is an improper resting position of the tongue.

If left uncorrected, this poor lingual positioning can in turn lead to other conditions, such as mouth breathing, anterior and anterolateral thrusting of the tongue, incorrect swallowing and speech patterns, and poor orthostatic posture. These residual conditions are stress-producing and have their origins as early as the prenatal period and remain throughout post partem. Upper respiratory breathing patterns, tongue thrusts, alterations in swallowing and poor vertical posture, in turn, may lead to generalized fatigue, imbalanced occlusal relationships, poorly developed oral musculature, the development of lower back pain, and the onset of temporomandibular joint (TMJ) symptoms.

Consider the prenatal period. At approximately twelve weeks of gestation the human fetus will

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begin to swallow. Because of the close proximity of the hand to the oral cavity, the thumb can readily enter the mouth, thus enabling a premature sucking reflex to occur. However, prenatal sucking usually is the exception and not the rule, but it can represent the very early beginnings of orofacial muscle imbalance.

During the neonatal period the sucking reflex is more of an automatic reflex. It is a normal reflex; essential to life in that sucking allows the infant to extract nutrients from his environment. These nutrients are expressed from either the mother's breasts, a conventional bottle nipple, or both. When an infant does not satisfy this reflex, or if his nutritional needs are not met, he will attempt to appease this requirement by sucking on any object or appendage that is closest to his mouth. This is observed by the parent when the infant is viewed sucking on his fist or a nearby toy.

At this stage of feeding, it is important to consider the overall design and shape of the object which is being placed in the infant's mouth. Any object placed in this oral cavity on which an infant sucks, other than the natural shape of the mother's breast, will act as an orthodontic appliance, and will not only alter the correct resting position of the tongue, but will also create different potentials for malocclusion. The effect of these potentials depends on the sucking force, the placement of the object in the oral cavity, and the duration of this activity. Because of the irregular pressures exerted by this foreign object in the mouth, the infant's teeth may be intruded, crowded or protruded. It is especially important to correct this sucking reflex after 24 months and during and after the eruption of the deciduous (temporary) teeth. Otherwise, there will be evidence in the growing child of anterior or posterior open bites, tongue thrusting, high cathedral palates and poor tone in the extraoral musculature. These undesirable effects will persist and will influence the positioning of the permanent adult teeth.

As mentioned earlier, the nonfunctional repose of the tongue is one of the major predisposing factors toward the development of myofunctional imbalances, including the likelihood toward malocclusion. The anterior portion of the tongue

should rest in an elevated position against the hard palate with the tip of the tongue slightly posterior to the maxillary incisors.

The positive effects of this tongue positioning are many. It helps to restore the proper balance between the intraoral and extraoral muscles of the face, thereby decreasing the compressive overbearing forces on the palate; it is conducive to establishing nasal diaphragmatic breathing; it controls abnormal movements of the temporomandibular joint (TMJ); and contributes to the proper eruption of the teeth. Factors that will influence its displacement are conventional bottle feeding, upper respiratory tract allergies, thumb sucking, enlarged tonsils and adenoids, and poor head/neck posture.

A more mature swallowing pattern should occur when a child reaches one and one-half years of age. This pattern will be inhibited if there is a continuous forward displacement of the tongue. With this continuous forward displacement, the child can develop excessive forward thrusting of the tongue during speech as observed when pronouncing sibilant sounds, such as /s,z,sh, and ch/.

Breastfeeding is an excellent deterrent to malocclusion and other myofunctional imbalances. As a baby nurses from his mother, the head is slightly elevated, and there is a repetitive movement of the jaw with minimal sucking at the lips. The movement which allows the baby to extract milk from the breasts is this forward excursion of the jaw. This forward movement of the jaw is essential in the proper early development of the orofacial structures. A breastfed baby who generally nurses twenty to thirty minutes at each setting will demonstrate less of a need to satisfy the sucking reflex. This in turn will decrease the need for hands and pacifiers in the mouth. Conventional bottle nipples may promote a forward thrusting of the tongue with significant sucking at the lips. This will serve to modify the functioning of those muscles which are responsible for correct swallowing, speech and the resting posture of the jaw.

Breast milk is more digestible than conventional cow's milk, and contains antibodies which protect the infant from upper respiratory tract infections. Therefore, breast feeding is also an excellent deterrent to upper respiratory tract infections.

In the younger population the majority of mouth breathing cases are secondary to upper respiratory tract infections, which cause an obstruction of the nasal cavity resulting from an allergic response. Nasal, diaphragmatic breathing will become increasingly difficult or even impossible. The child will therefore be forced to breathe through the mouth. Mouth breathing is an inefficient and fatiguing method of breathing. A mouth breather will inhale at twice the frequency of a nasal breather but actually at a decreased volume of 40 percent. This individual does not effectively expand the lungs to their functional capacity and therefore does not fully oxygenate the blood. This can be one very important factor contributing to overall body fatigue and malaise — poorly oxygenated blood.

In the physical examination of myofunctional imbalances, an assessment of the upper quarter muscle grades, including the intra and extraoral musculature, is completed in order to rule out the congenital and neurological components. A maxillo-facial evaluation is conducted in order to identify asymmetries in the cranio-facial bone structures, impairments in nasal air flow (such as a deviated septum), functional lip closure, occlusion, palatal shape, the presence or absence of tonsils and adenoids, alignment of the lip frenula, lingual frenulum, and the location and volume of the tongue. Functional activities such as the swallowing pattern, respiration, speech and mastication are observed and critiqued. The spinal postural alignment is additionally observed.

There are various warning signals that can alert a parent toward mouth breathing tendencies, upper respiratory tract infections, and tongue thrusts.

In a young child, an allergic response, or blockage of the nasal cavities, is easily recognizable by the following facial markings: bluish-black discolorations and baggings under the lower eyelids; dry, bulbous lips, constant tearing in the eyes; poor lip closure; high, arched palate; and nasal polyps.

Certain postural positions will predispose a child toward myofunctional imbalance as a result of negatively influencing proper tongue positioning. If the child's head is always resting forward

of the shoulder, this will, in turn, pull the shoulders forward and down and cause further adjustments in the spinal posture. This forward head posture perpetuates a hyperactive state in the suprahyoid muscle group, causing the tongue to leave its resting position. There is the added potential for the child to breathe through his mouth, experience difficulties with swallowing or undergo alterations in his speech. Additionally the physiological resting position of the mandible is altered, and clenching of the posterior molars is more likely to occur.

Parents should be aware of any difficulties in their child's swallowing abilities. These may be demonstrated by audible sounds such as gulping, burping, hiccups and popping sounds in the jaw; and through visible signs such as drooling or viewing the tongue sliding forward between the maxillary and mandibular incisors while the child is drinking.

During the immediate post partem period, breast feeding is preferred over conventional bottle feeding. However, feeding of any kind, if done with the child in a fully reclining position, will often cause the milk to flow into the infant's middle ear causing inflammation. In a fully reclining position, the infant will reflexively thrust his tongue forward to expel, or to slow down the flow of, the milk, thereby initiating an early tongue thrust. The infant's head should always be positioned in a semi-reclining, slightly elevated posture.

To satisfy the newborn sucking reflex, many mothers choose to use a pacifier. A Nuk orthodontic exerciser is strongly suggested in the choice of a pacifier. This exerciser will promote the proper mechanics of a natural sucking action. The infant's tongue lies flat under the nipple and not around it. It allows forward and backward movements of the jaw, as in nursing, and creates a seal at the corners of the mouth to prevent the swallowing of air. It should be remembered, however, that with continuous use of this exerciser after the deciduous teeth have erupted, an anterior open bite, similar to those of children with poor tongue positioning, can result. The exerciser is only to be utilized for a limited period.

Parents can avoid abnormally imposed pres-

sure to their child's facial and jaw muscles by totally eliminating, or at least curtailing, gum and bubble gum chewing, sucking on objects such as conventional pacifiers, thumbs, pencils and so on. Parents should be mindful of activities that can offset a good postural sense, such as prolonged use of the telephone (especially propping the receiver between the head and shoulder), resting and

leaning the head on the hands, watching television or reading on the stomach.

In summarizing, the prevention of myofunctional imbalance should be initiated immediately post partem by encouraging breastfeeding, proper oral habits, nasal breathing and correct posture. It is a worthwhile investment toward insuring a child's future of physical and mental health.