PROTRACTION OF THE MAXILLA MAY BE ACHIEVED WITH FACE MASK WITHOUT PREVIOUS PALATAL EXPANSION

Class III malocclusion treatment is a daunting challenge for Orthodontics. In growing patients, the treatment procedure chosen for this malocclusion is maxillary expansion followed by reverse traction performed by means of a face mask. According to the literature, the ideal age range for patients undergoing this type of treatment is between 7 and 8 years old. At this age, it is possible to achieve better orthopedic results in comparison to dental effects. Nevertheless, patient’s age may vary. Therefore, what is the ideal treatment approach for adult patients? Would it include maxillary expansion and protraction, as in younger patients, or protraction with face mask, only? According to Halicioglu et al,1 no study has been conducted to assess these treatment methods having adult patients as target. Thus, the authors conducted a study in which they assess the effects of protraction of the maxilla (alone and associated with palatal expansion) on treatment of young adults with maxillary retrognathism (Fig 1). Their results reveal that palatal expansion before maxillary protraction by means of a face mask does not enhance the effects of the former in young adult patients. Such outcomes are important, since they suggest that the use of face mask could start earlier without the need for previous maxillary expansion, thus taking advantage of the last months of maxillomandibular growth.
CONVENTIONAL AND SELF-LIGATING BRACKETS HAVE SIMILAR TOOTH MOVEMENT, ANCHORAGE LOSS AND TOOTH TIPPING RATES

Undoubtedly, the issue of self-ligating brackets is what currently arouses the interest of most orthodontists. These devices have several benefits, namely: better orthodontic movement, decreased chair time and stronger possibility of greater intervals between appointments. Although these advantages are widely known, further scientific evidence is required to support theory. In the attempt to answer these questions, Brazilian researchers conducted a clinical trial with Class I malocclusion patients in need for tooth extraction. Their aim was to assess the following rates: tooth movement, molar anchorage loss, and canine as well as molar tipping during canine retraction. Their results revealed that no differences are found regarding canine movement, molar anchorage loss and canine as well as molar tipping in comparing both types of brackets. It is worth noting that further studies are warranted to assess the other benefits offered by the aforementioned devices.

PREMATURITY AND LOW BIRTH WEIGHT DO NOT AFFECT POTENTIAL MALOCCLUSIONS

It is widely known that several etiological factors contribute to develop and worsen malocclusion. For this reason, Orthodontics is a unique specialty that deals with cases that seem similar, but in fact are caused by completely different etiological factors. Many studies have to be conducted to understand the occlusal characteristics associated with certain etiological factors. Prematurity and low birth weight are associated with several changes in physical development, including the orofacial structures. In this context, what are the functional and morphological characteristics of malocclusion in patients with deciduous dentition? In the attempt to answer this question, Slovene researchers conducted a study to clinically assess premature, underweight children by means of questionnaires answered by the children’s guardians. Their results revealed that the prevalence of malocclusion among premature children was not significantly different from the control group (children born from the 37th week of pregnancy on). The authors also found that premature birth is not considered an indication of risk of any functional or morphological characteristic of malocclusion.

VERTICAL PATIENTS HAVE THINNER CORTICAL BONE

Since their beginning, in the mid-90s, mini-implants have been constantly renewed. Initially, they required previous perforation. However, as time went by, mini-implants became self-drilling and, nowadays, have different

Figure 2 - Measuring cortical bone density. A) In sagittal view, the vertical reference line cuts the interdental area and is parallel to root long axis. B) In axial view the vertical reference cuts the interdental area. C) In coronal view, the cortical bone density is measured (in Hounsfield units or HU) between the points (one on the outer surface and the other on the border of the cortical-cancellous bone) on a line perpendicular to the bone surface and 4 mm apically to the alveolar crest. (Source: Ozdemir et al, 2014).
types of threads. All the modifications mini-implants went through happened for one reason: To increase stability and provide greater practicality during placement. Nevertheless, it is known that implant stability is associated with different factors, among which alveolar bone density is one of the most important. In this context, how can we measure an individual’s alveolar bone density without using tomography? Is it possible to estimate it based on the individual’s facial type? With a view to establishing an association between facial type and bone density, Turkish authors assessed the tomographic images (Fig 2) of patients with good growth vector, whether horizontal or vertical. Their results revealed that vertical patients tend to have lower bone density in comparison to other patients. They also found that women tend to have thicker palatal cortical bone in the alveolar process in comparison to men.

TOOTH GEL WITH MELALEUCA ALTERNIFOLIA PROVES EFFECTIVE IN CONTROLLING CARIOUS BIOFILM IN ORTHODONTIC PATIENTS

Controlling carious biofilm in orthodontic patients is one of the most challenging tasks orthodontists have to face daily. Which orthodontist never bothered seeing white lesions when debonding brackets? Every day, new products are launched on the market with a view to reducing the amount of carious microorganisms and, as a consequence, the amount of white lesions. Different substances have been added to dental pastes, mouthwashes and dental varnish with a view to reducing carious biofilm. Several medicinal plants with antimicrobial active ingredients have been added, among which Melaleuca alternifolia is the most frequent. In this context, the following question arouses: Is the active ingredient of Melaleuca alternifolia effective in reducing carious biofilm in orthodontic patients? In the attempt to answer this question, Brazilian researchers conducted a clinical study to compare tooth gel with Melaleuca with conventional tooth gel (Colgate Total®). In addition to assessing the microbiological activity of both gels, the participants were invited to conduct a sensorial analysis of the products (aspect, color, smell, brightness, viscosity and first taste sensation). They yielded satisfactory results, given that tooth gel with Melaleuca proved more efficient in controlling carious biofilm than conventional gel. Nevertheless, conventional tooth gel had better taste.

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Mini-implants and miniplates generate sub-absolute and absolute anchorage

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The functional demand imposed on bone promotes changes in the spatial properties of osteocytes as well as in their extensions uniformly distributed throughout the mineralized surface. Once spatial deformation is established, osteocytes create the need for structural adaptations that result in bone formation and resorption that happen to meet the functional demands. The endosteum and the periosteum are the effectors responsible for stimulating adaptive osteocytes in the inner and outer surfaces. Changes in shape, volume and position of the jaws as a result of skeletal correction of the maxilla and mandible require anchorage to allow bone remodeling to redefine morphology, esthetics and function as a result of spatial deformation conducted by orthodontic appliances. Examining the degree of changes in shape, volume and structural relationship of areas where mini-implants and miniplates are placed allows us to classify mini-implants as devices of subabsolute anchorage and miniplates as devices of absolute anchorage.


The protein cytoskeleton of cells is responsible for maintaining normal tridimensional cell shape, as well as cell movement and migration. Cytoskeletal proteins are classified according to their molecular weight and spatial structure as: microtubules, microfilaments and intermediate filaments.

In all body systems, the balance provided by the intrinsic annulation of all forces results in a force equals to zero known as tensegrity. All cells tend to be similar in shape as a result of balance established between inner and outer forces that, in turn, result from a mutual annulation between them. This state of balance or stability is also known as cellular tensegrity.

Whenever tensegrity is lost by compression of the cytoskeleton, the latter tends to go back to its natural state similarly to other natural systems, but by stimulating a set of events so as to meet that purpose. Chemical mediators are released to induce cell and tissue phenomena, which is part of the process established by the cells with a view to restoring tensegrity. Tensegrity is responsible for determining stability of shape and standard morphology of an object or system, particularly cells.

Breaking tensegrity affects the permeability of cell membrane and results in activation of intracellular metabolic pathways with release of substances

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that act as mediators capable of inducing cellular, tissue and/or vascular phenomena. These substances are the cytokines, growth factors and products of arachidonic acid. This mechanism transforms a physical event, such as force, into biological and biochemical events. This transformation is also known as mechanotransduction.

**Osteocytes are mechanotransductors!**

Osteocytes have between 40 and 50 extensions and, for this reason, have a dendritic shape. They comprise 90 to 95% of adult bone cells and are included in mineralized bone matrix inside the lacunae also known as osteoplasts (Figs 1, 2). Osteocyte extensions allow osteocytes to communicate with each other and with bone surface cells. The extensions are distributed in 100 to 300-nm thick canaliculi that, three-dimensionally, form a network that resembles the neural network of the central nervous system. The canaliculi are filled with a tissue fluid that carries nutrients as well as mediators and connects the osteocytes, not only with the cells of the cortical and trabecular surfaces, but also with bone marrow cells.

This network captures potential bone deformations resulting from compression and traction deflection. The osteocyte network acts as an excellent mechanotransductor. Additionally, it also plays a major role in bone metabolism by releasing mediators that reach the bone surface.

**Periosteum and endosteum act!**

The surface of bone trabeculae has a thin layer of connective tissue that consists of osteoblasts and undifferentiated cells and functions as bone modeling units and its clasts: the endosteum. It has a superior osteogenic and resorptive capacity that meets the increasing demand for bone remodeling.

Similarly, the outer surface of cortical bone is lined by the periosteum, a thicker membrane of fibrous connective tissue that covers outer bone surface. The outer periosteum layer is fibrous; whereas its inner layer, which touches the cortex, is highly cellularized and vascularized with young as well as pre and undifferentiated cells. These characteristics provide the periosteum with a high osteogenic reactional capacity.

The osteocytes network form a very sensitive 3D system that uptakes bone deformities. Any change in bone form during skeleton function can be captured by this sensitive network/web of osteocytes and extensions or mechanotransduction detection system. Exercise can increase bone structure by initially mechanical stimuli on this strain capturing network.

In other words: alterations in bone volume and shape are captured by the tridimensional osteocyte network that releases mediators and stimuli that allow osteoblasts and clasts to form or resorb bone according to the need for adaptation established by functional demand. Functional demand refers to alterations in shape and volume induced by tension and...