ARTICLES FROM THE CURRENT ORTHODONTIC LITERATURE, SELECTED AND REVIEWED BY:

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Sagittal split osteotomy with and without inferior border osteotomy

Böckmann R, Schön P, Neuking K, Meyns J, Kessler P, Eggeler G. In vitro comparison of the sagittal split osteotomy with and without inferior border osteotomy. J Oral Maxillofac Surg 2015;73:316-23.

The introduction of the sagittal split osteotomy (SSO) by Hugo Obwegeser in 1953 marked the dawn of a modern era in orthognathic surgery. The fundamental concept of the SSO is to fracture the mandible by a splitting maneuver to preserve the inferior alveolar nerve. The 2 most common and interrelated complications of the SSO are unfavorable splits and damage to the inferior alveolar nerve. The purpose of this in-vitro study was to determine whether the addition of an inferior border osteotomy to the traditional Obwegeser-Dal Pont SSO resulted in a defined fracture line and a reduction of torque required to fracture the mandible. Seventy formalin-fixed human hemimandibles were fixated in a customized rack and divided into 2 groups; 35 were split with the traditional Obwegeser-Dal Pont SSO and 35 with the modified Obwegeser-Dal Pont SSO with the addition of an inferior border osteotomy. The maximum torque force was recorded, and the fracture pattern was classified for each split. The mean torque forces required to split the mandible were 1.38 and 1.02 Nm in the traditional and modified groups, respectively. Most hemimandibles split with the traditional technique had a splitting pattern along the mandibular canal, whereas most hemimandibles split with the modified inferior border osteotomy fractured more favorably along the posterior border of the ramus and through the mandibular angle. The differences in mean torque force and splitting pattern for the traditional and modified techniques were statistically significant. The addition of an inferior border osteotomy decreased the force necessary to split the mandible and resulted in a more predictable splitting pattern that can cause less damage to the inferior alveolar nerve.

Reviewed by Nathan Wieder

Upper lip inclination in orthodontics and orthognathic surgery

Naini FB, Cobourne MT, McDonald F, Wertheim D. The aesthetic impact of upper lip inclination in orthodontics and orthognathic surgery. Eur J Orthod 2015;37:81-6.

The nasolabial angle is a common measurement used to determine facial balance in orthodontic and orthognathic surgery patients. However, it includes 1 aspect of the face that is unaffected by orthodontics—the nose. This article contends that using the upper lip inclination (ULI), which is measured by the angle formed from a line tangent to the upper lip and a horizontal line through subnasale, may be more appropriate. The purpose of the article was to evaluate the ULI on a quantitative basis to determine the perceived attractiveness and its esthetic impact in treatment planning. To do so, the authors used a series of silhouette profiles on which they incrementally altered the ULI and had them rated on a Likert scale by 3 groups of subjects: pretreatment orthognathic patients, laypeople, and clinicians. Also included was a questionnaire in which the subjects could state whether the silhouette profile looked as if it needed orthognathic surgery. The results showed that the most ideal ULI was between 79° and 85°, and that the perceived need for surgery was at a threshold of less than 64° or greater than 91°. The pretreatment orthognathic patients were the most likely of the groups to recommend orthognathic surgery; this showed that they were the most critical. This study focused only on white profiles, whereas future studies could use other ethnic groups and facial types to gain a greater pool of normative data. It would also be interesting to compare a series of silhouettes with identical nasolabial angle values, but differing ULI values and nasal inclinations.

Reviewed by Kirk Bean

Skeletal anchorage for molar intrusion in patients with open bite

Oliveira TF, Nakao CY, Gonçalves JR, Santos-Pinto A. Maxillary molar intrusion with zygomatic anchorage in open bite treatment: lateral and oblique cephalometric evaluation. Oral Maxillofac Surg 2015;19:71-7.

Anterior open bites, whether skeletal or dental in etiology, are challenging orthodontic problems to treat. This prospective pilot study was designed to evaluate dental and skeletal changes in 9 patients with skeletal open bite who were treated by using zygomatic anchorage for molar intrusion. All patients were past at least cervical vertebral maturation stage 5 (nongrowing), with no previous orthodontic treatment. A 0.021 × 0.025-in stainless steel sectional archwire was placed with a transpalatal arch to prevent buccal tipping with intrusion. The patients had zygomatic miniplates surgically placed, and 2 weeks later, intrusion began with elastic chains providing a force of 450 to 500 g to the archwire. The chains were replaced every 15 to 20 days. Right and left oblique cephalograms and lateral cephalograms were taken immediately before intrusion and 6 months after intrusion was completed. Measurements made on the first radiographs were transferred to the second radiographs by using the skull base and the miniplates, and were compared. The patients' open bites were corrected by molar intrusion. The lateral cephalograms showed counterclockwise rotation of the mandible, clockwise rotation of the occlusal plane, and decreased anterior facial height. The oblique radiographs demonstrated that the average amounts of intrusion of the maxillary molars were 2.03 mm when measured on the mesiobuccal cusp and 1.7 mm when measured from the apex of the mesial root of the molar. No changes in the palatal plane angle or the anteroposterior positioning of the molars were observed. The standardized oblique radiographs used in this study showed that molar intrusion with skeletal anchorage is a good treatment modality for closing skeletal open bites. However, because of the small sample size and the short duration of treatment, further analysis should be done.

Reviewed by Benjamin Christman

Force decay in esthetic, fiber-reinforced composite orthodontic archwires

Spendlove J, Berzins DW, Pruszynski JE, Ballard RW. Investigation of force decay in aesthetic, fibre-reinforced composite orthodontic archwires. Eur J Orthod 2015;37:43-8.

With more adults seeking orthodontic treatment, the desire for esthetic orthodontic treatment has increased in recent years. Alloy archwires with tooth-colored polymer coatings have been developed, but the coatings are not clinically durable. Fiber-reinforced composite archwires are under development, but commercial availability is limited. This study compared an 0.018-in fiber-reinforced composite archwire (Align A; BioMers Products, Jacksonville, Fla) with a 0.016-in martensitic-stabilized nickel-titanium archwire (Nitinol Classic; 3M Unitek, Monrovia, Calif). Fifteen archwires of each brand were used. Two 25-mm segments were cut from the distal ends of each archwire and placed into 1 of 2 groups: a 1-mm deflection group and a 2-mm deflection group. Each segment was tested in 3-point bending by using a universal testing machine (model 5500R; Instron, Norwood, Mass) with 14 mm between the supports and a maximum deflection of 3.1 mm. The segments were placed on a custom jig, which maintained a deflection of 1 or 2 mm for 30 days. The samples were tested again on the universal testing machine with the same protocol. Controls with wires not subject to the deflection for 30 days were also used to ensure that the initial 3-point bend did not alter the material. The fiber-reinforced composite archwires exhibited bending profiles similar to those of martensitic-stabilized nickel-titanium but delivered lower forces. Fiber-reinforced composite archwires did not exhibit a clinically significant force decay after 30 days when deflected by 1 mm. The majority of the wires in the 2-mm deflection group were unable to sustain the deflections without crazing; they experienced statistically and clinically significant decreases in force delivery.

Reviewed by Martin Trockel