REVIEWS & ABSTRACTS

Accuracy of third-order bends of nickel-titanium wires and the effect of high and low pressure during memorizing heat treatment
Thomas Stamm DDS, Senior faculty staff member; Ariane Hohoff DDS, Senior faculty staff member; Dirk Wiechmann DDS, Jan Sutfeld DDS, Senior faculty staff member; and Dirk Helm Dr Ing, Senior faculty staff member - American Journal of Orthodontics and Dentofacial Orthopedics Volume 126, Issue 4, October 2004, Pages 476-484

This Study evaluated the accuracy of third-order bends of nickel-titanium wires and determined the effect of high and low pressure for maintaining the wire shape during memorizing heat treatment. A computer-aided bending machine was used to incorporate 200 randomly determined torsional angles between 0° and 60° into 30 linear 0.016 x 0.022-in NeoSentalloy F80 (GAC International, Central Islip, NY) wires. The torsional bendings were randomized into 2 groups. Bends assigned to group 1 (n=100) received heat treatment of 50 MPa (500 bar) pressure. Cross sectional cuts from the bent wires were prepared by using standard metallurgical techniques, and the torsional angles were analyzed under computer control. The results of our study show that third-order bends <30° can be made with adequate clinical accuracy with an error of 1.89° ± 175° (0° to 10°) and 3.57° ± 157° (20° to 30°), irrespective of the pressure applied. With bends >30° but 40°, the method with the higher pressure offers fundamentally greater precision than that with the lower pressure. With torque bends >40°, the bending error with both methods is clinically unacceptable. In addition to the variability in the dimension and composition of nickel-titanium wires, the scale of the incorporated plastic deformations makes a substantial contribution to the bending error. As far as permitted by the clinical situation, then, the bend should be distributed over the maximum possible wire length. Third-order bends in the first rectangular pseudoelastic nickel-titanium wires represent an efficient means of effecting torque at any early stage. This individualization allows the full therapeutic potential of these archwires to be exploited right from the initial phase of treatment.

The effect of cervical headgear on patients with high or low mandibular plane angles and the “myth” of posterior mandibular rotation

The purpose of this retrospective survey was to compare the magnitude of posterior mandibular rotation during orthodontic treatment with edgewise appliances and cervical headgear in patients with high or low Frankfort-mandibular plane angles (FMA). The files of a private orthodontic practice were searched, and the records of growing patients with class II Division 1 malocclusion were selected. These were divided into 2 groups, according to FMA: the hypodivergent (FMA < 22°) or low-angle group consisted of 29 patients with a median FMA of 19.80°, and the hypodivergent (FMA < 28°) or high-angle group consisted of 31 patients with a median FMA of 32.70°. All patients had nonextraction treatment with full edgewise appliances (Roth prescription), including second molars, by the same clinician. Cervical headgear and class II elastics were used, and several patients also had fixed or removable anterior biteplanes for short periods. Pretreatment and posttreatment cephalometric tracings were superimposed on internal basic structures of the mandible. There was no difference in FMA changes between the 2 groups, nor were there statistically significant differences in changes during treatment, with 2 exceptions: the angle SN-Gn showed a very small (0.86°) mean differential change between groups, generated mostly by the counterclockwise mandibular rotation of the low-angle patients. This was verified with structural superimpositions to evaluate vertical changes. In addition, posterior face height increase was significantly greater in the low-angle group. Structural superimposition of the mandible after treatment showed marked counterclockwise rotations in relation to the anterior base of the skull in both groups, with the high-angle group rotating significantly less. On average, growth and treatment resulted in improvements in the high-angle patients but aggravated the problems in the low-angle patients with deep bite malocclusions.

Appraising number and clinical significance of regression equations to predict unerupted canines and premolars
Chong Yol Baik DDS, MS and Maria Ververidou DDS, MS - American Journal of Orthodontics and Dentofacial Orthopedics Volume 126, Issue 2, August 2004, Pages 228-230

A sound statistical or clinical reason for proposing several single linear regression equations (SLRE) for predicting unerupted canine and premolar tooth-width
A new approach of assessing sagittal discrepancies: the Beta angle

Chong Yol Baik DDS, MS and Maria Ververidou DDS, MS - American Journal of Orthodontics and Dentofacial Orthopedics Volume 126, Issue 1, July 2004, Pages 100-105

An accurate anteroposterior measurement of jaw relationships is critically important in orthodontic diagnosis and treatment planning. The angular and linear measurements that have been proposed can be inaccurate because they depend on various factors. The purpose of this study was to establish a new cephalometric measurement, named the Beta angle, to assess the sagittal jaw relationship with accuracy and reproducibility. This angle uses 3 skeletal landmarks—to measure an angle that indicates the severity and the type of skeletal dysplasia in the sagittal dimension. Seventy-six pretreatment cephalometric radiographs of white patients were selected on the basis of 4 criteria that indicate a normal Class I skeletal pattern; the mean and the SD for the Beta angle were calculated. This group was compared with Class II and Class III skeletal pattern groups. After using the 1-way analysis of variance and the Newman-Keuls test and running receiver-operating-characteristics curves, we obtained results that showed that a patient with a Beta angle between 27° and 35° can be considered to have a Class I skeletal pattern. A more acute Beta angle indicates a Class II skeletal pattern and a more obtuse Beta angle indicates a Class III skeletal pattern.

Enamel loss associated with orthodontic adhesive removal on teeth with white spot lesions: An in vitro study

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Teeth with white spot lesions (WSL) might be more prone to enamel loss during bracket debonding. This in vitro study compared enamel loss from teeth with (n = 14) and without (n = 14) WSL after polishing with low-speed finishing burs or disks (Sof-Lex, 3M ESPE, St Paul, Minn). Debonded surfaces were analyzed with a contact stylus profilometer, and digitized data were compared with baseline readings by using AnSur NT software (Regents, University of Minnesota, Minneapolis, Minn). Specimen surfaces were also examined with a scanning electron microscope. Two-way analysis of variance was performed to analyze the data. In teeth without WSL, the volume losses were 0.16 mm³ for the bur group and 0.10 mm³ for the disk group; the mean maximum depths were 47.7 m for the bur group and 54.3 m for the disk group.

In teeth with WSL, the volume losses were 0.06 and 0.17 mm³, and the mean maximum depths were 35.1 and 48.7 m for the bur and disk groups, respectively. There were no significant differences in enamel loss between the 2 groups of teeth without WSL (P = .12). However, in teeth with WSL, the burs removed less enamel than the disks (P = 0.006). Scanning electron microscope examination showed that any damage on the enamel surface was usually located in the cervical third of the teeth. On most specimens, even though tooth surfaces appeared resin-free to the naked eye, there were remnants of it. The differences between groups were so small that they might be clinically insignificant.