ABSTRACTS

OF LECTURES

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many variables involved in establishing these limits. Such variables include differences in growth patterns, abilities of the orthodontists, degree of patient co-operation, cultural and personal perspectives on what is an acceptable result, etc. While definitive research in this area is not available, clinical insights into the limits of treatment may set the stage for future research. It is helpful to discuss this subject relative to the vertical, horizontal, and transverse dimensions.
Vertical: Misconceptions exist concerning the ability to open and close the mandibular plane with and without the extraction of teeth. Changes that do occur are primarily due to growth variations, and only very minimal changes can be made orthodontically. Therefore the focus in the vertical dimension should be placed on the dentoalveolar changes that can be achieved in the anterior and posterior segments.
Horizontal: The limits of treatment in Class II and Class III cases can be focused on the antero-posterior relationship of the maxilla to the mandible (for example, by looking at such measurements as the Wits measurement) and on the torque or inclination of the upper and lower incisors.
Transverse: Unrealistic expansion of the lower arch is one of the major problems in orthodontics, despite the extensive literature indicating that such expansion is unstable in the majority of cases. Management of the transverse dimension should be based on a realistic evaluation of where the mandibular teeth should be positioned.

47 BONE REACTION TO IMMEDIATE LOADING OF ORTHODONTIC IMPLANTS

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AIM: To evaluate the deformation by means of a finite element (FE) analysis of the surrounding bone generated when an orthodontic implant is loaded and to relate these findings to the biological reaction observed histologically in a monkey experiment.
MATERIAL AND METHODS: A three-dimensional FE-model was generated of an orthodontic anchorage screw, 7 mm long and 2.1 mm in diameter, and the surrounding bone. The screw was loaded with 50 cN pulling perpendicular to the long axis through the head of the screw. Eight different scenarios were simulated in which the cortical bone had a thickness of 0.5, 1.0, 1.5, or 2 mm, while the underlying trabecular bone was assumed to be either dense or porous. The deformation patterns and the stress distributions in the cortical and trabecular bone were determined. In a monkey experiment 16 screws were inserted: eight into the retromolar area of the mandible and eight into the infrazygomatic crest. They were all loaded immediately. After 1–3 months the bone reaction adjacent to the screws was evaluated histomorphometrically.
RESULTS: The largest deformations and stresses were found in the model with the thinnest cortex and the underlying porous trabecular bone. The accompanying strain was a result of an interaction between the added load and the deformation occurring during chewing due to the difference in stiffness of bone and screw. Histological examination revealed that after 1 month the bone-to-screw contact was more than 30 per cent and after 3 months the density of the trabecular bone was significantly increased.
CONCLUSION: Immediate loading in combination with forces generated during function will result in a mild overload and thus bone formation adjacent to the orthodontic anchorage screw.

48 ARCH DISCREPANCY MEASUREMENT: COMPARISON OF VISUAL, MANUAL, AND COMPUTER-AIDED METHODS

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AIM: To compare five different methods for measuring arch discrepancy.
MATERIALS AND METHODS: The mandibular plaster casts of 44 patients (17 males, 27 females in the permanent dentition, aged 15–25 years) were evaluated by means of five different methods. The Nance method consisted of measuring, with a brass wire, the length of the mandibular arch, whereas the sum of the mesio-distal diameter of the permanent teeth (premolars, canines, and incisors) was calculated with a gauge. The amount of dentoalveolar discrepancy was the difference between the two values. According to the Hunter method, the lower arch was divided into four segments, from the mesial aspect of the first molars to the mesial aspect of the canines, as well as from the mesial aspect of the canines to the mesial aspect of the central incisors for each side. These segments were measured with a calliper. The same device was used to measure all teeth mesial to the first molars. The difference in the measurements represented the dentoalveolar discrepancy. The May method consisted of measuring each tooth mesial to the first molars and the space available for each one in the arch. For the visual method, two dental students and two experienced orthodontists evaluated ‘at a glance’ the amount of discrepancy. Finally, the computer-aided method consisted of calculating the mesio-distal diameters and the space available in the arch by means of a digitizer connected to computer software (Quick Ceph Image). Statistical analysis (ANOVA) was performed.
RESULTS: No statistically significant differences in mean dentoalveolar discrepancy ($P > 0.05$) were found among all the methods tested for measuring arch discrepancy.
CONCLUSIONS: Clinical reliability of all the methods employed for arch discrepancy measurement is similar. Therefore, the visual method can be considered a valid alternative to more sophisticated methods.

49 A CRITICAL VIEW OF TREATMENT PRIORITY INDICES IN ORTHODONTICS

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