# DEPARTMENT OF REVIEWS AND ABSTRACTS

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## *THESIS ABSTRACTS*

### In vivo orthodontic bond strength: Comparison with in vitro results

Kevin L. Pickett
*Graduate School, University of Alabama at Birmingham, 2000*

The bond strength of orthodontic bracket bonding systems has been tested and evaluated extensively over the past decades. Traditionally, orthodontic bonding systems have been evaluated by means of in vitro shear bond strength tests using a Universal Testing Machine such as the Instron (Instron Corp, Canton, Mass). However, it would be ideal if bond strength values could be assessed based on actual in vivo debonding forces rather than in vitro results.

The purpose of the present study was to test a new in vivo debonding device and compare in vivo bond strength recordings from this device with in vitro bond strengths recorded by the debonding device and the Instron Universal Testing Machine. For the in vitro part of the study, 60 extracted premolars were divided into 2 groups of 30 each. Both groups of 30 teeth had 3M/Unitek Victory Twin brackets, precoated with Transbond XT composite resin, bonded to them. Shear bond strength tests were carried out in vitro using the Instron machine on 1 group of 30 teeth, whereas the debonding device was used on the other group of 30 teeth. The mean shear bond strength of the group debonded using the Instron machine was 11.02 MPa and that of the group debonded with the debonding device was 12.82 MPa. For the in vivo part of the study, 8 patients randomly assigned to the clinician from patients in The University of Alabama School of Dentistry, Department of Orthodontics, had a total of 60 premolars bonded with 3M/Unitek Victory Twin brackets. After comprehensive orthodontic treatment (average time, 23 months), shear bond strength tests were carried out with the debonding device that can measure debonding forces in vivo. The mean shear bond strength recorded in vivo was 5.47 MPa. Statistically significant differences were found between all 3 groups tested. The results appear to indicate that mean bond strengths recorded in vivo after comprehensive orthodontic treatment are significantly lower than bond strengths recorded in vitro.

### Behandlungsplanung und Biomechanik der Distraktionsosteogenese aus kieferorthopädischer Sicht

Barry H. Grayson, Pedro E. Santiago
*IOK, 32. JAHRG. 2000;1:9-10.*

As in traditional combined surgical and orthodontic procedures, the orthodontist has a role in the planning and orthodontic support of patients undergoing distraction osteogenesis. This role includes predistraction assessment of the craniofacial skeleton and occlusal function in addition to planning both the predistraction and postdistraction orthodontic care. Based on careful clinical evaluation, dental study models, photographic analysis, cephalometric evaluation, and evaluation of 3-dimensional computed tomographic scans, the orthodontist, in collaboration with the surgeon, plans distraction device placement and the predicted vectors of distraction. Both surgeon and orthodontist closely monitor the patient during the active distraction phase, using intermaxillary elastic traction, sometimes combined with guide planes, biteplates, and stabilization arches, to mold the newly formed bone (regenerate) while optimizing the developing occlusion. Postdistraction change cause by relapse is minimal. Growth after mandibular distraction is variable and appears to be dependent on the genetic program of the native bone and the surrounding soft tissue matrix. A significant advantage of distraction osteogenesis is the gradual lengthening of the soft tissues and surrounding functional spaces. Distraction osteogenesis can be applied at an earlier age than traditional orthognathic surgery because the technique is relatively simple and bone grafts are not required for augmentation of the hypoplastic craniofacial skeleton. In this new technique, the surgeon and the orthodontist have become collaborators in a process that gradually alters the magnitude and direction of craniofacial growth. Accompanying the article are photographs and illustrations.

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