

**SCIENTIFIC
SECTION**

Commentaries on scientific papers published in this edition

A randomized control clinical trial investigating orthodontic bond failure rates when using OrthoSolo universal bond enhancer compared to a conventional bonding primer

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This study was a compact, well-executed randomized clinical trial on bracket failure, comparing OrthoSolo and Transbond adhesives. The strengths and weaknesses of the study are highlighted in the discussion, which addresses adequately some of the minor shortcomings of the study. It is interesting to note that a reference cited by the author¹ (in a publication from the manufacturers) recommends that OrthoSolo should be applied to clean, dry, etched enamel – in other words, an ideal environment. It also states that OrthoSolo ‘polymerizes in the presence of the slight amount of water remaining in the etched enamel’, implying deeper penetration of the resin. The manufacturers therefore do not seem to be claiming that the product is a ‘wet field’ material, and it is perhaps not surprising that no difference was found between the two materials in the present study, given that the operator was striving to keep a dry field during bonding. In a clinical trial such as this, assumptions are often made that there will be the usual range of moisture control during bonding among the participants. With the relatively low numbers in the study (a characteristic of most orthodontic studies) and little information on bonding conditions, this assumption may not be valid. To truly test whether a product is superior in moist conditions the bonding environment should reflect those very conditions, although ethical dilemmas arise with respect to optimum treatment care. Swartz¹ does cite an *in vitro* study where teeth were contaminated with saliva, but this is difficult to reproduce in a clinical trial, and one will have to wait for additional studies and greater numbers of participants to determine fully whether there is any advantage of any product over another. This paper is certainly a step in the right direction.

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Reference

1. Swartz M. Bond strength of a universal bonding agent. *Ormco Clinical Impressions* 2005; **14**: 14–16.

Space conditions and prevalence of anterior spacing and crowding among nine-year-old schoolchildren

Christopher J. Lux, Britta Dücker, Maria Pritsch, Uwe Niekusch, Gerda Komposch

The authors designed this epidemiological survey to evaluate the prevalence of crowding and spacing in a sample of school children, with a mean age of 9 years, located in south-west Germany. The rationale for selecting subjects in the mixed dentition included minimal orthodontic intervention in the sample of 494 (males=237, females=257). Removable orthodontic appliances were being worn by 11% of the subjects, but it is unclear if treatment was to align the incisors, reduce an overjet or modify growth with a functional appliance.

An orthodontist evaluated the subjects during a caries detection dental examination. The posterior segments were measured between the first permanent molar and the lateral incisor using a custom designed ruler. Incisor spacing and crowding was measured with a stepped ‘interception gauge’. These measurements were tested for reliability and validity and evaluated against the gold standard of a digital calliper with a high inter-rater reliability. The types of malocclusion included in the sample are not reported so spacing/crowding of the incisors may have been influenced by proclined incisors, increased overjet, hypodontia/tooth size discrepancies or early loss of primary teeth.

The IOTN scores occlusal traits including crowding of the anterior segments, overjet and hypodontia but was only used in this study to evaluate crowding/spacing. Confounders such as early loss of primary canines with spontaneous alignment/spacing of the incisors and a description of the homogeneity of the sample are not reported. Race and ethnicity may influence crowding

and spacing of the dentition as reported in the NHANES study so the heterogeneity of the sample would be of interest. Nevertheless, this study adds new information and reports that crowding was more prevalent and severe in the anterior and posterior maxillary segments than in the mandible. As expected the earlier maturing girls in Björk stage DS3 were ahead of the boys in the eruption of their canines and premolars at age 9 years, which influenced the posterior segment measurement by arch length reduction.

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Effect of sandblasting on the retention of orthodontic brackets: a controlled clinical trial

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This clinical study set out to establish whether sandblasting would affect the failure rate of orthodontic brackets. This prospective, clinical study used a split-mouth design; the first group of 30 patients had quadrants allocated to control and experimental treatments specified one way round and this allocation was reversed for the second group of thirty patients. The 60 patients who thus agreed to take part (and who had a variety of malocclusions and requiring either one- or two-arch fixed appliance treatments) were followed up

for one year. Refreshingly, the authors are very honest in acknowledging that there are problems in their study. These and others are worth noting as future studies could consider taking steps to avoid at least some pitfalls that can arise. Examples relate to randomization, the power calculation and perhaps, use of the split-mouth design. However, as also noted by the authors, the use of confidence intervals is helpful in assessing how firmly (or otherwise) the conclusions can be relied upon. Interestingly, a recent systematic review¹ advises that patients should ideally be followed up to the end of treatment to account for bracket failure rates which could change over time. This scenario has been reported for example, by Manning *et al.*,² although it is not yet clear how prevalent or common such changes over time might be.

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References

1. Mandall NA, Millett DT, Mattick CR, Hickman J, Worthington HV, Macfarlane TV. Orthodontic adhesives: a systematic review. *J Orthod* 2002; **29**: 205–10.
2. Manning N, Chadwick SM, Plunkett D, Macfarlane TV. A randomized clinical trial comparing 'one-step' and 'two-step' orthodontic bonding systems. *J Orthod* 2006; **33**: 276–83.