

**SCIENTIFIC
SECTION**

Commentaries on scientific papers published in this edition

The effectiveness of laceback ligatures: a randomized controlled clinical trial

R. Irvine, S. Power and F. McDonald

This study adopted the ‘gold-standard’ of a randomized controlled clinical trial to assess the effects of laceback ligatures on the antero-posterior and vertical position of the lower incisors and the mesial position of the lower first molars. Sixty-two adolescents were randomly assigned to the experimental (laceback) or control (non-laceback) groups. The groups had a similar sex distribution, similar malocclusions and required the extraction of all first premolars. One operator treated all the cases. Each patient had the same archwire sequence and all archwires were cut distal to the first molar tube with no cinching. Lower incisor and lower molar positions were assessed from lateral cephalometric radiographs and from lower study casts. The latter were taken when the fixed appliances were placed and 6 weeks after placement of a 018 SS wire.

Interestingly, the lower incisors retroclined and extruded in both groups, with no statistically significant differences between the groups. Labial segment crowding and arch length decreased in both groups, but there were no statistically significant differences between the groups. There was significantly greater mesial movement of the lower first molars (0.83 mm) in the laceback group compared to the non-laceback group ($p < 0.05$).

The authors have taken commendable care to try to control for the many variables within a study of this nature. One highly trained and experienced clinician undertook all treatments. Different operators may generate different results owing to possible variation in forces on placement of ‘passive’ lacebacks and with tightening to take up apparent reduction in tension at subsequent visits. These may influence the findings with regard to the loss of posterior anchorage.

This is a well-conducted and interesting study that provides useful information for clinicians with regard to the effectiveness of lacebacks.

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Comparing a Quality of Life measure and the Aesthetic Component of the Index of Orthodontic Treatment Need (IOTN) in assessing orthodontic treatment need and concern

**Y. V. Kok, P. Mageson, N. W. T. Harradine
and A. J. Sprod**

This interesting paper compares the use of the Aesthetic Component (AC) of the Index of Orthodontic Treatment Need (IOTN) and the recently developed Child Perceptions Questionnaire (CPQ) in assessing orthodontic treatment need and concern. This paper is a very useful addition to the orthodontic literature at a time when clinicians are increasingly appreciating the importance of considering quality of life in their treatment planning. It is also good to see studies using well-constructed questionnaires developed by other researchers, rather than trying to develop more new questionnaires that may never be used.

The study included 204 10–12-year-old children who completed the CPQ and some additional questions related to orthodontic concern. In addition, AC scores by the child and examiner were recorded. The study was well structured and the sample size was good. My only comment would be that, as the CPQ was originally developed for use with 11–14-year-olds, it was a shame not to use the same age group in this study. However, I fully appreciate the problems of gaining access to schools for this type of study. It would also have been interesting to see some test–retest repeatability data. I understand the authors’ reasons for not doing so, but as the original study was in Canada, it would have been interesting to establish whether the repeatability was equally good in a UK sample.

The findings of the study were interesting in that the correlations were generally very low, and the IOTN AC and the CPQ appear to be measuring different attributes. The authors conclude that normative indices (such as AC IOTN) should be supplemented with a quality of life measure if resources are to be targeted

most appropriately. This should definitely be an aim for the near future.

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Measuring failure of orthodontic treatment: a comparison of outcome indicators

N. A. Fox and J. R. Chapple

This paper set out to compare the percentage of unsatisfactory orthodontic treatment measured with 3 occlusal indices—IOTN, PAR and ICON. They assessed the before and after treatment study models of 130 cases treated within the hospital service in the Northern region of England. They defined failure in two ways: first, they compared IOTN and ICON by calculating the percentage of final study models, which had a residual need for treatment. Secondly, they compared PAR and ICON by calculating the percentage of cases, which failed to achieve a predefined threshold of occlusal improvement, between the pre- and post-treatment models.

The sample included quite a high proportion of discontinued cases (nearly 25%), which is to the authors' credit. Despite this, the proportion of cases that had not benefited from orthodontic treatment, using the pre-determined criteria was low at 3% for PAR and 10% for ICON. The results for residual treatment need using IOTN showed that only 6% of post-treatment study models fell in IOTN DHC treatment need categories 4 or 5; however 17% of cases showed some residual need for treatment with ICON.

They conclude that ICON is more suitable for making comparisons of treatment outcome than PAR. Some of this was based on their subjective assessment of the outcome of the cases; they felt that PAR was too lenient. It is certainly true that the PAR weightings can be contentious; however, one problem I find with ICON is that a significant component of the calculation is the aesthetic assessment using the IOTN photographs. My experience of teaching occlusal indices is that this can cause as much controversy as the PAR weightings. In addition, the one examiner in this study showed very good reproducibility with the aesthetic component of IOTN. It is unlikely that several examiners will be as reliable. The authors also conclude that ICON is quicker to apply than IOTN. This surprised me, as it is not my experience of using (and teaching) the two indices.

Orthodontists are ahead of the game in the development of occlusal indices. It is important that we continue to develop and debate their use, as they reduce the

sometimes arbitrary nature of clinical decision making. They also provide us with a measure (however imperfect) of our clinical outcome. However, I unfortunately doubt that we will ever find one perfect index that will measure everything we need in orthodontics and please everyone.

Philip Benson
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An ex-vivo evaluation of resin-modified glass polyalkenoates and polyacid-modified composite resins as orthodontic band cements

J. Knox, K. Y. Chye and P. Durning

What is the best band cement? One simple way to compare the performance of cements is to look at the force needed to displace bands cemented to teeth. This article compares a wide variety of cements in this way. The displacement force was measured in laboratory tests and the site of failure noted according to whether it was at the enamel surface, at the metal surface or within the cement. With a view to simulating the effect of repeated masticatory loading in service, some samples were subjected to ball milling prior to testing.

Substantial variations in the displacement forces were found, depending on the cement used. Surprisingly, no one class of cement performed consistently worse or better, and no clear pattern was evident in the results. The effect of ball milling was also inconsistent, with displacement forces increased for some cements and decreased for others. There was no obvious correlation between failure site and displacement force.

From these results it is certainly possible to select the cement with the highest displacement force, but how far is resistance to displacement a good proxy for clinical performance? The few comparisons that can be made are not encouraging. For example, in this study, zinc phosphate cement displays one of the highest mean band displacement forces, yet in a clinical trial failures with zinc phosphate cement were significantly more common than with a glass-ionomer cement. Although this article shows a much higher displacement force for Fuji than Ketac-Cem, almost identical clinical failure rates have been recorded for two. Again, the present study shows a higher displacement force for Diamond than Ketac-Cem, but there was no significant difference in failure rates in a clinical trial. So these latest results must cast increasing doubt on whether displacement force can usefully be employed as a proxy for clinical reliability. It is even arguable from the evidence that a better alternative might be to use the site of failure as a

criterion, with failures at the cement-enamel interface suggesting poorer clinical reliability, and this could be the most useful approach until a better laboratory test can be devised and validated.

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Self-perceived orthodontic treatment need evaluated through 3 scales in a university population **C. Flores-Mir, F.R. Salazar and P.W. Major**

Orthodontic treatment need has previously been measured from a clinical viewpoint. However, researchers are now evaluating patient/self-perceived need as this is

likely to influence demand for orthodontic treatment. Flores-Mir *et al.* measured correlations between IOTN AC, OASIS and visual analogue scale approaches for assessing consumer perceptions. This investigation was well carried out on a large random sample of first-year university students. Correlations between the scales were moderate and were attributed to differences in approaches for each scale. It is also possible that the scales used reflect different consumer values and perceptions of need for treatment. It would also be interesting to investigate correlations between these scales on a child population where treatment need is mixed between none/borderline and definite.

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