Reply

Sir,
We have read the comments from Drs Spassov, Bernhard, Lehmann, and Pavlovic concerning our paper on ‘Posterior crossbite and TMD: need for orthodontic treatment?’. We really appreciate their positive opinion in their first paragraph. Besides, we will give some clarification to the ‘warning points’.

We agree that ‘TMD is complex’, stressed in our Introduction. Thus, our aim was to focus on differential diagnosis of TMD as well as of posterior crossbite, which ‘might answer the issue: is there any association between some special sign/symptom of TMD and the type of posterior crossbite, which will call for orthodontic treatment?’ Our literature search was in agreement with earlier reviews (the first four lines in the Discussion). However, the few studies reporting on differential types of crossbite indicated that a functional type is associated with headache, TMJ and muscular pain, and clicking. We found this information interesting and this was dealt with in the discussion, based on our present knowledge of muscular function and tissue response in the TMJ area. Our conclusion is that early treatment of functional crossbite aims to rehabilitate the asymmetric muscular activity and the changed position condyle/fossa. It is to be hoped that the reader will agree and ‘not to draw false conclusions in the process of making a clinical decision’.

According to our inclusion and exclusion criteria, presented in Material/Methods, the four articles by Gesch et al. had to be excluded; one of them is a review article and the others are population-based studies using logistic regression analysis to investigate any associations between a number of TMD and normal/malocclusion variables; different types of crossbite are missing.

Finally, a few words about prophylactic measure of proclined maxillary incisors: in most textbooks on trauma (especially Andreasen’s ‘Bible’) we have learned that the frequency of fractures to proclined incisors teeth is high and thus call for prophylactic measures. We find this so evident and will not comment on the three lines on this point.

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A comparison between dental measurements taken from CBCT models and those taken from a digital method: a query about methodology

Sir,
We were interested to read the article by Tarazona et al. published in the February 2013 issue of *European Journal of Orthodontics*. The authors assessed reliability, accuracy, and reproducibility in measuring mesiodistal tooth sizes, bicanine widths, bimolar widths, and arch lengths using cone-beam-computed tomography (CBCT) and compared them with the same measurements obtained using a two-dimensional digital method (Tarazona and Llamas, 2013) They reported that the correlation study of the two measuring methods, which were compared by determining the regression parameters and the values of one method as opposed to the other, showed how both methods are comparable, although the means and standard deviations of all the measurements analyses present statistically significant differences (Tarazona and Llamas, 2013) The common practice for assessing reliability is to apply well-known statistical tests [intraclass correlation coefficient agreement (ICC) for quantitative variables and weighted kappa for qualitative variables] and it is unclear why the authors did not consider employing such practice (Jeckel, 2007; Szklo, 2007; Rothman, 2008; Sabour and Dastjerdi, 2012).

Reliability (precision, reproducibility, or repeatability) and validity (accuracy) are two completely different methodological issues in research (Jeckel, 2007; Szklo, 2007; Rothman, 2008; Sabour and Dastjerdi, 2012). Reliability (or reproducibility) is being assessed by different statistical tests such as Pearson r,
least square, and paired t-test, all of which are among the common mistakes in reliability analysis (Jeckel, 2007; Szklo, 2007; Rothman, 2008; Sabour and Dastjerdi, 2012).

Validity (accuracy) of a test can also be assessed using sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), likelihood ratio positive (LR+: true positive/false positive), likelihood ratio negative (LR−: false negative/true negative), odds ratio (true results/false results, preferably more than 50), and diagnostic accuracy (Jeckel, 2007; Szklo, 2007; Rothman, 2008).

The authors pointed out in their conclusion that CBCT digital models are as accurate and reliable as the digital models obtained from plaster casts (Tarazona and Llamas, 2013). We think that this conclusion is a misinterpretation of the results, which may lead to misdiagnosis and mismanagement of patients.

As a take-home message, for reliability and validity analyses, appropriate tests should be applied with careful interpretation.

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Reply

Sir,

First of all, we would like to express our thanks to the authors of the letter we received for the interest they have shown in our work and to say that we fully agree with their comments on the validity of the statistical methods they mention in assessing the reliability, accuracy, and reproducibility of a measuring method. Indeed, as they say, they are the usual tests for evaluating these concepts.

However, we would like to point out the advantages of using a regression method with 95% confidence interval (CI) of slope and y-intercept for comparisons between two very similar measuring methods, as both the 2D Digital Method and the cone beam computed tomography method are undertaken on a digital image.

Applying regression to compare whether the two methods used provide the same measurements for the elements analysed allows us to see whether the methods provide the same or different measurements and, in the latter case, to see what the cause of that difference is. If the slope and y-intercept confidence level, respectively, include 1 and 0 and there is a high correlation coefficient, we can state that both methods measure equally and also that the size appraisal of 95% CI is also indicative of the similarity between the measurements taken by both methods. However, in cases where there is a discrepancy between the methods, it is possible to determine whether, between the measurements taken by the two methods, there is a systematic error (slope 1 by y-intercept other than 0) or a discrepancy in the scale of the measurement (slope values greater or lower than 0), or both situations (y-intercept other than 0 and slope other than 1). Moreover, the possibility of a visual representation (on the regression line) of the measurements carried out by either of the two methods perfectly shows the good or bad correlation of the measurements undertaken using both methods.

Given the great number of data available to us and the evidence provided by the figures and tables presented, plus the additional information that this method provides in this case, we decided to choose this methodology for presenting the results of our work, without undervaluing in any way