Author's response to reviews

Title: Objective Assessment of shoulder mobility with a new 3D gyroscope. A validation study

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Author's response to reviews: see over
Dear Reviewer Prof. Arturo Vega-Gonzales,

Thank you very much for carefully reading and reviewing our paper „Objective Assessment of shoulder mobility with a new 3D gyroscope – validation study“.

Concerning your first comment with compulsory major revisions our biostatistician states:

“Indeed, we used a linear regression model to analyse the accuracy of the new instrument. I agree with you, that the method by Bland and Altman is a nice and simple method to compare two measurements, which I had often used. However, it relies on the assumption that measurements errors of both methods are nearly equal. In our study, this is not reasonable, because it is well known, that the chosen angle on Biodex is nearly exact. On the other hand, it is reasonable that measurements from the Dynaport have a non negligible amount of measurement error.

Since there are no models for situations, where both methods have very different measurement errors and one method has a measurement error near 0, I have decided to consider the measurements from Biodex as gold standard without a measurement error and to use a method suitable for this situation. Carstensen (2010) proposed in his book for such situations to do a regression of the new “imperfect method” on the gold standard method. Therefore, we have applied a linear regression model in our paper.


Concerning your second comment:

The increase in width of the prediction interval is explainable through the different slopes for the different devices. For each device, the variability of measurement errors (residuals) seems to be nearly constant over the range of considered angles. Hence, it seems to be okay to apply such a linear mixed regression model. Since the model is fitted on more than 4000 measurements, the obtained p-values should be okay since asymptotic expansion should be working for this large sample size.

Kind regards,

Dr. Nina Timmesfeld (Biostatistician)"
The required minor essential revisions were all done! Thank you for that!

Thank you very much for the review and looking forward for a quick publication!

Best regards

Bilal Farouk El-Zayat