

## Letters to the Editor

### Prediction of mechanical complications in adult spinal deformity surgery: methodological issues

Dear Editor,

We read with great interest the study by Jacobs et al [1]. The aims of the study were to assess and compare the ability of the Schwab classification and the Global Alignment and Proportion (GAP) score to predict mechanical complications following adult spinal deformity surgery. For this purpose, 39 patients from two centers with adult spinal deformity who received surgical treatment constituting posterior spinal fusion of at least four vertebrae, and for whom standing full spine plain radiographs pre- and postoperatively were available, were included. Radiographs of patients were analyzed for mechanical complications. The pre- and postoperative Schwab and GAP score was calculated. To assess the ability of scores for prediction, logistic regression was used. The discrimination between the GAP score and the Schwab classification was determined by receiver operating characteristic curve. The result showed that the GAP score was significantly ( $p=.003$ ) more appropriate than the Schwab classification. The AUC for the GAP score was 0.86 (95% confidence interval: 0.75–0.97), whereas the AUC for the Schwab classification was 0.69 (95% confidence interval: 0.52–0.86).

The AUC is usually used to evaluate the accuracy of a diagnostic model. Moreover, AUC, even if statistically significant, does not guarantee prediction [2–5]. For developing and validating prediction models, we need data at least from one cohort divided to two in order to perform internal validation or from two different cohorts to perform external validation. Different approaches can be applied for validation of a prediction model such as the split sample, bootstrapping, or other well-known methods [2–5]. Developing prediction models without assessing interaction and correlation of potential predictors can also produce misleading results [6]. In this study, only the correlation between factors of the GAP score and Schwab classification were estimated.

The authors concluded that the Schwab classification and the GAP score were able to predict mechanical complications following adult spinal deformity surgery. However, the GAP score proved to be significantly more appropriate.

In this letter, we discussed methodological issues on prediction studies. Any estimation of prediction models should be accompanied by a discussion of the above-mentioned methodological issues [2–6].

### References

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