

Validation of a kinematic functional shoulder score including only essential movements.

Measurement of shoulder function is a controversial issue. There is a great variety of measurement tools but none of them has been universally accepted. There is therefore a need to develop extensively validated and convenient measurement tools. Embedded computerized movement analysis can potentially meet these requirements for measurement of shoulder function. Ambulatory measurement devices allow application in various clinical conditions, display adequate precision and accuracy, and are considerably more straightforward than laboratory-based systems. Using a Physilog II embedded system, Coley (2007) developed a relatively simple score of shoulder function (P Score). The method is based on arm power measurement by three-dimensional accelerometers and gyroscopes during seven consecutive shoulder movements. It demonstrated reliability, responsiveness and criterion-based validity. However, additional knowledge and technological progress could now contribute to further simplification of the. A secondary analysis of Coley's study data based on principal component analysis and multiple regressions highlighted that a procedure including only two selected movements produces comparable results to P Score. Moreover, the development of wireless systems considerably simplifies set up. Consequently, simpler but equivalent measurement procedure can now be considered. However, this new approach has now to undergo extensive validation to precisely establish its measurement properties.

Aim

The aim of the study is to establish measurement properties of a simplified shoulder functional kinematic score, considering scope of application in shoulder pathologies, intra- and inter-observer reproducibility, responsiveness, minimal clinically important difference and criterion-based validity.

Methods

A clinical validation study is planned. Measurement will be carried out with four groups of patients representative of frequent shoulder conditions (rotator cuff condition,

shoulder instability, diaphyseal or subcapital humerus fracture, frozen shoulder) and a contrai group free from any shoulder condition. Measurement procedure includes two consecutive measurements, alternatively conducted by two evaluators at baseline, and an additional single measurement 6 months later. Currently used functional questionnaires will be completed at bath stages.

Analysis will address intra- and inter-observer reproducibility, responsiveness, minimal clinically important difference and criterion-based validity, respectively for the four considered shoulder conditions.

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