Reviewer's report

Title: Reproducibility of a 3-dimensional gyroscope in measuring shoulder anteflexion and abduction

Version: 2 Date: 7 February 2012

Reviewer: Richard Hyde

Reviewer's report:

Major Revisions

[1] It is unclear to me what question the paper is trying to answer. Is it to validate the use of a gyroscope to make shoulder measurements, or is it to answer a physiological question about repeatability of movement range for a sequence of repeated identical tasks? If it is to validate the measurement system, then I don’t believe the objective has been achieved. The paper lacks any detail on the sensors and how raw sensor information is converted into estimated joint angles. Reported joint angles are not independently validated e.g. by using motion tracking. Validation of the sensor system would be much better carried out using a mechanical rig with directly-measurable joint angles, and actuated to perform representative movements. If the objective is to make measurements that look at changes in sequences of repeated movements due to, for example, loosening of the joint, changed pain threshold or fatigue, then the title needs to be changed to reflect this. There should also be more treatment of the sensor system accuracy e.g. gyroscopes drift, and based on quoted drift rate and measurement time window, error bars on the measurements can be determined.

[2] The title suggests that the sensor system is gyroscope based, whereas in the Measurement techniques section reference to accelerometers is made. Line 208 then refers to a 3-axis gyroscope. Please could you clarify.

[3] Line 112: Please could you add more information on how calibration was carried out?

Minor Essential Revisions

The discussion section should include some discussion on expected maximum sensor error so that its possible contribution to results is understood. Differences in lines 212-214 might be explained by this, or ruled out. Lines 226 to 234 largely repeat information already presented, so could be cut if necessary.

Discretionary Revisions

A number of minor grammatical errors were noted, mainly missing commas. When referencing papers, the reference should appear first, followed by the full stop [1].
Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests