

## COMPARISON OF THE SCORE AND HA METHODS FOR LOCATING IN VIVO THE GLENOHUMERAL JOINT CENTRE

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### Abstract

A recent paper has described a new functional method, the symmetrical centre of rotation (SCoRE), for locating joint centre position [Ehrig, R.M., Taylor, W.R., Duda, G.N., Heller, M.O., 2006. A survey of formal methods for determining the centre of rotation of ball joints. *Journal of Biomechanics* 39 (15), 2798–2809]. For in vitro analyses, the SCoRE method showed better precision than helical axis (HA) or sphere fitting methods. Despite HA determination is very sensitive to small angular velocity, the International Society of Biomechanics has recommended to use HA for locating the glenohumeral joint centre. This paper aims at comparing the SCoRE method with the HA method for locating in vivo the glenohumeral joint centre according to the movement characteristics.

Nine subjects performed 10 cycles of three different movements at two different velocities. For each test (combination of movements) the location of the centre of rotation was estimated with both methods (SCoRE and HA). Analyses focused on the 3D location of the glenohumeral joint centre and on the repeatability of location (standard deviation). This study showed that SCoRE and HA methods yielded the same GH location. Nevertheless, with SCoRE method, the location of the glenohumeral joint centre was different according to the test. This study evidenced that the SCoRE method was more precise than HA method (error of 3 mm versus 4.6 mm) and that the GH location with the SCoRE method was not affected by movements with slow velocities.

**Keywords:** Glenohumeral; Functional method; Rotation centre

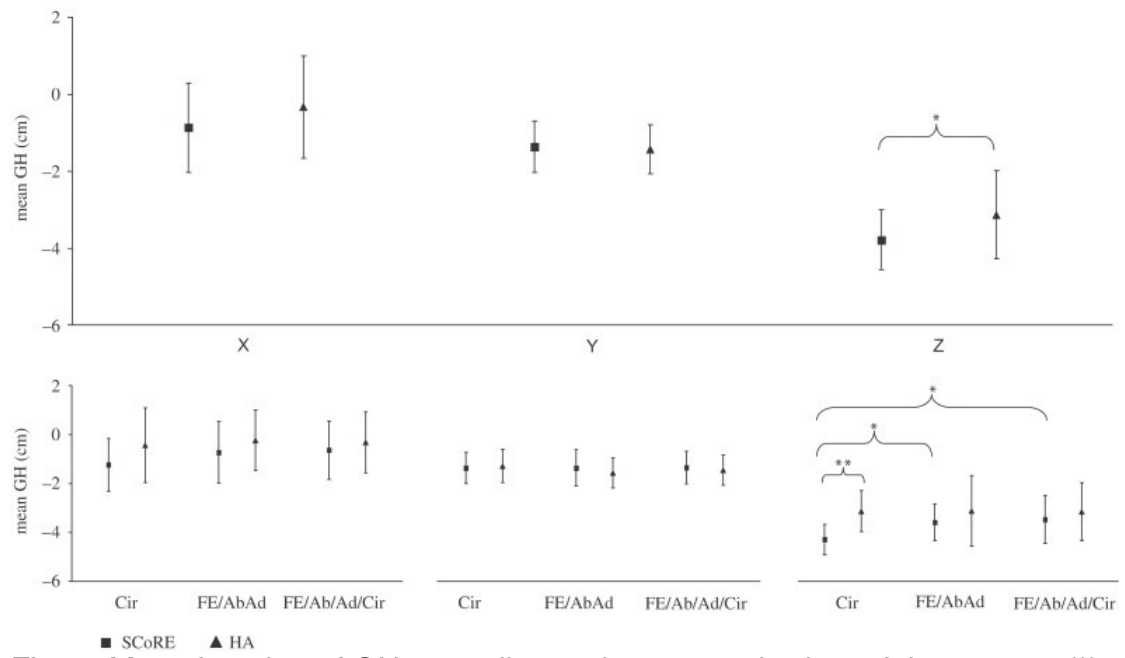


Fig. 2. Mean location of GH according to the two methods and three tests. (\*) indicates a significant difference with  $p < 0.05$  and (\*\*) indicates a significant difference with  $p < 0.01$ .