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RELIABILITY OF HELICAL AXIS PARAMETERS DURING GLENOHUMERAL ROTATION

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BACKGROUND AND AIM

Shoulder instability (SI) is a common pathology defined as symptomatic laxity of the glenohumeral joint. The SI diagnosis is based in history and physical examination that included specific provocative tests. There is currently lack of diagnostic procedures aimed to quantify the shoulder arthrokinematics. The aim of this study was to evaluate the reliability of finite helical axis (FHA) parameters in the analysis of shoulder rotation.

MATERIALS AND METHODS

Nineteen healthy subjects (7M, 12F, age: 23.2±2.7 years) participated. Shoulder kinematics was measured with six infrared cameras (Optitrack). The arm was fixed in a light wooden frame with velcro straps in order to keep the elbow angle at 90 degrees flexion. The subjects were asked to perform two series of ten shoulder internal and external full range rotations. The two series of movements were separated by two minutes of rest without removing the wooden frame. The protocol was repeated for both arms in randomized order.

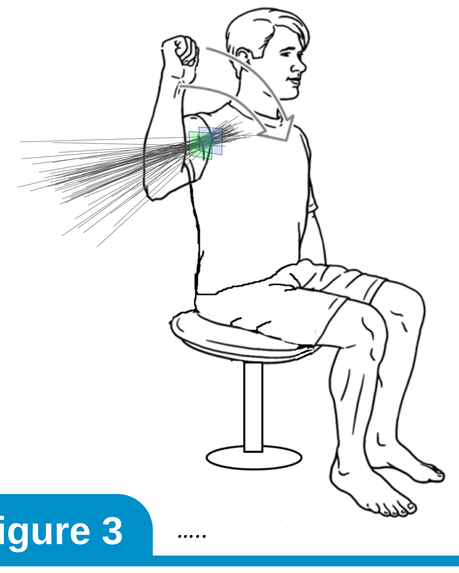

Figure 3 .....

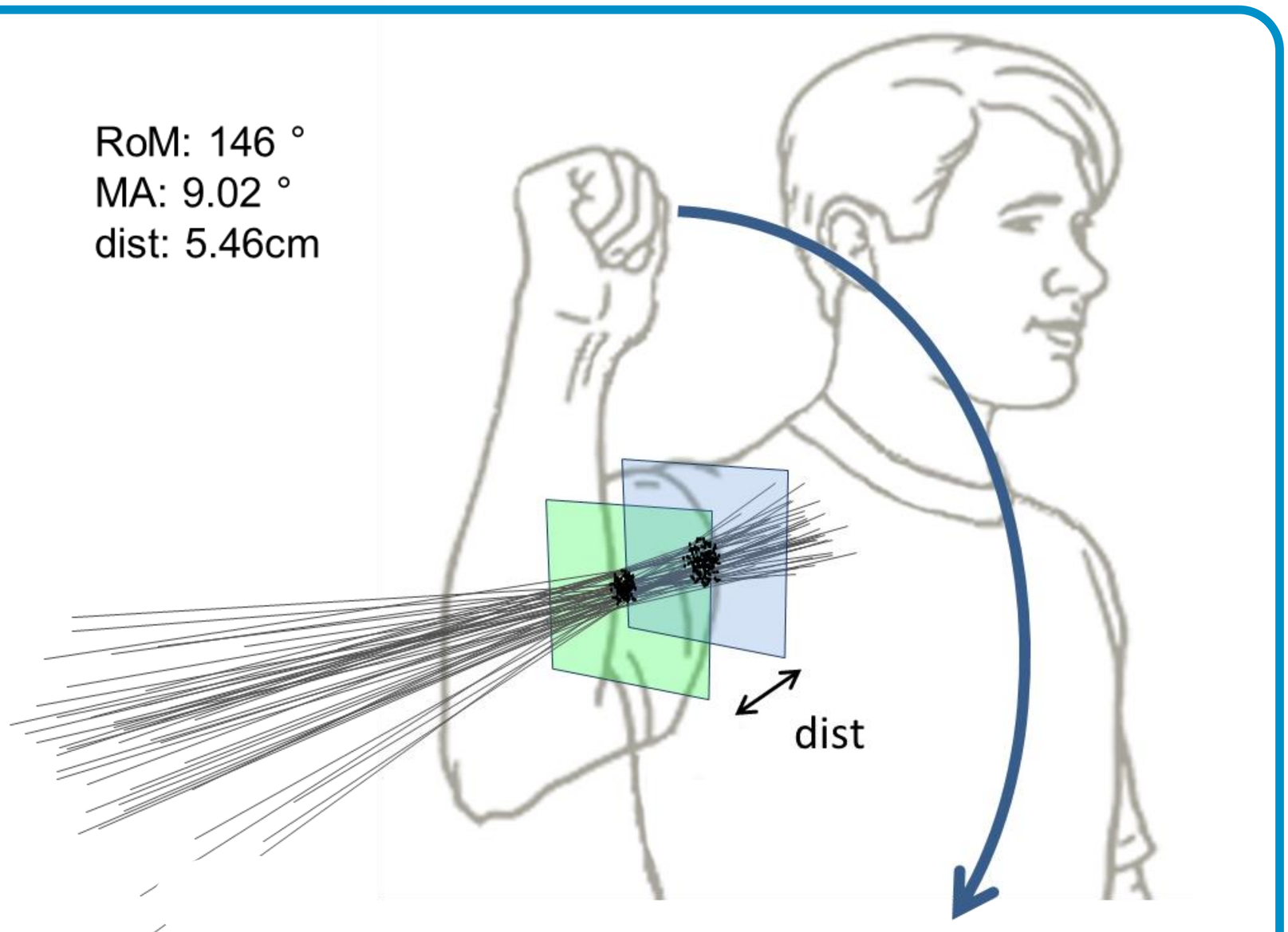

Figure 3 .....

RESULTS

Side dominance was asked to the subjects resulting in two left dominant subjects.

The data were divided in dominant and non-dominant side in order to evaluate differences in shoulder stability analysis between the two sides.

The shoulder rotations were analysed with the FHA technique, using angles of 10 degrees to compute each FHA. The dispersion of the FHA for each of the four conditions was computed using the minimum convex hull (CH) and mean angle (MA).

The convex hull area was also computed in the intersection of the vertical plane at the level of the Acromion.

The intraclass correlation coefficient (ICC) minimum detectable change and standard error of the means were computed for CH, MA and range of movement (RoM) in both arms. The table summarizes the results of the reliability analysis.

	Non-dominant side			Dominant side		
	ICC (95%CI)	SEM	MDC	ICC(95%CI)	SEM	MDC
RoM (°)	0.91 (0.76; 0.96)	5.29	14.67	0.89 (0.70; 0.96)	5.97	16.56
CHA (cm²)	0.93 (0.83; 0.97)	2.87	7.95	0.89 (0.72; 0.96)	2.36	6.53
CHA Acromion (cm²)	0.95 (0.86; 0.98)	2.81	7.78	0.88 (0.70; 0.95)	2.56	7.09
MA (°)	0.84 (0.57; 0.94)	0.54	1.48	0.82 (0.52; 0.93)	0.50	1.40

Table *Summary of the reliability parameters. ICC, conf. interv. (95%) upper and lower bounds, std error of the meas. (SEM) and minimum detectable change (MDC) are shown for the four variables analysed.*

CONCLUSIONS

The reliability of the helical axis parameters was excellent for both sides. Further investigations are needed to establish the clinical relevance of this technique in patients with SI.

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