

POSTURAL ESTIMATES FROM DIGITAL IMAGES: INTER- AND INTRA-TESTER RELIABILITY

To be presented at the World congress of Biomechanics in Calgary, August 5th 2002

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INTRODUCTION

The present investigation was designed to assess the ability of examiners to reliably place reflective anatomical markers over well-established skeletal landmarks: specifically, intra- and inter-tester (within and between) examiner consistency.

METHODS

Three examiners evaluated 12 subjects (6 male, 6 female; age=22.7±4.6 and 25.8±10.2, respectively). Prior to the assessment, examiners were trained on designated marker placement for approximately one hour, one week prior to testing. Examiners evaluated each of the experimental subjects on two separate days. Evaluations involved the palpation of anatomical landmarks and the placement of 32 reflective markers. Four digital images (Epson, 1024x768 pixels) were recorded against a calibrated backdrop, and then processed (Biotonix software) to provide 30 biomechanical measures of body segments in three planes: anterior, posterior and lateral. Comparison within and between testers was done by using inter-class correlation coefficients as outlined in Portney and Watkins (2000).

RESULTS AND DISCUSSION

A high degree of intra-rater reliability was found when comparing the measures for the two different measurement days (Table 1). With the exception of three measures, the measures demonstrated repeatability in marker placements (ICC=0.76 to 0.96). High inter-examiner reliability also was observed (ICC=0.61 to 0.97) for 27 of 29 parameters. Low consistency was associated with marker placements overlying pelvic and upper leg locations (and the measures generated from these marker placements). In particular, the markers placed over the superior border of the upper leg (greater trochanter) gave rise to the lowest inter-rater correlation values (i.e. 0.33, 0.45). Moderate correlations were associated with markers placed over the ankles, back of the knees and posterior pelvis.

SUMMARY

High inter- and intra-examiner reliability was found in the ability of examiners to place markers over anatomical markers that define optimal posture. Some locations appear to be more difficult than others to reliably place markers, and additional attention to training is warranted.

Table 1 Intra and inter-tester ICCs of the postural measures.

		INTRA	INTER
Anterior view	Shoulders	0.95	0.97
	Pelvis	0.82	0.82
	Knees	0.82	0.85
	Forehead	0.91	0.93
	Shoulders	0.91	0.96
	Umbilicus	0.91	0.92
	Pelvis	0.89	0.87
	Knees	0.80	0.75
	Toes	0.63	0.81
Posterior view	Shoulders	0.93	0.92
	Pelvis	0.78	0.70
	Knees	0.77	0.74
	Left foot	0.73	0.64
	Right foot	0.76	0.61
	Shoulders	0.81	0.79
	C7	0.82	0.76
	5T	0.82	0.70
	Pelvis	0.94	0.80
	Knees	0.90	0.71
	Ankles		
Lateral view	Head to shoulders	0.96	0.95
	Shoulders to pelvis	0.93	0.96
	Pelvis to hips	0.82	0.33
	Hips to knees	0.81	0.45
	Knees to feet	0.93	0.88
	Head	0.96	0.95
	Shoulders	0.71	0.77
	Pelvis	0.92	0.93
	Hips	0.88	0.69
	Knees	0.96	0.87
	Mean	0.85	0.79

REFERENCES

Portney, L.G., Watkins, M.P. (2000). *Foundations of clinical research: applications to practice (2nd ed.)*, Prentice Hall