Intra-rater Reliability of a Web-based Dynamic Assessment Tool

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INTRODUCTION

The Body Map[tm] is a web based transitional movement assessment tool used to detect muscle imbalances and generate custom exercise programs. Digital photos are taken at end range of motion (ROM) during double (DL) and single (SL) leg squats. A variety of judgments are made concerning the assessment of musculoskeletal deviations observed in the images. Corrective exercises are assigned based on movement observations addressing both rehabilitative and preventative interventions. An important aspect of any movement observation system that involves judgments, particularly with clinical application, is its within and between observer reliability. The present research focused on the within rater reliability.

PURPOSE

The purpose of this study was to determine the assessment reliability of a novice user of the Body Map[tm], trained using the instructional CD.

INSTRUMENTATION

METHODS

Twenty subjects (11 females and 9 males) with a mean age, height and weight of 34 ± 8 yrs., 169.5 ± 10.9 cm., 72.3 ± 12.9 kg. respectively, under went the Body Map[tm] assessment, consisting of images taken at the end ROM (max. knee flexion) during DL and SL squat tasks. During the DL, separate images were taken from the front (figure #1), back (figure #2) and side views (figures # 3). During the SL squat, images were taken from the front view (figures # 4 & 5) as subjects performed on both the right and left leg. All images were taken by an expert to eliminate possible confounding affect of errors in testing protocol. After undergoing the instructional training as presented through the training CD, the novice rater assessed all subjects' images on two separate occasions. A total 26 possible asymmetries can be assessed from the images captured during the Double Leg and Single Leg squat tasks. Intra-rater reliability of each item was assessed by calculating the percent agreement and kappa coefficient for each item between the two assessment sessions.

Figure #1: Front View

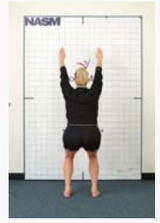


Figure #2: Back View

Figure #3: Side View

Figure #4: Single Leg - Left

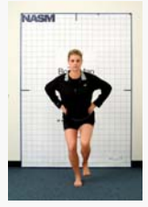


Figure #5: Single Leg - Right

RESULTS

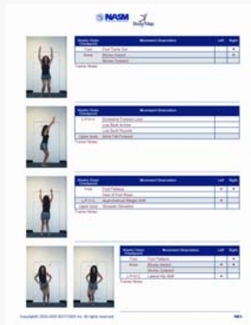
Percent agreement ranged from 70-100% with a mean value of 89.81% ± 9.22% for all possible items scored on the Body Map[tm]. The Kappa coefficients ranged from moderate to excellent with more than half (65%) in the good to excellent range. The overall mean score for the twenty six possible selections was 0.683 ± 0.246

Novice Day 1 vs. Day 2

	Kinetic Chain Checkpoint	% Agreement	Kappa Statistic	Rank
Anterior View	Left Foot Turns Out	80.00%	0.583	Moderate
	Right Foot Turns Out	95.00%	0.773	Good
	Left Knee Moves Inward	90.00%	0.608	Good
	Right Knee Moves Inward	90.00%	0.688	Good
	Left Knee Moves Outward	85.00%	0.571	Moderate
	Right Knee Moves Outward	95.00%	0.828	Excellent
Lat View	Excessive Forward Lean	100.00%	1.000	Excellent
	Low Back Arches	100.00%	1.000	Excellent
	Low Back Rounds	100.00%		
	Arms Fall Forward	90.00%	0.786	Good
Posterior View	Left Foot Flattens	85.00%	0.681	Good
	Right Foot Flattens	85.00%	0.681	Good
	Heel of Left Foot Rises	95.00%	0.773	Good
	Heel of Right Foot Rises	95.00%	0.773	Good
	Asymmetrical Weight Shift to Lef	100.00%	1.000	Excellent
	Asymmetrical Weight Shift to Rig	90.00%	0.692	Good
	Left Shoulder Elevation	100.00%	1.000	Excellent
	Right Shoulder Elevation	90.00%	0.762	Good
Anterior View Single Leg	Left Foot Flattens	90.00%	0.783	Good
	Right Foot Flattens	75.00%	0.444	Moderate
	Left Knee Moves Inward	80.00%	0.583	Moderate
	Right Knee Moves Inward	85.00%	0.583	Moderate
	Left Knee Moves Outward	100.00%		
	Right Knee Moves Outward	100.00%		
	Lateral Hip Shift to Left	70.00%	0.417	Moderate
	Lateral Hip Shift to Right	70.00%	0.417	Moderate
	AVERAGE	89.81%	0.714	Good
	Standard Deviation	9.22%	0.178	

Kappa Score Rating:

Excellent	1.00 - 0.80
Good	0.79 - 0.60
Moderate	0.59 - 0.40
Poor	0.39 - 0.20
Very poor	0.19 - 0.00



DISCUSSION

Use of the step by step instructional CD that accompanies the Body Map[tm] Starter Kit adequately trains a novice rater to consistently and reliably assess transitional movement asymmetries based on the Body Map[tm] system. Although the within examiner ratings were quite high, some target areas were observed that are likely to be improved with more attention to introductory training materials. This is likely to increase the reliability of what appears to be a robust and potentially relevant clinical tool.

CONCLUSIONS

Postural assessment has been used clinically for years. These clinical assessments have been qualitative in nature and have been criticized for their lack of objectivity and reproducibility. The Body Map[tm] was designed to provide the clinician with a tool to quantify postural assessment. Furthermore, by using transitional movement patterns, this postural assessment is a more functional reflection of an individual's postural habits and provides client friendly handouts to assist the clinician with their clinical intervention.