



CONSTRUCT VALIDITY OF FOUR NOVEL UPPER LIMB FUNCTIONAL TESTS FROM THE PERFORMANCE MATRIX



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Background

Until recently the focus of injury screening had been on testing joint range, muscle strength and muscle extensibility in Isolation^{1,3,4}

“Real function” has been defined as the influence of multiple muscle interactions acting on multiple joints in functionally orientated tasks¹.

Research suggests that functional movement tests have the potential to be used as predictive measure of injury^{5,6,7}.

Recently functional screening has also been promoted as a performance enhancement strategy.

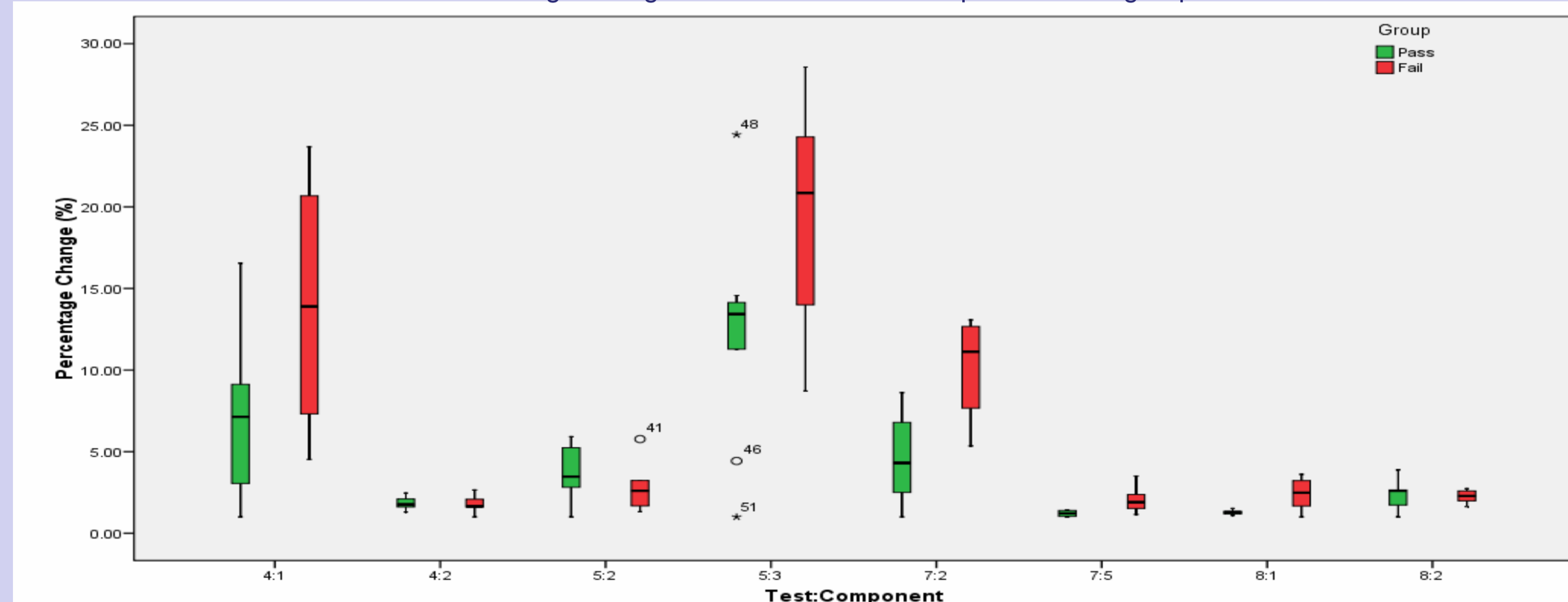
The Performance Matrix is an online movement screening tool that has been developed to identify uncontrolled movement (UCM) using a set of 10 functional tests; 5 low threshold (LT) and 5 high threshold (HT)².

Many current screening tools identify that there is a problem in movement control, but do not classify the uncontrolled movement. This tool has set out to classify the UCM in terms of 3 criteria²:

- 1) the site of UCM
- 2) the direction of UCM
- 3) the threshold of UCM

Results

Percentage change of movement between pass and fail groups



The amount of movement taking place during the test was calculated using vector angles and ranges from 1.76° -49.5° .

Of the 8 components assessed 5 displayed significant differences in the percentage change of movement between participants who passed and failed;

Low Threshold Tests	High Threshold Tests
Test 4 C1 (P=0.035)	Test 7 C2 (P=0.002)
Test 5 C3 (P=0.017)	Test 7 C5 (P=0.017)
	Test 8 C1 (P=0.006)

Components displaying significant differences were also those in which large amounts of movement were taking place. Testing relies solely on visual observation and therefore a lack of significance in some components may be due to the difficulty in distinguishing between small amounts of movements.

Aim

To evaluate the construct validity of 4 functional tests from the Performance Matrix.

Methods

Validation was carried out using a 3-Dimensional motion analysis system, CODA MPX 30. A novel 50 marker protocol was used.

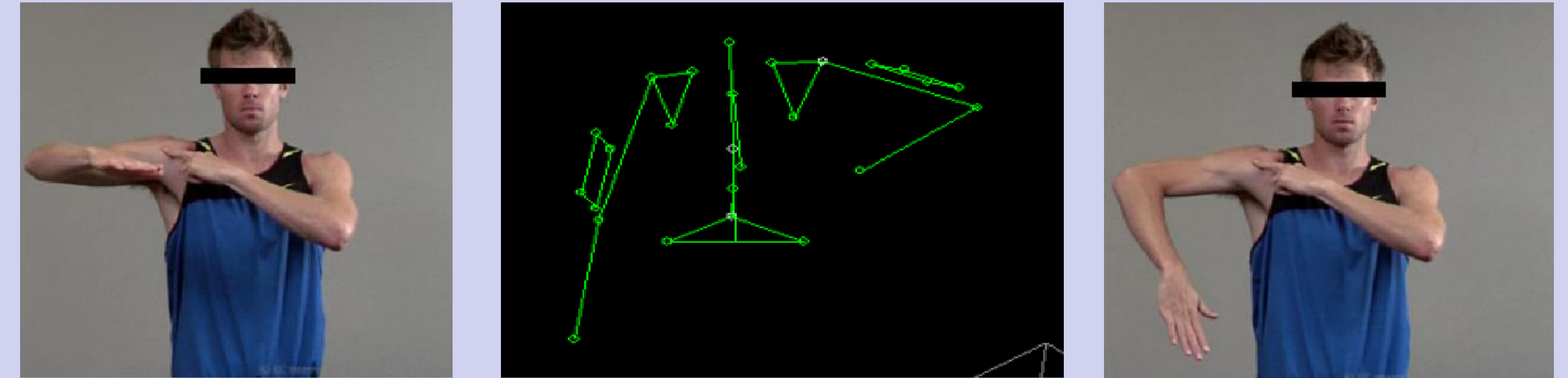
8 Participants were recorded using the CODA motion analysis system whilst being tested by one of 2 qualified performance matrix testers.

Vector angles were chosen from the whole body protocol which best simulated the movement being assessed in each given component. Two components from each test were selected and analysed using CODA motion analysis software.

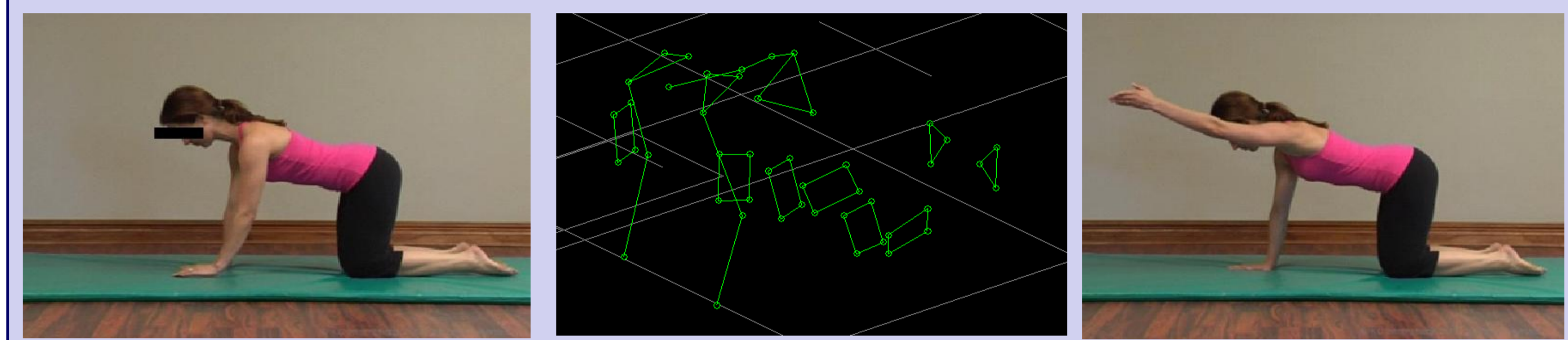
Independent t-tests were performed between pass and fail groups.

Functional Tests Used⁹⁻¹⁵

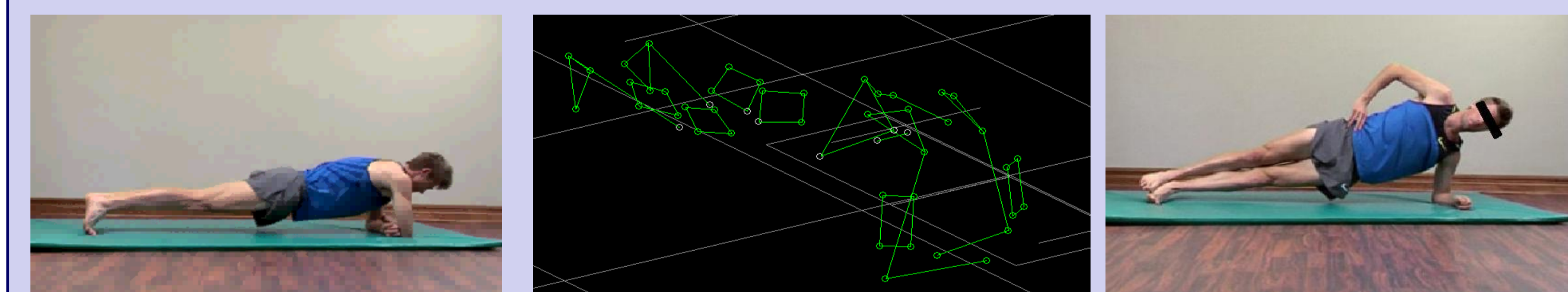
Test 4 (LT): Controlled Shoulder Internal Twist



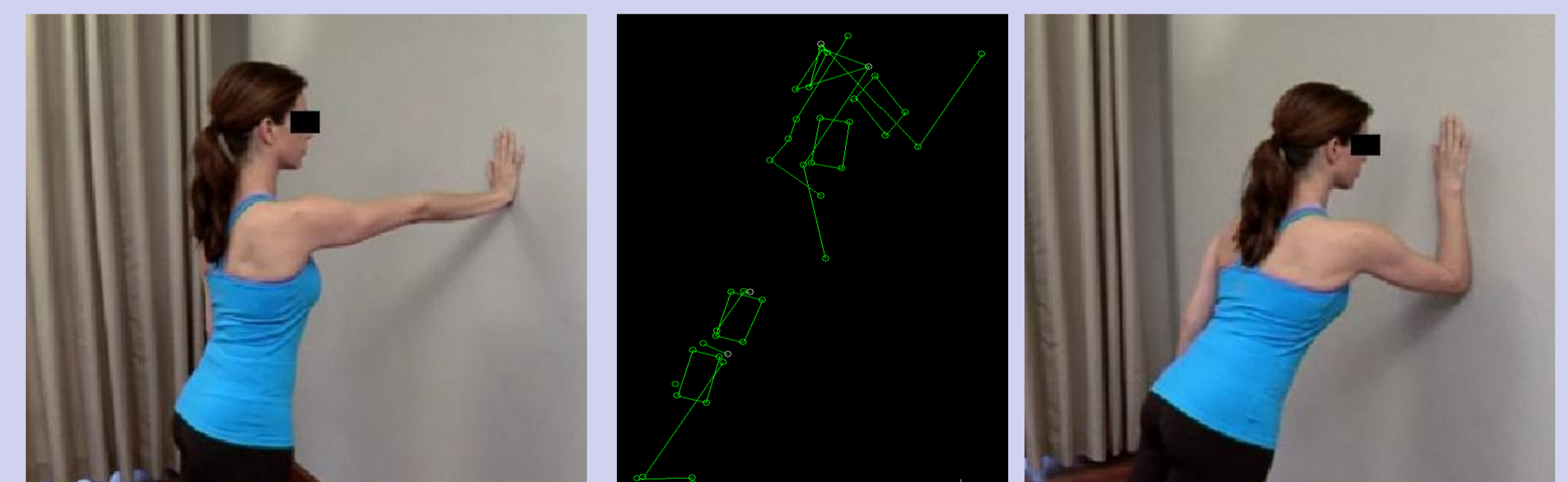
Test 5 (LT): 4 Point Arm Reach



Test 7 (HT): Plank and Lateral Twist



Test 8 (HT): One Arm Wall Push



All test pictures were taken from the Performance Matrix Website:
<http://www.theperformancematrix.com>

Conclusion

The results of this study suggest these functional tests have moderate construct validity, especially the high threshold tests . Under increased load the movement faults are more apparent and more clearly differentiate subjects with good control. What remains unclear is the point or threshold at which normal movement becomes uncontrolled, and what the tests mean in terms of injury risk. Longitudinal studies need to be carried out to determine the predictive nature of the findings however current data suggests that these tests have the potential to be used with confidence by health care professionals.

References:

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