OUTPUT CAPTURE 10-5 TEST VALIDATION

INTRO

To investigate the concurrent validity of the Output V2 IMU for measuring Reactive Strength Index (RSI) during a 10-5 repeated jump test, the system was compared to an optical measurement system (OptoJump). It is essential that a system has good validity and accuracy for evidence-based practice which is vital for any practitioners using the Output Capture system. Given the portability and practicality of the system, this will ensure that wherever and whenever practitioners are, they will be able to accurately measure the 10-5 repeated jump RSI test.

METHODOLOGY

An OptoJump was used as the ground truth for this validity investigation, as it has been shown to have excellent concurrent validity with force platform data. The Output V2 IMU was worn on the foot for the investigation while performing the 10-5 tests. A total of 28 participants participated in the study. They all completed the 10-5 test with their hands on their hips, with each participant completing 10 reps. A total of 1080 repeated jumps were recorded for the investigation. The Pearson Correlation Coefficient (r), Adjusted R^2, Mean Absolute Error (MAE), and Root Mean Square Error (RMSE) were used to complete the analysis.

RESULTS

The results can be seen in Table 1 below. All measurements were plotted in a correlation plot and can be seen in the figures below.

CONTACT TIME		FLIGHT TIME		RSI	
r	0.965	r	0.991	r	0.986
R^2	0.930	R^2	0.983	R^2	0.973
MAE	0.008 s	MAE	0.008 s	MAE	0.054 m/s
RMSE	0.010 s	RMSE	0.011 s	RMSE	0.075 m/s

Table 1 - Results for contact time, flight time and RSI scores of the 10-5 Test

CONCLUSION

These results show a strong correlation and excellent agreement between Output V2 IMU and OptoJump. A limitation of this investigation is the number of participants that were included. Further investigation could be carried out to validate Output V2 IMU across a wider cohort of participants of varying ability and varying repeated jump heights. However, given the high correlation and excellent agreement, it is expected that this accuracy will carry over to practical application of

10-5 Repeated Jump testing. Therefore, enabling practitioners to accurately measure RSI, without the usual laboratory constraints, using the Output V2 IMU.

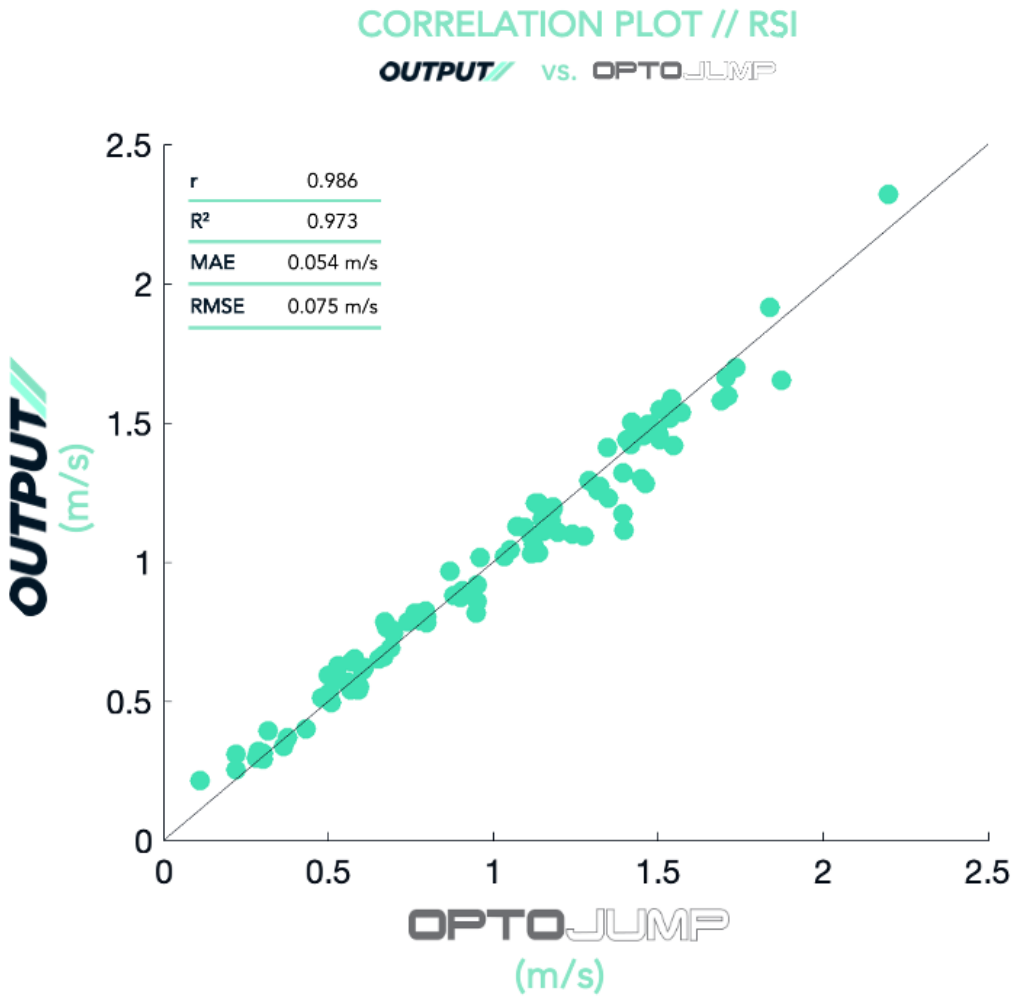

Figure 1 - Correlation Plot RSI Score

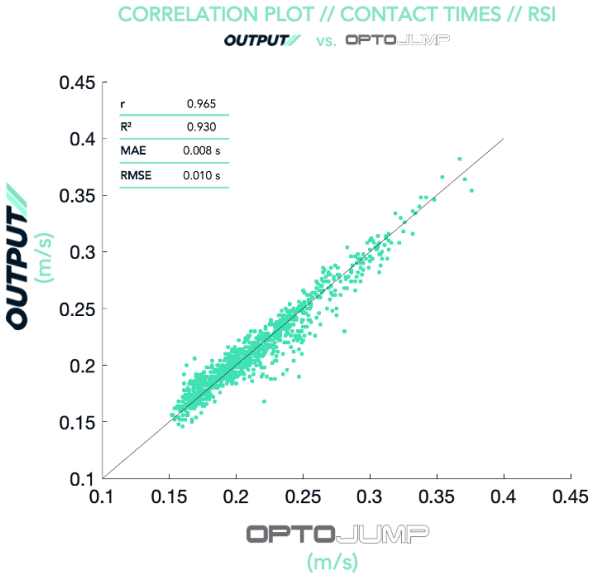

Figure 2 - Correlation Plot for Contact Times

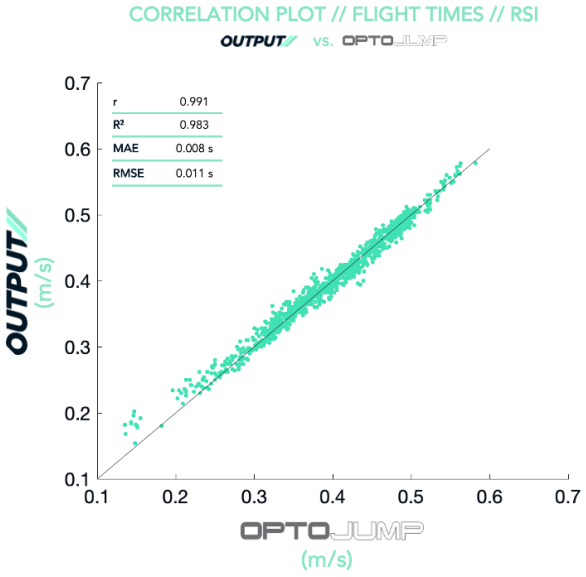

Figure 3 - Correlation Plot for Flight Times