Instrumented Egg: A Quantitative Assessment Tool of Hand Dexterity

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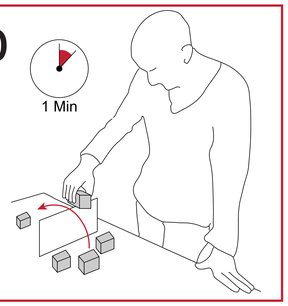
MOTIVATION

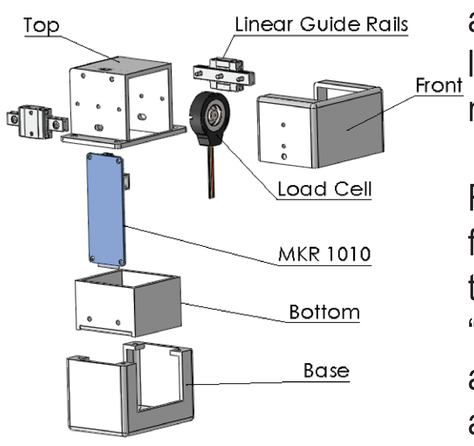
Current clinical assessment tools assess gross motor function but cannot measure ability to finely regulate force. The ability to handle fragile objects is vital aspect of hand dexterity.

BACKGROUND

In current test, Box-and-Blocks Test, patients move wooden blocks over a short vertical barrier as quickly as possible in 60 seconds.

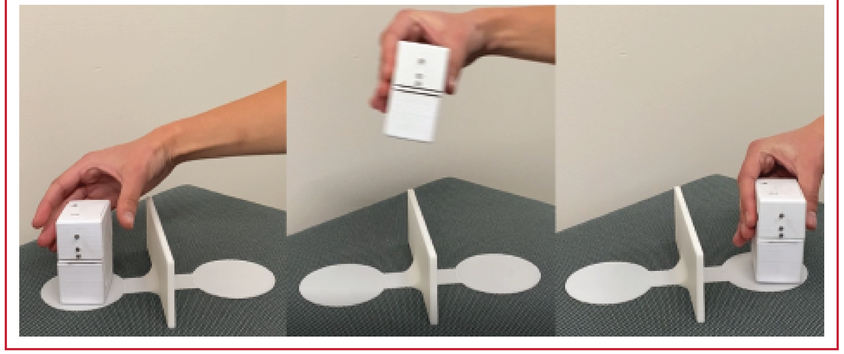


DEVICE DESIGN



The Instrumented Egg is a modified block with a load cell and wireless microcontroller.

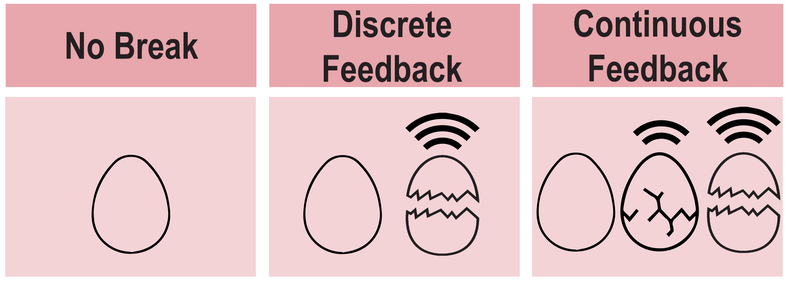
Real-time transfer of grip force data allows device to mimic fragile objects. A "break" threshold is set and indicated when applied force passes the threshold.



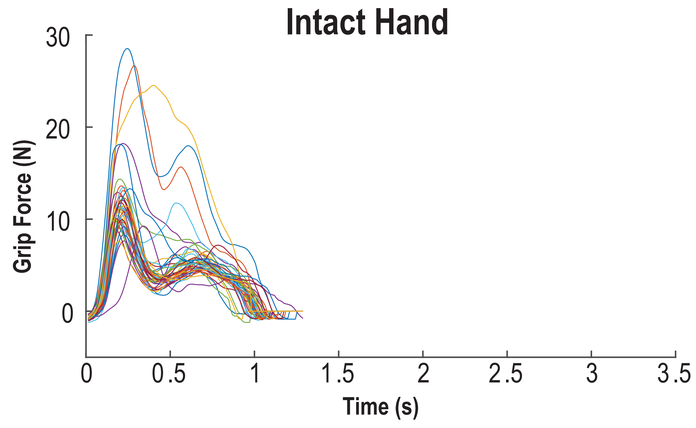
THREE ASSESSMENT MODES

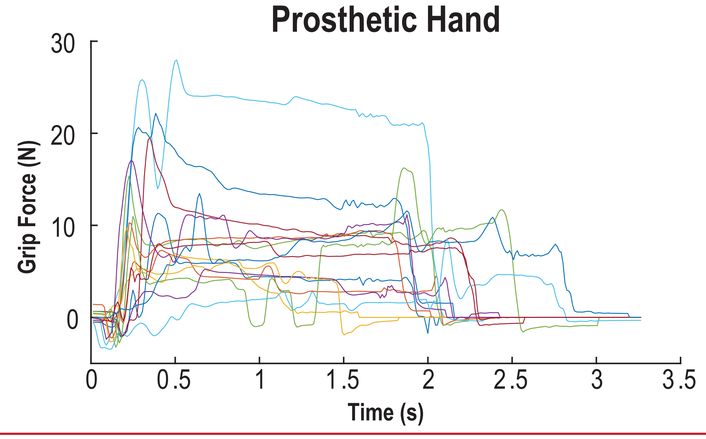
Participants transferred the Instrumented Egg 10 times under each of 3 conditions. Trials were completed with their intact hand and with an EMG-controlled prosthetic hand, held via bypass socket.

Instrumented Egg Conditions

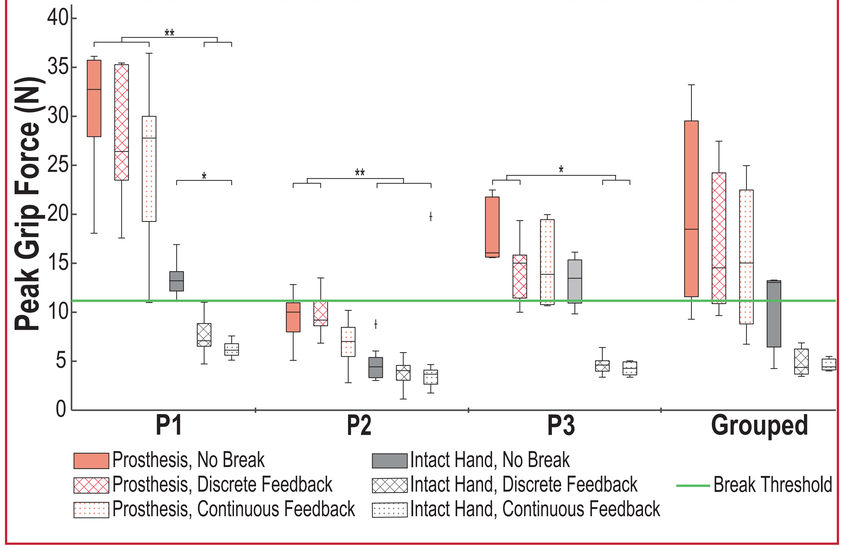


REAL-TIME GRIP FORCE TRACES

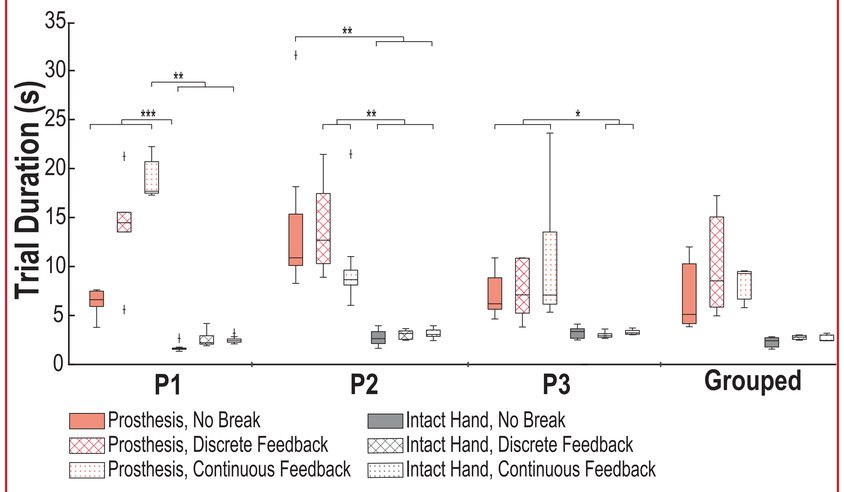




LESS PRECISION WITH PROSTHESIS



SLOWER TRANSFERS WITH PROSTHESIS



FUTURE WORK

Evaluate device with multiple patient populations and create interface for clinicians

ACKNOWLEDGEMENTS

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