

**Motion capture analysis of dexterity tests**

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A person’s ability to manipulate objects is known as their dexterity; it can be broken down in a variety of ways into different subtypes e.g. macro-dexterity, and micro-dexterity. Most people will go through their daily lives unaware of their dexterity level but for those who are recovering from stroke or loss of dexterity there are a wide variety of dexterity tests available to health practitioners to assess that person’s ability and need for support. Tests such as the Purdue Pegboard and Moberg Pickup are used to do this assessment, however they do not always test the dexterity subtypes required for activities of daily living (ADL).

This work is to identify the dexterity subtypes assessed by common dexterity tests using video ethnography and motion capture. Parallel to this, using the same methods, five ADL were assessed for the dexterity subtypes required to complete them.



Figure 1: Motion Capture Laboratory and markers on one candidate’s hands

This investigation was based on 8 healthy participants between 24 and 40 years old carrying out a selection of 5 dexterity tests and 5 ADLs, with the main goal being the identification of the biomechanical factors that account for dexterity. Additional assessment was carried out to relate the subtypes of dexterity to the performance levels achieved.

Dexterity Tests	Activities of Daily Living
Purdue Pegboard Right Hand	Pouring from a bottle to a glass
Purdue Pegboard Left Hand	Open an envelope
Purdue Pegboard Assembly	Eating with a spoon
Dexterity Types Test	Open bottle of soft drink
Moberg Pickup Test	Open box of cereal

Table 1: Dexterity Tests and ADLs assessed

It has been shown that in order to accurately measure hand function it is essential to take into account the dynamics, perception of movement and speed of manipulation as well as the relationship between all these factors and functional tasks. Establishing links between dexterity tests, ADLs and dexterity subtypes will aid health practitioners in their understanding of the assessment results. It will also help in the development of accurate, repeatable and inclusive methods for the measurement of dexterity, truly assessing a person’s ability to carry out ADLs and thus their capability to maintain their independence.

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