

## Supplementary material to Parry et al.

### Effects of Hand Configuration on the Grasping, Holding and Placement of an Instrumented Object in Patients With Hemiparesis

Tables S1—S6 provide a summary of significant correlations between clinical evaluations and iBox parameters measured across the four different hand configurations used. Values in bold represent the spearman correlation coefficients while the values in parentheses indicate the 95% confidence intervals for the correlation matrices detailed in section 2.8 of the manuscript. Columns of each table have been shaded in order to distinguish temporal parameters (green), grip force parameters (red), object angle (blue) and contact errors (grey).

**Table S1: Correlation between strength measured with grip force dynamometer (DGS) and variables measured with iBox**

|           | Force change during unloading  | Force change during release | Max grip force                 | Hold force average             | Grip force at <i>tp</i>        | Alpha at <i>tl</i>             |
|-----------|--------------------------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Precision | ns                             | ns                          | ns                             | <b>0.738</b><br>[-0.714/0.714] | <b>0.738</b><br>[-0.714/0.714] | ns                             |
| Top       | ns                             | ns                          | ns                             | ns                             | ns                             | <b>-0.718</b><br>[-.618/0.600] |
| Pinch     | ns                             | ns                          | ns                             | ns                             | ns                             | ns                             |
| Palmar    | <b>0.720</b><br>[-0.580/0.594] | ns                          | <b>0.762</b><br>[-0.580/0.577] | <b>0.867</b><br>[-0.573/0.580] | ns                             | ns                             |

**Table S2: Correlation between Fugl Meyer sensory function subscore and variables measures with iBox**

|           | Release phase duration           | Force change during unloading  | Force change during release    | Grip force at <i>tl</i>        | Max grip force                 | Hold force average             | Grip force at placement        | Grip force at <i>tr</i>         | Alpha at <i>tl</i>              | Alpha during hold phase          |
|-----------|----------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|----------------------------------|
| Precision | <b>-0.743</b><br>[0.719/0.719]   | <b>0.743</b><br>[-0.719/0.730] | <b>0.755</b><br>[-0.719/0.731] | <b>0.779</b><br>[-0.707/0.719] | <b>0.779</b><br>[-0.719/0.707] | <b>0.802</b><br>[-0.719/0.731] | <b>0.802</b><br>[-0.719/0.731] | ns                              | ns                              | ns                               |
| Top       | ns                               | ns                             | ns                             | ns                             | ns                             | ns                             | ns                             | ns                              | ns                              | ns                               |
| Pinch     | <b>-0.7306</b><br>[-0.616/0.594] | ns                             | <b>0.781</b><br>[-0.612/0.603] | ns                             | ns                             | ns                             | ns                             | <b>-0.731</b><br>[-0.608/0.603] | ns                              | ns                               |
| Palmar    | ns                               | ns                             | ns                             | ns                             | ns                             | ns                             | ns                             | ns                              | <b>-0.799</b><br>[-0.646/0.657] | <b>-0.835</b><br>[-0.630/0.6383] |

**Table S3: Correlation between Fugl Meyer motor function subscore and variables measures with iBox**

|           | Duration of unloading phase     | Release phase duration          | Force change during unloading | Force change during release    | Peak acceleration               | Grip force at <i>tr</i>         | Alpha during hold phase       |
|-----------|---------------------------------|---------------------------------|-------------------------------|--------------------------------|---------------------------------|---------------------------------|-------------------------------|
| Precision | <b>-0.731</b><br>[-0.731/0.719] | <b>-0.779</b><br>[-0.719/0.707] | ns                            | ns                             | <b>0.826</b><br>[-0.719/0.7186] | ns                              | <b>-0.728</b><br>[-0.634/646] |
| Top       | <b>-0.736</b><br>[-0.565/0.576] | <b>-0.766</b><br>[-0.580/0.577] | ns                            | ns                             | ns                              | ns                              | ns                            |
| Pinch     | ns                              | <b>-0.705</b><br>[-0.613/0.604] | ns                            | ns                             | ns                              | <b>-0.728</b><br>[-0.604/0.613] | ns                            |
| Palmar    | <b>-0.805</b><br>[-0.585/0.573] | <b>-0.805</b><br>[-0.584/0.587] | <b>0.8787</b><br>[-0.587/587] | <b>0.714</b><br>[-0.569/0.587] | ns                              | ns                              | ns                            |

**Table S4: Correlation between Fugl Meyer Evaluation (FME) total score and variables measured with iBox**

|           | Unloading phase duration        | Release phase duration          | Force change during unloading  | Force change during release    | Maximal grip force           | Grip force at <i>tr</i>         | Alpha at <i>tl</i>              | Alpha during hold phase         | Alpha at <i>tp</i>              |
|-----------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Precision | <b>-0.862</b><br>[-0.731/0.731] | <b>-0.838</b><br>[-0.719/0.719] | <b>0.814</b><br>[-0.707/0.719] | <b>0.755</b><br>[-0.731/0.719] | ns                           | ns                              | ns                              | <b>-0.829</b><br>[-0.628/0.638] | <b>-0.757</b><br>[-0.757/0.775] |
| Top       | ns                              | ns                              | ns                             | ns                             | ns                           | ns                              | ns                              | ns                              | ns                              |
| Pinch     | ns                              | <b>-0.790</b><br>[-0.612/0.598] | ns                             | ns                             | ns                           | <b>-0.872</b><br>[-0.598/0.607] | ns                              | ns                              | ns                              |
| Palmar    | <b>-0.842</b><br>[-0.579/0.591] | <b>-0.758</b><br>[-0.596/0.589] | <b>0.867</b><br>[-0.579/0.582] | <b>0.709</b><br>[-0.586/0.590] | <b>0.702</b><br>[-0.584/586] | ns                              | <b>-0.811</b><br>[-0.639/0.644] | ns                              | ns                              |

**Table S5: Correlation between Jebsen Taylor Hand Function Test (JTT) and variables measures with iBox**

|           | Duration of unloading phase    | Release phase duration         | Force change during unloading   | Force change during release     | Lag time (max grip to peak acc) | Grip force at <i>tl</i>        | Alpha at <i>tg</i>           | Alpha during hold phase        | Alpha at <i>tp</i>             |
|-----------|--------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|------------------------------|--------------------------------|--------------------------------|
| Precision | ns                             | ns                             | ns                              | ns                              | ns                              | ns                             | ns                           | ns                             | ns                             |
| Top       | <b>0.833</b><br>[-0.714/0.716] | ns                             | <b>-0.762</b><br>[-0.714/0.714] | ns                              | ns                              | <b>0.810</b><br>[-0.714/0.714] | <b>0.762</b><br>[-0.75/0.75] | ns                             | ns                             |
| Pinch     | ns                             | <b>0.786</b><br>[-0.714/0.738] | <b>-0.714</b><br>[-0.714/0.714] | <b>-0.810</b><br>[-0.714/0.714] | <b>0.738</b><br>[-0.714/0.714]  | ns                             | ns                           | ns                             | <b>0.786</b><br>[-0.714/0.714] |
| Palmar    | ns                             | ns                             | ns                              | ns                              | ns                              | ns                             | ns                           | <b>0.976</b><br>[-0.771/0.771] | ns                             |

**Table S6: Correlation between Frenchay Arm Test (FAT) and variables measured with iBox**

|           | On touches                      | Force change during unloading  | Grip force at <i>tg</i>         | Alpha at <i>tl</i>              | Alpha during hold phase         | Alpha variance during hold      |
|-----------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Precision | ns                              | ns                             | ns                              | ns                              | ns                              | ns                              |
| Top       | <b>-0.724</b><br>[-0.584/0.589] | <b>0.706</b><br>[-0.582/0.579] | <b>-0.740</b><br>[-0.572/0.582] | <b>-0.703</b><br>[-0.598/0.621] | ns                              | <b>-0.846</b><br>[-0.632/0.640] |
| Pinch     | ns                              | ns                             | ns                              | <b>-0.780</b><br>[-0.611/0.616] | ns                              | ns                              |
| Palmar    | ns                              | ns                             | ns                              | ns                              | <b>-0.787</b><br>[-0.628/0.638] | <b>-0.787</b><br>[-0.637/0.634] |