Supplementary Material 1: Definition of the segmental coordinate system and the joint coordinate centers.

The segmental coordinate systems were defined as follows:

1) Torso coordinate system:
   \( \overrightarrow{eto1} \) (mediolateral axis) is perpendicular to the plane formed by the four torso markers.
   \( \overrightarrow{eto3} \) (vertical axis) is perpendicular to \( \overrightarrow{eto1} \) and lies in the plane formed by the connecting line between the middle points of the markers STCA/SPT8 and STCR/SPC7 and \( \overrightarrow{eto1} \).
   \( \overrightarrow{eto2} \) (anteroposterior axis) is perpendicular to \( \overrightarrow{eto1} \) and \( \overrightarrow{eto3} \).

2) Shoulder girdle coordinate system:
   \( \overrightarrow{esg1} \) (mediolateral axis) is the connecting line between the left and the right acromion markers.
   \( \overrightarrow{esg3} \) (vertical axis) is perpendicular to \( \overrightarrow{esg1} \) and lies in the plane formed by the connecting line between the GHJC calculated as in Rab et al [16] and the acromion marker and \( \overrightarrow{esg1} \).
   \( \overrightarrow{esg2} \) (anteroposterior axis) is perpendicular to \( \overrightarrow{esg1} \) and \( \overrightarrow{esg3} \).

3) Upper arm coordinate system:
   \( \overrightarrow{eua1} \) (mediolateral axis) corresponds to the functionally estimated EJA.
   \( \overrightarrow{eua3} \) (vertical axis) is perpendicular to \( \overrightarrow{eua1} \) and lies in the plane formed by the GHJC and \( \overrightarrow{eua1} \).
   \( \overrightarrow{eua2} \) (anteroposterior axis) is perpendicular to \( \overrightarrow{eua1} \) and \( \overrightarrow{eua3} \).

4) Forearm coordinate system:
   \( \overrightarrow{efa3} \) (vertical axis) is the connecting line between the WJC and the EJC.
   \( \overrightarrow{efa1} \) (mediolateral axis) is perpendicular to \( \overrightarrow{efa3} \) and lies in the plane formed by the markers WRA and WRB and the EJC.
   \( \overrightarrow{efa2} \) (anteroposterior axis) is perpendicular to \( \overrightarrow{efa1} \) and \( \overrightarrow{efa3} \).

5) Hand coordinate system:
   \( \overrightarrow{eha2} \) (anteroposterior axis) is perpendicular to the plane formed by the four hand markers.
\( \vec{eha3} \) (vertical axis) is perpendicular to \( \vec{eha2} \) and lies in the plane formed by the connecting line between the middle points of the markers DM2/DM5 and CM2/CM5 and \( \vec{eha2} \).

\( \vec{eha1} \) (mediolateral axis) is perpendicular to \( \vec{eha2} \) and \( \vec{eha3} \).

Joint coordinate systems were defined as follows:

1) Sternoclavicular joint coordinate system:
\( \vec{esc1} \) (flexion/extension axis) is fixed at the proximal segment (torso) and corresponds to \( \vec{eto1} \).
\( \vec{esc3} \) (internal/external rotation axis) is fixed at the distal segment (shoulder girdle) and corresponds to \( \vec{esg3} \).
\( \vec{esc2} \) = floating axis (adduction/abduction axis) is perpendicular to \( \vec{esc1} \) and \( \vec{esc3} \).

2) Glenohumeral joint coordinate system:
\( \vec{egh2} \) (adduction/abduction axis) is fixed at the proximal segment (shoulder girdle) and corresponds to \( \vec{esg2} \).
\( \vec{egh3} \) (internal/external rotation axis) is fixed at the distal segment (upper arm) and corresponds to \( \vec{eua3} \).
\( \vec{egh1} \) = floating axis (flexion/extension axis) is perpendicular to \( \vec{egh2} \) and \( \vec{egh3} \).

3) Elbow joint coordinate system:
\( \vec{el1} \) (flexion/extension axis) is fixed at the proximal segment (upper arm) and corresponds to \( \vec{euu1} \).
\( \vec{el3} \) (internal/external rotation axis) is fixed at the distal segment (forearm) and corresponds to \( \vec{efa3} \).
\( \vec{el2} \) = floating axis (adduction/abduction axis) is perpendicular to \( \vec{el1} \) and \( \vec{el3} \).

4) Wrist joint coordinate system:
\( \vec{wr1} \) (flexion/extension axis) is fixed at the proximal segment (forearm) and corresponds to \( \vec{efa1} \).
\( \vec{wr3} \) (internal/external rotation axis) is fixed at the distal segment (hand) and corresponds to \( \vec{eha3} \).
\( \vec{wr2} \) = floating axis (adduction/abduction axis) is perpendicular to \( \vec{wr1} \) and \( \vec{wr3} \).