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Muscle synergies are coordinative structures which act as discrete low-level units typically combined to construct a diverse range of physical movements. By grouping and operating muscles that do not naturally belong in a synergy innate activations may be overwritten to form abstract muscle synergies. We hypothesise that the flexibility of the nervous system is such that individuals may supersede innate biomechanical constraints on upper-limb muscles and joints, and that this ability may be exploited to develop abstract muscle synergies for the purpose of myoelectric-control. We are currently running experiments to quantify this capability in a mixed clinical population of amputees and users with congenital limb deficiencies. Users are assessed in their ability to use a myoelectric-computer interface (MCI) under two conditions; using a minimal pair of electrodes and using a data-driven weighted combination of electrodes. The MCI presents a two-dimensional cursor, controlled by flexible contraction and co-contraction of paired muscles / muscle groups. User performance is measured primarily according to their ability to move the cursor to, and hold it within, a series of rapidly presented targets. Preliminary results demonstrate that users are able to coordinate novel patterns of muscle activity for cursor control. At present this equates to the differentiation of either four or eight targets according to users current ability levels. Data-driven spatial weighting of sensors has led to more reliable results and typically produces a control signal dynamic which users prefer over minimal pairs of electrodes.