

**0-0012****Motor representation of the limb with brachial plexus avulsion injury is directly associated with neuropathic pain intensity**

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**【Purpose】** We revealed that pain caused by brachial-plexus-avulsion-injury (BPI) ameliorated after re-acquiring voluntary movement representation of the affected limb by the mirror visual feedback treatment (Sumitani et al 2008). Based of our previous findings, we investigated the relationship between pain intensity and motor representation in an objective method using the circles-lines bimanual coordination task.

**【Methods】** Eight BPI patients participated in this study. While blindfolded, they were asked to repeatedly perform uni-manual drawing movements (drawing vertical lines back and forth on the tablet PC monitor by the intact hand) or bimanual movements (drawing the lines by the intact hand and simultaneously intending to draw circles by the affected hand) for 20 seconds. The patients could not draw circles by the affected hand because of motor paralysis. An oval shape transfiguration of the repeatedly-drawn vertical lines by the intact hand when simultaneously intending to draw circles by the affected hand indicates that voluntary movement representations of the affected hand can influence those of the intact hand. Namely, the oval transfiguration suggests confirmation of the voluntary motor representation of the affected limb. In order to quantify the oval shape of the lines drawn by the intact hand, an arbitrary ovalization index (OI) was calculated as the standard deviation of the intact hand trajectories from the absolute vertical line. We analyzed the relationship between the OI value and their pain intensity measured by numeric rating scale (NRS).

**【Results】** A significant negative correlation was observed between the OI value ( $8.24 \pm 1.68\%$ , mean  $\pm$  SD) and NRS ( $4.62 \pm 1.86$ ) ( $r = -0.66$ ,  $p < 0.05$ ). The patients, demonstrating the noticeable oval transfiguration of the intact hand movements, suffered less pain, and vice versa.

**【Discussion】** Our present finding suggests our methodology can assess motor representation objectively, and implies that BPI patients suffering severe pain merely confirm vague motor representation of the affected limb.