

EDITORIAL COMMENTARY

When aliens invade: multiple mechanisms for dissociation between will and action

The term alien hand sign was coined by Joseph Bogen to describe a curious wayward behaviour occasionally seen during recovery from transection of the corpus callosum.¹ Such patients would react with surprise, concern, and perplexity at the capacity of their non-dominant hand to perform purposeful acts over which they felt no control. The term derived from an appellation originated by Brion and Jedynak—"le signe de la main étrangère"—describing behaviours seen in patients with callosal tumours.² Although initially thought to be a problem affecting the non-dominant hand of patients with impaired callosal transmission, an identical problem affecting either the dominant or non-dominant hand occurs in patients with lesions damaging the mesial surface of the contralateral frontal lobe.³⁻⁴ As Bundick and Spinella⁵ point out in this issue of the *Journal*, pp 83–85, this particular sign may be a component of at least three different constellations or syndromes each of which has a different neuroanatomical association.⁵ These symptom constellations seem related to what Denny-Brown termed "kinetic apraxias" in which sensorimotor linkages during involuntary actions are biased in distinctive magnetic or repellent ways.⁶

The callosal syndrome involves the non-dominant hand and is characterised by prominent and relatively isolated problems with intermanual conflict. The patient typically shows little evidence of limb paresis. In the frontal form, the patient often presents with a crural paresis of the limbs contralateral to the affected hemisphere. In addition, the frontal form involves associated release of involuntary exploratory behaviours including reach-and-grasp subroutines which bring the palmar surface of the affected hand into direct and self sustaining contact with surrounding objects or parts of the patient's own body. The patient is often rendered involuntarily attached to objects in their surroundings showing difficulty with voluntary release of grasped objects. The frontal form tends to be a dissociation primarily between will and action. There is no suggestion of sensory distortion or anosognosia. They show no lack of

recognition of the limb as part of their own body schema even though they feel no direct attachment to the source of its purposeful direction.

This seems to contrast sharply with findings in patients with the posterior parieto-occipital form in which the involuntary movement of the hand involves an avoidance of palmar surface contact. The hand tends to levitate into the air away from support surfaces with a bias toward an extended posture at the metacarpophalangeal and wrist joints exacerbated by anticipated palmar contact. An instability of motor control may also be noted in which the affected hand displays a prominent ataxic motion in finger to nose testing characterised by a hesitation and overt struggle to touch the examiner's finger. Sensory impairment is prominent with the patient often showing evidence of visual and somatosensory dysfunction as well as body schema distortion.

The appearance of alien hand sign alone is thus relatively non-specific neuroanatomically. Its context of symptoms and signs, however, can help to differentiate separable pathways and corresponding disruptions in distributed brain systems which lead to the end point of dissociation between self perceived will and purposive action.

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