Painful hand and moving fingers (PHMF) was first described in 1985 in a patient suffering from radiation-induced brachial plexopathy, with pain and movements of all fingers.\(^1\) Since then, few cases have been reported, generally in patients with peripheral nerve, plexus, or root disease.\(^2\) Deep aching or pulling pain often precedes movements by several months. Involuntary movements are composed of complex sequences of flexion/extension and abduction/adduction, which cannot be imitated. Treatment is unsatisfactory. Similar symptoms occur in the inferior limb in the much more common syndrome of painful legs and moving toes (PLMT).\(^5,6\) We report a patient with unilateral PHMF after median nerve lesion in whom tactile stimulation in the same territory simultaneously interrupted both the movement and the pain.

Case report. A 55-year-old woman was referred to our center for pain and movement in the left hand. Two years before, she had suffered traumatic fracture of the left distal part of the radius bone. After conservative treatment, she developed continuous pain, hyperalgesia, and sudomotor changes and was diagnosed with complex regional pain syndrome (CRPS), treated by pamidronate and calcitonin for 2 years. She reported no abnormal movements of all fingers.\(^1\) Since then, few cases have been reported, generally in patients with peripheral nerve, plexus, or root disease.\(^2\) Deep aching or pulling pain often precedes movements by several months. Involuntary movements are composed of complex sequences of flexion/extension and abduction/adduction, which cannot be imitated. Treatment is unsatisfactory. Similar symptoms occur in the inferior limb in the much more common syndrome of painful legs and moving toes (PLMT).\(^5,6\) We report a patient with unilateral PHMF after median nerve lesion in whom tactile stimulation in the same territory simultaneously interrupted both the movement and the pain.

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Disclosure: the authors report no conflicts of interest.

Received December 12, 2005. Accepted in final form March 24, 2006.

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however, in our patient, both movement and pain could be immediately suppressed by tactile stimulation in the median nerve territory.

Marsden et al. reported abnormal movement modified by sensory stimulation of muscle spasms and tremor and CRPS. In their patient, an oscillation at 7 Hz could be induced by the application of a fork over the thenar eminence (their case 1). However, this effect was not observed after skin anesthesia, suggesting that some symptom-modifying impulses were conveyed by skin sensation. Also, cases of painless limbs and moving extremities (PlessLME) were described, one of them with a striking suppressive effect of tactile stimulation. These clinical entities could be viewed as different manifestations of a symptom spectrum, from CRPS to PlessLME, with PHMF and PLMT in between.

Our patient further supports this hypothesis, illustrating the intimate relationship between pain and involuntary movement, through their simultaneous suppression by the same stimulus.

A mechanism involving sensorimotor reorganization secondary to disturbed sensory input may cause PHMF, but also CRPS, Déjerine-Roussy syndrome, and spinal myoclonus and focal dystonia and was long ago evoked as an explanation for involuntary movement after peripheral lesions. It gained support from experimental data that showed changes in the pattern of neuronal activation after peripheral nerve injury to happen anywhere along the sensory pathways, from the dorsal horn to the somatosensory cortex. However, other authors have advocated supraspinal mechanisms or the combination of both central and peripheral lesions.

In our patient, a central mechanism is strongly supported by the different levels of afferent (median nerve, roots C6 and C7) and efferent (radial and ulnar nerves, roots C7 to T1) pathways, along with the delay of several months between trauma and occurrence of symptoms. Sensory-evoked potentials, back-averaging, cerebral MRI, and, above all, fMRI speak against a movement generator situated above the spinal cord. In particular, a cortical origin seems improbable, as one would have expected a reduction of activity in the third finger motor cortex region of interest upon tactile stimulation of the second finger (which interrupted the movement) compared with rest condition, when the involuntary movement was present.

This therefore suggests that the critical events leading to pain and involuntary movements probably took place in the spinal cord and were induced by sensory input alterations due to peripheral nerve damage of traumatic or surgical origin. The clinical picture may have been favored by previous CRPS, in which abnormal movements are not uncommon. The inhibitory effect of the sensory stimulus on both pain and movement could be viewed as a gating mechanism, tactile information acting on neuronal networks at a spinal cord level, inhibiting the transmission of pain to upper centers, and acting on interneurons implicated in the genesis of the involuntary movement.

References

Figure. (A and B) Needle EMG in rest conditions showing continuous spontaneous burst activity in the extensor digitorum communis muscle (A) and in the second dorsal interosseous muscle (B). (C) Interruption of spontaneous activity upon tactile stimulation in the median nerve territory. (D) fMRI during voluntary flexion-extension movements of the left third finger, showing activity in the corresponding primary contralateral frontal cortex. (E) fMRI activity in the region of interest defined in (D), expressed as a percentage of change compared to rest conditions. Condition 1: movement stopped by tactile stimulation of second finger; condition 2: tactile stimulation of fifth finger, not influencing the spontaneous movement; condition 3: voluntary movement (see text for comment).

NeuroImages

Transcranial cerebral herniation after chronic subdural hematoma treatment with no dura closure
F. Doglietto, MD; G. Sabatino, MD; D. Policicchio, MD; B. Tirpakova, MD; and A. Albanese, MD, Rome, Italy

Ten days after surgical evacuation of a left hemisphere chronic subdural hematoma (figure, A), a 57-year-old man presented with sudden right arm monoparesis and dysarthria, associated with local scalp swelling. Neuroradiologic examination documented a cerebral herniation through the previous craniectomy (figure, B through E). Urgent enlargement of the craniectomy and duroplasty were performed (figure, F). The patient’s condition improved dramatically, though fine movements of the hand were still impaired at 6-month follow-up.

Cranietomy and no dural closure have been suggested as treatment for chronic subdural hematoma.1,2 Local cerebral edema is possible after hematoma surgical evacuation and cerebral herniation should be considered a possible complication if the dura is not closed when a craniectomy is performed.

Disclosure: The authors report no conflicts of interest.
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Neurology 2006;67;493
DOI 10.1212/01.wnl.0000218283.98647.d4

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