

Reflecting on Novel Approaches to Pain Management: A Case of Successful Use of Mirror Therapy

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BACKGROUND

Recent advances in our understanding of the neurophysiology of pain have established that maladaptive cortical mechanisms underpin Complex Regional Pain Syndrome Type 1 (CRPS 1). The following central changes have been observed:

- Shrinkage of the cortical representation of the affected limb in the primary somatosensory cortex leading to disruption of sensory cortical processing
- Disrupted body schema
- Disinhibition of the motor cortex
- Loss of laterality recognition in patients with CRPS and phantom limb pain

There is a relationship between this maladaptive cortical reorganization, pain intensity, and function. It has been suggested that treatments that specifically target this maladaptive plasticity must be integrated into conventional care.

Mirror therapy is one such treatment approach that is designed to “train the brain,” with the idea that if cortical changes are the underpinnings for CRPS 1, then reorganizing the cortex will help decrease pain. Mirror feedback from the unaffected limb tricks the brain into visualizing the affected side as moving in a pain-free normal movement pattern. It is thought that this visual feedback reconciles motor output and sensory feedback through activation of pre-motor and motor cortices which have intimate connections with visual processing areas.

As requested by our institution (IWK Health Centre), parental consent was obtained before submitting this abstract.

Special thanks to the Lacombe family for letting us tell Mathieu's story.

CASE HISTORY

Mathieu was a 15 year-old boy with relapsed rhabdomyosarcoma and metastatic disease. He was referred to Physiotherapy complaining of acute left hand pain and decreased sensation post-arterial line insertion while in PICU recovering from extensive abdominal surgery. He characterized his pain as burning, cutting, numbness and tingling and reported a significant decrease in his left hand function which limited his ability to play video games. Pain was rated at 9/10 constantly. His symptoms followed a classic median nerve distribution.

Objective physiotherapy examination of the left hand revealed these findings: a resting clawhand deformity; pin prick hyperalgesia and brush allodynia over the sensory distribution of the median nerve; significant wasting of the thenar eminence; full and painful passive range of motion of the thumb; no active thumb opposition or adduction; positive median nerve neurodynamic test; and decreased overall dexterity.



INTERVENTION

Pharmacological therapy included fentanyl and hydromorphone as part of his abdominal surgery pain management. Gabapentin was added at the same time that physiotherapy was consulted.

Physiotherapy management consisted of three weeks of mirror therapy (two thirty to sixty minute sessions per day). Mirror therapy involved asking Mathieu to place his affected hand out of view inside the mirror box. His unaffected hand was placed outside the box, in front of the mirror. Mathieu was then instructed to look in the mirror (at the mirror image of the unaffected hand) and move the unaffected hand, creating the illusion that the injured hand is moving without pain.

OUTCOME

Mathieu reported immediate pain reduction following each mirror therapy session by two points on a ten point scale. Following three weeks of daily mirror therapy, he reported his baseline pain at 5 out of 10 and was able to return to playing video games.

CONCLUSIONS

This case illustrates the use of mirror therapy to reduce pain and functional disability. The addition of gabapentin at the same time as the physiotherapy consult suggests a possible pharmacological explanation for the reported pain relief. However, the direct stimulus-response relationship of mirror therapy sessions and pain relief implies the outcome is more likely attributable to the mirror therapy intervention.