

Can chronic hand pain be treated with sensory modulation? A single case study

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Introduction

Extensive cortical reorganization has been demonstrated in chronic pain conditions such as back pain and CRPS^{1,2,3,4}. The change in sensory experience seen in these conditions results in remapping of the somatosensory and motor cortex, thalamus and brain stem.

The motor cortex representation of the affected area enlarges which correlates with poor function in motor planning tasks particularly when integrated vision and proprioception are required⁴

In CRPS, a direct correlation between the extent of cortical re-organization and the level of pain has been demonstrated; with the pain reducing as the map reverses.

This case study demonstrates how the treatment modalities that focus on addressing the cortical reorganisation associated with CRPS, may be useful in other chronic pain situations. Intervention in therapies out-patient setting can have a positive impact.

Case Study

Patient was reviewed by a Clinical Physiotherapy Specialist (CPS) and Clinical Occupational Therapy Specialist (COTS) as no response to previous treatment.

Right hand dominant female, 23 years of age, electrical engineer, guitar player in band, enjoyed Pilates & Yoga

History of Presenting Condition – 7 year history diffuse wrist and hand pain, worsened whilst at University, now plateaued but constant 8-9/10 VAS.

No trauma, onset not associated to any increase/change in activity

Past Medical History – high resting BP & heart rate

Pain relief - Pregabalin, Co-codamol and Diazepam

Did not fit Budapest Diagnostic Criteria for CRPS

Exacerbating activities

Lifting pans/shopping bags. Pushing door open (extended wrist)

Changing gear in car. Driving. Unable to play guitar

Numerous previous treatments: Steroid injections, ultrasound, physiotherapy, acupuncture, splintage, functional rehab.

Investigations:

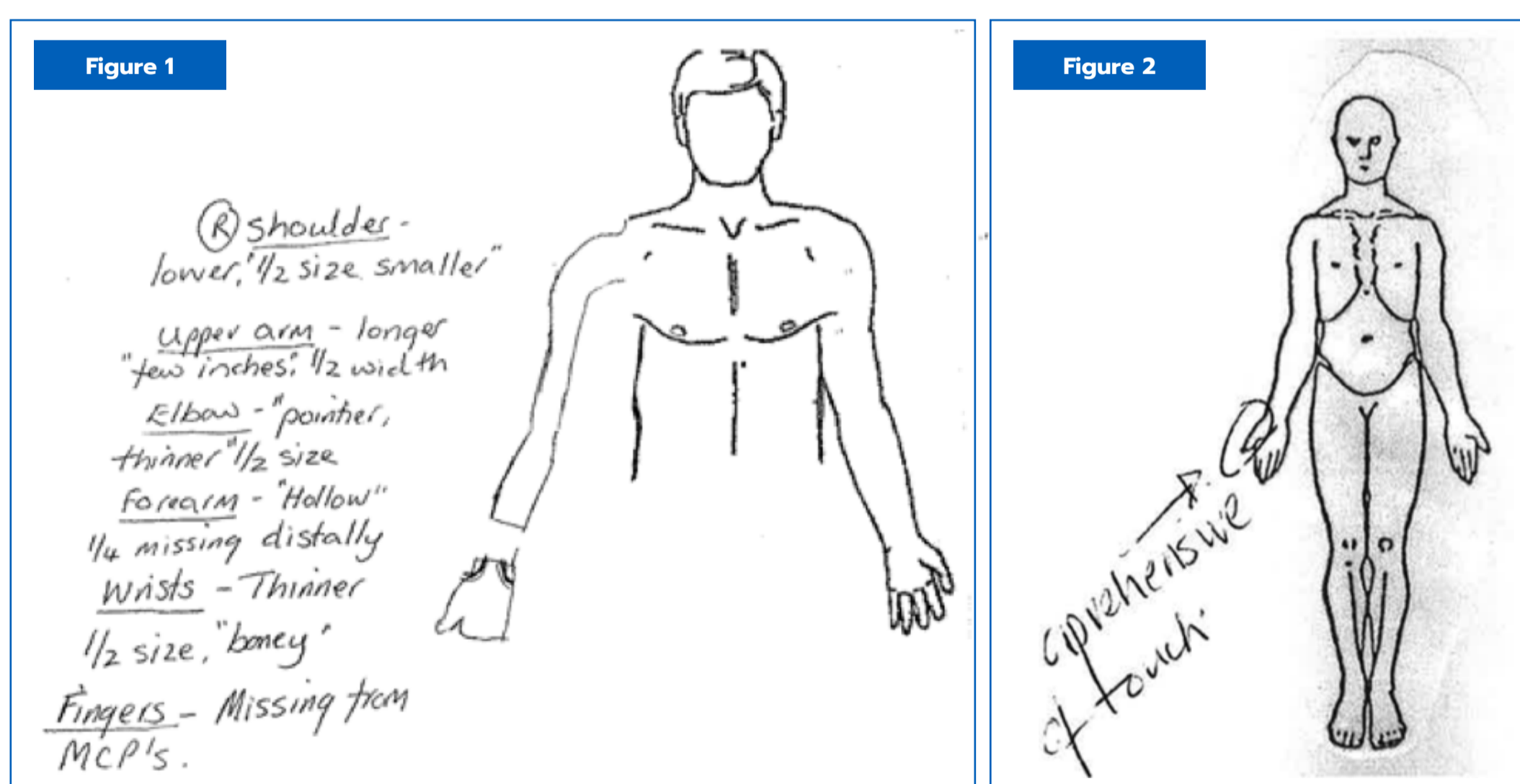
MRI, arthrogram, X-rays, CT all normal

“Warning signs for condition recalcitrant to treatment”

- Intensive past therapy, all “usual” therapeutic interventions had been unsuccessful, patient reports has “done all therapy including NOI recognise programme”
- Full range of isolated and composite wrist and hand movements
- All routine clinical tests unremarkable
- Gross sensation normal but altered graphesthesia and ridge/edge perception
- Altered body perception assessment (Fig.1)

Therapist observations:

- Apprehensive to touch (Fig 2.)
- Increased expectation of pain
- Negative patient expectation of outcome of therapy intervention



Patient reports:

- Spontaneous bruising, lasts 1 day
- Subjective swelling, does not use hand for function due to pain
- Has had a lot of time off work because of hand pain; VAS score 8-9/10

Treatment Interventions:

- Re-visited Noi group “recognise programme” used to re-establish pre-motor ability and reinforce hand laterality recognition
- Sensory bombardment & multi sensory re-education – Bilateral and multisensory reintegration through gradual exposure to different tactile stimuli utilising all senses

- Visualisation
- Encouraged to change feelings towards limb – consider positive aspects of limb function
- Body perception training and positive reinforcement
- Environmental enrichment during rehabilitation
- Activity diary.

Progressed to:

- Graded relevant activity e.g. introduction of guitar
- Functional posture correction
- Specific, meaningful functional goal setting: daily personal goal based functional task list
- Written record of achievements
- Bilateral activities—graded, gross and fine motor skills
- Progressed sensory bombardment, bilateral multisensory and complex environment

Results:

- Patient independently recognised that sensory bombardment controlled any minor flare ups in her pain and independently utilised this modality
- Textures regularly changed by patient to maintain benefit
- VAS 0/10, mild intermittent (self managed) flare, 3/10: abolished to 0/10 independently
- Body perception almost normal (“finger tips sl. fuzzy”)
- Sensory discrimination R = L
- Spontaneous engagement in functional activities
- Re-joined band

Discussion

Moseley⁵ suggested that the links between reorganisation at various levels of the sensory neuraxis, tactile acuity and pain, imply that improving tactile acuity, or normalising neural organisation, or both, may reduce pain. Lewis⁶ recognised that sensory re-education encourages correct processing of daily sensory input and normalises sensation to promote function. Environmental enrichment can induce anatomical plasticity.⁷ There is a significant relationship between reorganisation and pain intensity.⁷ Resultant cortical reorganisation is suggested to reduce pain levels.

This approach is now commonly employed in our unit for chronic hand pain, we recognise that this presentation is a single case study and as such more work is required to validate this.

Conclusions

Graded motor imagery and multi sensory bombardment may correct sensory input, and normalise attitudes of the affected limb in chronic hand pain.

Implementing a combination of sensory, cognitive and motor inputs in order to normalise the affected limb body schema, is recognised as critical to recovery²

Frequently thinking about, looking at, recognising and touching the affected area combined with cognitive strategies relieved chronic pain in this patient when other treatments had failed.

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