Stanmore Therapy Service Approach to Management of Phantom Pain in the Post-operative Phase

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PHANTOM LIMB PHENOMENON

- “Truly it is a wondrous thing, strange and prodigious which will scarce be credited, unless by such as have seen with their own ears, the patient who many months after cutting away the leg, grievously complained that they yet felt exceeding great pain of that leg so cut off”

Ambroise Pare : Military Surgeon/ Barber 16th C
EVALUATION OF KNOWLEDGE

- How did we explain what PLS / PLP was?
- How did we explain why an amputee experienced PLS and/or PLP?
- How did we currently manage or treat PLP in post-op patients?
- Are there any new treatments or techniques we could consider?
- Evidence base?
MAIN CHARACTERISTICS

- Removed body part is still felt to be present
- Neuropathic
- Kinesthetic sensations
- Kinetic sensations
- Exteroceptive or cutaneous sensations
- Telescoping
“Network of neurone that extend throughout widespread areas of the brain, composing the anatomical substrate of the physical self”

- lateral = sensory-discriminative
- medial = cognitive-evaluative, affective-motivational
- Hard-wired / genetically determined
- Plastic / adaptable /modulated
- Output = neurosignature
FIG. 1.3 Factors that contribute to the patterns of activity generated by the body-self neuromatrix, which is composed of sensory, affective, and cognitive neuromodules. The output patterns from the neuromatrix produce the multiple dimensions of pain experience, as well as concurrent homeostatic and behavioral responses. (From Melzack R: Pain and the neuromatrix in the brain, J Dent Educ 65:1378–1382, 2001.)
SENSORY HOMUNCULUS

- An area in your brain called the sensory homunculus (primary somatosensory cortex)
- Holds a picture or map of every area of your body (hard-wiring two arms, two legs, )
- Areas which require us to have more sensation such as the hands, feet, lips and tongue have more nerve endings or receptors and occupy a larger part of this map
- Just because your limb is physically removed doesn’t mean that the map in your brain is also removed
- The information coming into this area of the brain is changed and so what is experienced or felt is as a consequence changed or different
Schematic illustrating the main factors that influence nociceptive processing to affect pain perception (Tracey 2007)
BRAIN IMAGING AND PLASTICITY

- Flor 2002

  Assessment of reorganisation of the primary somatosensory cortex in an individual with amputation of the arm and has phantom-limb pain.

  The mouth representation on the amputated side has completely invaded the hand region.

  The larger the shift demonstrated by the red arrow the greater the cortical reorganisation.
DETERMINANTS OF PLP/PLS

- Peripheral: tissue damage inflammation - chemical soup, ectopic discharge from severed nerve endings

- Spinal: altered input from periphery results in distinct changes within the dorsal horn due to disinhibition initially and then by loss of modulation.

- Psychological: stress - endocrine system, HPA axis, thoughts, beliefs, mood

- Cortical: neuromatrix
THERAPY MANAGEMENT OF POST-OPERATIVE PHANTOM LIMB PAIN

- Explanation of PLP
- Breathing
- Relaxation
- Reduction swelling
- Desensitisation
PHARMACOLOGICAL MANAGEMENT OF PAIN

- Epidural or PCA: Opiod based
- Oral analgesia: paracetemol/ NSAID/ Opiods
- Neuropathic acting drugs: pre-gabalin / gabapentin + / - amitriptyline
GRADED MOTOR IMAGERY

- Laterality
- Imagined Movements
- Mirror box therapy
LATERALITY RECONSTRUCTION

- Ability to recognise right or left side of the body.

- Looking at an image requires initial selection of right or left, then mental spatial transformation/rotation to confirm the choice.

- Following several tries this task become more subconscious therefore implicit imagery.

- Activates pre-motor cortices.
LATERALITY TECHNIQUES

- Left / right discrimination: Feet flash cards
- Separate out into right and left
- Play games e.g. pairs or snap with family members
- Recognise App for different body parts: vanilla, abstract, contextual images
Explicit Motor Imagery is essentially a cognitive process of imagining moving your own body (part) without actually moving it.

- Has been used by athletes, dancers, musicians for many years to improve performance.
- Intention, preparation, carrying out and evaluation of movement.
- Activates primary motor cortex.

Watching someone move will activate motor regions but to a lesser extent than imagined movements or actual movements. (Nedelko 2010, Ehrsson et al 2003) Mirror neurons.
IMAGERY TECHNIQUES

- Is the whole of the amputated limb present?
- Is the phantom the same length as the remaining limb?
- Can they describe their phantom foot in detail?
- Is the phantom limb stuck in one position or can they move any part of it?
IMAGERY

- What activity did they enjoy before amputation: cycling, swimming, walking, dancing, listening to music - tapping toes? Can they picture themselves in a place doing that activity?

- Can they picture in their mind the phantom limb doing that activity?

- Contraction of the muscles in the residual limb may help facilitate movement of the phantom

- Movements can be small or large

- Eyes open or closed

- Quiet space to busier environment
IN SUMMARY

- GMI techniques proving to be a useful adjunct to existing approaches.
- Often only take a few minutes to do and can be incorporated into other aspects of treatment.
- Patients own imagination is a fertile landscape: different scenarios and contexts that are relevant to them.
- Can have an immediate effect on the phantom.
- Patients feel empowered.
REFERENCES

- Melzack, R. (1999) From the Gate to the Neuromatrix *Pain Suppl 6*; s121-126
  
Thank you for listening!

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