

Graded hand activity examples

- Looking at the hand
- Turning the hand to face up and down by rotating the forearm at the elbow
- Flattening out the hand
- Taking some weight though the hand and individual fingers
- Moving individual fingers
- Touching thumb to individual finger tips
- Tapping fingers
- Use tools (pen, scissors, screwdriver, nail cutters, etc – make it appropriate to the left or right hand)
- Introduce your clinicians hand to the mirror – touching, massaging, mobilising etc.
- Bring your face into view and touch it.

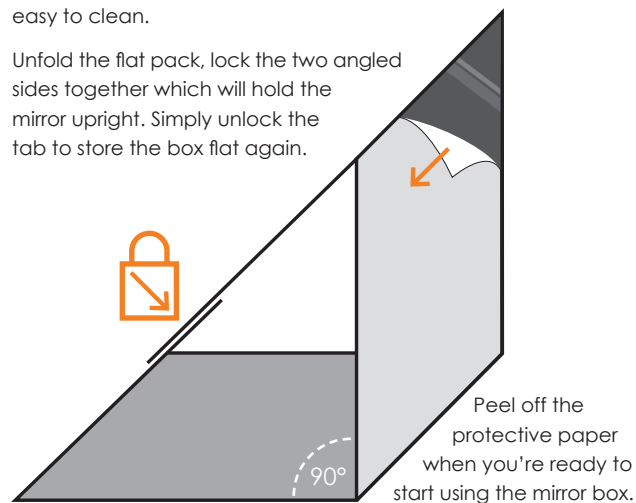
Context variables to alter

- Environment – start where you feel 'safe' and progress to areas associated with threats or worry
- Add distraction – balancing on a chair, counting backwards in sevens from 100...
- Emotions
- Time of day
- Position – sitting, standing, lying
- Add music and different smells
- People around you

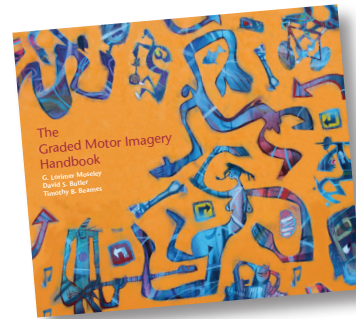
Assembly

The NOI mirror box is designed to be simple to use, easily portable, lightweight and easy to clean.

Unfold the flat pack, lock the two angled sides together which will hold the mirror upright. Simply unlock the tab to store the box flat again.



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The Graded Motor Imagery Handbook

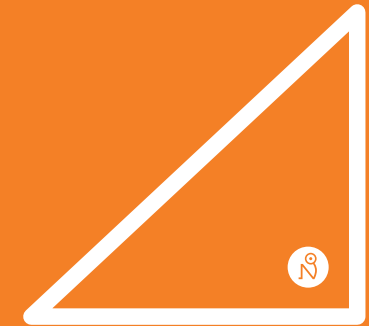
GMI is an individually tailored treatment programme which has successfully been used to treat persistent and complex pain states*. It provides a progressive brain training programme aimed at giving back precision, clarity, flexibility and creativity to constructions of the body and movement. Moseley, Butler, Beames. Noigroup Publications, Adelaide, Australia, 2012 (updated 2019), ISBN 978-0-9872467-5-2 [eBook also available](#)

*References

- 1/ Graded motor imagery is effective for long-standing complex regional pain syndrome: a randomised controlled trial., Moseley, G.L., Pain 2004
- 2/ Is successful rehabilitation of complex regional pain syndrome due to sustained attention to the affected limb? A randomised clinical trial. Moseley, G.L., Pain 2005
- 3/ Graded motor imagery for pathologic pain: A randomized controlled trial. Moseley, G.L., Neurology 2006
- 4/ Does evidence support physiotherapy management of adult Complex Regional Pain Syndrome Type One? A systematic review. Daly, A. E., Biolocerkowski, A. E., European Journal of Pain, 2008. *"CONCLUSION: Graded motor imagery should be used to reduce pain in adult CRPS-1 patients. Further, the results of this review should be used to update the CRPS-1 clinical guidelines."*



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noi mirror box

Neuro Orthopaedic Institute Australasia
Knowledge driving health

NOI reinvests directly into ongoing research in pain literacy education, graded motor imagery and neurodynamics. Our core philosophy is to create and provide evidence-based multimedia resources and courses for the treatment of pain.

Noigroup Publications has grown in response to the demand for resources to support our education system and the clinical application of emerging research.

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Introduction to Graded Motor Imagery (GMI)

GMI is a rehabilitation programme that uses brain training exercises to treat pain associated with a range of conditions. The programme consists of three stages, undertaken in the following order: left/right discrimination training, imagined movements, and mirror therapy. There is evidence that mirror therapy will be more effective if you are able to accurately discriminate between images of left and right body areas and imagine your body moving first. Our supporting websites contain resources to guide your use of GMI, and a range of products for every stage, including flashcards and smartphone Apps.



Noigroup Recognise Apps, for patient use and treatment, contain advanced toolsets for the first two stages of GMI. Available in six body part options for iOS or Android – noigroup.com

Mirror therapy

Hiding the affected body area behind the mirror and using the reflection of the unaffected area in the mirror is the focus of treatment. As the third stage of the GMI programme, mirror therapy can be used for a variety of painful conditions, including complex regional pain syndrome, phantom limb pain, stroke, carpal tunnel syndrome and osteoarthritis. Mirror therapy can be used to treat a range of body areas including hands, wrists, feet, elbows, knees and shoulders.

Biological basis

Here is an example of an introduction to mirror therapy that we would use for a patient.

Your brain consists of billions of neurones and thousands of billions of connections. Through the amazingly complicated interaction of your brain, your body and the environment around us, you are able to 'represent' and construct things. For example, you are able to see because your brain is able to 'represent' the light coming into your eye and construct an image. What you feel is a construction based on the representation of your body and its interaction with the world. People who lose a limb, but have phantom pains, provide us with evidence that the experience of having a limb can still be represented and constructed, even when the limb itself is gone. If you use your hands in a repetitive, meaningful way, such as playing a musical instrument or reading Braille, your brain will adapt and more area of the brain will be devoted to representing your hands and constructing a rich, accurate experience of your hands in the world.

However, your brain can change quickly. The brain areas devoted to representing body parts and movements can be 'smudged' in pain and disability states – they lose a bit of precision and clarity. This may sound a bit scary, but it happens all the time and is probably part of your brain trying to look after you. The really important news is that your brain is 'plastic' and with the appropriate training, can change back.

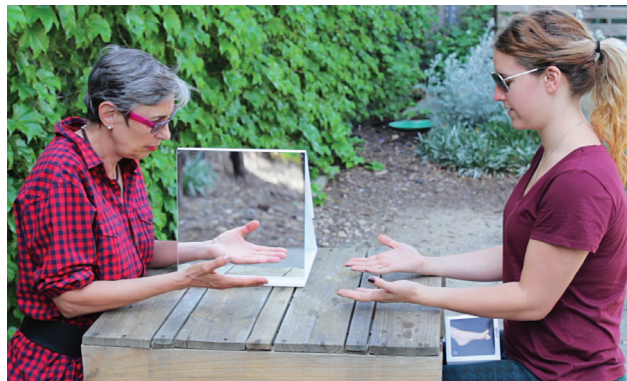
Mirrors to trick the brain

By using a mirror, you can create the powerful illusion that an injured body area is okay and moving freely and comfortably once again. This provides a powerful 'exercise' for those thousands of billions of connections in your brain. For example, if the left hand was a problem, it can be hidden in the box with your attention focussed on the mirror image of the right hand. What you now 'see' is a left hand that is okay, which provides a signal to the brain that *'the left hand is fine, it's time to properly represent and construct a comfortable experience of the left hand again'*.

Suggestions for use

Note the image below of a person using a mirror box for a left hand problem.

- Sit comfortably with the left hand in the box and hidden from view.
- Place your right hand in front of the mirror. Lean forward slightly and look at the image in the mirror – you are now 'seeing' the left hand. If you wiggle the right hand it may feel a bit odd as you are 'seeing' the left hand move (even though it is completely still in the box).
- Keep the mirror centred in front of you, and position your right hand so that the mirror image closely matches where your left hand is in the box.



Guidelines for training your brain

1. Where possible, be guided by a clinician that understands brain function and has undertaken training in GMI.
2. Create the best illusion possible – remove jewellery and watches, wear long sleeves to cover tattoos or other markings.
3. Plan the activities to perform with the hand outside the box. Start by spending some time just looking at the hand in the mirror. Remember to focus on the hand in the mirror. We like to say 'the power is in the mirror'.
4. In general, with more severe problems (eg. Complex Regional Pain Syndrome) start with small movements, performed often in short sessions.
5. When you are feeling comfortable with a movement, try to perform it in a different 'context' – do it with a song in your head, or playing on the radio. Do it with altered emotions by thinking about something happy or something a bit sad at the same time, do it inside and outside, in the quiet and in busy environments – the more variety the better.
6. Feel comfortable with each movement before progressing to a more challenging activity.
7. Take care. If the hand in the box hurts more or sweats, you may have taken the brain training too far – even though the hand in the box hasn't moved (this is powerful evidence though for the idea that our experiences are represented and constructed!)
8. As a progression, try moving the hand in the box too – move it to the point where it hurts a little and then take the moment further 'in the mirror' by moving the hand outside the box just a bit more.
9. Move the hand in the box to match the other hand or do the opposite.
10. By placing a folded mirror box between the feet, a similar therapy can be performed for foot problems.
11. A hand, wrist or ankle in a plaster cast can be hidden in the box and mirror therapy used to maintain 'templates' for movement while a fracture heals.
12. Mobilising a stiff wrist, hand or ankle just out of a plaster cast simultaneously 'in the box' and 'in the mirror' provides powerful rehabilitation.

Overall, you will need to repeat movements, gradually increase the number and range of movements, and add rich variations in context to perform the optimal brain training and achieve the best health for your brain's connections.