Step 1 works on re-establishing the brain’s ability to determine left and right sides of the body. This step aims to increase speed and accuracy when discriminating between left and right and prepares the brain for imagined movement. It is based on implicit motor imagery therefore it is performed ‘unconsciously’ meaning the patient should try and perform the tasks as quickly as possible and not spend too long trying to analyse the pictures.

**HOW TO DO THIS**

- **iPad or phone app - “Recognise”**
  “Recognise” involves digital flashcards where the patient is required to select whether the picture is a left or right hand. Recognise will provide a summary of the patient’s results based on speed and accuracy.

- If the patient does not have access to an iPad or phone, flashcards can be purchased or made with pictures of left and right hands in different positions. Flashcards are available to purchase through the noigroup website - [http://www.noigroup.com/en/product/btrfc](http://www.noigroup.com/en/product/btrfc)

- If using flashcards:
  1. Allocate areas where the patient will sort the flashcards into two piles – one for the left hands and one for the right hands (you could write a heading for each pile so the patient can easily see where to put the card after they have made their choice).

  2. The patient then picks up each flash card, determine whether it is a left or right hand and places it on one of the two piles. You can time the patient completing the task to monitor improvements in speed. You can also then check the accuracy by writing down the total number of cards in the correct pile. For example left - 5/12 correct and right - 3/12 correct.

Patients can also practise using magazines or photo albums by identifying left and right hands in the pictures.

**WHAT IS NORMAL?**

- Accuracy of 80% and above
- Speed of 2.5 seconds per card
- Accuracies and response times should be nearly equal for the left and right
- Results should be consistent for at least a week

*Note: some people may not achieve “normal” therefore after completing the interventions for at least two weeks move onto step 2.

**HOW OFTEN?**

Aim to complete for two hours a day for two weeks before moving onto step two. The two hours can be broken into shorter sessions throughout the day. This can include practice using magazines or photo albums.

If the patient is scoring within normal range, practice for a week to ensure consistent results.

Step 2 continues over the page
STEP 2: MOTOR IMAGERY

Motor imagery is the process of thinking about moving without actually moving while identifying one side of the body as distinct from the other. This step is relying on ‘mirror neurones’ which fire when you think of moving or watch someone else move. It is using similar brain areas to those activated during actual movement. For patients to use mental practice correctly, you will need to spend time teaching them how to do the practice.

HOW TO DO THIS

Encourage your patient to imagine moving their affected hand in purposeful ways. To introduce the concept to patients, you can use pictures of hand positions (i.e. the ‘Recognise’ app or flashcards) and get clients to imagine copying the hand position and then returning to a resting position. The patient may then be able to progress to functional movements. Choose functional movements that relate to their overall goals eg. to return to cooking = imagine mixing the ingredients in a bowl.

EXAMPLES OF FUNCTIONAL MOVEMENTS

Patients can imagine themselves using their affected arm/hand to:
- Comb their hair
- Put on make up
- Shave
- Brush their teeth
- Pick up a cup
- Mix ingredients in a bowl
- Write their name
- Use hand tools

Patients can heighten their motor imagery experience by imagining elements such as warmth, textures, smells, sounds, weight, and the environment. You can help by prompting these additional sensory cues.

*Continue left and right discrimination tasks (step 1) through this step. Use of the recognise app could be completed as a warm up before starting motor imagery.

HOW OFTEN

Again aim for two hours a day for two weeks before moving onto step three. The two hours can be broken into shorter sessions throughout the day.
STEP 3: MIRROR THERAPY

Mirror therapy is designed to trick the brain into believing the reflection of the non affected arm/hand is the affected arm/hand and is able to do the movements performed by the unaffected hand. This activates the motor area responsible for the affected hand.

EQUIPMENT

• Mirror box (if you make your own; it is recommended to use a Perspex mirror to avoid glass injury)

• Noi group have mirror boxes available to purchase through their website - http://www.noigroup.com/en/Product/BTMB

• Everyday objects i.e. cup, cutlery, pen etc

HOW TO...

1. Remove patient’s jewellery and cover any tattoos/scars

2. Position the patient comfortably at a table with their affected arm/hand in the mirror box (hidden from view)

3. Place the patient’s non-affected hand in front of the mirror. The patient needs to be able to comfortably look into the mirror.

4. Start with simple motor actions, easy tasks and gradually progress to harder tasks. Gradually increase the difficulty of movements with their non-affected hand.

5. If the patient has movement in their affected arm/hand, over time you can start to get the patient to move their affected hand inside the box.

6. No matter what movement the patient is doing they should be looking at their reflection in the mirror as this is tricking their brain into thinking their affected arm is moving normally.

7. Once the patient has progressed with movements, get them to try and perform it in a different context. For example, completing the movements with some music playing or at a different time in the day.

8. Continue to monitor the patient, continue to ask how their affected hand is feeling and monitor changes e.g. swelling, change in colour, and position changes.
EXAMPLE OF EXERCISES

Start simple and gradually increase the movement of their non-affected hand, for example:

<table>
<thead>
<tr>
<th>NON-AFFECTED HAND</th>
<th>AFFECTED HAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remain still in front of mirror – the patient just observes their reflection</td>
<td>Remains resting in the box</td>
</tr>
<tr>
<td>Move fingers</td>
<td>Remains resting in the box</td>
</tr>
<tr>
<td>Make a fist</td>
<td>Remains resting in the box</td>
</tr>
<tr>
<td>Touch each finger separately to the thumb</td>
<td>Remains resting in the box</td>
</tr>
<tr>
<td>Touch their face</td>
<td>Remains resting in the box</td>
</tr>
<tr>
<td>Try tasks such as picking up a cup, sort through coins, holding a pen/writing</td>
<td>Remains resting in the box</td>
</tr>
</tbody>
</table>

If the patient has movement in their affected arm/hand, over time you can start to get the patient to move their affected hand in the box, start gradually and slowly progress until their affected hand is trying to copy their non affected hand for example:

<table>
<thead>
<tr>
<th>NON-AFFECTED HAND</th>
<th>AFFECTED HAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move fingers</td>
<td>Slowly bend the fingers of their affected hand in the mirror box.</td>
</tr>
<tr>
<td>Make a fist</td>
<td>Make half a fist with their affected hand still in the box</td>
</tr>
<tr>
<td>Try tasks such as picking up a cup, sort through coins, holding a pen/writing</td>
<td>Affected hand is pretending to pick up a cup in the box/sort through coins etc</td>
</tr>
</tbody>
</table>

REFERENCES

• Graded motor imagery website - http://www.gradedmotorimagery.com/


  This study includes a description of how to complete each stage of GMI including activities and timeframes.