



## Short Communication

# Mirror Therapy

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### ARTICLE INFO

### ABSTRACT

Received: 02 July 2016  
Accepted: 24 Aug 2016

Mirror therapy was initially described for use in amputees who experienced phantom limb pain. Phantom limb syndrome is the ability to feel sensations and even pain in a limb or limbs that no longer exist. The objective of this short communication is to highlight the benefits of this lesser known mode of management used for the purpose of rehabilitation of patients who have had loss of function of a part or of the body part per se. **METHODOLOGY:** Literature search was carried out to trace the evolution of mirror therapy and summarise the uses of this therapy in different types of conditions. **DISCUSSION:** Although the painful symptoms of phantom limb syndrome resolve on their own in some patients, other patients may experience severe chronic pain. This may be controlled by drugs, hypnosis, progressive muscle relaxation, and biofeedback. Mirror therapy appears to re-program the brain's pain circuits into thinking that the painful injury is no longer present. **CONCLUSION:** Over decades, the uses of mirror therapy have been extended successfully to stroke rehabilitation, complex regional pain syndrome, limb rehabilitation and neuropathic pain<sup>1</sup>. Besides, it is also proving beneficial for patients suffering unilateral neglect after stroke, in helping relieve phantom limb pain suffered by victims of earthquake as well as to soothe arthritis pain. Mirror therapy is an initial step toward the development of therapeutic targets for technical interventions including brain computer interfaces that are aimed at ameliorating the negative effects which are associated with limbs that are impaired or missing.

**Keywords:** Limb, Mirror, Pain, Sensation, Therapy.

## 1. INTRODUCTION

Mirror therapy was initially described for use in amputees who experienced phantom limb pain<sup>1</sup>. The phenomenon of phantom limbs has been known since ages<sup>2,3</sup>. The term can be traced back to its first description in 1552 by French surgeon Ambroise Paré, who operated on wounded soldiers and wrote about patients who complained of pain in amputated limbs. Lord Nelson, who is famous for his distinguished service in the British Royal Navy, lost his right arm during an attack, after which he experienced phantom limb pain. The first clinical description of phantom limbs

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was given after about three centuries. Much later did sensory perception come to be considered as the underlying phenomenon of this syndrome. Phantom limb syndrome is the ability to feel sensations and even pain in a limb or limbs that no longer exist. Phantom limb syndrome is characterized by both non-painful as well as painful sensations<sup>2,3</sup>. Non-painful sensations can be divided into the perception of movement and the perception of external sensations, including touch, temperature, pressure, vibration, and itch. Pain sensations range from burning and shooting pains to feelings of tingling. Phantom limb pains are a common and difficult problem after amputations because even though the injured limb is removed, the pain continues<sup>3,4</sup>. This is because the pain pathways in the spinal cord and brain 'remember' the painful injury. Because of this memory, the missing arm or leg continues to ache, sometimes severely so, long after the limb itself has been amputated<sup>4,5,6</sup>. While phantom limb syndrome occurs only in amputees, phantom sensations may be perceived in people who have survived strokes but lost function of certain body parts. Besides, these may also be seen in people who have spinal cord injury or peripheral nerve injury<sup>2,3</sup>. The objective of this short communication is to highlight the benefits of this lesser known mode of management used for the purpose of rehabilitation of patients who have had loss of function of a part or of the body part per se.

## 2. METHODOLOGY

Literature search was carried out to trace the evolution of mirror therapy and summarise the uses of this therapy in different types of conditions. Also, to highlight the uses this therapy can have when visualized for the future.

### Mirror Therapy Vs Conventional Management

Although the painful symptoms of phantom limb syndrome resolve on their own in some patients, other patients may experience severe, sometimes debilitating chronic pain. This may be controlled by drugs, hypnosis, progressive muscle relaxation, and biofeedback<sup>4</sup>. Nonsurgical treatments that may relieve phantom pain include shock therapy (or electroconvulsive therapy), acupuncture and transcutaneous electrical nerve stimulation<sup>2,4</sup>. Implantable treatments, generally used only after non-invasive treatments have failed, include deep brain stimulation, intra-theal drug delivery systems, and spinal cord stimulation<sup>3,4</sup>.

Mirror therapy cannot be recommended as a first intention treatment in phantom limb pain<sup>3,5</sup>. Nevertheless, mirror therapy is a method evolved to alleviate the patients from phantom limb pain<sup>1,2</sup>. Mirror therapy appears to re-program the brain's pain circuits into thinking that the painful injury is no longer present. Removing the source of the pain may not let the brain forget this memory, but by controlling, seeing, and reacting to a healthy limb, the brain can be tricked into believing the limb has healed, reducing the risk of phantom limb pain when the injured limb is eventually amputated<sup>2,4</sup>. Mirror therapy was started in an attempt to prevent phantom

pain in soldiers requiring leg amputation because of combat injuries. In each case, amputation was necessary after extensive efforts to save the leg. Before amputation surgery, the patients performed several sessions of mirror therapy<sup>1,4,6</sup>. In this form of therapy, patients sit with a mirror placed vertically between the legs and arms so that they are reflected in it. The reflection in the mirror makes it look like the injured arm or leg is healthy and normal. Patients then observe and control their injured arm or leg in the mirror, but they are actually observing and controlling the reflected uninjured arm or leg. The brain and spinal cord are visually tricked into believing that all of the arms and legs are intact and without pain<sup>5</sup>. It was found that these soldiers had major problems with phantom pain after amputation. Any episodes of phantom limb pain, if occurred, were brief and mild<sup>1,3,4</sup>. Findings of many studies have demonstrated that mirror therapy is more effective than conventional therapy for the training of stroke patients to improve their upper limb function and activities of daily living<sup>6,7,8</sup>.

## 3. CONCLUSION

Over decades, the uses of mirror therapy have been extended successfully to stroke rehabilitation, complex regional pain syndrome, limb rehabilitation and neuropathic pain<sup>1</sup>. Besides, it is also proving beneficial for patients suffering unilateral neglect after stroke, in helping relieve phantom limb pain suffered by victims of earthquake as well as to soothe arthritis pain<sup>1,6</sup>. With increase in awareness about the therapy coupled with the boom of online availability of consumer goods, mirror boxes are now also up for sale on the internet and are therefore, more easily available than ever before<sup>9</sup>. However, further research is needed to assess the effect of mirror therapy on pain, use of prosthesis, body representation, as well as to standardize protocols<sup>5</sup>. Mirror therapy is an initial step toward the development of therapeutic targets for technical interventions including brain computer interfaces (BCIs) that are aimed at ameliorating the negative effects which are associated with limbs that are impaired or missing<sup>2</sup>.

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**Conflict of Interest: None**

**Source of Funding: Nil**