

# MIRROR THERAPY



by Beth D. Darnall, PhD

## Expanding global access to phantom pain care

Phantom pain is often a chronic, debilitating condition that affects about 80 percent of people following limb loss. Of those who acquire phantom pain, as many as 85 percent report continued phantom pain 2 years after amputation, and for some people, phantom pain may last for decades. People who are bothered by phantom pain are more likely to report greater distress and depressive symptoms. Thus, phantom pain may have a major negative impact on quality of life. For these reasons, it is important to improve access to phantom pain care.

Mirror therapy was first described as a successful treatment for phantom pain by Dr. Vilayanur Ramachandran in the mid-1990s. Since then, several case reports have described similar success with the treatment. In 2007, results from a randomized controlled trial of mirror therapy was published in *The New England Journal of Medicine*. The findings from this study showed that mirror therapy was effective for reducing phantom pain after 4 weeks of regular practice. Mirror therapy was also shown to be superior to placebo and mental visualization comparison groups.

Mirror therapy works by essentially “tricking the brain” out of pain. Because pain signals are processed in the brain, we can change the brain “input” and get different “output” in terms of pain. When mirror therapy is practiced, the brain

receives information that both limbs are intact and functional. It is now widely accepted that cortical restructuring occurs in the brain when this new information is received, and that the restructuring lessens or resolves the pain.

Historically, mirror therapy is described as being therapist-guided and it is often described as involving a specific set of exercises that must be followed. However, my research has shown that therapist guidance with mirror therapy is optional, and one need not follow a structured set of exercises to achieve good results. In other words, mirror therapy is quite simple, and it is something you can do yourself at home. All you need is a mirror and dedication to practice the treatment daily.

I first realized the simplicity of mirror therapy after treating a gentleman with

phantom leg pain. With minimal instruction, he purchased a mirror and began doing mirror therapy for 20-25 minutes each day at home. He made sure to watch the mirror while performing gentle movements with his intact leg. He simply moved his intact leg any way he wished; he got creative to keep his interest up while doing the treatment. He reported enjoying the treatment because he found it relaxing and he started noticing pain reduction. Within several weeks his phantom pain had resolved completely and he was able to taper off all of his pain medication.

Based on the success of this case study, we recently conducted a pilot study with 40 people with phantom limb pain to further test the idea that mirror therapy can be self-delivered at home. Study

## What Is Mirror Therapy?

1. Take a standard mirror (closet-size for leg amputation; shorter for arm amputation).
2. Arm amputation position: sit at a table.  
Leg amputation position: sit on the floor, sofa or bed.
3. Position the mirror across the midline of the body so the amputation site is hidden behind the mirror.
4. The mirror should reflect the image of the intact arm or leg. Thus, you are able to view your healthy limb and the image of another healthy limb. In this way, the brain encodes the information that no amputation has occurred.
5. Find a way to stabilize the mirror so you are not concerned about balancing the mirror while you perform the treatment.
6. Perform gentle movements while looking in the mirror for 20-25 minutes daily.

### Seek Help From a Physical Therapist If:

1. You have trouble staying on track with your daily practice.
2. You are having trouble balancing your mirror or have other trouble getting your mirror set up comfortably.
3. You are depressed; you may benefit from additional personal support.



The mirror should be positioned across the midline of the body as shown

participants were shown a brief demonstration of mirror therapy (either in person or via a DVD demonstration) and they were asked to practice the technique for 25 minutes daily. Participants self-treated at home with no therapist guidance (however, participants did have the ability to call me or the study coordinator with questions). Study findings showed that self-delivered mirror therapy is indeed effective for phantom pain. Almost half of the participants reported phantom pain reduction, with an average pain reduction of almost 40 percent. Ten participants reported phantom pain reduction greater than or equal to 40 percent. Two participants reported 100 percent phantom pain resolution. Like all medical treatments, not everyone in the study benefited from mirror therapy, but the study results suggest that many patients may effectively self-deliver mirror therapy at home with a simple mirror. Self-treatment with mirror therapy may reduce pain medication prescriptions and medical costs, thus reducing the cost burden of limb loss. Most impor-

tantly, successful self-treatment may reduce suffering and may improve quality of life.

While mirror therapy is simple and can be done at home, some people may benefit from added structure and guidance (see sidebar, “*Seek Help From a Therapist If...*”). Like any behavioral plan, mirror therapy only works if it is practiced daily, and many people may have trouble staying on track with a daily practice plan. In these cases, seek guidance from a local therapist. (For therapists and individuals unfamiliar with the techniques, please refer to the Resources section of this article for additional information.)

Currently, global outreach efforts are underway to educate physicians and practitioners who treat amputees in developing countries about mirror therapy and its ease of use. The End the Pain Project is a non-profit organization that is providing mirror tool kits containing printed instructions for mirror therapy and nonbreakable mirrors – all free of charge to medical organizations and patients in Vietnam, Cambodia and Somalia. Due to the limited availability of

medical resources in many regions of these countries, self-delivered mirror therapy may help people with phantom pain from limb loss of all etiologies (causes), including the large percentage of people in these countries who are survivors of landmines, military conflicts or other trauma. ■

## Related Resources

### **Beth Darnall, PhD**

“Do It Yourself Mirror Therapy”

[bethdarnall.com](http://bethdarnall.com)

### **Dublin Psychoprosthetics Group**

[tcd.ie/Psychoprosthetics](http://tcd.ie/Psychoprosthetics)

### **The End the Pain Project**

[endthepainproject.org](http://endthepainproject.org)

### **Vilayanur S. Ramachandran MD, PhD**

[cbc.ucsd.edu/ramabio.html](http://cbc.ucsd.edu/ramabio.html)

*Photograph provided by Beth D. Darnall*

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