

# Phantom Limb Pain Management: A Drug-Free Solution

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*This is a review of the research, literature and testimonials on the alleviation of phantom limb pain by Farabloc, a fabric with electromagnetic shielding properties. This review looks to determine its efficacy when worn by amputees. Research comparing results from Farabloc use to results associated with placebo fabric are reviewed, as well as presentation of testimonials from amputees.*

The first objective of this literature review is to bring forward the tangible and practical effects of a drug-free solution for phantom limb pain (PLP). The second is to provide prosthetists with information regarding the dispensing of this solution to their patients.

Phantom limb pain is a painful sensation perceived in the missing limb after amputation which affects the majority of amputees. PLP is distinct from stump pain, which is pain in the residual portion of the limb, and phantom limb sensation, which is any sensation (paresthesia, dysesthesia, hyperpathia) of the missing limb without pain. PLP is characterized by a cramping, stabbing or crushing sensation in the missing extremity, which may be of an episodic or continuous nature. Phantom limb pain can be very severe and disabling.

## Statistically Speaking

A publications review leads us to believe that in the first year after amputation, 60 to 70 percent of amputees experience PLP. Research also shows that it does diminish with time. In a series of studies, 72 percent of amputees experienced PLP one week after amputation, 67 percent had pain six months later, and 60 percent continued to have pain at seven years. These studies addressed PLP and differentiated PLP from stump pain and phantom limb sensation.

A study conducted in the 1980s reported that of 2,694 amputees surveyed, 51 percent experienced PLP severe enough to hinder lifestyle at least six days per month. It was also reported that 27 percent of the amputees in the study experienced PLP for more than 15 hours per day, and a further 21 percent reported daily pain over a 10 to 14 hour period.

## Treatment Options

A wide variety of treatments for this condition have been studied and researched including neurosurgical, pharmacological, physical, and psychological strategies. Going back to 1980, literature reviews have identified a large number of techniques for treating PLP, but concluded that few produced relief and that placebo responses were common.

Some treatment recommendations for PLP have suggested regimens in line with the management of neuropathic pain states, although trials of treatments for neuropathic pain rarely include patients with PLP and the pathophysiology of PLP remains poorly understood.

In independent research, and in its application with amputees over the years, the Farabloc solution has clearly demonstrated its positive effect on PLP.

## Farabloc Spells Relief

Farabloc is a light and strong fabric consisting of a woven mesh of eight micron metal and polyamide threads. The fabric is physically similar to linen and is easily tailored and laundered in a washing machine. The fabric is incorporated in the production of limb covers, socks, gloves, jackets, blankets, wrapping bands and other custom-designed apparel for application

on painful parts of the body. Farabloc represents a drug-free pain relief system published as PubMed indexed to MEDLINE journals.

## Reducing Painful Pathways

A number of studies have proposed that the alteration of the electromagnetic field (EMF) has an effect on biologic systems.

It is important to preserve the permeability of the membrane of a healthy cell. Research studies have demonstrated that cells exposed to the electromagnetic field spectrum will experience a variable change in cell membrane permeability and receptor proteins.

Research on Low Frequency (LF) EMF exposure to lymphocytes shows a reduction in cell membrane fluidity and an increase in superoxide dismutase. As the EMF frequency increases, there is an increase in the cell membrane permeability. Research shows that low energy LF EMF reduces permeability while high energy high frequency (HF) EMF increases permeability.

Protecting healthy cells from HF EMF is important because an increase in permeability of these cells will have negative effects.

Other authors have speculated that an alteration in EMF may have biological effects secondary to stabilization of the cell membrane including an enhancement of antioxidant properties. This could explain the reduced levels of anti-inflammatory markers in the delayed onset muscle soreness study.

Farabloc is a very effective electromagnetic shield for high and ultra-high frequency electromagnetic fields. EMF high frequencies in the range of 1 MHz (radio frequencies) and above are substantially blocked by a double layer of Farabloc. The shielding capacity of the fabric is limited at the lower frequencies and has been found to generally have a positive effect on biologic systems such as reduction of cell membrane permeability and bone healing.

## Research Results

In a review by Halbert et al. published in *Clinical Journal of Pain* (2002) a reference is made to a study of 34 patients – 24 with amputation of the lower extremity and 10 with upper extremity amputation.

All patients presented complaints of phantom limb pain. Patients with residual limb complications, compensation involvement, prosthetic fitting complications or neuropsychological problems were excluded.

The patients were divided into two groups in a randomized double-blind, cross-over design and treated with either Farabloc/placebo or placebo/Farabloc fabric fitted over the residual limb.

Pain was evaluated by the use of a visual analog scale (VAS). The zero point on a 10 cm line represented “no pain relief” and the other extreme, 12, represented “complete pain relief.”

VAS was measured at the outset, the end of the first phase, after the crossover and washout period, and at the conclusion of the study. Repeated measures analysis of variance and Tukey’s multiple pairwise comparison range test were used to analyze the results. Significance was set at  $p < 0.01$  and  $p < 0.05$  respectively.

The study reported that pain was significantly reduced in the Farabloc group compared to the placebo group as shown in ( $p < .001$ ). The pretreatment, placebo, and Farabloc means demonstrated a significant effect on pain reduction by Farabloc ( $p < .05$ ).

The greatest pain relief in the 34 subjects occurred during the period when double layers of Farabloc covered the residual limb of the amputated extremity.

Nine of the subjects reported pain relief of greater than five points on the VAS scale, while the average relief was measured at three points. One subject reported increased pain while using Farabloc. The nature of the study does not allow for any explanation of these positive results.

## Customer Testimony

Larry Gardner of Vancouver, BC, became an amputee in 1974 as a result of a motorcycle injury. He started experiencing PLP two years after his amputation. “Phantom pain comes on strong with sharp, shooting pains originating in the bottom of my residual limb,” he explains. “I experience the pain in my ‘missing’ shin, knee or foot area,” he specifies. “The sensation for me is like an electric shock of pain or a sharp

stabbing feeling. The pain can come on fast or slow with a wide range of intensity. It may last a few hours or a few days or longer.”

As with most amputees suffering from PLP, the throbbing pain had a serious effect on Gardner’s life and lifestyle. “The pain, being unbearable at times, causes much discomfort in my life. It affects my sleep, my relationships, and my attendance at work.”

Prior to discovering the Farabloc solution while researching PLP on the internet, he used Tegretol (carbamazepine, a nerve relaxer) and Tylenol with codeine, without satisfying results.

Gardner has been using Farabloc for 10 years and is satisfied with the drug-free result he experiences. “When I feel the pain coming on, I put the cover over my stump, and I feel the pain decrease almost immediately, accompanied by a warm feeling.” Comparing his pain to his electric guitar amplifier turned up to nine or ten, he maintains that the Farabloc cloth turns it down to about a two or three! “Finally, actual pain relief without medication,” enthuses Gardner. “I have relied on Farabloc’s shielding properties for a decade now. For me, the important thing is simply to halt the pain, just like any pain sufferer wants. Farabloc works for me. Simple as that.”

## **Universal Application**

This light and strong fabric, similar to linen, is easily tailored to make a limb cover. This apparel can be custom-tailored or selected from a catalog of available shapes and sizes. The cover is washable in a home washing machine and has shown that it will last beyond its warranty period. The same fabric is also available to prosthetists for lamination in prosthetic sockets.

## **After Review: The Judgment**

This electromagnetic shielding fabric, worn on the residual limb or laminated in a prosthetic socket, reduces phantom limb pain suffered by amputees when assessed in a placebo-controlled double-blind cross-over study. This is supported by a significant number of testimonials from amputees.