

FARABLOC TECHNOLOGY

Occupational Therapy In Health Care

Improving Functional Outcomes for Vascular Amputees Through Use of Mirror Therapy and Elimination of the Effects of Electromagnetic Fields

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Farabloc technology (Farabloc Development Corporation, 2012) uses a fabric that is woven using 9.5% steel wire fibers consisting of iron, nickel, chromium, and nylon. It is designed to shield the effect of high frequency EMF (greater than 1MHz) on the amputated limb (Bach & Clement, 2007). The exact mechanism of action for Farabloc is unknown. However, it is theorized that Farabloc shields the body from the high frequency EMF that may cause cellular damage and subsequent pain (Clement & Taunton, 2001). Specifically, Farabloc has been found to block EMF four times more effectively than placebo fabric (Clement & Taunton, 2001) and double layers of Farabloc are able to completely block high-frequency EMF such as in radio waves (greater than 1 MHz) (Zhang et al., 2000). Although Farabloc shields high-frequency EMF, it does not block low-frequency EMF, which has the benefit of facilitating healing (Bordiushkov et al., 2000; Pilla, 2002).

There are studies to support the absence of EMF as a treatment. In a sequential, controlled, double blind cross-over study (Conine et al., 1993), Farabloc fabric wrapped around the post-amputation residual limb of amputees, was found to be statistically significant in reducing PLP, as compared to a placebo fabric. Twentyone of the 34 amputees reported their greatest PLP relief during Farabloc intervention, with no adverse effects. In another placebo crossover study in 2000, using double layers of Farabloc fabric wrapped around the thigh post-exercise ($n = 20$) produced similar results (Zhang et al., 2000). In this study, untrained participants were exposed to eccentric exercises to produce delayed onset muscle soreness in

the quadriceps. Farabloc technology therapy significantly reduced pain, reduced strength loss, and reduced serum inflammatory markers (malondialdehyde, creatine phosphokinase, myoglobin, leukocytes, and neutrophils), compared to placebo fabric, suggesting that the use of Farabloc leads to a decrease in the blood markers for inflammation and cell destruction (Bach & Clement, 2007).

Conversely, a recent study did not find any difference between two groups of amputees using Farabloc and a sham Farabloc (Hsiao et al., 2012). In this study, 57 subjects were randomly and blindly assigned to using either the Farabloc or sham Farabloc limb covers. Outcomes measures on overall pain, PLP frequency, and general and mental health were completed at 6 and 12 weeks. Although there was no significant differences between the groups, limitations of the study population had a high population of amputations attributed to diabetes instead of trauma as in the Conine et al. (1993) study and the average participants were 10 to 15 years postamputation, perhaps too late to reverse pain pathways. Another limitation of this study is that the original protocol for the study was not followed (Nixdorf, 2012). This would have involved laminating the Farabloc into the prosthesis, as opposed to cutting the Farabloc and using it as an insert, thereby potentially reducing the integrity of the fabric. Using the Farabloc as an insert would cause folds in the material (which contains metal fibers) which may have lead to the "discomfort and suboptimal fitting and caused more subjects to drop out in the true Farabloc group" (Hsiao, 2012), potentially influencing the results.

Two systematic reviews found evidence to support Farabloc as an effective treatment for management of PLP (Halbert et al., 2002; Stannard, Kalso, & Ballantyne, 2010). The 2002 review on the optimal management of acute and chronic PLP, documented that Farabloc research was only one of three studies to score the maximum of five points for a quality assessment. For late PLP (greater than 2-week postoperatively), this review agreed that there is evidence suggesting that Farabloc is an effective treatment (Halbert et al., 2002), although there was only one study in which Farabloc technology was studied. However, the findings were affirmed in the second review, listing Farabloc as an intervention supported by evidence for the management of PLP (Stannard et al., 2010).

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