There is no evidence that massage increases muscle blood flow overall. Subjective pain and stiffness, but not overall FM symptoms, seem to be the primary pain state reduced by massage. There is preliminary evidence that massage therapy can improve objective physiological parameters, specifically for fibromyalgia, in particular. If there is objective support for this claim, then it will help us understand the mechanism by which massage provides therapeutic relief for fibromyalgia.

**Background**

It is widely accepted that massage therapy increases blood flow and oxygenation to muscles (Goats 1994), yet there is very little objective evidence in the literature to support this statement (Durkin et al. 2006). Near-Infrared Spectroscopy (NIRS) technology provides a simple, non-invasive means of providing semi-quantitative measures of tissue oxygenation and quantitative measures of blood volume of muscles (Kell et al. 2004; Durkin et al. 2006). However, to our knowledge there have been no published studies using NIRS to assess the ability of a manual massage therapy protocol to effect an increase in muscle blood volume and oxygenation.

Fibromyalgia (FM) is a well-documented but generally poorly understood musculoskeletal condition. There are many theories attempting to explain the etiology of FM, including abnormally low muscle cell oxygenation (Sanberg et al. 2005; Elvin et al. 2006). It has also been hypothesized that massage therapy might benefit FM sufferers, but there has to date been little well-designed research to support this claim.

This research will provide objective information about the fundamental assumption that massage therapy increases blood flow to the muscles. If there is objective support for this claim, then it will help us understand the mechanism by which massage provides therapeutic relief, in general, and perhaps for fibromyalgia, in particular.

**Research Methods**

Initially 11 female fibromyalgia (FM) and 5 healthy female control (C) participants were recruited into the study. Each was to receive a series of 6 weekly massage treatments, but only 6 FM and 3 C participants completed the full trial. Of those, the average ages were 52 (FM) and 27 (C). FM participants were required to have had ongoing symptoms for at least 12 consecutive months leading up to the start of their treatment, and they cannot have been receiving any novel therapies, including massage, within the past 6 months. They were advised not to begin any novel therapy during the course of their participation in this research.

Each subject that completed the trial received a series of weekly 30-minute back massage treatments. The massage protocol was designed specifically for fibromyalgia patients by the massage technique instructors at the Atlantic College of Therapeutic Massage, with the same technique being used with each patient. During weeks 1, 3 and 6, NIRS and EMG sensors were applied anteriorly to the belly of the trapezius muscle, and Fibromyalgia Impact Questionnaires were completed. The purpose of the EMG sensor was to help determine whether observed changes in muscle parameters were due to engagement of the muscles versus the effect of the treatments. Prior to and following the massage protocol, NIRS measurements were recorded during and after a functional test whereby a 3 lb weight was raised to shoulder level.

Changes in blood flow, muscle oxygenation, and EMG responses were also tracked by treatment technique during the massage protocol, and the data were examined for correlations between subjective changes and objective measurements of muscle parameters.

**Results**

A. Fibromyalgia Impact Questionnaire results:

- Intensity of pain (p=0.044) and stiffness (p=0.001**) were significantly reduced from week 1 to 6 (paired t-test), but this did not carry over to week 9.
- Total FIQ scores were reduced overall from weeks 1 to 6 and 6 to 9, but the decrease was not statistically significant.

**B. NIRS test results:**

1. Change in blood volume during last 10 seconds of performing massage technique

   - Each Panel shows the blood volume change from baseline during the last 10 seconds of the indicated technique. Except for technique 8, the blood volume changes for FM subjects appear more like the healthy control response during the 6th week of massage therapy compared to the first week.

2. Change in tissue oxygenation index during last 10 seconds of performing massage technique

   - Each Panel shows the change from base line for the Tissue Oxygenation Index (TOI) during the last 10 seconds of applying the indicated massage technique. All 4 techniques suggest an increase in TOI for FM subjects during massage in the 6th week of massage therapy when compared to the first week.

3. Post-massage functional test data (blood volume and TOI)

   - Left top and bottom panels show that, despite having massage therapy, the blood volume change remains compromised during and after performing the functional test at weeks 1 and 6 for FM patients. Despite this, the TOI shows improvement by 6 weeks in FM subjects (right top and lower panels).

**Review of Key Findings**

- There is no evidence that massage increases muscle blood flow overall.
- FM blood flow responses resemble healthy controls more closely after 6 weeks of massage therapy than prior to treatment.
- Blood flow response to muscle activity (functional test) and following muscle activity is compromised in FM and this does not improve with 6 weeks of therapy, although the TOI does seem to improve by week 6.
- Subjective pain and stiffness, but not overall FM symptoms, seem to improve with 6 weeks of therapy.

**Overall conclusion**

- There is preliminary evidence that massage therapy can improve objective and subjective evidence of FM, but more intensive therapy may be needed to recover normal blood flow / TOI responses in these subjects.