# Therapeutic Ultrasound and Photobiomodulation Applied on the Palm of Hands: A New Treatment for Fibromyalgia – A Man Case Study

**Daniel Marques Franco[1], Juliana da Silva Amaral Bruno[1], Anderson Luis Zanchin[2], Heloisa Ciol[1], Vanderlei Salvador Bagnato[1] and Antonio Eduardo de Aquino Junior[1*]**

*[1]Institute of Physics of São Carlos, University of São Paulo, São Carlos, São Paulo, Brazil*

*[2]MMOptics, São Carlos, São Paulo, Brazil*

[*]**Corresponding author**: Antonio Eduardo De Aquino Junior, Institute of Physics of São Carlos, University of São Paulo, PO Box 369, 13560-970, São Carlos, São Paulo, Brazil, Tel: +55 (16) 3373 9810; E-mail: antonioaquino@ifsc.usp.br

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**Abstract**

Fibromyalgia is a chronic disorder put in the spotlight in the last decades. Known since the 1920s, the disease is described by multiple painful points, of heightened sensitivity to touch that prevails in women, and afflict 3% to 10% of worldwide population. Fibromyalgia affects skeletal muscles and soft tissues. However, although there is no joint pain. Pharmacological treatment consists in analgesics and anti-inflammatory drugs to ease the pain. In addition, antidepressants, anxiolytics and anticonvulsants can be prescribed to control pain crises. Non-pharmacological approaches as therapeutic ultrasound and photobiomodulation are an alternative for pain relief. Recently, the synergic action of therapeutic ultrasound and photobiomodulation has emerged as an alternative to treat fibromyalgia in women when applied at the palm of hands. The success of the treatment is attributed to stimulation of neuroreceptors close to blood vessels located at the palm of hands and found to be in higher incidence in fibromyalgic patients when compared to healthy patients. This study aimed to evaluate the synergic effect of therapeutic ultrasound and photobiomodulation applied to the palm of hands of a fibromyalgic man patient. Evaluation was based on Quality Life Questionnaire (SF-36) and Visual Analogue Scale (VAS). Results show the treatment could improve the patient's quality of life (SF-36) and reduce pain (VAS), indicating a new therapeutic approach to treat chronic disorders like fibromyalgia, reducing pain and increasing quality of life of fibromyalgic patients.

**Keywords:** Fibromyalgia; Photobiomodulation; Therapeutic ultrasound; Ultra-laser; Palm of hands

## Introduction

Fibromyalgia is considered a modern disease, being highlighted in the last 20 years with improvement of clinical diagnosis based on symptoms and signs. However, several are the terminologies encountered previously, with a record similar to the disease dating from 1824 in England, when Balfour reported cases of patients with painful stitches and increased sensitivity to touch [1].

Fibromyalgia is a chronic condition that affects the muscles and soft tissues, although it does not affect the joints, causing severe pain spread throughout the body, adding up to 18 pain points. The prevalence of the disease is higher in women, but can also affect men, affecting 3% to 10% of the adult population. This condition strongly interferes with the patient's lifestyle and daily routine [2], impacting patient's life and social and occupational function [3], resulting in a negative impact on patient's quality of life [4,5].

Treatment approach to Fibromyalgia can rely on medications or therapeutics. Pharmacological approach consists of analgesics and anti-inflammatory drugs to ease the pain. In addition, antidepressants, anxiolytics and anticonvulsants can be prescribed to control pain crises [6,7]. Non-pharmacological treatments used so far can include therapeutic ultrasound and photobiomodulation as an alternative pain relief. Physical exercise and dietary have also shown to contribute to clinical improvement of Fibromyalgia patients [8-12].

Technological resources as low-level laser therapy (or photo… have proven to be efficient as anti-inflammatory and … by enzymatic modulation and mitochondria ac… ATP supply and anti-inflammatory effect by a… l factors, new protein synthesis and cell p… eutic ultrasound is widely used to ease m… gesic, anti-inflammatory and thermal tissue acti… latation and increase in the speed of nervous signali…

The synergic action of therapeutic ultrasound and low-level laser therapy have been used in fibromyalgia and osteoarthrosis treatment, combining both therapeutic approaches in one single piece of equipment developed by our group and named ultra-laser. First trials of the synergic effect of ultrasound and photobiomodulation report a decrease in pain sensation, as well as improve functional capacity after treatment by the ultra-laser therapy [15-18]. By these results it is hypothesized that analgesic effect is obtained overlapping the effect of photobiomodulation and therapeutic ultrasound on tissue [15-18].

Moreover, the new technology that put together laser and ultrasound therapeutics in one single piece of equipment is used not only in local pain, but also on palm of hands, revealing a new therapeutic approach for…

hyperalgesia [20]. It is also important to emphasize that cerebral blood flow changes can also play a roll in managing pain on fibromyalgic patients [21], which could affect the organism systemically.

## Study of Case

Patient of the male gender, caucasian, 43 years old, weighing 105 kg and 1.74 m of height, body mass index 34.69 kg/m². Patient was

In all treatment sessions, the patient was asked to use the Visual Analogue Scale to quantify pain before ultra-laser therapy. Figure 2 shows the patient's pain evolution, in the initial session and final session.


**Figure 2:** Evolution of the patient's clinical condition through treatment sessions, considering pain relief quantified by Visual Analogue Scale (VAS). The evaluation was performed before each session.

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