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Photobiomodulation for the Treatment of Fibromyalgia

In this case presentation and protocol review, the authors report on patient outcome after using low-level light therapy.

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Fibromyalgia Syndrome (FS) is a chronic pain syndrome, affecting approximately 5 million Americans (2 to 5% of adults and up to 6% of school-age children).[1] In the pediatric population, the typical diagnosis of Juvenile Primary Fibromyalgia Syndrome (JPFS) is usually confirmed around 12 years of age. Adults receive a diagnosis of FS by meeting the American College of Rheumatology (ACR) diagnostic

criteria, which includes a combined widespread pain index and symptom severity score of 12 or greater, symptoms that have been consistently present for at least three months, and no other confirmed disorder that explains the pain.[1-3]

Fibromyalgia is thought to affect neural stimulation leading to a decrease in blood flow due to a vasoconstriction in blood vessels.[4] Recent evidence supports one of two theories to explain the etiology: damage to small sensory nerve fibers similar to Small Fiber Polyneuropathy or hyperexcitable C nociceptors.[5,6]

Patients with FS commonly experience diminished strength, decreased upper body flexibility, poor balance, loss of coordination, and reduced endurance [7] Usual treatment for this syndrome has included: pharmacological interventions, cognitive behavior therapy, myofascial release, TENS, and exercise.[8, 9]

The average medical cost to treat an adult fibromyalgia patient (https://www.practicalpainmanagement.com/pain/myofascial/fibromyalgia/fibromyalgia-chronic-fatigue-chronic-fatigue-syndrome) in the United States between 2002 and 2005 was $9573 ± $20,135 annually.[10] And yet, pharmacologics for individuals with FS appear to reduce pain at best by half, suggesting an urgent need to identify safe, affordable, effective, non-pharmacological treatments for the syndrome. One such example, photobiomodulation (PBM), reportedly decreases pain enough to support an increase in activity levels in fibromyalgia syndrome patients.[11-13] As such, PBM may be a viable alternative to be employed to improve symptom relief in patients with fibromyalgia.

To provide greater appreciation for PBM, the authors describe a successful at-home approach employing this management strategy to treat a patient diagnosed with fibromyalgia. In addition, the authors explain a possible physiological mechanism for the beneficial effect that photobiomodulation may have in fibromyalgia syndrome.

(https://www.practicalpainmanagement.com/sites/default/files/imagecache/lightbox-large/images/2018/11/06/casestudy02.jpg)

The Case

A 46-year-old Caucasian woman diagnosed with FS 14 years ago was referred to our rehabilitation clinic. The patient was screened during initial evaluation using the ACR's Preliminary Diagnostic Criteria to confirm her diagnosis.[1,14] She reported a widespread pain index (WPI) of 13 out of 19 possible locations including the: left shoulder girdle, left upper arm, left lower arm, left and right buttock, upper leg, lower leg, neck, chest, upper and lower back. The patient had a symptom and severity score of 9 out of 12.

The patient completed the Fibromyalgia Impact Questionnaire (FIQ) to establish baseline measures.[15,16] The FIQ provides for an assessment of how a patient's fibromyalgia pain has been affecting activities of daily living and the ability to complete tasks. These tasks may include: the ability to grocery shop, do laundry, prepare meals, wash dishes, vacuum, make beds, walk several blocks, visit with friends or relatives, complete yard work, drive a car, and climb stairs. Additionally, the FIQ includes a measurement of pain, fatigue, anxiety and depression using a visual analog scale (VAS).

The patient did not have any of the contraindications photobiomodulation therapy including active cancer, pacemaker, and being pregnant. The patient was presented with the option of treatment with PBM and discussed the positive research results to date, after which the patient agreed to try this new therapy.

Treatment Approach

A TQ-Solo device (Multi Radiance Medical, Solon, OH: 15W, SPL 905nm; IR 875nm; Red 670mn; variable frequency 1000-3000Hz; Beam spot size 4cm2, 15 mW/cm2; 4.7 J/cm2) was used to treat the patient. Each identified fibromyalgia painful point (n = 13) was treated with PBM for two minutes using the variable setting for total of 26 minutes; the variable setting was used to inhibit pain. The patient reported an immediate decrease in pain at each treated site. (Note: The TQ-Solo was chosen primarily because it was the only handheld device that was available to the patient for at-home use (https://www.practicalpainmanagement.com/treatments/complementary) .)

Since the reduction in pain was deemed successful, the patient received education on the use of the TQ-Solo equipment in order to self-treat at home. She was advised to apply treatment to each painful site for 2 minutes once per day, as needed. The patient was instructed not to treat any site for more than 12 days in a row to avoid overtreatment, which could produce an exasperation of symptoms. The patient documented her pain levels using the Brief Pain Inventory (BPI) daily, tracked her physical activity, and completed the FIQ once per week to monitor the effectiveness of the treatments.[15] She was scheduled for a follow-up visit every two weeks. During the follow-up visits her BPI, FIQ, and physical activity logs were reviewed. The treatment protocol was adjusted based on her reported outcomes. For example, the patient noticed an increase in pain symptoms just prior to a storm system moving into the area where she lives.

Ongoing Management and Monitoring

After the first four days of consecutive at-home PBM treatment, the patient reported a reduction in pain from 8 out of 10 to 0 out of 10 (see Figure 1) and her WPI decreased from 13 out of 19 to 0 out of 19. Additionally, her FIQ score decreased from 75 out of 100 to 31 out of 100. The patient reported one caveat—an increase in pain when a storm system moved through the area at the end of the first week—for which the laser therapy had no effect. However, after the storm moved out of the area, the PBM treatments again were effective at reducing her pain and she returned to her prestorm physical activity levels. We instructed the patient to treat 4 to 6 of her typically worst painful sites prophylactically when she knew a storm was coming, which proved effective in reducing the pain flares that occurred during subsequent storms.

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