: Fibromyalgia; Fotobiomodulation; Ultrasound; Autism; Pain; Life quality

Marked by intense learning, childhood is a phase that brings psychic development through socialization, exploratory instinct and understanding of cultural values [1]. Developed capabilities and lived experiences can directly in uence future development and well-being because it is the moment in which beliefs, orientations and expectations are created [2]. us, the environment in which the child is inserted during childhood is a de nitive factor in the child's physical, cognitive, social, emotional and linguistic progress and development, all of which have a profound impact on the individual's current and future general well-being [3].

F

Fibromyalgia is a chronic disease that manifests itself through di use pain and sensitivity in

E

e equipment used in the study was developed at the Technological Support Laboratory (LAT) of the Physics Institute of São Carlos, University of São Paulo (USP) and produced by MMOptics, São Carlos, São Paulo, Brazil, patent number BR102014007397-3 A2, named RECUPERO®. e equipment allows for the simultaneous application of fotobiomodulation (low-level laser therapy) and ultrasound, providing the combined application of resources, allowing the overlapping of therapeutic elds (Figure 1).

Combined laser and ultrasound therapy was applied to each of the patient's hands, totaling 10 sessions performed twice a week. A frequency of 1MHz, intensity of 0.5W/cm², lasting 5 minutes for each hand, and a pulse of 48Hz were used. e red laser used had a wavelength of 660nm and power of 1.30W (Figure 2).

e application was performed on the palms of the hands due to the high innervation of the region, with the application area occurring in the muscles of the Hypothenar, enar and Palmar Aponeurosis regions [11].

Figure 3 shows the evolution of quality of life according to the Fibromyalgia Impact Questionnaire, considering the 10 intervention sessions, measured before and a er treatment. A reduction in values is observed when evaluating the questionnaire, with an initial value of 81 and a nal value of 28 (Figure 3).

Figure 4, which shows the visual analogue scale that illustrates the intensity of the patient's pain, according to the Visual Analogue Scale, which quanti es pain by questioning the patient, considering 10 intervention sessions. A reduction in values is observed through the evaluation of the questionnaire, with an initial value of 10 and a nal value of 1 (Figure 4).

Table 1 shows the evolution of depression and anxiety measured according to the Hospital Anxiety and Depression Scale Questionnaire, considering 10 intervention sessions. A reduction in values is observed upon evaluation of the questionnaire, with an initial value of 20 to 18 for anxiety and 8 to 5 for depression (Table 1).

Figure 1: Shows the use of laser combined with ultrasound (RECUPERO®) on the palms of the hands.

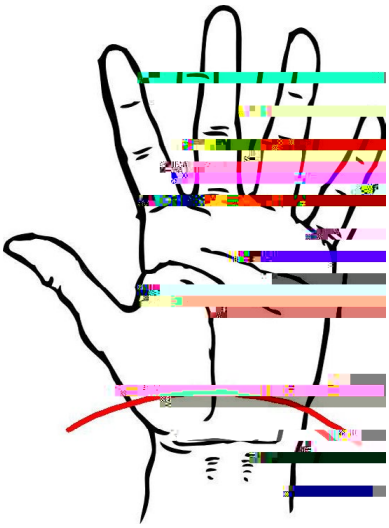

Figure 2: Illustration of the area of application of the hand preserving the growth area of the long bones.

D

According to previous studies [11], the use of combined technology has been widely used in treatments for improving sleep and anxiety [23], rheumatoid arthritis [24], psoriatic arthritis [25], osteoarthritis [26] e bromyalgia [11], promoting an improvement in the conditions.

e treatment of bromyalgia with this new technology that combines laser and ultrasound, through the overlapping of therapeutic elds, allows the simultaneous association of these resources in a single approach, presenting greater e ciency in the organism of the patient with bromyalgia by modulating the nervous system and peripheral

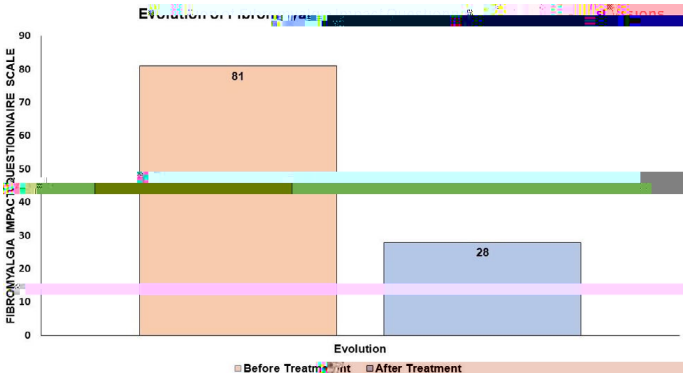

Figure 3:
(81) and after treatment (28), with a percentage reduction of 65.4%.

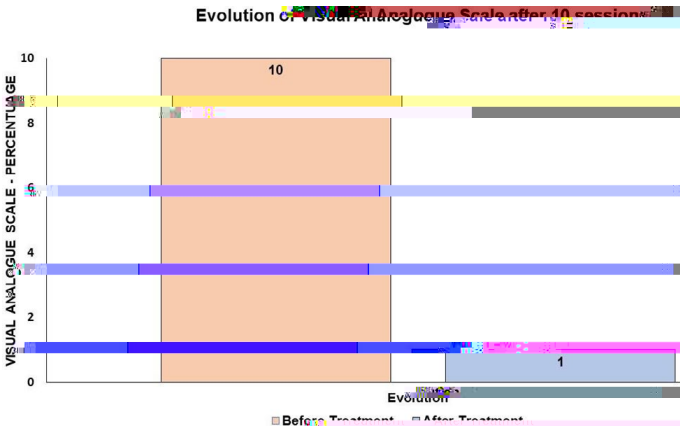

Figure 4:

Table 1:

Anxiety			Depression		
Before	Afer	%	Before	Afer	%
20	18	10	8	5	37.5

blood ow, causing severe changes in the pain threshold and improving quality of life. In the present study, the case report initially indicated intense pain and limitations in activities and participation restrictions [11]. Regarding the treatment methodology with application in the palms of the hands, a structural di erence was indicated in a biopsy performed by Albrecht et al 2013 [26], which supported the entire treatment methodology of synergistic use of resources for systemic pain control [26].

A signi cant improvement was observed in the patient a er treatment with combined laser and ultrasound intervention. e results obtained were measured using the Fibromyalgia Impact Questionnaire (gure 3), which indicates an improvement in quality of life (65.4% improvement). Figure 4, which shows the Visual Analog Scale, allows the analysis of pain intensity, which indicates a reduction in pain (90% reduction).

When observing the patient, Autism Spectrum Disorder (ASD) is also reported, in this case, mild autism, classi ed as level 1, according to the DMS-5. Assuming that in relation to ASD it is the main concern, anxiety and depression can directly impact the well-being of the individual with this spectrum [27]. Comorbidities commonly associated with autism include psychiatric disorders and unfavorable behaviors when performing certain activities [26,27]. However, depression is a disorder that presents a sad, empty or irritable mood, which is added to cognitive changes that shake the individual, which can also be observed when it comes to anxiety, as the disorder tends to persist even when developed in childhood, whether induced by stress or fear [12,27,28]. us, associated therapies can be impactful alternatives for a comprehensive approach to treating anxiety, depression and autism [24,28,29]. us, the use of combined laser and ultrasound therapy may have an in uence on the evolution of these behaviors, given the improvement in carrying out daily activities considered uncomfortable, such as cutting hair and trimming nails, as reported by the person in charge.

As observed in previous studies [11], the combined action of fotobiomodulation and ultrasound shows a systemic action with its activity beginning when applied to the palms of the hands, targeting the peripheral nerve endings of the thenar, hypothenar and palmar aponeurosis areas, acting on the nerve cells present near blood vessels (anomaly observed in the study), as observed by Albrecht PJ, et al. [26]. e use of ultrasound allows the action of cellular cavitation, facilitating the transition of sodium, potassium and calcium ions, possibly improving nerve conductivity. In addition, there is the analgesic and anti-in ammatory action of the ultrasound resource. Low-intensity laser, in addition to its analgesic, anti-in ammatory and enzymatic modulation action, also produces ATP. rough a erent nerve pathways, the stimulus is conducted to the central nervous system, where a brief modulation of intracranial compliance occurs in the brain [30], allowing an adjustment of the pain center present in the prefrontal cortex and, as a consequence, a decrease in hypersensitivity. Also in an observed case report and in a related study on sleep disorders a reduction in anxiety and depression levels was observed with the same treatment methodology. Although the present study had results on the quality of life and pain present in the bromyalgia condition, where the standard use of 10 intervention sessions has been shown to be e ective, even in the anxiety and depression issues observed previously [11,30], a new model with a longer intervention time may be more e ective on issues relevant to Autism Spectrum Disorder.

us, the proposed intervention allowed a reduction in pain and an improvement in quality of life, enabling the patient to perform actions not previously performed, such as playing, but showed low e ectiveness in assessing anxiety.

C

is study shows an improvement in quality of life and a reduction in pain in bromyalgia, through the technological support of laser and ultrasound used on the palms of the hands, indicating the e ciency of the protocol used. However, when observing Autism Spectrum Disorder, a longer intervention period is suggested for better evaluation and possible di erence in the observation of the patient, allowing greater reliability in the therapeutic action of this spectrum.

A

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