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Effect of Occupational Therapy with Contrast Bath as an adjunct in the Management of Complex Regional Pain Syndrome

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Abstract

Pain is an unpleasant feeling experienced by individuals caused by any stimuli or damage to the bodily structure which in turn makes the individual withdraw from the stimulus. Thus, in Complex Regional Pain Syndrome cases, pain indirectly affects the functioning of the individual resulting in dependence and disability. Occupational therapy tend to increase independence in daily living of individuals. Contrast bath can reduce pain on immersion thereby increasing the independence in the individual. To assess pain and Range of Motion of wrist and hand. To evaluate pain and range of motion after providing contrast bath. This study was done in a rehabilitation setup in Madurai, Tamilnadu with 4 subjects presented with a case of complex regional pain syndrome. Subjects were selected on the basis of selection criteria. Pain is assessed using Wong – Baker FACES pain rating scale and ROM using Goniometer. Contrast Bath has been given for 3 weeks, followed by occupational therapy. After 3 weeks, post-test evaluations have been done. Comparison of mean score of pre-test and post-test have shown that the pain is reduced from 6 to 4 in the Wong – Baker FACES pain rating scale and goniometric assessments indicated an increase in range of motion by 5 to 15 degrees. There was a reduction in pain and improvement in range of motion in wrist and fingers after application of contrast bath.

Keywords

Contrast Bath, Pain, Range of motion, Occupational Therapy

Introduction

Complex Regional Pain Syndrome (CRPS) is a progressive condition characterized by severe pain, swelling showing sensory, autonomic, motor, and dystrophic signs (Baron R, 2006; Robert J Schwartzman, 2009). Typical features include dramatic changes in the color and temperature of the skin over the affected limb or body part accompanied by intense burning pain, skin sensitivity, swelling, sweating and restricted range of motion (Derya et al., 2010). In more than 90% of cases, CRPS is triggered by nerve trauma or injury to the affected limb that damages the thinnest sensory and autonomic nerve fibers. Pain is an unpleasant feeling accompanied by physical, physiological, and psychological disability. However, it is important not only as a protective response for the

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body but also as an assessment indicator of a patient's initial and post-treatment statuses (Jin et al., 2022). The primary goal of the treatment for CRPS is functional restoration. Specific exercise therapy is the most essential part of the treatment. Therapeutic cold and heat, TENS-therapy, contrast bath and occupational therapy are the other component of therapy (Serdar, 2013).

Contrast bath is a form of hydrotherapy which is used to decrease pain, inflammation, swelling and restoring power. Contrast bath includes alternate immersion of extremities in hot and cold water in an alternating manner for a defined length of time at the predetermined temperature of $98 – 110^0$ F (warm); $45 - 70^0$ F (cold) which helps to decrease edema, increase blood flow, and reduce pain and joint stiffness via alternating vasoconstriction and vasodilatation of blood vessels allowing for edema reduction and increased mobility (Tom Emiliya et al., 2019; Tristan et al., 2012). The goals of Contrast Bath include decreasing pain, swelling and inflammation, improving mobility, muscle recovery after exercising. A contrast bath is a good modality of choice for swelling and pain around the joints and soft tissue in the body which includes acute injuries to limbs or joints (over 72 hours), plantar fasciitis, ankle fractures, Achilles tendinitis, hand and finger arthritis, conditions with reduced blood flow, muscle hypertonicity resulting in cramps or spasms, Repetitive strain activities, such as carpal tunnel syndrome, CRPS. If there is a good palpitation in the extremities, diabetics and those with neuropathies can benefit from contrast bath (AnkleAid, 2013).

In this study, we aimed to evaluate the effect of occupational therapy with contrast bath as an adjunct in the management of complex regional pain syndrome.

Methodology

The study was done in an in-patient rehabilitation setup, Madurai, India in a 6 month period with 4 subjects selected based on the physician's diagnosis as CRPS, between age 40 – 60, both male and female subjects, subjects with pain range between 6 and 8 in Wong – Baker FACES pain rating scale. Sample with periarthritis shoulder, below 40 years and above 60 years, and pain range above 6 has been excluded from this study. One-group pretest-post-test design was adapted, and purposive sampling technique has been used in this study. Information about the study and treatment session has been explained and informed consent has been obtained from the participants who were interested in participating in the study. Subjects were selected based on the selection criteria. The pretest of pain was done using Wong – Baker FACES pain rating scale for subjects experiencing pain. Contrast bath has been given for 3 weeks, started with immersion of wrist and hand in warm water of $85^0 – 95^0$ F for 3 minutes followed by rest for 30 seconds then applied gel pack for 1 minute and the next immersion in warm water started after 30 seconds. It was repeated 4 times for 20 minutes and followed by occupational therapy. After 3 weeks, the post-test evaluation was done. The data were tabulated and statistically analyzed, and results were concluded.

Goniometer is used for measuring the range of motion of wrist and hand. Wong–Baker FACES pain rating scale, as shown in Figure 1 below.

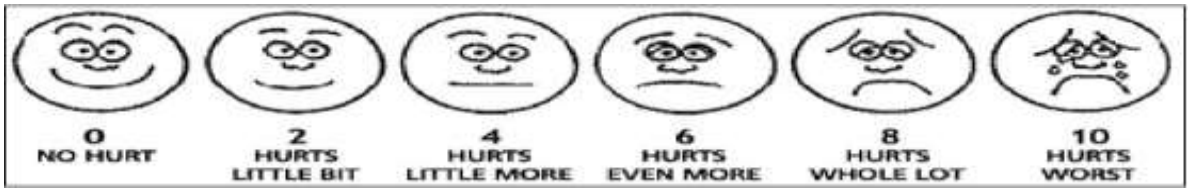

Figure 1. Wong-Baker Faces pain rating scale.

In a study of the Validation of three pain scales among adult postoperative patients in Ghana, two existing pain scales (0-10 Numeric Rating Scale [NRS] and Wong-Baker FACES [FPS] scales) and one new pain scale (Color-Circle Pain Scale [CCPS]) were validated. A mixed methods design was adopted, and the study was conducted at two hospitals in Accra, Ghana. The qualitative phase involved 17 patients and 25 nurses, and the quantitative phase involved 150 post-operative patients. The psychometric properties of the scales, Convergent validity was very good and significant (0.70-0.75), Inter-rater reliability was high (0.923-0.928)

Results

Table 1. Comparison of pre-test and post-test of pain.

Variable	Test	N	Mean	SD	T value	P value
Pain	Pre-test	4	5.75	0.50	7	0.0060
	Post test	4	4	0.82		

Table 2. Comparison of pre-test and post-test of ROM

Variable	Test	N	Mean	SD	T value	P value
Range of Motion	Pre-test	4	10	4.08	4.9771	0.0156
	Post test	4	31.25	8.52		

Discussion

On Comparison of mean score of pre-test and post-test, it is evident that the pain is reduced. Table 1 shows the mean value of pre-test = 5.75, SD = 0.50; the mean value of post-test = 4, SD = 0.82; t value = 7, p value = 0.0060 of pain indicating that it is statistically significant. Table 2 shows the pretest mean value = 10, SD = 4.08; the post-test mean value = 31.25, SD = 8.52 of ROM indicating that it is statistically significant. In a study of The Effectiveness of Contrast Bath on Reducing Hand and Wrist Pain by Elizabeth (2014) aimed to find out the effect of patient education compared to patient education and contrast bath for alleviating symptoms of hand and wrist pain with 8 subjects and concluded that contrast bath increased active range of motion for wrist extension and increased function. Christina et al. (2019) discussed in the population-based study

in Minnesota, over the period 1989 – 1999, applying the IASP criteria resulted in an incidence rate for CRPS type 1 of 5.46/100,000 person-years. On the other hand, CRPS type 2 incidence rate was just 0.82 per 100,000 person-years. The female-to-male ratio was 4:1, while the median age of onset was 46 years. Elizabeth et al. (2014) in her comparative RCT study observed a trend with the results from the cryotherapy and contrast baths groups. The contrast baths group seemed to have a greater improvement in the first two weeks and then tapered off in the last two weeks. The cryotherapy group had a more gradual increase throughout the four weeks indicating that contrast baths may have more of an effect in the first two weeks than cryotherapy but overall they are just as effective over a period of four weeks. Amy et al. (2014) in a case study of early adjunct treatment with topical lidocaine results in improved pain and function in a patient with complex regional pain syndrome had included contrast bath as a part along with other occupational therapy components which resulted in improvement in range of motion and function of patients with CRPS.

Conclusion

CRPS is a multifactorial disease characterized by pain, reduced function, and poor quality of life. Many studies suggest that use of contrast bath reduces pain in CRPS cases. The result of this study reveals that there was a reduction in pain and an increase in range of motion in the wrist and fingers after application of contrast bath as an adjunct to occupational therapy in CRPS cases, which also improved the functioning of the subjects.

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