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OSTEOARTHRITIS: THE EFFECT OF SPECIFIC WATSU THERAPY ON PEAK TORQUE AND FUNCTIONAL PARAMETERS- AN ANALYTICAL STUDY

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ABSTRACT

The aim of this study was to find out the effect of specific Watsu program on range of motion and relieving of chronic pain in people with osteoarthritis of the knee and hip. 30 male with osteoarthritis between the ages of 50-55 years were selected as subjects. They were divided into two groups: group I or experimental group (n = 15), and group II or control group (n = 15). The first group underwent a specific Watsu® Therapy program for eight weeks, two days/week and 45 min/per session in water. Group II - performed no specific exercise program. Pre and post-tests were conducted on the flexibility test for lower limb and relief of chronic pain by a questionnaire Pain Catastrophizing Scale designed to determine the decrease of pain threshold on the functional score. Physical activity level is measured by 1-mile walk time. Mean, standard deviation, and t test were used to analyze the data and percentages were calculated for the pain relief. The results showed positive results on the peak torque, torque development rate and functional test were similar between groups before exercise program. A peak torque increase ($P < 0.05$) was found in hip extension, hip flexion and plantar flexion in the experimental group. The peak torque of knee flexion & extension and ankle dorsiflexion did not differ between groups in post training assessment ($P > .05$). No changes were found in the control group ($P > 0.05$). As far as the decrease of pain threshold is concerned, the experimental group had a 60% reduction in functional score compared to the control group, which had only a 15% score. It was concluded that specific Watsu training has a beneficial effect on the flexibility of the experimental group in three parts of the body and has a reduction in pain of more than normal range indicating that the above training is highly effective in rehabilitation of osteoarthritis.

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Introduction

It is believed that the most enervating settings that a person can sustain is enduring pain that persists for more than a period of six months [1]. Long-lasting pain can ensue in many parts of the human body, and frequently inhibits subjects from executing significant tasks in life, such as exertion and community activity [2]. There are countless cures for prolonged pain, but the most effective is aquatic therapy. [3-6]

If the human body is immersed in water to the level of the chest, 80% of the body weight is condensed from the reckoning. This permits the person to rehabilitate muscles and joints in a comforting backdrop where the body can rectify quicker and workout effortlessly at a higher level. The warmness of the water operates openly on the skin to reduce pain; however, water pressure provides resistance that transforms the exercises involved in a particular line of treatment adequately challenging [7]. On the other hand, the decreased weight of the body itself makes it effortless for the patient to emphasis on strength and mobility reorientation in the maximum indispensable extents [8]. The aquatic environment provides multiple benefits for physical rehabilitation programs. Aquatic therapy techniques are an effective complement to therapeutic work on land for sedentary, obese, elderly patients with special orthopedic and rheumatologic needs [9-11]. Water effects the patient in different ways due to viscosity, buoyancy, turbulence, weight relief, hydrostatic pressure, ease of movement and thermal

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conductive property [12]. Exercise and therapy are much less painful in warmish water than on land. Water offers low-strain, low-weight ambience exercise that allows synovial fluid to transport nutrients to joint surfaces and reduces the threat of injury or unwarranted strain on the joints [13]. Osteoarthritis is the most familiar usage of arthritis in the elderly, and is one of the utmost recurrent outcomes of physical disability among them. Osteoarthritis (OA) was earlier understood to be a customary result of aging, thus leading to the terminology of degenerative joint disease. However, it is now gathered that OA is the result of a composite chemistry of numerous elements, including joint veracity, genetic predilection, local soreness, mechanical powers, and cellular and biochemical procedures. There is a widespread research literature promoting aquatic therapy, as well as in the field of basic science area and clinical field including several studies on Watsu [14, 15]. In Watsu, therapy practitioners use body weightlessness to decompress the joints and to elongate the muscles in ways that are not possible on land. Watsu therapy is used in the management of chronic pain conditions, physical capacity and being incorporated in to aquatic therapy treatment programs around the world. Studies on Watsu therapy should have robust methodological designs and detailed reporting of temperature, care settings, and techniques used [15-17]. To have firm conclusions about identifying the techniques that are most effective in rehabilitation of osteoarthritis, further good-quality studies about Watsu therapy and its unique techniques should be performed. Therefore, the aim of this study was to scrutinize the effect of 8 weeks of Watsu-therapy techniques on the flexibility, physical activity and pain index in elderly male with osteoarthritis.

Method

30 male participants with osteoarthritis between the ages of 50-55 years were selected as subjects. They medically diagnosed as spinal arthritis or osteoarthritis of the spine. Outcome measures included pain, flexibility, and levels of physical activity. They were divided into two groups: group I or experimental group (n = 15), and group II or control group (n = 15). Group I undertook explicit Watsu® Therapy package used for eight weeks, two days/week and for a duration of 45 minutes per period in water. Group II executed no precise exercise program. The research was premeditated as a randomized controlled trial in which subjects were methodically administered 8 weeks of Watsu therapy or no aquatic physical therapy. A certified practitioner applied Watsu therapy for the experimental group. Personal consent for voluntarily participation in the study was obtained from all subjects apart from medical confirmation.

The water temperature was 34 °C throughout the therapy program. Watsu training including gently trunk rotations and traction with soft rocking movement of the limbs applied for 45 minutes while they were being floated on the surface of water. Subjects were allowed to move their arm or head whenever they felt uncomfortable.. Tests at the beginning and conclusion of the training were performed on the outcome of the therapy program including flexibility, pain control and physical activity. The flexibility test was performed by the MVIC torques test of the leading lower limb. A standard scale for measuring pain used to evaluate self-reported pain called PCS (Pain Catastrophizing Scale) [18], was administered to subjects. This scale includes 13 test items rated from 0 for certainly not to 4 for all the time on a five point Likert scale. The highest score in this scale is 52, that refers to the elevated pain levels. There are three subscales in PCS namely rumination, helplessness and magnification. Physical activity level was measured with time for a 1-mile walk. The mean, SD (standard deviation), and t-test were utilized to evaluate the records and percentages were determined for the release of agony, flexibility of the lower limbs and level of physical activity.

Results

Table 1 shows the Mean, SD and P-values on the Peak Torque at pre and post-tests.

Table 1. The Mean, SD and P-values on the Peak Torque at pre and post-testsPeak Torque

Variable	Experimental Group		Control Group				
	Before M±SD	After M±SD	Before M±SD	After M±SD	F	P	ES (Cohen's d)
Extension (Hip)	107.2±34.9	150±47.9*	113.7±45.7	111±37.1	20.18	.00	.45
Flexion (Hip)	45.54±9.9	53.7±12.2*	57.7±17.2	51.6±14.9	6.03	.01	.06
Extension (Knee)	73.7±27.9	84.2±40.5	78.0±24.7	76.4±32.2	3.21	.08	.12
Flexion (Knee)	30.0±12.6	33.6±14.6	30.0±10.4	30.3±9.7	0.44	.50	.16
Plantar Flexion	22.3±9.2	31.8±13.2*	21.5±5.9	21.9±6.1	18.09	.00	.61
Dorsi Flexion	16.4±6.9	19.2±7.2	14.7±4.2	15.3±3.8	1.66	.20	.45

F and p values indicate the interaction differences

- Significant time effect (pre Vs post) differences at $p < 0.05$

The analyzed data revealed that in the hip extension and flexion of the experimental group had values of 107.2±34.9, 150±47.9,45.54±9.9, and 53.7±12.2 from pre to post-tests respectively, which was significant $P < 0.05$. The control group with reading113.7±45.7, 111±37.1,57.7±17.2, and 51.6±14.9 respectively from pre to post-test, also did not show any significant effect $P > 0.05$.

Figures related to knee extension and flexion for the experimental group showed a reading of 73.7±27.9, 84.2±40.5, 30.0±12.6, and 33.6±14.6 from start to end of the program, respectively, that was not noteworthy P > 0.05. The control group with scores of 78.0±24.7, 76.4±32.2, 30.0±10.4, and 30.3±9.7 from pre to post-test, respectively, also did not exhibit any change P> 0.05.
Performance due to Planter flexion yielded values of 22.3±9.2, 31.8±13.2 for the experimental group from the beginning to the conclusion of the program, that was substantial P< 0.05, but on the other hand, Dorsi flexion of this group did not show any significant result with record of 16.4±6.9, 19.2±7.2, P < 0.05. The result of control group for plantar and dorsi flexion was 21.5±5.9, 21.9±6.1, 14.7±4.2, and 5.3±3.8 from pre to post-test, respectively, which was insignificant P < 0.05.
The Cohen's D test revealed that the effect size of the plantar flexion was nearly large, whereas for the hip extension, it was medium and hip flexion was the least with values of 0.61, 0.45, and 0.06, respectively.

Discussion

The main purpose of this study was to investigate the explicit Watsu therapy package on the ambit of motion and releasing of prolonged pain in the patients with knee and hip osteoarthritis.
Demographic evolution in modern eras has caused in a noteworthy upsurge in the aging populace around the biosphere. This has caused many problems that society has faced [19]. Chronic pain is a familiar disorder that is described in the population and also acts as a substantial financial liability on well-being maintenance. Enduring pain is described as pain that is continues between 3 to 6 months [20]. Analogous to records in over-all populace, the occurrence of chronic pain also fluctuates broadly from 15.2% in Malaysia [21] to 69.8% in Germany [22]. These figures are greater (up to 83%) between the elderly in some parts of the world [23]. Pain has not been reported in the seniors owing to misunderstanding, which is a customary procedure of aging and because of cognitive turbulences.Musculoskeletal maladies such as progressive spine and arthritic disorders are the most important cause of persistent pain in society.. Alernate routine condition of impact comprises of neuropathic pain, ischemic pain, and pain owing to cancer together with its management [24]. The literature has observed an extraordinary frequency of vertebral compression fractures that cause pain and distress. Uneasiness alongside the back, spine and neck are the peak troubling routes of chronic pain. Back pain is the result of stress alongside the vertebrae, or adjacent nerves, muscles or bones. Most adults encounter phases of back pain, whether it is owing to age, injury or job-related stress. Neck pain shoots from stress in the upper back and lower neck, and disturbs approximately two-thirds of the population [25]. This study revealed that there are not many changes in the pain threshold levels of subjects, which is in conformity with the studies of Marinho-Buzelli et al. (2015), Latridou et al. (2018), and Mooventhan & Nivethitha (2014) [26-28]. Aquatic therapy can be utilized as a management technique for various types of chronic pain. The hard and rigid pain in the inferior extremities can be overcome if an underwater treadmill is employed to assist a patient recuperate his or her walking strength. On the other hand, pain in the upper part of the body improves with the comforting qualities of water during a execution of an exercise regime of moderate intensity [29]. Underwater ambience is correspondingly challenging and helpful for convalescing patients.Aquatic therapy is a solitary absolute powerful technique for relieving pain alongside the back, spine and neck. The comforting effects of water helps to relieve pain in muscles and nerves, especially for patients who are afflicted with partial damage of flexibility because of chronic pain in these areas [29]. Water diminishes the trauma of the body weight and provides resistance that creates the situation for gradual strength training. Water-structured exercise can principally of great use to treat various ailments and increase mobility in different parts of the body [30]. Arthritis is a provocative joint condition that occurs in more than 100 diverse forms and induces approximately one in four grown-ups. The most familiar manifestation of arthritis are osteoarthritis and rheumatoid. Osteoarthritis is caused due to the breakdown of cartilage and intrinsic bone tissue, while rheumatoid is a progressive malady for irresolute reasons. Symptoms in arthritis are swollen joints, stiffness and joint pain. Water is one of the most congenial backgrounds in which an individual suffering from the malady of arthritis can recuperate flexibility and alter pain in tender joints of the body. This study observed that there was an increase in the flexibility of hip and ankle joints, which is quite significant and in line with the investigation of Dundar et al. (2009), Tsae et al. (2007), and Wyatt et al. (2001) [31-33]. On the other hand, the studies of Lee et al. (2018) and Gobel (2001) show no difference which is against the result of our study because the age of subjects are different from our study [34, 35].
Finally, with regard to the aerobic capacity, this study showed the improvement in physical activity levels in the one-mile walk after the Watsu training, which confirms previous studies of Tufekcioglu et al. (2018), Margaret et al. (2006), and Wouters et al. (2010) [36-38].

Conclusion

It was concluded that Watsu therapy improves the ROM of knee and hip and time of one-mile walk. The severity of individual pain in the Watsu group is significantly reduced when matched with the control group. The exercise adherence rate was 91·7% and no therapy-related adverse effect was observed or reported. Further good-quality studies about Watsu therapy and its unique techniques are needed to have firm conclusions on identifying the techniques that are most effective in rehabilitation of osteoarthritis.

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