



Effectiveness of Aquatic Therapy on Reducing Pain and Increasing Physical Function in Adult Patients with Hip and/or Knee Osteoarthritis



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Abstract

Objectives: this study was conducted to examine the evidence of the effectiveness of aquatic therapy in patients with hip and/or knee Osteoarthritis (OA) on reducing pain and improving physical function.

Results: our review found three studies suggesting that in patients with hip and/or knee OA, the aquatic therapy can reduce pain and improve physical function.

Conclusion: aquatic therapy exercises are effective and helpful in reducing pain and improving physical function in patients with hip and/or knee OA.

Keywords: Aquatic therapy; Osteoarthritis; Function; Activities of daily living; Occupational therapy

Introduction

Osteoarthritis (OA) is the most common type of arthritis with knee being the most affected joint. Most common symptoms of OA are pain, reduced balance, muscle weakness, decreased Range of Motion, and joint instability Beissner et al. [1]. All these affect performances of activities of daily living (ADL) Kwon et al. [2]. There are many ways to treat OA Lin et al. [3]. One of the methods is aquatic therapy. The beneficial effect of aquatic therapy is reduction of pain by using warm water, buoyancy of water, turbulence or depth of immersion, and facilitating closed-chain exercises Lund et al. [4]. However, there are limitations to this method, which are high cost for setting and lack of studies in community-based settings in OA. The purpose of this study was to examine the evidence of the effectiveness of aquatic therapy in patients with hip and/or knee OA on reducing pain and improving physical function. For this study, we created a clinical/research PICO question (Population, Intervention, Comparison, and Outcome), a key to evidence-based decision Richardson et al. [5]. The PICO formed for our study is as follows:

- P: For patients with hip and/or knee OA
- I: Does aquatic therapy
- C: Compared to other therapy or control conditions
- O: Reduce pain and/or increase physical function?

Methods

Review of literature and search strategy: A research has been made in the following databases: Ovid, MEDLINE, Global Health, and CINAHL. Keywords and Search items used to search articles for our study were Aquatic therapy, Osteoarthritis, function, activities of daily living, occupational therapy. We used PICO method to search for the relevant articles that have the evidence. We then selected the strongest study based on a variety of factors, such as relevance, study design, sample size, outcomes, significance, year of publication, and intensity of the intervention (frequency and duration).

Results

Our review revealed three articles that focus most relevantly on the purpose of this study. Evidence study design and study level were determined based on the hierarchy of levels of evidence in evidence-based practice Hughes [6]. The first study Wang et al. [7] was level II evidence with a randomized controlled trial design. The participants were 38 subjects with OA of hip and/or knee. Also, they were directed to do 50 minutes aquatic exercise, 3 random days per week for 12 weeks. The exercise was composed of warm up, flexibility, strength training, and cool down. The temperature of pool was about 30 degree Celsius. The results were significant improvements on 3 out of 4 physical functions measurement and no

significant change on pain measurement. The second study Hinman et al. [8] was level II evidence with a single blinded randomized controlled trial design. In this study, the participants were 71 subjects with OA. They were directed to do 45 to 60 minutes of aquatic exercise, twice weekly for 6 weeks. The exercises were functional weight-bearing and progressive exercise. The temperature of pool was 34 degrees. The results were significant improvements on both pain and physical functions. The third study Silva et al. [9] was level II evidence with randomized controlled trial design with blinded investigator. In this study, the participants were 64 subjects with OA divided into groups of 5 to 8 participants. They were directed to do 50 minutes aquatic training session, 3 times a week for 18 weeks. The exercise composed of static stretching, isometric and isotonic strengthening of major muscle group of the lower extremities, and gait training. All adapted land-based exercises with floaters and increased speed. The pool was 32 degrees. The results were divided into 2 groups which are intergroup and intragroup. The intergroup comparison showed significant improvement on pain.

The intragroup comparison showed significant improvement on pain but not as much improvement on physical functions.

Discussion

We chose the strongest study by considering different factors, such as year of publication, intensity of intervention, and detailed explanation of intervention. Silva study had the most recent publication year. Also, its experiment had the longest duration. Furthermore, it had the most detailed explanation of treatment plan. Therefore, Silva study was selected as the strongest evidence in our review and showed that aquatic therapy reduces pain in OA condition and leads to improvements in physical function. So, depending on Silva et al. [9], we created clinical guidelines and recommendations to follow aquatic therapy protocol in clinics. Our study protocol can be applied in case of all individuals with OA of hip and/or knee joint. Thus, clinical guidelines, recommendations, a plan and audit tool have been developed in our study to implement aquatic therapy in clinical settings (Table 1).

Table 1: A summary of recommendations, plan, and audit tool.

Recommendation	Implementation Plan	Criteria	Audit Method	Compliance Plan
1. Physicians will be given a summary of the supporting article and an intervention plan. Or small seminar can be arranged for physicians explaining the new treatment protocol for osteoarthritis and the evidence behind this.	An occupational therapy (OT) manager will provide each physician a summary of the supporting article and an intervention plan. The physicians will be asked to give comments with their signature.	All physicians who receive a summary or attend seminar of the supporting article and an intervention plan will return comments on the intervention plan with their signature	The OT manager will keep a list of the physicians who received a summary of the supporting article and an intervention plan or who attended seminar on the topic in the ring binder. Then, the OT manager will track physicians who return comments and do not return comments.	The OT manager will remind physicians who do not return the comments or signature within 2 weeks. If a new physician is employed, the OT manager will send a summary of the supporting article and an intervention plan. Also, the OT manager will request that the physicians return comments with their signature within 2 weeks.
2. An interested qualified therapist will attend a training course in aquatic therapy.	The Department of OT will enroll the therapist in a training course in aquatic therapy.	The therapist who attended the training course will obtain a certificate as proof of competency in aquatic therapy.	The OT manager will check the certificate and keep the certificate in the ring binder. Every 2 months, the OT manager will also confirm the presence of a certified therapist.	If the therapist fails to obtain the certification (therapist will not be appointed on program as instructor if he/ she cannot produce certification) or the certified therapist is transferred to another institute, a new therapist will attend a training course in aquatic therapy to obtain a certificate.
3. Therapists will show competency in use of all of the following outcome measures: Lequesne Index for OA, WOMAC, Pain on 100-mm VAS before and after 50FWT, walking time at fast and comfortable paces during 50FWT, and number of NSAIDs.	Therapist should obtain certification of all the outcome measures to be used in the study, Maximum three attempts will be provided to pass the test and achieve certification of competency. The noncertified therapists will take the tests before being qualified as trainers for the aquatic program.	Therapists providing proof of certification of competency of all outcome measures will be qualified to be the trainers for the program.	The OT manager will keep record of certificates related to competency in all outcome measures of all instructing therapists of the program.	Therapists who could not meet the criteria for passing will take the certification test after 1 week with or without reeducation. It will be mandatory for therapist to pass the test within 3 attempts.

4. Therapists will determine the appropriate patients considering the inclusion and exclusion criteria in the evidence article.	Instructor therapists who showed competency in evaluation of outcome measures, and carrying out aquatic therapy program will determine which patients best fit the recommended intervention according to the study.	OT manager will make sure that all of the patients chosen will meet the inclusion and exclusion criteria in the evidence study.	The OT manager will check the eligibility of chosen patients once a month. Also, the OT manager will maintain record of the specific medical conditions of the chosen patients and keep them for further reference.	The OT manager will remind those therapists who fail to choose appropriate patients according to the inclusion and exclusion criteria. They will be asked to put a copy of the criteria on their desk, or appear for an exam set by manager testing knowledge of criteria required for the program.
5. Therapists will provide brochures explaining intervention protocol and its effects on OA to selected participants.	In the first therapist-patient meeting after confirming patient for aquatic therapy, each therapist will provide participants with informative brochure to clear their concepts about the study.	Therapists will make a correct informative brochure or handout of aquatic therapy. Therapists will provide all standard information. Each therapist will collect signature and comments from each subject at the same time.	The manager will get feedback from patients if they received and understood all information and materials within 1 week from the first patient-therapist interaction.	The OT manager will examine handouts to be distributed among the patients for correct and detailed information before they are distributed.
6. Therapists will evaluate the eligible patients with outcome measures for baseline data.	Therapists selected as instructors for training aquatic therapy program will collect data on all outcome measures at baseline in case of eligible subjects of the study.	All of the eligible patients will be evaluated in an appropriate manner before starting aquatic therapy.	The OT manager will keep record of the results of the evaluations for further reference.	OT manager will educate those therapists who did not evaluate patients before beginning with aquatic therapy or evaluated them in an incorrect manner. In such cases, re-evaluation will be presented to OT manager in 2 days. If needed, the OT manager can require the therapists to undergo the education process again.
7. Therapists will provide aquatic therapy to the patients.	Therapists will provide aquatic therapy to the patients. In 120-cm deep pool maintained at 32°C, aquatic therapy will be given in a group of 5 to 8 people. Exercises will include stretching and strengthening of the major muscle groups of the lower extremities, along with gait training.	Therapist will provide aquatic therapy following the intervention protocol.	OT manager will check if the aquatic therapy given to patients is appropriate once every week.	Manager will keep check on appropriateness of therapy given to each patient every week. If any therapist fails to follow the protocol, reeducation of protocol will be made mandatory. OT manager will decide if they have to pass the test set by manager to continue being instructor for the program.
8. Using the outcome measures, the therapists will re-evaluate the patients at 9th and 18th weeks of aquatic therapy intervention.	Instructor therapists will collect data on outcome measures at 9th and 18th weeks to keep follow-up of effects of aquatic therapy on participants. They will also notice number and reasons of dropouts, or adverse effects due to therapy.	All of the patients who received aquatic therapy will be re-evaluated at 9th and 18th weeks in an appropriate manner.	OT manager will check re-assessments at 9th and 18th weeks and give approval for continuation of aquatic therapy. The results of the re-evaluations will be kept in record for further reference. The OT manager will check each therapist once in 2 weeks to ensure that he/she is in compliance with the standard intervention.	OT manager will educate those therapists who did not evaluate patients at 9th and 18th weeks of aquatic therapy or evaluated them in an incorrect manner on the importance of the evaluations. Such therapists might have to undergo the education process again, and pass the test set by the manager.

Conclusion

Our review suggests that aquatic therapy exercises are effective and helpful in reducing pain and improving physical function in patients with hip and/or knee OA. Thus, clinical guidelines, recommendations, a plan and audit tool have been created in our study to implement aquatic therapy in clinics. The clinical guidelines for recommended intervention, the plan, and the audit tool recommend therapists to apply aquatic therapy with patients with hip and/or knee OA.

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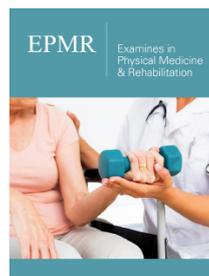
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