Land-Based Exercise vs. Hydrotherapy in Osteoarthritis

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Abstract

Osteoarthritis (OA) is the most common form of arthritis. It results in joint pain, stiffness, reduced mobility, and decreased quality of life. While NSAIDs are the cornerstone of treatment, aerobic exercise is one of the safest and least expensive treatments. Aerobic exercise can be completed on land or in water.

The database, PubMed, was used to acquire articles that compare hydrotherapy to land-based therapy in individuals with large-joint OA. Outcomes of interest included pain relief, joint mobility, and quality of life.

Based collectively on six articles, there was no consensus on whether hydrotherapy was superior to land-based therapy. There was little consensus among study results, indicating that no therapy modality appeared to be superior. One theme was exhibited, however-- some exercise therapy is more beneficial than no therapy.

Introduction

Overview

- Affects 33 million in the United States
- Most commonly affects hips, knees, lower back, and hands
- Risk Factors: age >60, obesity, female sex, joint overuse

Signs & Symptoms

- Joint pain, crepitus, stiffness, swelling, decreased range of motion, joint asymmetry
- In severe cases, joint deformity and disability

Treatment

- Not curable, but treatable
- Pharmacological: OTC analgesics (NSAIDs, Tylenol), Tramadol, Intra-articular corticosteroid injections
- Non-pharmacological: Aerobic exercise, weight loss, assistive ambulation devices, joint replacement surgery

Methods

Literature Review

- Performed in December 2020
- MedLine via PubMed

- Search Terms: "osteoarthritis AND hydrotherapy OR water aerobic AND physical therapy OR land therapy AND randomized control"

- Inclusion Criteria:
  - RCT
  - Published after 2000
  - Subjects >18 years old
  - Subjects with OA dx by physician
- Excluded:
  - Use of invasive tx
  - Animal subjects
  - Meta-analyses or systematic reviews
  - Failure to compare LBE to HT
  - RCT still in progress

Results

Foley A, Halbert J, Hewitt T, Crotty M. Does hydrotherapy improve strength and physical function in patients with osteoarthritis—a randomised controlled trial comparing a gym based and a hydrotherapy based strengthening programme. *Annals of the Rheumatic Diseases.* 2003; 62(12): 1162-1167.

Single-blind RCT with compared hydrotherapy, land-based exercise, and no physical therapy in 105 community living participants aged 50 years and over with clinical OA of the hip or knee. Outcome measures pre- and post-therapy: muscle strength dynamometry, six minute walk test, WOMAC OA Index, total drugs, SF-12 quality of life, Adelaide Activities Profile, and the Arthritis Self-Efficacy Scale.

Fransen M, Nairn L, Winstanley J, Lam P, Edmonds J. Physical activity for osteoarthritis management: A randomized controlled clinical trial evaluating hydrotherapy or Tai Chi classes. *Arthritis and Rheumatology.* 2007; 57(3): 407-414.

An RCT with 152 participants diagnosed with clinical OA of the hip or knee compared Tai Chi, hydrotherapy, and no physical therapy. Outcome measures pre-, 12 weeks, and 24 weeks post-therapy: pain and physical function (Western Ontario and McMaster Universities Osteoarthritis Index), general health status (Medical Outcomes Study Short Form 12 Health Survey [SF-12], version 2), psychological well-being, and physical performance (Up and Go test, 50-foot walk time, timed stair climb).

Waller B, Munukka M, Rantalanin T, ...Hakkinen A, Kujala UM, Heinonen A. Effects of high intensity resistance aquatic training on body composition and walking speed in women with mild knee osteoarthritis: a 4-month RCT with 12-month follow-up. 2017; 25(8): 1238-1246.

An RCT compared intensive WBE and intensive LBE in 87 participants with clinical large-joint OA. Outcome measures pre- and 4 months post-intervention: Body composition was measured with DEXA, walking speed over 2 km and the knee injury and osteoarthritis outcome score were measured, leisure time physical activity.

Lund H, Weile U, Christensen R, ... Marie E, Danneskiold-Samsoe B, Bliddal H. A randomized controlled trial of aquatic and land-based exercise in patients with knee osteoarthritis. 2008; 40(2): 137-144.

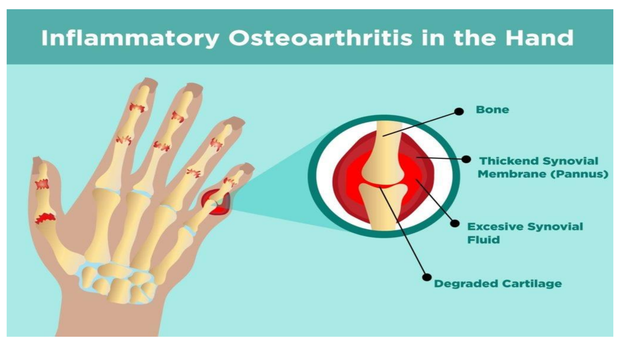
An RCT compared the efficacy of aquatic exercise and a land-based exercise program vs control in 79 patients with knee osteoarthritis. Outcome measures pre-, 8 weeks, and 3 months post-therapy: change in pain, and in addition Knee Injury and Osteoarthritis Outcome Score questionnaire, and standing balance and strength.

Silva LE, Valim V, ...Myamoto S, Jones A, Natour J. Hydrotherapy versus conventional land-based exercise for the management of patients with osteoarthritis of the knee: a randomized clinical trial. 2008; 88(1): 12-21.

A single-bline RCT compared WBE and LBE in 64 subjects with knee OA. Outcome measures pre- and 18 weeks post-intervention: visual analog scale (VAS) for pain, the WOMAC, pain during gait assessed by a VAS at rest and immediately following a 50-foot walk test (50FWT), walking time measured at fast and comfortable paces during the 50FWT, and the Lequesne Index.

Wang TJ, Lee SC, Liang SY, Tung HH, Wu SFV, Lin YP. Comparing the efficacy of aquatic exercises and land-based exercises for patients with knee osteoarthritis. 2010; 20(17-18):2609-22.

An RCT compared LBE, WBE, and no physical therapy in 84 patients with knee OA. Outcome measurements at baseline, 6 weeks, and 12 weeks: Knee Injury and Osteoarthritis Outcome Score, a standard plastic goniometer, and the six-minute walk test.

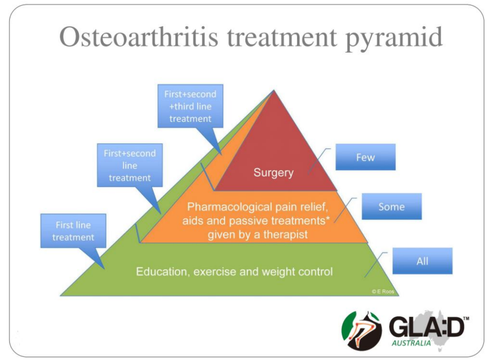


Discussion

OA is a prevalent, chronic medical condition that often results in pain, reduced function of affected joint(s), and lower perceived quality of life. Physical activity has shown to be a lower-risk treatment option compared to pharmaceuticals and invasive procedures. Land-based exercise is the most common modality of OA physical therapy, and has been shown to reduce pain and stiffness, while increasing muscle strength. However, concerns arise about land-based exercise. There is an increased risk of injury and there is a risk of heat exhaustion especially if exercise is conducted outdoors. In contrast, with water-based therapy there is no risk of fall and decreased risk of collision with objects or other people. Water also provides increased resistance compared to air, so muscle strengthening may occur quicker. Hydrotherapy is also conducted at a temperature that mitigates the risk of heat exhaustion.

This review examined six articles comparing hydrotherapy, land-based therapy, and/or a control in participants with OA in large joints. The studies produced inconclusive results. One theme persisted, however—some form therapy is more beneficial than no therapy at all.

Limitations included small sample size, varying durations and quality of therapy between studies, and lack of consistent reporting on subject use of analgesics.



Conclusion

To conclude, the studies showed that hydrotherapy and land-based exercise exhibited comparable effects in the treatment of OA of large joints. Upon examination of the literature, no single modality can be deemed superior to the other. One thing consistent among the studies was that exercise is superior to no exercise. Healthcare professionals caring for patients with OA should consider recommending either land or aquatic exercise programs based on patient preference and convenience.

Furthermore, more current high-quality RCTs including more participants from more locations, and longer follow-up periods are necessary to evaluate the efficacy of these treatment modalities.