



## **Early Aquatic Therapy Justified for Post Surgery**

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*In the last five years, this author had two orthopedic surgeries and two arguments with surgeons as to when to start vertical water training – aqua fitness exercises. The hip surgeon said three months; the fracture surgeon allowed aqua fit only after 6 months. He said at one point... "What part of no don't you understand". That started my search for research into aquatic exercise and aqua therapy as a means of enhancing recovery from orthopedic and other physical ailments. I only wish I had found this meta-study earlier but it was only just published in 2012. Early intervention with aquatic exercise is advisable, as early as 4 days after surgery.*

### **Introduction**

The research questions were: is early aquatic physical therapy for adults after orthopedic surgery low risk in terms of wound-related adverse events and beneficial (in regard to reducing impairment and increasing activity and participation) when compared with land-based physical therapy?

The results from this systematic review provide evidence from 8 controlled trials, with 287 participants, that there was no increased risk of wound-related adverse events for subjects undertaking aquatic physical therapy in the early post-operative period after orthopedic surgery compared with land-based therapy.

Despite the rationale for early aquatic physical therapy in rehabilitation and anecdotal popularity with subjects, there is conflicting information on how soon wounds can be immersed after orthopedic surgery and when the optimal time to commence aquatic physical therapy is. Some recommend that subjects must wait until 2 weeks post-operation to allow for wounds to heal, others suggest that subjects be allowed to submerge in water 1 week after surgery, and yet others have documented that it is common practice to commence aquatic physical therapy as early as 4 days post-operatively.

Precautions and contraindications associated with aquatic physical therapy may explain some of the variability in recommendations found in the literature. For example, open wounds are contraindicated (but may be immersed if they are covered with an occlusive waterproof dressing) because there may be concerns for delayed wound healing and increased susceptibility of wound infections. In addition, the physiological changes that occur during immersion such as increased central blood volume due to hydrostatic pressure gradients means that certain medical conditions such as cardiovascular disease may contraindicate aquatic therapy or require modification of the program for subject comfort and safety. This study looked at adverse events such as wound infections and also recorded any variance between the effects of aquatic therapy and land therapy.

## **Adverse events**

Meta-analysis of 8 trials and 287 participants provided evidence that aquatic physical therapy did not increase the risk of wound-related adverse events compared with land-based therapy. **Seven trials reported no adverse events** for both the experimental and control groups during the length of the trial and follow-up period. One trial reported the number of deep and superficial surgical site infections, and there were no differences between groups in this trial.

## **Activities of daily living**

When compared with standard land-based physical therapy in 6 trials with 134 total participants, aquatic physical therapy resulted in a significant improvement in measures of ADL (Active Daily Living).

## **Pain**

When comparing pain levels in 4 trials, the differences between groups did not reach statistical significance.

## **Edema**

When comparing the amount of edema in 4 trials with 173 participants, the differences between groups did not reach statistical significance. In 1 trial, circumferential measurements were taken at 4 locations and averaged to obtain the edema measurement while the other 3 trials used 1 measurement closer to the knee joint.

## **Muscle strength**

There was no statistically significant difference in knee extension or flexion strength between the aquatic and land-based groups in the 2 trials reporting on effects post-ACL (anterior cruciate ligament) reconstruction. One trial on adults after THR (total hip replacement) and TKR (total knee replacement) reported increased knee extension strength and significantly increased hip abduction strength when compared with land-based physical therapy after 2 weeks of aquatic physical therapy **commenced at 4 days post-operation**. One study used stair-climbing power as a measure of strength and reported that both the aquatic group and the land-based group improved over time; however, the aquatic group demonstrated significantly more improvement than the land-based group between 8 and 26 weeks post-surgery.

## **Joint ROM**

Seven trials recorded joint ROM (range of motion). These were not combined into a meta-analysis because there was clinical heterogeneity in joints measured and surgical procedures. Brady reported that the aquatic physical therapy group made significantly more improvement in shoulder flexion range than did the land-based physical therapy group after rotator cuff repair at 3 and 6 weeks post-operatively, and McAvoy reported that subjects in the aquatic physical therapy group had significantly greater improvements in knee flexion active ROM after total knee arthroplasty compared with land-based therapy only. The other 5 trials found no significant differences between the aquatic therapy group and the land-based therapy group in terms of ROM.

## **Quality of life**

The 3 studies that measured QOL (quality of life) found no significant differences between the aquatic and land-therapy groups when assessing QOL. These were not combined in a meta-analysis because of heterogeneity in the outcome measures used.

After orthopedic surgery aquatic physical therapy improves function and does not increase the risk of wound-related adverse events and is as effective as land-based therapy in terms of pain, edema, strength, and range of motion in the early post-operative period.

The importance of early mobilization after orthopedic surgery has been well documented, and there is evidence to suggest that the earlier subjects can commence mobilization and strengthening after orthopedic surgery, the quicker their return to functional activities. Early mobilization, however, can be limited by pain and reduced muscle coordination, strength, and ability to bear weight in the early post-operative period which aquatic therapy can moderate. In addition, an intensive land-based physical therapy program may result in high dropout rates in older adults.

## **Conclusions**

Aquatic physical therapy can be used as an adjunct to, or instead of, land-based physical therapy to enhance motion in early stages after orthopedic surgery, particularly for rotator cuff repair, TKR, THR, and post-ACL reconstruction. Early aquatic physical therapy does not increase the risk of wound-related adverse events compared with land-based therapy and can result in improved measures of activity. No differences between aquatic and land-based physical therapy were found for pain, edema, strength, ROM, or QOL in the early postoperative period after orthopedic surgery.

The primary outcome was adverse events in relation to wound healing. For the purpose of this review, adverse events were defined as any event resulting in a deep or superficial surgical site infection or delayed wound healing. Any reported adverse events that were not associated with the wound site were not included in the analysis (eg, symptomatic anemia).

Where authors did not specify the type of adverse event they had investigated, the entire number of adverse events was used in analysis. RD was used to measure the difference in the observed risk of events between the aquatic and land-based groups and was chosen because it could be used even when there were no adverse events in either group. Secondary outcomes were measures of impairment (edema, pain, strength, and ROM), ADL's, and participation, as indicated by QOL.

Edema and pain are common after orthopedic surgery and can impede recovery. It is important to control these factors to enable subjects to participate fully in their rehabilitation program to regain function. Strength and ROM will play a major role in determining functional capacity and are important outcomes to assess after therapy to monitor treatment effect. ADL's were selected because the main aim of rehabilitation is to help subjects reach their functional goals and achieve independence as much as possible. QOL can cover broad domains such as physical and psychological health, social relationships, and the environment and can be used as a measure of participation in life situations important to the individual.

## **We Know that Water Works!**

Study Name: Early Aquatic Physical Therapy Improves Function and Does Not Increase Risk of Wound-Related Adverse Events for Adults After Orthopedic Surgery: A Systematic Review and Meta-Analysis.  
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