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Clinical Report: Land-Based Versus Pool-Based Exercise for People Awaiting Joint Replacement Surgery of the Hip or Knee: Results of a Randomized Controlled Trial

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Land-based versus pool-based exercise for people awaiting joint replacement surgery of the hip or knee: results of a randomized controlled trial

Gill SD, McBurney H and Schulz DL (2009): Land-based versus pool-based exercise for people awaiting joint replacement surgery of the hip or knee: results of a randomized controlled trial. *Archives of Physical Medicine and Rehabilitation* 90: 388 – 394 (Abstract prepared by Cheryl Rudisile-Smith, Marissa Loosli and Jason Brumitt)

Background: Individuals with either knee or hip osteoarthritis are at risk of experiencing pain and developing functional limitations (Bennell 2005). In many cases, to alleviate pain and improve one's quality of life, an individual may require a total joint replacement. Despite advances in surgical technique and joint replacement hardware, surgical procedures are not without risk. Conservative treatments, including therapeutic exercise programmes, may improve a patient's status while avoiding the potential risks associated with surgery (pain, medication utilisation, long bouts of rehabilitation, and/or death). Researchers have demonstrated that some patients may experience improvements in pain and functional abilities after participating in either land-based or aquatic-based exercise programmes (Maurer et al 1999, Hinman et al 2007). However, according to Gill et al (2009), there is paucity of literature addressing post-exercise outcomes in individuals who are scheduled for either hip or knee joint replacement surgery.

Aim: To assess self-reported and performance-based functional measures in individuals (who were scheduled to have either a hip or knee joint replacement) after the completion of either a land-based or pool-based exercise programme.

Methods: The authors implemented a randomised controlled trial, allocating subjects to either the land-based (n=40) or pool-based (n=42) exercise programme, stratified by the involved joint. Subjects were recruited from a waiting list of patients who were scheduled for either a knee replacement or hip replacement. Each exercise session was performed for one hour over a total period of 12 sessions (2 times a week for 6 weeks). In addition, the authors instructed the subjects to exercise 3 days a week at home (for 30 minutes each session) performing a combination of walking, stationary bicycling, and/or other exercises they performed in class. Self-reported function (as measured by Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), performance-based outcomes (50-foot timed walk and 30-second chair stand test), and psychosocial status (SF-36 MCS) measures were collected prior to treatment, at the end of the 6-week training session, and finally two months later. These data were collected by a blinded assessor. Additionally, daily pre- and post-exercise pain levels were recorded during each session.

Results: The authors reported that both pool-based and land-based exercise programmes were effective in reducing pain and increasing function in patients with a diagnosis of either knee or hip arthritis. However, there were no differences between groups for WOMAC pain ($p = .614$), WOMAC function ($p = .739$), 50-foot timed walk test ($p = .173$), the 30-second chair stand test ($p = .179$), or the SF-36 MCS ($p = .205$). Those who participated in the land-based programme experienced improvements in pain at both assessment periods ($p = .000$; $.015$) whereas the participants in the pool-based programme only demonstrated improvements at the first assessment ($p = .011$; $.431$). Both groups demonstrated significant functional improvements at the first testing session for performance-based tests as well as demonstrating significant improvement in WOMAC function scores and the 30-second chair stand test at the final assessment session. Those who participated in the

pool-based programme experienced a significantly lower daily pain score ($p = .005$) when compared to those in the land-based programme.

Conclusion: The authors report that both training programmes may lead to positive functional outcomes in individuals who are awaiting a joint replacement surgery. In addition, the authors report that those who participated in the pool programme may tolerate the treatment with less post-exercise pain.

Commentary

The authors have provided valuable insight into the functional changes that a patient with a diagnosis of either hip or knee arthritis may experience after participating in a therapeutic exercise programme. Utilising a randomised controlled trial design, they were able to demonstrate that both groups made significant improvements and that neither approach was superior. This study should serve as a springboard for future investigations. We wish to highlight how additional measures may improve our understanding associated with either exercise programme.

First, this study may have benefited by testing a larger sample population. Gill et al (2009) reported, to be properly powered, each group required 64 participants. However, due to the limitations associated with the funding period, they were only able to recruit an initial 86 volunteers. Only 66 (land n=34, pool n=32) of the 86 initial subjects completed the study, approximately one-half of the *a priori* sample size. In addition, this investigation would have benefitted from the inclusion of a true control group.

Second, the authors were able to provide insight to the efficacy of an exercise programme for patients who had been scheduled for a total joint replacement. Their rationale for assessing this population is that many individuals may have a long wait prior to receiving a joint replacement. During this period of time, these individuals may be able to exercise in order to help to alleviate pain or improve post-operative outcomes. The authors did report significant improvements in both groups; however, it would be of benefit to identify the outcomes per joint involved and per arthritic condition. Do individuals in the hip group fair better than those in the knee group (or vice versa)? Do individuals with a diagnosis of osteoarthritis demonstrate greater improvements when compared to those with a diagnosis of rheumatoid arthritis (or vice versa)?

Finally, the authors potentially confounded the results by having all participants perform a land-based home exercise programme. Did the potential inclusion of land-based exercises influence outcome measures in the pool-based group?

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