

Croft, Hannah, Miller, Paul K. ORCID: <https://orcid.org/0000-0002-5611-1354>
and Bampouras, Theodoros ORCID: <https://orcid.org/0000-0002-8991-4655>
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3. Time course adaptation of gait in lower limb amputees

Croft, H. E.¹✉, Miller, P. K.¹, Bampouras, T. M.²

¹Department of Sport Rehabilitation, University of Cumbria, Lancaster, UK

²Faculty of Health and Medicine, Lancaster University, Lancaster, UK

✉ s1600836@uni.cumbria.ac.uk

There were 94,819 amputees in the United Kingdom in 2003, and 1.6 million (0.55% of the population) in the United States, projecting that this number would more than double by 2050, with the vast majority being lower limb amputees. Lower limb amputees have been shown to have a decreased quality of life and impaired function. Although resistance exercise has been shown to improve both, exercise levels drop following amputation, with lack of confidence being a key issue. It is well established that exercise-based programmes designed around the participant's aims are more effective and better adhered to than conventional rehabilitation programmes. The aim of the present study was to explore the effect of an aim-personalised, gym-based strength programme on functional ability and quality of life. We hypothesize that the gains in functional ability and quality of life seen by this type of programme will be larger than typical exercise programmes seen in the literature. Participants ($n = 3$) were male trans-tibial amputees, aged 42.5 ± 22.5 years old, recruited from a specialist mobility and rehabilitation centre. Both institutional and NHS Trust ethical approval were given, and participants gave signed informed consent. Following the setting of personalised training aims with the physiotherapist, training took place over a 12-week period. Participants' mental wellbeing, leg circumference, strength, gait, aerobic fitness and postural balance were assessed at baseline, 4, 8 and 12 weeks. To assess mental well-being the Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS) was used. Leg strength was assessed bilaterally using an isometric leg extension contraction with the ankle attached to a force gauge (Myometer) while leg circumference above the knee was measured with an anthropometric tape. Gait parameters (stride length and stance time) were assessed via a two-metre walkway. Aerobic fitness was assessed with the 6-minute walk test. Expired air from the last minute of the walk was collected (Douglas bags) to assess oxygen consumption and respiratory exchange ratio. Finally, postural balance was assessed using a 20 second stance test on the Biodex. The final results for this investigation are still pending. However, non-parametric tests were used to assess change such as Friedman's, Wilcoxon's and Bonferroni's correction. If the findings are in line with the hypothesis then this will show that this form of rehabilitation programme is effective in improving functional ability. Therefore, meaning that with further research on a larger population this type of rehabilitation could be implemented and recommended to trans-tibial amputees.