The Efficacy of a Community Based Eccentric Hamstring Strengthening Program in Peri-Urban Black South African Soccer Players

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Abstract

Introduction: Hamstring injury prevalence in soccer remains a major concern. Research in this context has focused on Caucasian populations with little attention given to other ethnic groups. The compatibility and applicability of such research to the South African context, particularly at an amateur level, may be minimal due to fundamental differences in physical characteristics, as well as complexities with regards to implementation. The aim of this investigation was therefore twofold. 1) Identify the lower extremity strength and performance profile of Peri-urban Amateur South African Players, and 2) Assess the efficacy of a community based intervention through the use of the Nordic Hamstring Exercise. Methods: 19 Black male Eastern Cape amateur players participated in a 12 week randomly controlled trial (9 = Control, 10 = Intervention). All participants completed regular training, while the intervention group, in addition, performed the Nordic Hamstring exercise post warm up. The incremental program design was taken from Mjolsnes et al. (2004), with a progressive increase in both sets and repetitions. Compliance was defined as completion of the required exercises for that session. Isokinetic strength evaluations (at 60°.s⁻¹ and 180°.s⁻¹) including assessment of peak torque and total work, as well as performance measures of countermovement and squat jump, were completed pre and post intervention, with the profile of the Peri-urban player the combined responses of both groups at baseline. Additionally, both the functional ratio (Eccentric Hamstrings/Concentric Quadriiceps) and eccentric utilization ratio (Countermovement Jump/Squat Jump) were calculated. Results: Concentric quadriceps peak torque at baseline reported values of 195 (±22) Nm and 141 (±21) Nm at 60°.s⁻¹ and 180°.s⁻¹. Values of 162 (±21) Nm were observed for peak torque of the eccentric hamstrings at 60°.s⁻¹, while 157 (±18) Nm was indicated at 180°.s⁻¹. Mean functional ratio responses were observed as 0.83 (±0.11) and 1.12 (±0.16) for 60°.s⁻¹ and 180°.s⁻¹ respectively. Additionally, the eccentric utilization ratio responses were recorded as 1.04 (±0.08). Regarding the intervention, concentric quadriceps total work of the dominant limb significantly improved over the time course of experimentation within the intervention group. Other quadriceps variables, concentric hamstrings, squat jump capability and performance measures all reported no significant changes (p>0.05) over the course of assessment when compared to the control. Eccentric ii hamstrings peak torque observed significant improvements (p<0.05), with a 2.48-7.66 % and 5.33
% improvement noted following completion of assessment. Conclusion: Isokinetic responses at baseline observed decreased quadriceps strength, and increased hamstring strength when compared to both amateur and professional populations examined in previous studies, for both isokinetic testing speeds. Additionally, performance measures indicated similar responses to other amateur populations. Regarding the intervention, significant improvements in eccentric hamstring peak torque and countermovement jump indicate the partial success of the present intervention. Additionally, while the functional ratio and eccentric utilization ratio reported no significant changes, improvements were noted within the intervention group while the control noted no change. The Nordic hamstring lower therefore resulted in strength improvements within the eccentric hamstrings, reported as a significant factor for injury risk, however, such changes were not sufficient to significantly impact the functional ratio. It can be concluded that community based programs within South Africa have the potential to be effective; however, there are many barriers to implementation, including, language, ethnic and cultural differences, while a lack of resources and infrastructure play a significant role in a lack of development. More research of this nature is required to provide scientific support for structures and guidelines for the peri-urban community based South African player, to ensure the efficacy of internationally successful interventions such as the Nordic exercise.