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Effectiveness of FIFA 11+ Warm-Up on Ankle Range of Motion Among National-Level Football Referees

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I. INTRODUCTION

Football referees are exposed to high physical demands during competitive matches, including repeated sprints, sudden stops, accelerations, and multidirectional running [1]. These biomechanical stresses place considerable load on the lower limbs, especially the ankle joint. Reduced ankle range of motion (ROM), particularly dorsiflexion, has been linked to impaired movement efficiency and balance performance and may increase the risk of ankle sprains [2]. Although the FIFA 11+ warm-up programme has become a widely implemented evidence-based injury prevention strategy in football players [3], limited research has focused on its efficacy among football referees. Referees represent an understudied but physically demanding population within sports science research [4]. Therefore, this study aimed to assess the effectiveness of a four-week FIFA 11+ warm-up programme on ankle ROM among national-level football referees in Malaysia.

II. METHODS

A true experimental pre-test and post-test control group design was used. Ten male national-level football referees (mean age = 26 years) were recruited based on the inclusion criteria and stratified into an intervention group ($n = 5$) and a control group ($n = 5$). The intervention group followed the FIFA 11+ warm-up programme three days per week for four weeks, while the control group continued their usual warm-up routine. Ankle dorsiflexion ROM was evaluated using the Weight-Bearing Lunge Test (WBLT), a valid and reliable measure of functional ankle mobility. Data were analysed using Jamovi statistical software. Descriptive statistics were calculated. Paired-samples t-tests were used to evaluate within-group changes, and independent-samples t-tests were used to compare post-test differences between groups. Statistical significance was set at $p < 0.05$.

III. RESULTS AND DISCUSSION

The results showed a statistically significant improvement in ankle ROM in the intervention group after the four-week FIFA 11+ programme ($p < 0.001$). Although the control group also showed a

slight increase ($p = 0.009$), the magnitude of change was substantially smaller. Post-test comparisons showed a significant difference between the intervention and control groups ($p = 0.016$), indicating that the FIFA 11+ warm-up programme was more effective than the usual warm-up routine in improving ankle ROM. The observed improvements may be attributed to the neuromuscular, balance, and proprioceptive components embedded in the FIFA 11+ protocol. These exercises likely increase ankle joint stability and dorsiflexion mobility. The findings support existing literature on the effectiveness of the FIFA 11+ and extend this evidence to match officials.

IV. CONCLUSIONS

In conclusion, the FIFA 11+ warm-up programme had a significant positive effect on ankle ROM among national-level football referees. The intervention was more effective than the traditional warm-up routine. These results support the use of a structured neuromuscular warm-up programme before matches and referee training to aid performance and potentially reduce ankle injury risk. Future studies should involve larger samples, a more diverse group of referees, and longer intervention durations.

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