

Longitudinal Monitoring of Eccentric Hamstring Strength During Fixture Congestion in Professional Football: No Changes in Force Despite Increased Match Frequency

INTRODUCTION

Hamstring strain injury remains a major challenge in professional football, particularly when players are exposed to repeated match demands and limited recovery (Cuthbert et al., 2020;Maniar et al., 2023).

The Nordic hamstring exercise (NHE) is widely used within hamstring injury-prevention strategies, yet fixture congestion may influence how the exercise is prescribed because of concerns around fatigue, recovery and muscle soreness.

This study longitudinally monitored eccentric hamstring peak force across **28 weeks** of professional football to determine whether fixture congestion was associated with changes in eccentric strength.

Aim: To examine changes in eccentric peak force across the season, compare **single- and double-fixture weeks**, and assess **dominant vs non-dominant limb differences**.

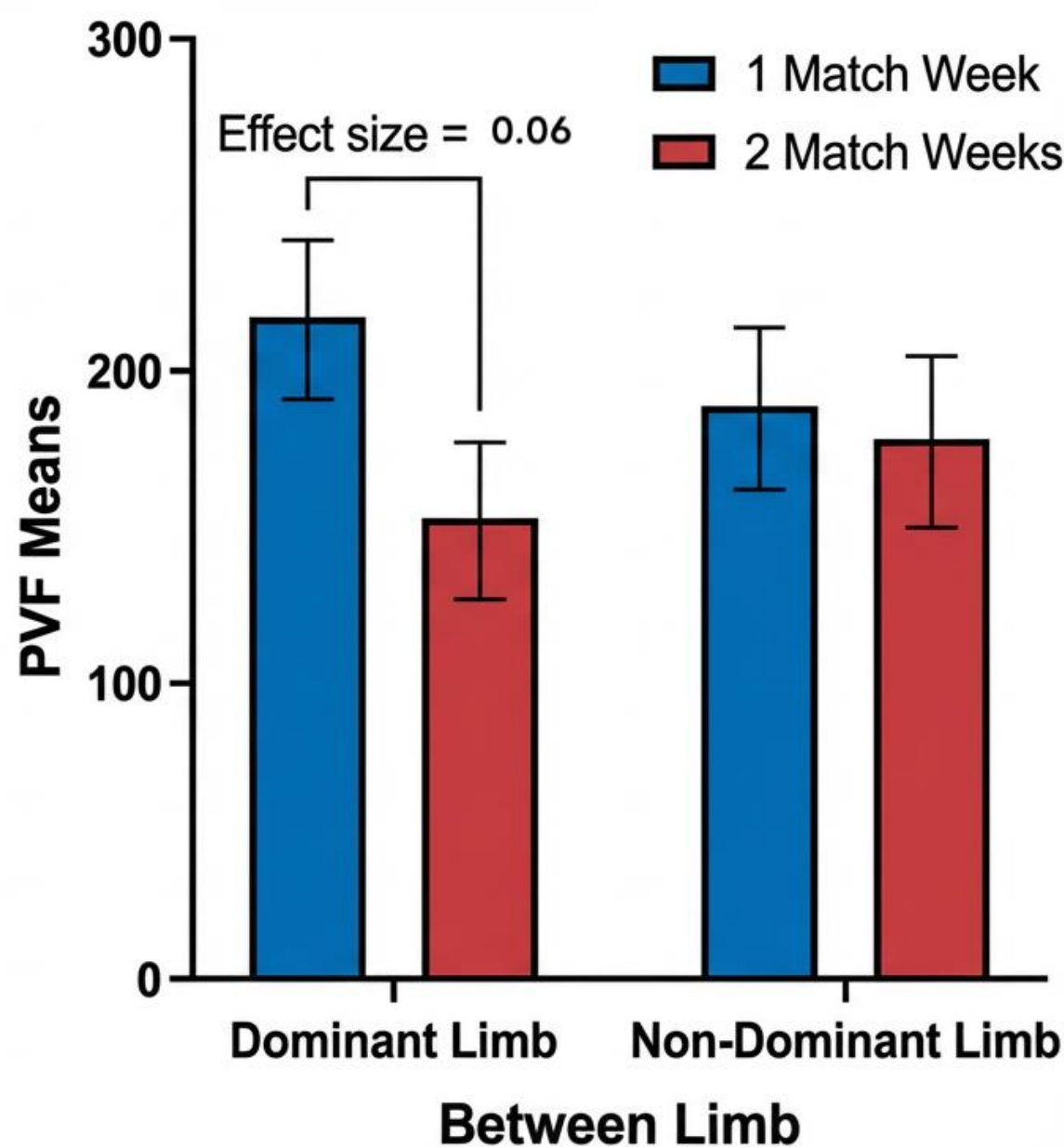
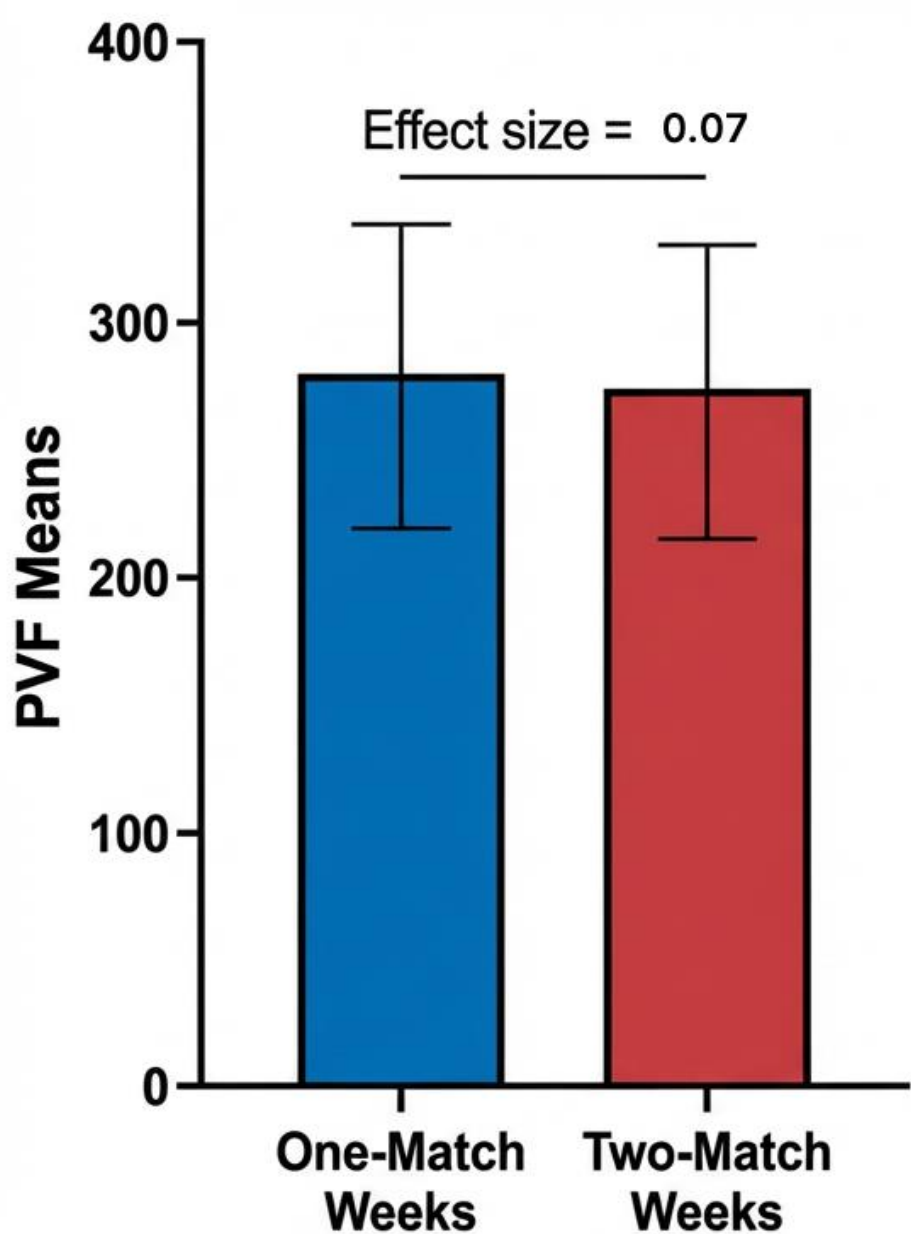
ECENTRIC FORCE & LIMB DIFFERENCES

Eccentric peak force remained **stable across the season**, with no significant effect of fixture congestion on force production (**p = 0.300**, $\eta^2p = 0.070$).

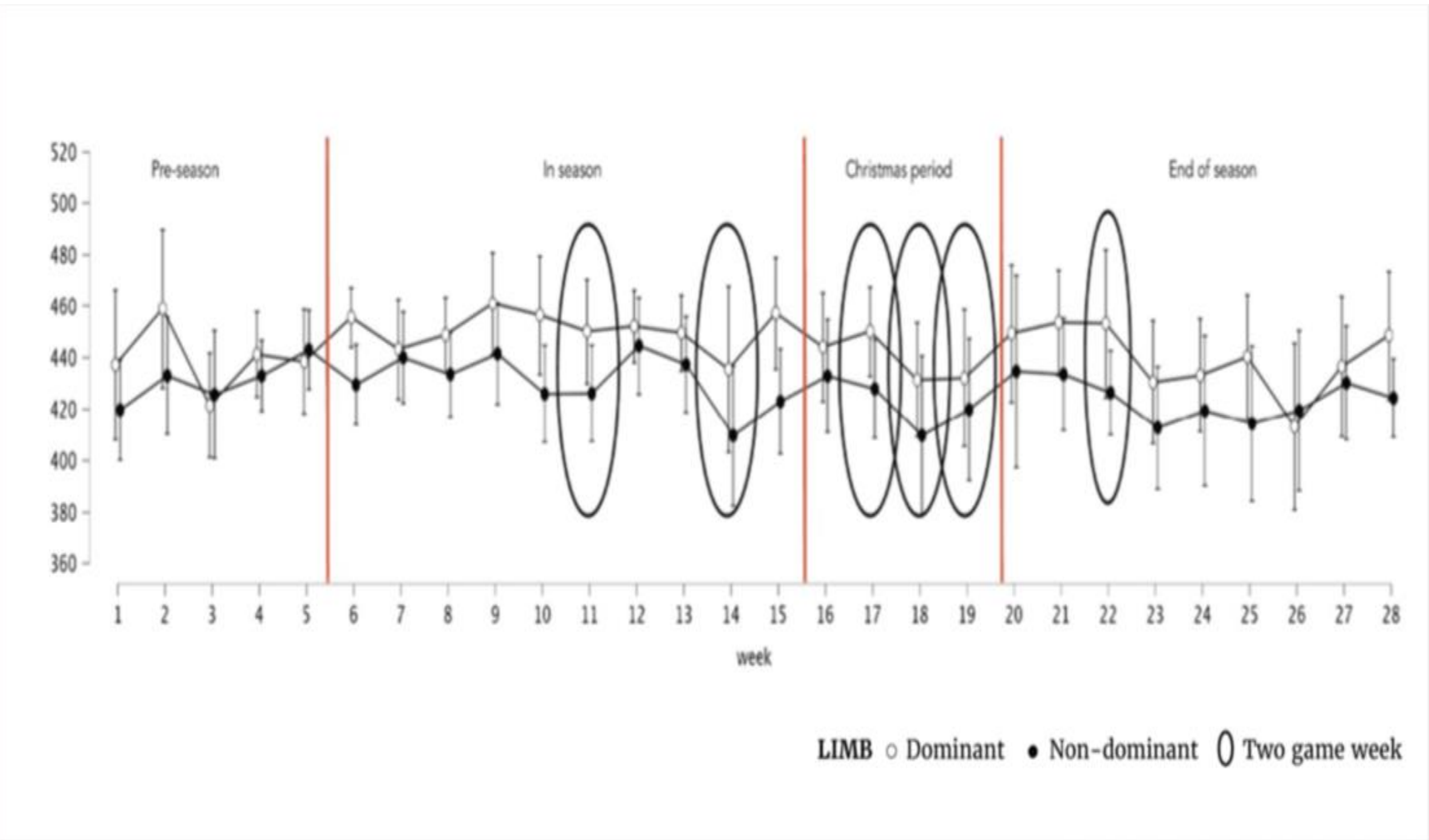
A significant **limb effect** was observed (**p = 0.024**, $\eta^2p = 0.295$), with the dominant limb consistently producing greater eccentric force than the non-dominant limb.

The between-limb difference was approximately **6–8%** and remained evident across both single- and double-fixture weeks.

Key message: Fixture congestion did not reduce measured eccentric force, but persistent inter-limb differences highlight the value of continued bilateral monitoring.



Schematic representation of how peak force (PVF) changes based off fixture congestion (on the left) and limb dominance characteristics (on the right).



Longitudinal representation of average peak force values from the Nordic hamstring exercise, over the 28-week period.

CONCLUSION

A micro-dosed Nordic hamstring exercise strategy could be effectively integrated throughout periods of fixture congestion to **maintain eccentric hamstring force**, despite increased match frequency and reduced recovery time.

These findings support **consistent exposure rather than complete withdrawal of the NHE stimulus** during congested periods, with exercise volume adjusted according to the demands of the competitive schedule.

The persistent difference between dominant and non-dominant limbs also highlights the importance of **regular bilateral monitoring** to inform individualised strength management across the season.

Practical implication: Maintaining an appropriately prescribed NHE stimulus may help practitioners balance **hamstring strength maintenance, recovery demands and fixture congestion** within professional football.

FIXTURE CONGESTION ACROSS THE SEASON

Across the **28-week monitoring period**, players experienced **64 competitive matches**, including periods of increased fixture density.

Despite fluctuations in match frequency, eccentric peak force remained stable. No significant difference was detected between **single- and double-fixture weeks**, including the period of highest fixture density around Christmas.

The reduced NHE exposure used during congested periods (**2 × 1 repetition on MD+2**, compared with **2 × 2 repetitions on MD-4** during single-fixture weeks) did not result in a detectable reduction in eccentric peak force.

Key message: A reduced-volume, micro-dosed NHE strategy may provide a practical approach for maintaining eccentric force during fixture congestion.