

Strength Micro-dosing Approach: A Practical Framework for Integrating Strength Training in Football

Chema M.¹

¹ Real Federación Española de Fútbol

Strength training | Micro-dosing | Decision-Making | Football | Functional training | Resistance training

Headline

Football is a high-intensity intermittent sport, marked by frequent changes in pace and direction that reflect the substantial mechanical and metabolic demands placed on players (Bradley & Ade, 2018; Buchheit et al., 2024). The game's evolution toward greater speed, precision, and competitive density has increased the challenge for coaches and sports science professionals (Lago-Peñas et al., 2023).

Despite advances in technology, physical preparation, and training monitoring, injury rates—particularly muscular injuries such as hamstring strains—have not decreased and continue to rise (Ekestrand et al., 2022). In this context, modern football demands a strategic use of training science to: (1) optimize performance by developing specific physical qualities that support repeated high-intensity actions, and (2) enhance player availability by reducing individual risk factors.

Strength training has emerged as a key strategy to meet these demands (Beato et al., 2021; Comrado-Slack et al., 2016; McCall et al., 2014). However, integrating strength into a congested competitive schedule raises key questions: What type of strength training is most effective for performance and injury prevention? How can it be structured when matches are played every few days? How much load is needed to trigger adaptation without compromising readiness? And when should it be applied to avoid interference with tactical prioritization?

These questions have no easy answers. Football's complex and dynamic nature resists simplistic models, and much of the literature still relies on reductionist approaches that overlook the interactions between variables (Bittencourt et al., 2016; Verhagen & Gabbett, 2019).

In the face of this complexity, and understanding that only through the strategic integration of physiological, contextual, and structural factors can useful and applicable knowledge be generated, this article proposes a practical and visual model to support decision-making around the key questions we ask about strength training in football.

Aim

This article aims to provide a practical framework to support fitness coaches, strength and conditioning coaches (SCCs), and performance staff in contextualizing strength training in football, particularly within the constraints of limited training opportunities during the competitive season.

What to Do?

"Strength is the origin of motor function and, therefore, optimizing strength means optimizing movement" (Touss, 2017).

Based on this principle, strength training represents a fundamental pillar of physical preparation in football, developing

the functional capacities required to meet the game's unique demands. However, its effectiveness relies on a deep understanding of the competitive load.

During a professional match, players execute between 1,200 and 1,400 activity changes, including accelerations, decelerations, changes of direction, and linear or curved sprints—often under residual fatigue. Simultaneously, they engage in 150 to 250 high-intensity duels involving jumps, collisions, and body contact, producing substantial neuromuscular stress and mechanical load (Bradley et al., 2010; Castellano et al., 2014; Chema et al., 2020).

Football is also a high-risk sport in terms of injury. Between 65% and 91% of professional male players suffer at least one injury per season. With an incidence rate of 8.1 injuries per 1,000 hours, most affect the lower limbs, particularly muscles and joints (Häggård et al., 2013; López-Valenciano et al., 2020; Pferrmann et al., 2016).

While tactical training remains central to stimulating the systems that underpin performance (Pons et al., 2020), it should be supported by targeted physical interventions. These coadjutant strategies protect the athlete's physical integrity and prepare them to meet daily performance demands of tactical training and competition (Gómez et al., 2015).

From this perspective, strength training is not only a performance enhancer but also a protective strategy to manage injury risk. The strength and conditioning coach, acting as a performance facilitator, must provide movement solutions aligned with competitive demands while improving the athlete's ability to tolerate those demands.

Evidence shows that strength-based programs focusing on neuromuscular control and functional stability not only improve function but also reduce injury risk (Hernández-Abad, 2022; Mendiguchia et al., 2020; Turner & Stewart, 2014). These goals are not mutually exclusive but synergistic.

Authors such as Gabbett (2016, 2020) and Verhagen & Gabbett (2019) have emphasized the need to move away from the binary view of optimization versus prevention. Instead, they advocate for an ecological and integrated model in which the training process aims to generate both protective and performance-enhancing stimuli (Gabbett, 2020; Malone et al., 2017). From this perspective, what optimizes also prevents, and what prevents also optimizes.

Consequently, defining what to do in strength training requires an integrated and context-sensitive approach, in which competitive demands, the player's status, and the timing within the season act as key modulators in the decision-making process.

To address the question "what to do?", Figure 1 presents a conceptual map grounded in scientific literature and practi-

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there are no parenthesis there are no powers written to powers product rule of exponents

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