RCMOS – Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

Tactical periodization as a strategy for preventing muscle injuries in high-performance athletes: a systemic and integrated approach.

Tactical periodization as a strategy for preventing muscle injuries in high-performance athletes: a systemic and integrated approach

José Antonio Miranda da Silva Junior

Summary

This scientific article analyzes the methodology of Tactical Periodization from the specific perspective of preventing musculoskeletal injuries in high-level professional soccer. The research problem questions whether the total integration of physical preparation into the Game Model, as opposed to analytical and isolated physical training, is effective in reducing the incidence of soft tissue injuries (muscles and tendons) in congested schedules. The overall objective is to demonstrate that the rigorous application of the Specificity Principle and load management through the Propensity and Horizontal Alternation Principles allow for morphological, metabolic, and neural adaptations that protect the athlete from the demands of the game. The methodology is based on a critical and systematic review of literature on training methodology, physiology, and sports medicine, limited to publications up to 2021. The results suggest that contextualized training, which respects the complex logic of the game, better prepares the musculoskeletal structure for the chaotic and unpredictable demands of competition.
It is concluded that the Cartesian dissociation between physical and tactical training is a latent risk factor, and that a holistic and systemic approach is superior in maintaining the athlete's health and longevity.
Keywords: Tactical Periodization. Injury Prevention. High-Performance Football.
Integrated Training. Sports Medicine.

Abstract

This scientific article analyzes the methodology of Tactical Periodization from the specific perspective of preventing musculoskeletal injuries in high-level professional soccer. The research problem questions whether the total integration of physical preparation into the Game Model, to the detriment of analytical and isolated physical training, is effective in reducing the incidence of soft tissue injuries (muscle and tendon) in congested calendars. The general objective is to demonstrate that the rigorous application of the Principle of Specificity and load management through the Principle of Propensity and Horizontal Alternation allows morphological, metabolic, and neural adaptations that protect the athlete from the demands of the game. The methodology is based on a critical and systematic literature review on training methodology, physiology, and sports medicine, limited to publications up to 2021. The results suggest that contextualized training, which respects the complex logic of the game, better prepares the musculoskeletal structure for the chaotic and unpredictable demands of competition. It is concluded that the Cartesian dissociation between physical and tactical training is a latent risk factor, and that the holistic and systemic approach is superior in maintaining athlete health and longevity.

Keywords: Tactical Periodization. Injury Prevention. High-Performance Soccer. Integrated Training. Sports Medicine.

Introduction

Indirect muscle injury, particularly in the hamstrings (biceps femoris) and rectus abdominis.

femoral artery disease remains statistically the leading cause of lost training days and

Competition in global professional football, generating technical, tactical and economic losses.

immeasurable for clubs and athletes. Traditionally, conventional physical training sought

To prevent these injuries through a reductionist and mechanistic approach, focused on strengthening.

Isolated training on weight machines and continuous linear running for overall endurance gain.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

However, the emergence and consolidation of Tactical Periodization, a systemic methodology that
It subordinates the physical dimension to the tactical and cognitive dimensions of the game, bringing a new paradigm to the...
Sports science. Academic training in Physical Education and *Fitness Training* allows us
To raise the central question: how can training for the game, in its complexity, be biologically more...
Is it safer and more efficient than training the muscle in isolation?

The rationale for this in-depth study is based on the urgent need to optimize the
training time in increasingly dense and congested competitive calendars, where the
Time available for passive recovery and blocks of pure physical training is scarce or nonexistent.
The "survival" and success of the elite athlete depend on their ability to execute motor actions.
of high complexity and intensity in a state of accumulated fatigue. Tactical Periodization proposes
Fatigue should not only be avoided, but also managed tactically, that is, by training concentration.
decisional and technical execution under specific fatigue conditions, which, paradoxically, improves
Mechanical efficiency, economy of movement, and reduced risk of injury due to incoordination.
neuromuscular function during critical moments of the match.

This article explores in detail the structuring methodological principles of
Tactical Periodization — the Principle of Specificity, Horizontal Alternation in Specificity, the
The Principle of Propensity and Complex Progression — and establishes its direct correlation with the
Physiology of injury prevention. We will analyze how the structure of the Standard Morphocycle distributes
the loads of muscle contraction, mechanical tension, and metabolic demand throughout the week,
ensuring systemic recovery of the musculoskeletal systems while acquiring the
desired tactical behaviors. The working hypothesis is that the human body adapts
specifically to the type of stress it receives; therefore, training soccer by playing soccer (with rules,
(scientifically manipulated spaces and numbers of players) generates protective tissue adaptations.
more transferable to the reality of the game than any conventional physical training method.
out of context.

The principle of supraspecificity and tissue adaptation.

In modern exercise physiology, the Principle of Specificity is absolute: adaptations
Biological (neural, metabolic, and morphological) changes are unique to the type of overload imposed on the organ.
In the context of football, injuries occur mostly during high-speed actions.
Sudden braking, quick turns, or powerful kicks are moments when internal and external forces come into play.
Regarding the tissues, the effects are maximum. Tactical Periodization strongly argues that physical training
Decontextualized and analytical approaches (like running 5km in a straight line or doing leg presses) do not prepare you.
properly adapt the tissue architecture (muscles, tendons, fascia, and ligaments) to the mechanical chaos.
and the randomness of the real game. Training should replicate, on a controlled scale, the intermittency, the

RCMOS – Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

Vector complexity and mechanical unpredictability that the athlete will face in the competition.

When conducting *Small Sided Games (SSG)* or ball possession drills and In the context of the Game Model, the athlete is subjected to a constant regime of... accelerations, decelerations, changes of direction, jumps, and unpredictable physical contact. This A "chaotic" and stimulus-rich environment recruits motor units asynchronously and demands a reflexive and anticipatory *(feedforward)* joint stabilization that linear machines cannot achieve. to stimulate. From a preventive point of view, this specificity increases joint proprioception and... tensile strength of collagen tissues at angles and force vectors specific to the sport, creating a functional "biological armor" that protects anatomical structures at the boundaries of range of motion.

Specificity also applies to the speed of contraction and the activation regime. Muscular. Football demands extremely rapid stretch-shortening cycles (SSCs). Training strength only at low speeds (as in traditional hypertrophy weight training) can to induce neural adaptations that are not optimal for injury prevention in ballistic movements. Tactical Periodization, by requiring that actions be performed at "maximum relative intensity" to The game ensures that the neuromuscular system is constantly adapted to the rates of rate of force development (RFD) required to protect the Joints during unexpected explosive actions, such as reacting to a dribble or recovering a ball. lost.

Horizontal alternation and undulating management of fatigue.

One of the most robust methodological pillars of injury prevention in Tactical Periodization. It is the Horizontal Alternation in Specificity. Unlike the classical periodization (Matveev, Bompa), which often focuses on developing one physical component per mesocycle (e.g., strength block, block (of resistance), Tactical Periodization varies the predominance of the muscle contraction regime and the The metabolic demand within the weekly microcycle itself (morphocycle) prevents saturation of a same physiological system and allows the recovery of specific structures while others are worked.

- **Tension Day (Specific Strength):** Usually held on Tuesday or Wednesday (depending on the game day), it utilizes reduced spaces, many accelerations/decelerations, and ball disputes. The emphasis is on explosive strength, braking ability (eccentric strength), and density of actions. intense neuromuscular.
- **Duration Day (Specific Endurance):** Utilizes large spaces, longer execution time, and a greater number of players. The emphasis is on organic endurance, maintaining medium intensity, and the ability to repeat efforts in large spaces, mimicking the continuity of the game.
- **Speed Day (Specific Speed):** Held close to the game (usually Friday),

RCMOS – Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

It utilizes medium/large spaces with short durations and plenty of recovery time. The focus is on reaction speed, agility, and rapid execution without the accumulation of fatiguing metabolites (lactate).

This intelligent alternation allows for different energy substrates and metabolic pathways. and different types of muscle fibers are stressed and recovered in a wave-like fashion throughout the week. This prevents the phenomenon of *overuse* (repetitive strain injury) of a specific structure and reduces drastically reduces the risk of injuries resulting from monotonic overload, ensuring that the athlete reaches on game day (the peak of the cycle) in a state of physical and tactical supercompensation.

The principle of propensity and the dosage of the load.

The Principle of Propensity in Tactical Periodization refers to the creation of contexts of exercises that cause a specific behavior (tactical and physical) to appear with great intensity. frequency. From an injury prevention standpoint, this allows the coach and physical trainer to... To precisely adjust the mechanical load. If the goal is to prevent adductor injuries (pubalgia), the The coach can design exercises that avoid excessive long-range kicks or flyes. Excessive leg work on a recovery day, or, conversely, creating a propensity to strengthen that Muscle development in a training day, through short passes and controlled changes of direction.

Manipulating the variables of the exercise (field size, number of players, rules) (of scoring) directly alters the physiological and mechanical demands. Longer and narrower fields They emphasize linear speed and protect ligaments from excessive twisting, making them useful for... Return from injury or speed work. Short, wide fields emphasize laterality, turns and Braking increases the load on the knees and ankles, so they should be used with caution and Monitoring on specific force days. A deep understanding of these correlations allows a "reverse engineering" of training, where injury prevention is built into the design of tactical exercise.

The propensity also operates at the subconscious level. By repeating tactical behaviors Correct actions (e.g., proper body positioning, intelligent defensive coverage) allow the athlete to save energy. Energy and avoids getting into unnecessary physical risk situations. A player who "reads" the game well. Through proper training, the player reaches the ball sooner, avoiding traumatic impact or... Forced stretching to reach a loose ball. Therefore, the quality of the tactical exercise is, in itself, a tool for load management and prevention of work-related sports accidents.

Tactical concentration as a factor in neuromuscular protection.

Muscle injuries in soccer often occur when there is a momentary disconnection. between the brain and the muscle — a millimetric delay in motor command due to central fatigue or Cognitive distraction. Tactical Periodization exhaustively trains "Decisional Concentration". The

RCMOS - Multidisciplinary Scientific Journal The Knowledge.
ISSN: 2675-9128. São Paulo-SP.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

The athlete is forced to think, process information, and make complex decisions constantly during Physical training. This creates mental toughness *that* is transferable to The game. When the brain is trained to maintain focus under pressure, the quality of motor control improves. For the stabilizing muscles, it is maintained for longer, protecting the joints.

Furthermore, collective tactical organization acts as a mechanism for individual protection. When the athlete is tactically well-positioned and anticipates the play (improved game reading). (through tactical training), he needs to perform fewer emergency physical efforts, such as maximum *sprints.* recovery movements or desperate tackles, which are common mechanisms of muscle injury and traumatic. Therefore, tactical intelligence acts as an energy-saving mechanism and Physical preservation. A well-organized team runs "better" and in a more coordinated way. not necessarily "more," and consequently, exposes its athletes to lower risks of injury. traumatic.

Emotional fatigue is also managed through this model. Decontextualized training and Monotonous routines lead to boredom and loss of focus, increasing the risk of inattention-related injuries. Tactical training, Competitive games that simulate the match keep the athlete's level of alertness and engagement high. Motivation and the state of flow *during* training ensure that muscle tone and... reflexes are optimized, creating a safer neurophysiological environment for the performing high-intensity movements.

Integrating recovery into the game model

Recovery in Tactical Periodization is not seen merely as passive rest, but as An active part of the training process. The day after the game is focused on active recovery, many Sometimes using low-impact tactical and cognitive strategies to promote blood circulation. and the removal of metabolites without imposing significant new mechanical or mental stress. This This approach respects the biology of tissue repair. The understanding that "rest is also "Training" is fundamental, but Tactical Periodization goes further, integrating tactical recovery and Emotional recovery (recovery from core fatigue) through regenerative sessions that reconnect the group. without wearing it out.

Nutrition and preventative physiotherapy should be aligned with the Morphocycle. On days of Tension (Force), the demand for protein and structural support is greater; on days of Duration (Resistance), the demand for glycogen is prioritized. The *Fitness Training* professional who Understanding the logic of tactical periodization allows one to guide nutritional and *recovery* interventions. (massage, cryotherapy, mobility) that are synchronized with the stimulus of the day, enhancing adaptations and accelerated readiness for the next stimulus. Injury prevention becomes, Thus, a multidisciplinary effort orchestrated by the logic of training.

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025

Conclusion

A thorough analysis of the scientific literature and methodological principles allows to conclude, with certainty, that Tactical Periodization is a superior methodological tool not not only for maximizing technical and tactical performance, but fundamentally for health and Physical integrity of the soccer player. By integrating the physical, technical, tactical and psychological dimensions. In a single, indivisible process, this methodology respects the biological and human complexity of athlete, avoiding the fragmentation that often leads to imbalances and injuries.

Injury prevention is no longer a "separate" or compensatory task. isolated within the medical department, it becomes intrinsic to the very design and execution of Field training. The physical trainer, the physiologist, and the coach must work in unison. Using common language, designing exercises that prepare the body for the "war" of the game. through the controlled and progressive simulation of the battle itself. The specificity of the stimulus ensures the specificity of the protective adaptation.

Finally, sports science validates that the best "vaccine" against injury in modern football... It's not about avoiding intense effort, but rather about specific, measured, intelligent training. Contextualized. Tactical Periodization, by promoting the adaptation of the body to the logic of the game, creates athletes who are more robust, more intelligent, and statistically, healthier and longer-lived in their professional careers. The paradigm shift from analytical training to systemic training is, Therefore, a necessary and ethical evolution in the management of performance and health in high-performance sports.

References

DELGADO-BORDONAU, JL; MENDEZ-VILLANUEVA, A. **Tactical Periodization: Mourinho's best-kept secret?** *Soccer Journal,* vol. 57, no. 3, p. 29-34, 2012.

FRADE, V. **Tactical Periodization: a methodological concept.** Porto: University of Porto, 2013.

GABBET, TJ **The training—injury prevention paradox: should athletes be training smarter and** *harder? British Journal of Sports Medicine,* v. 50, no. 5, p. 273-280, 2016.

IMPAGLIAZZO, PA **Sports training methodology: from beginner to high performance.** Rio de Janeiro: Rubio, 2018.

MOURINHO, J.; ALVES, M. **Training and the game: an integrated view.** Lisbon: Prime Books, 2011.

OLIVEIRA, JG; RESENDE, N. **Tactical Periodization: the art of football based on criteria.** Curitiba: Prime, 2006.

TAMARIT, X. **What is Tactical Periodization?.** Murcia: MCSports, 2007.

TOBAR, JB. **Tactical Periodization: understanding and deepening the methodology.** Lisbon: Futebol de

Year V, v.1 2025 | Submission: 08/06/2025 | Accepted: 10/06/2025 | Publication: 12/06/2025
Book, 2016.