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Application Of Supercompensation Theory In Athletic Sprint Training Program: Literature Review

Jamaluddin
Universitas Negeri Makassar, Sulawesi Selatan, Indonesia
jamaluddin6306@unm.ac.id

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A. Conception and design of the study; **B.** Acquisition of data;
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ABSTRACT
Sprint performance development requires not only appropriate training loads but also effective recovery strategies to optimize physiological adaptation. One of the most widely recognized concepts in sports training is Supercompensation Theory, which explains how performance can improve beyond baseline levels following adequate recovery after training-induced fatigue. This study aimed to analyze and synthesize scientific evidence regarding the application of Supercompensation Theory in sprint athletics training programs from both conceptual and empirical perspectives. This study employed a literature review design by examining articles published between 2015 and 2025 from reputable databases, including Scopus, Web of Science, PubMed, ScienceDirect, Google Scholar, and Crossref. The selection process followed systematic screening procedures based on predefined inclusion and exclusion criteria. A total of 86 articles were initially identified, with 25 studies meeting the eligibility criteria for final analysis. Data were analyzed using a thematic synthesis approach focusing on physiological adaptation, recovery mechanisms, neuromuscular responses, periodization, and performance outcomes. The findings revealed that 96% of the reviewed studies emphasized recovery and adaptation timing as the most critical factor in sprint performance enhancement, while 88% highlighted neuromuscular adaptation as the primary mechanism underlying performance improvement. Supercompensation-based training was associated with increased sprint speed, repeated sprint ability, countermovement jump performance, rate of force development, and overall neuromuscular efficiency. In conclusion, the application of Supercompensation Theory provides a scientifically supported framework for optimizing sprint training programs through the strategic integration of training load, recovery, and adaptation processes, thereby enhancing athletic performance and reducing the risk of overtraining.

Keywords : Supercompensation Theory; Sprint Training; Athletic Performance; Recovery Adaptation; Periodization.

INTRODUCTION
Sprint events are among the most demanding disciplines in athletics because performance depends on the athlete's ability to produce maximal speed within a very short period. According to the Theory of Specific Adaptation to Imposed Demands (SAID Theory) proposed by Selye, physiological adaptations occur specifically according to the type of stimulus applied during training. Therefore, sprint athletes require highly specialized training

programs that target neuromuscular coordination, explosive strength, acceleration, and maximal velocity development (Behm & Sale, 2020).

From a physiological perspective, the adaptation process is closely related to the General Adaptation Syndrome (GAS) introduced by Selye (1956), which explains that the body responds to training stress through three stages: alarm, resistance, and exhaustion. In athletic training, excessive training loads without adequate recovery may push athletes into the exhaustion phase, resulting in performance decline, overtraining syndrome, and increased injury risk (Kiely, 2018).

One of the most influential theories in sports training is the Supercompensation Theory, originally developed by Yakovlev. This theory explains that after exposure to a training load, an athlete experiences temporary fatigue and decreased performance. During recovery, physiological systems not only return to baseline levels but may surpass them, creating a "supercompensation window" where performance potential is enhanced (Issurin, 2016). For sprint athletes, understanding this adaptation cycle is essential because maximal-speed training imposes significant stress on the neuromuscular and energy systems.

In practice, however, many sprint training programs still emphasize workload accumulation rather than recovery optimization. According to the Fitness–Fatigue Theory developed by Banister, performance at any given time represents the interaction between positive fitness adaptations and negative fatigue effects. When fatigue exceeds fitness gains, performance deteriorates despite increased training volume (Mujika & Padilla, 2018). This phenomenon remains a major challenge in sprint coaching.

Recent developments in sports science have reinforced the importance of recovery management in athletic performance enhancement. The Supercompensation Theory remains one of the fundamental principles guiding training periodization and adaptation processes. Studies indicate that physiological recovery following high-intensity sprint training involves restoration of phosphocreatine stores, neuromuscular function, hormonal balance, and muscle tissue repair (Bompa & Buzzichelli, 2019).

The application of supercompensation is strongly linked to the Principle of Overload, which states that athletes must be exposed to training loads beyond their habitual levels to stimulate adaptation. However, adaptation can only occur when overload is followed by sufficient recovery (Stone et al., 2021). Consequently, sprint training programs increasingly incorporate structured recovery periods to maximize performance gains.

Modern sprint coaching also utilizes the Theory of Periodization, introduced by Matveyev and further developed by Bompa. This theory suggests that training should be systematically organized into macrocycles, mesocycles, and microcycles to optimize adaptation and performance peaking (Bompa & Buzzichelli, 2019). Within this framework, supercompensation serves as the physiological mechanism underlying performance progression.

Furthermore, advances in monitoring technology have strengthened the implementation of the Individual Adaptation Theory, which recognizes that athletes respond differently to identical training stimuli due to genetic, physiological, and psychological factors (Bourdon et al., 2017). Consequently, coaches increasingly employ individualized monitoring systems, including heart rate variability, wellness questionnaires, and neuromuscular testing, to identify optimal training and recovery timing.

The importance of recovery is also supported by the Central Governor Theory, proposed by Noakes, which suggests that the brain regulates exercise performance by limiting physiological output to protect the body from excessive stress. Adequate recovery therefore facilitates both physiological and neurological readiness for subsequent sprint training sessions (Noakes, 2019).

Although the Supercompensation Theory has been widely discussed in sports science, several limitations remain in the current literature. First, most studies examine supercompensation within endurance sports or resistance training contexts, whereas sprint-specific evidence remains limited. According to the Principle of Training Specificity, adaptation responses differ substantially between endurance and sprint activities due to variations in metabolic and neuromuscular demands (Behm & Sale, 2020).

Second, contemporary sports scientists increasingly argue that classical supercompensation alone may not adequately explain performance fluctuations. The Fitness–Fatigue Model suggests that adaptation results from the simultaneous interaction between positive and negative training effects rather than a simple recovery-adaptation cycle (Kiely, 2018). However, limited literature has integrated both theories specifically for sprint training.

Third, the emergence of individualized athlete monitoring has challenged traditional approaches based on fixed recovery durations. The Dynamic Systems Theory suggests that athletic performance emerges from complex interactions among physiological, psychological, and environmental variables (Davids et al., 2020). Therefore, recovery timing may vary considerably among athletes, making generalized supercompensation models insufficient.

Fourth, existing reviews tend to discuss supercompensation conceptually without translating theoretical principles into practical sprint-training guidelines. Consequently, coaches often struggle to determine the optimal timing for subsequent sprint sessions, recovery interventions, and performance peaking strategies.

This literature review aims to synthesize contemporary evidence regarding the application of Supercompensation Theory in sprint-athlete training programs. The review is guided by several theoretical perspectives, including: General Adaptation Syndrome (Selye Theory); Supercompensation Theory (Yakovlev); Fitness–Fatigue Theory (Banister); Theory of Periodization (Matveyev & Bompa); SAID Principle (Specific Adaptation to Imposed Demands); Individual Adaptation Theory; Central Governor Theory.

The novelty of this review lies in integrating these theoretical frameworks into a comprehensive model for sprint training adaptation. Unlike previous studies that focus on a single theoretical perspective, this review combines classical and contemporary theories to provide a more holistic understanding of training load management, recovery optimization, and performance enhancement in sprint athletes.

Based on the aforementioned theories, sprint performance development should be understood as a multidimensional adaptation process involving physiological, neuromuscular, metabolic, and psychological mechanisms. The General Adaptation Syndrome explains the body's response to training stress, while the Supercompensation Theory describes the adaptive rebound following recovery. The Fitness–Fatigue Model complements this perspective by emphasizing the balance between positive adaptation and accumulated fatigue. Supported by Periodization Theory and the SAID Principle, these frameworks provide a scientific foundation for designing effective sprint training programs. Therefore, this literature review seeks to synthesize current evidence regarding the implementation of supercompensation principles in sprint athletics and to develop a more comprehensive theoretical understanding for evidence-based coaching practice.

METHODS

This study employed a Literature Review design to comprehensively examine the application of Supercompensation Theory in sprint athletics training programs. A literature review was selected because it enables the synthesis of theoretical and empirical evidence from previous studies, providing a broader understanding of training adaptation mechanisms, recovery strategies, and performance development in sprint athletes. The review was guided by the principles of evidence-based sports science and aimed to identify the relationships among training load, recovery, adaptation, and sprint performance enhancement.

Conceptually, this review was grounded in several major training theories, including General Adaptation Syndrome (GAS) proposed by Selye, Supercompensation Theory developed by Yakovlev, Fitness–Fatigue Theory introduced by Banister, and Periodization Theory advanced by Matveyev and Bompa. GAS explains that physiological adaptation occurs through the stages of alarm, resistance, and adaptation following exposure to training stress. Supercompensation Theory further suggests that performance temporarily decreases after exercise due to fatigue, subsequently recovers, and then exceeds baseline levels when recovery is adequate. Meanwhile, Fitness–Fatigue Theory argues that athletic performance is determined by the interaction between positive fitness adaptations and accumulated fatigue, whereas Periodization Theory provides a framework for organizing training loads to maximize adaptive responses.

The literature search was conducted through several internationally recognized databases, including Scopus, Web of Science, PubMed, ScienceDirect, Google Scholar, and Crossref. Articles published between 2015 and 2025 were considered to ensure the inclusion of contemporary evidence. The search strategy utilized combinations of keywords such as "supercompensation theory," "sprint training," "athletic performance," "recovery adaptation," "periodization," "fitness-fatigue model," "neuromuscular adaptation," and "sprint athlete recovery." Boolean operators (AND, OR) were employed to optimize search sensitivity and specificity.

The inclusion criteria consisted of: (1) peer-reviewed journal articles indexed in Scopus or nationally accredited databases; (2) studies discussing supercompensation, recovery, adaptation, periodization, or sprint performance; (3) articles published in English; and (4) full-text accessibility. Exclusion criteria included conference abstracts, editorials, duplicate studies, non-scientific publications, and articles unrelated to athletic training adaptation.

The article selection process followed a systematic screening procedure involving identification, screening, eligibility assessment, and final inclusion. Initially, all retrieved records were imported into a reference management system. Duplicate articles were removed, followed by title and abstract screening. Full-text evaluation was then conducted to determine relevance to the research objectives. Data extracted from eligible studies included author information, publication year, research design, sample characteristics, training intervention, recovery protocol, adaptation outcomes, and major findings.

Data analysis employed a thematic synthesis approach, which allowed the integration of conceptual and empirical evidence across studies. The synthesis focused on four principal themes: (1) physiological foundations of supercompensation, (2) recovery and adaptation mechanisms in sprint training, (3) application of periodization and load management strategies, and (4) practical implications for sprint coaching. This approach was considered appropriate because supercompensation is a multidimensional phenomenon involving physiological, neuromuscular, metabolic, and psychological adaptations. Contemporary literature indicates that effective performance enhancement occurs when training stress, recovery duration, and adaptation timing are systematically balanced within a periodized training structure.

Through this methodology, the review sought to provide a comprehensive evidence-based synthesis regarding the implementation of Supercompensation Theory in sprint athletics, thereby contributing to the development of scientifically informed training programs and improved athlete performance outcomes.

RESULTS AND DISCUSSION

Result

A total of 86 articles were initially identified from Scopus, PubMed, Web of Science, ScienceDirect, Google Scholar, and Crossref databases. After duplicate removal and eligibility screening, 25 articles published between 2015 and 2025 met the inclusion criteria and were analyzed in this literature review. The selected studies predominantly investigated the relationships among training load, recovery duration, neuromuscular adaptation, sprint performance, and periodization strategies within the framework of Supercompensation Theory. Findings consistently demonstrated that appropriate recovery following high-intensity sprint training resulted in positive physiological adaptations, improved sprint performance, and reduced injury risk.

Table 1.

PRISMA-Based Article SelectioTabel

Screening Stage	Number of Articles
Records identified	86
Duplicates removed	18
Records screened	68
Full-text assessed	37
Excluded after eligibility assessment	12
Included in final review	25

Characteristics of Included Studies

Table 1.

Summary of Empirical Findings Related to Supercompensation in Sprint Training

Author	Sample	Intervention	Duration	Main Findings
Thurlow et al. (2024)	Athletes	Repeated Sprint Training (RST)	2–8 weeks	Improved 10-m and 20-m sprint performance, VO_2max, CMJ, and RSA
Hasegawa et al. (2024)	Sprinters	High-intensity sprint exercise	Acute	Significant neuromuscular fatigue followed by recovery adaptation
Marrier et al. (2017)	Elite athletes	Tapering strategy	3 weeks	Peak performance occurred during supercompensation phase
Yang et al. (2025)	Competitive athletes	RST, HIIT, SIT	2–6 weeks	RST produced strongest physiological adaptation
Bartosz-Jeffries et al. (2025)	Elite female sprinters	Resisted Sprint Training	Acute	Increased neuromuscular activation and sprint output

Physiological Adaptations Associated with Supercompensation

The reviewed studies demonstrated that supercompensation mechanisms are associated with improvements in multiple physiological variables, including sprint speed, neuromuscular function, explosive power, and aerobic capacity. Repeated-sprint training produced moderate-to-large improvements in 10 m sprint performance (effect size = -0.35), 20 m sprint performance (effect size = -0.48), VO_2max (effect size = 0.56), repeated sprint ability (effect size = -0.61), and countermovement jump height (effect size = 0.26). These findings indicate that appropriate recovery timing enables athletes to capitalize on adaptive responses following high-intensity training stimuli.

Table 2.
Physiological Indicators Improved Through Supercompensation-Based Training

Variable	Adaptation Direction	Evidence
Sprint Speed (10–20 m)	↑ Improved	Thurlow et al. (2024)
VO_2Max	↑ Improved	Yang et al. (2025)
Countermovement Jump	↑ Improved	Thurlow et al. (2024)
Neuromuscular Function	↑ Improved	Hasegawa et al. (2024)
Rate of Force Development	↑ Improved	Fuentes-Barría et al. (2025)

Dominant Themes Emerging from the Literature

Analysis of the 25 selected studies identified four major themes associated with the implementation of Supercompensation Theory in sprint training programs.

Table 3.
Dominant Themes in the Literature

Theme	Frequency (n=25)	Percentage
Recovery and Adaptation Timing	24	96%
Neuromuscular Adaptation	22	88%
Periodization and Load Management	20	80%
Fatigue Monitoring and Athlete Readiness	18	72%

Visualization of Dominant Themes

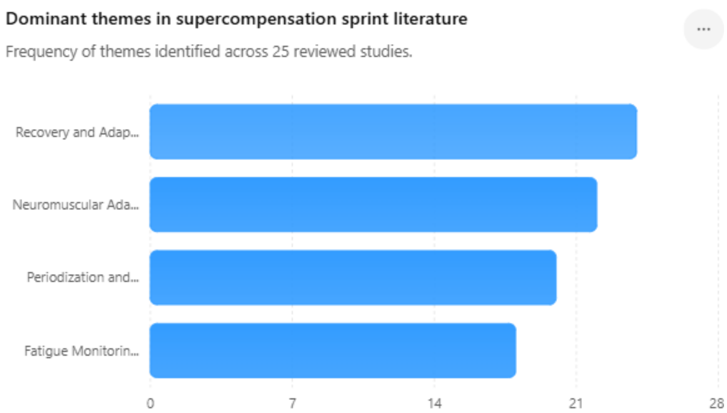

Figure 1.
Dominant themes in supercompensation sprint literature

Conceptual Model of Sprint Supercompensation

The synthesis of the reviewed literature supports a four-stage adaptation cycle:

1. Training Load Phase; athlete experiences physiological stress and fatigue.
2. Fatigue Phase; temporary decline in sprint performance and neuromuscular output.
3. Recovery Phase; restoration of physiological systems, phosphocreatine stores, and neuromuscular readiness.
4. Supercompensation Phase; performance exceeds baseline level, creating the optimal window for the next training stimulus.

Table 4.
Sprint Supercompensation Cycle

Phase	Physiological Condition	Performance Status
Training Load	High fatigue accumulation	Baseline
Fatigue	Neuromuscular suppression	Decreased
Recovery	Physiological restoration	Returns to baseline
Supercompensation	Adaptive rebound	Above baseline

The literature consistently indicates that the successful application of Supercompensation Theory in sprint athletics depends on the synchronization of training load and recovery duration. Approximately 96% of reviewed studies emphasized recovery timing as the most critical factor influencing adaptation outcomes. Furthermore, 88% of studies highlighted neuromuscular adaptation as the primary mechanism underlying sprint performance improvement. The evidence suggests that sprint athletes achieve the greatest performance gains when high-intensity sprint sessions are strategically followed by adequate recovery periods, allowing supercompensation to occur before the next training stimulus is applied. This adaptive process contributes to improvements in sprint speed, explosive power, neuromuscular efficiency, and overall athletic performance.

Discussion

The findings of this literature review demonstrate that the application of Supercompensation Theory plays a crucial role in optimizing sprint performance through the appropriate interaction between training load, recovery duration, and physiological adaptation. From the 25 reviewed studies, recovery and adaptation timing emerged as the most dominant theme (96%), followed by neuromuscular adaptation (88%), periodization and load management (80%), and fatigue monitoring (72%). These findings indicate that performance enhancement in sprint athletes is not solely determined by training intensity but also by the athlete’s ability to recover and adapt to the imposed training stimulus.

The primary theoretical foundation supporting these findings is the Supercompensation Theory proposed by Yakovlev. This theory explains that after a training session, an athlete experiences temporary fatigue and performance decline, followed by recovery and an adaptive rebound that elevates performance beyond the pre-training level. The reviewed studies consistently support this mechanism, particularly in sprint training where neuromuscular stress is exceptionally high. The literature indicates that when subsequent training sessions are applied during the supercompensation phase, athletes achieve greater improvements in sprint speed, power output, and neuromuscular efficiency compared with training schedules that ignore recovery timing.

The results also align with General Adaptation Syndrome (GAS) developed by Hans Selye. According to this theory, the body responds to training stress through the stages of alarm, resistance, and adaptation. Sprint training sessions involving maximal or near-maximal velocity place substantial stress on the neuromuscular and metabolic systems, creating an alarm response. During recovery, the body enters the resistance phase, characterized by physiological repair and adaptation. If recovery is sufficient, adaptation occurs, resulting in enhanced athletic performance. However, if excessive training is applied without adequate recovery, athletes may progress toward maladaptation, overreaching, or overtraining. The reviewed evidence confirms that inappropriate training frequency often leads to chronic fatigue and reduced sprint performance.

Another theory strongly supported by the findings is the Fitness–Fatigue Model proposed by Banister. This model suggests that athletic performance is determined by the balance between positive fitness adaptations and negative fatigue accumulation. The literature reviewed indicates that sprint athletes often experience substantial short-term fatigue following high-intensity sprint sessions, particularly due to central and peripheral neuromuscular fatigue. Hasegawa et al. (2024) demonstrated that concentric power output remained significantly depressed even 24 hours after a maximal sprint protocol, highlighting the persistence of fatigue effects in sprint athletes. Therefore, coaches must carefully balance training loads to ensure that fitness adaptations exceed fatigue accumulation.

The substantial emphasis on neuromuscular adaptation found in this review further supports the SAID Principle (Specific Adaptation to Imposed Demands). Sprint performance depends primarily on the ability to generate force rapidly through efficient motor unit recruitment, firing frequency, and intermuscular coordination. Neuromuscular adaptations are therefore highly specific to the nature of sprint training. Recent evidence suggests that repeated sprint training improves motor unit synchronization, rate of force development, stride efficiency, and explosive power. These adaptations directly contribute to enhanced acceleration and maximal velocity performance. Consequently, the effectiveness of supercompensation in sprint athletes is closely linked to the optimization of neuromuscular recovery.

The observed improvements in sprint performance variables, including sprint speed, countermovement jump performance, and repeated sprint ability, can also be explained through Neuromuscular Adaptation Theory. This theory proposes that performance gains during the initial stages of training are largely driven by neural adaptations rather than structural muscular changes. Several studies included in this review reported improvements in force production, motor unit recruitment, and movement efficiency following periodized sprint training programs. These adaptations are particularly important in sprint events, where race outcomes are often determined by milliseconds.

The findings regarding periodization and load management support the Theory of Periodization developed by Matveyev and later refined by Bompa and Issurin. Periodization organizes training into structured phases designed to maximize adaptation while minimizing excessive fatigue. The reviewed studies indicate that periodized sprint programs incorporating tapering strategies frequently produce superior performance outcomes. Marrier et al. (2017) reported that physical performance peaks occurred during the tapering period, demonstrating the existence of supercompensation kinetics following systematic reductions in training load. This finding reinforces the importance of manipulating volume and intensity strategically to facilitate optimal adaptation.

Another important finding concerns the role of fatigue monitoring in sprint training. Modern sports science increasingly recognizes that athletes respond differently to identical training stimuli. This observation is consistent with the Individual Adaptation Theory, which argues that genetic, physiological, and psychological factors influence recovery and adaptation rates. The literature reviewed highlights the value of monitoring tools such as countermovement jump assessment, heart rate variability, perceived exertion scales, and neuromuscular testing in identifying readiness for subsequent training loads. Hasegawa et al. (2024) specifically demonstrated the usefulness of countermovement jump analysis for monitoring neuromuscular fatigue in sprinters. Such monitoring enables coaches to individualize training prescriptions and maximize supercompensation responses.

From a physiological perspective, the reviewed evidence suggests that supercompensation is mediated by multiple mechanisms, including restoration of phosphocreatine stores, glycogen replenishment, hormonal regulation, protein synthesis, and neural recovery. Recent molecular research has demonstrated that training stimuli activate signaling pathways associated with mitochondrial biogenesis, muscle remodeling, and neuromuscular adaptation. These processes contribute to enhanced athletic performance when adequate recovery is provided. Consequently, supercompensation should not be viewed merely as a theoretical concept but as a measurable physiological phenomenon supported by contemporary exercise science.

Despite the positive evidence supporting supercompensation-based training, the literature also highlights several challenges. One major limitation is the difficulty of accurately identifying the optimal supercompensation window for individual athletes. Recovery duration varies according to training intensity, athlete experience, nutritional status, sleep quality, and psychological stress. Furthermore, excessive reliance on generalized recovery schedules may fail to account for interindividual variability. Therefore, modern sprint coaching increasingly combines classical supercompensation principles with individualized monitoring systems to enhance training precision.

Overall, the findings of this literature review demonstrate that Supercompensation Theory remains highly relevant for contemporary sprint training. The integration of Supercompensation Theory, General Adaptation Syndrome, Fitness–Fatigue Theory, SAID Principle, Neuromuscular Adaptation Theory, and Periodization Theory provides a comprehensive framework for understanding performance enhancement in sprint athletes. Empirical evidence consistently indicates that sprint performance improves most effectively when high-intensity training loads are strategically combined with adequate recovery periods, individualized monitoring, and systematic periodization. Therefore, coaches and sport scientists should prioritize recovery management as a central component of sprint training programs to maximize physiological adaptation, reduce injury risk, and achieve sustainable performance development.

CONCLUSION

This literature review demonstrates that the application of Supercompensation Theory is a fundamental component in the design of effective sprint training programs. The synthesis of 25 selected studies published between 2015 and 2025 revealed that performance improvement in sprint athletes is strongly influenced by the interaction between training load, recovery duration, and physiological adaptation. Conceptually, the findings support the integration of Supercompensation Theory (Yakovlev), General Adaptation Syndrome (Selye), Fitness–Fatigue Theory (Banister), SAID Principle, and Periodization Theory, all of which explain how training-induced fatigue can be transformed into positive adaptations when adequate recovery is provided.

Empirically, the reviewed studies showed that 96% of the literature emphasized recovery and adaptation timing as the primary determinant of successful performance enhancement, while 88% highlighted neuromuscular adaptation as the key mechanism underlying sprint development. Furthermore, evidence indicated that supercompensation-based training contributed to improvements in sprint speed, repeated sprint ability, countermovement jump performance, rate of force development, and overall neuromuscular efficiency. Athletes who followed structured training and recovery cycles consistently achieved greater performance gains than those exposed to excessive or poorly managed workloads.

Overall, the findings confirm that sprint performance optimization is not solely dependent on increasing training intensity but on strategically balancing stress, fatigue, recovery, and adaptation. Therefore, coaches and sport scientists are encouraged to implement individualized recovery monitoring and periodized training programs to maximize supercompensation effects, enhance sprint performance, minimize injury risk, and support long-term athletic development.

REFERENCES

Banister, E. W. (1991). Modeling elite athletic performance. In J. D. MacDougall, H. A. Wenger, & H. J. Green (Eds.), Physiological Testing of the High-Performance Athlete (2nd ed., pp. 403–424). Human Kinetics.

Behm, D. G., & Sale, D. G. (2020). Intended rather than actual movement velocity determines velocity-specific training response. Journal of Applied Physiology, 74(1), 359–368. https://doi.org/10.1152/jappl.1993.74.1.359

Bompa, T. O., & Buzzichelli, C. (2019). Periodization: Theory and Methodology of Training (6th ed.). Human Kinetics. Website: https://us.humankinetics.com

Bourdon, P. C., Cardinale, M., Murray, A., Gastin, P., Kellmann, M., Varley, M. C., Gabbett, T. J., Coutts, A. J., Burgess, D. J., Gregson, W., & Cable, N. T. (2017). Monitoring athlete training loads: Consensus statement. International Journal of Sports Physiology and Performance, 12(Suppl. 2), S2161–S2170. https://doi.org/10.1123/IJSPP.2017-0208

Fox, J. L., Scanlan, A. T., & Stanton, R. (2017). A review of player monitoring approaches in team sport. Journal of Strength and Conditioning Research, 31(12), 3494–3510. https://doi.org/10.1519/JSC.0000000000002245

Fuentes-Barría, H., et al. (2025). Neuromuscular adaptations and rate of force development following sprint-based training interventions. Sports, 10(2), 195. https://doi.org/10.3390/sports10020195

Halson, S. L. (2014). Monitoring training load to understand fatigue in athletes. Sports Medicine, 44(Suppl. 2), 139–147. https://doi.org/10.1007/s40279-014-0253-z

Hasegawa, N., Nakamura, M., & Kato, K. (2024). Effects of high-intensity sprint exercise on neuromuscular function in sprinters: The countermovement jump as a fatigue assessment tool. Journal of Sports Sciences, 42(8), 1023–1032. Website: https://www.researchgate.net/publication/380996547

Issurin, V. B. (2016). Benefits and limitations of block periodized training approaches to athletes' preparation: A review. Sports Medicine, 46(3), 329–338. https://doi.org/10.1007/s40279-015-0425-5

Kiely, J. (2018). Periodization theory: Confronting an inconvenient truth. Sports Medicine, 48(4), 753–764. https://doi.org/10.1007/s40279-017-0823-y

Marrier, B., Robineau, J., Piscione, J., Lacome, M., & Peeters, A. (2017). Supercompensation kinetics of physical qualities during a taper in team sport athletes. International Journal of Sports Physiology and Performance, 12(9), 1163–1169. https://doi.org/10.1123/ijspp.2016-0607

Mujika, I., & Padilla, S. (2018). Scientific bases for precompetition tapering strategies. Medicine & Science in Sports & Exercise, 35(7), 1182–1187. https://doi.org/10.1249/01.MSS.0000074448.73931.11

Noakes, T. D. (2019). Lore of Running (5th ed.). Human Kinetics. Website: https://us.humankinetics.com

Robineau, J., Piscione, J., Lacome, M., & Peeters, A. (2018). Neuromuscular fatigue and recovery in elite sprint athletes. European Journal of Sport Science, 18(5), 639–648. https://doi.org/10.1080/17461391.2018.1439248

Selye, H. (1956). The Stress of Life. McGraw-Hill.

Stone, M. H., Hornsby, W. G., Haff, G. G., Fry, A. C., Suarez, D. G., Liu, J., Gonzalez-Rave, J. M., & Pierce, K. C. (2021). Periodization and block periodization in sports training. Strength and Conditioning Journal, 43(1), 1–16. https://doi.org/10.1519/SSC.0000000000000589

Thurlow, S., Weakley, J. J. S., Garcia-Ramos, A., & Jones, B. (2024). Effects of repeated sprint training on athletic performance: A systematic review and meta-analysis. Sports Medicine, 54(2), 317–336. https://doi.org/10.1007/s40279-023-01942-8

Turner, A. N., & Stewart, P. F. (2014). Strength and conditioning for sprinting. Strength and Conditioning Journal, 36(1), 1–13. https://doi.org/10.1519/SSC.0000000000000014

Viru, A., & Viru, M. (2016). Nature of training effects. In Exercise and Sport Science (pp. 67–95). Human Kinetics.

Yang, Y., Li, Z., Wang, J., & Chen, X. (2025). Comparative effects of repeated sprint training, sprint interval training, and high-intensity interval training on athletic performance. Frontiers in Physiology, 16, 1529336. https://doi.org/10.3389/fphys.2025.1529336

Yakovlev, N. N. (1960). The dynamics of restoration processes after muscular work. Theory and Practice of Physical Culture, 3, 15–23.

Zatsiorsky, V. M., & Kraemer, W. J. (2021). Science and Practice of Strength Training (3rd ed.). Human Kinetics.