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The Influence of Biomechanics on Sports Kinesiology Techniques: Impact on Performance and Injury Prevention

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Abstract. The biomechanical and kinesiology approach provides a scientific foundation for understanding the relationship between force, movement, and neuromuscular control in enhancing performance and preventing injuries. This study aims to analyze the influence of biomechanics on sports kinesiology techniques through a literature review of studies published between 2020 and 2025 sourced from PubMed, ScienceDirect, SpringerLink, BMC, BMJ, and The Lancet. The findings show that integrating both disciplines improves movement efficiency, postural stability, and physiological adaptation in athletes through the application of real-time biomechanical feedback and integrative neuromuscular training (INT). In addition, wearable sensor technology assists in detecting mechanical loads and individual injury risks. Thus, biomechanics serves not only as an analytical tool but also as a foundation for developing adaptive, safe, and sustainable training strategies to support optimal athletic performance.

Keywords: Athletic Performance, Biomechanics, Injury Prevention, Movement Efficiency, Sports Kinesiology

1 Introduction

The biomechanics and kinesiology of sport approaches are increasingly important in explaining how force, motion, and neuromuscular control shape athlete technique and performance. Through kinematic and kinetic analysis, coaches can identify the technical components that most determine movement efficiency and effectiveness. Similarly, recent research emphasizes that biomechanical feedback integrated with skill acquisition theory is more powerful than simply visually “correcting form.” This integration helps translate complex data into meaningful training interventions for both athletes and coaches. In a performance context, motion modeling plays a role in optimizing force production, utilizing tissue elasticity, and segmental timing. This approach also maps the trade-offs between stability and speed, allowing technique to be tailored to the demands of the sport. Thus, biomechanics is not simply a diagnostic tool but a foundation for evidence-based training design (Glaizier, 2021; Yeadon & Pain, 2023).

In addition to improving performance, biomechanics plays a central role in injury prevention through understanding tissue loading mechanisms and structural tolerance. Interdisciplinary research indicates that technique modifications that reduce specific moments or stresses on joints/muscles can reduce recurrent injury risk. Through objective measurements, practitioners can link biomechanical indicators to actual injury risk in elite populations. These findings reinforce the prevention paradigm that focuses on modifiable risk factors, such as strength asymmetries, pelvic control, or landing patterns. Recent evidence suggests that even simple biomechanical risk scores can correlate with injury incidence in specific groups of athletes. This provides practical, on-the-field screening opportunities without expensive instrumentation. In other words, the right metrics can bridge the gap between laboratory science and daily decisions on the field (Hughes et al., 2021).

At the systems level, injury prevention is no longer viewed as a linear problem with a single "right solution," but rather as a complex issue requiring adaptive and contextual strategies. The "wicked problem" framework emphasizes the importance of tailoring interventions to each organization's culture, calendar load, and resources. This approach encourages iteration: observing, testing, evaluating, and then continually adjusting technical protocols or training loads. In high-level performance practice, multidisciplinary teams—including sports scientists, physiotherapists, and data analysts—integrate biomechanical measurements with load monitoring to enhance decision-making. Evidence from professional performance settings demonstrates how research on tendons, tissue architecture, and bone stress is being integrated into technique and game readiness programs. This synergy accelerates the translation of science into micro-daily training policies. Therefore, successful prevention and performance require a collaborative ecosystem, not a single intervention (Burki, 2025; Verhagen et al., 2025).

The development of wearable technology and inertial sensors is expanding the capabilities of in-situ biomechanical measurement during training and competition. Data-to-action is now more established: collection, cleaning, feature extraction, and actionable reporting by coaches. Subtle mapping of load patterns and technique deviations from an individual's baseline facilitates personalized interventions. Recent scoping research highlights how wearables are being used for training adaptation and injury prevention, while identifying methodological gaps that need to be addressed. Furthermore, machine learning is beginning to be used to filter out important risk factors from a large set of variables in running and other high-risk sports. However, data quality and external validation remain prerequisites for accurate recommendations. In the future, the integration of edge computing and real-time feedback has the potential to accelerate the technique correction cycle (Rahlf et al., 2022; Rebelo et al., 2023).

In the fundamental sciences, the biomechanics-based performance research landscape continues to evolve from motion description to the design of interventions that impact real-world performance. A historical-critical review demonstrates a shift from highly controlled laboratory studies to more ecological and competition-relevant contexts. These changes have prompted the use of more sophisticated models to link technical variables to performance outcomes, such as economy of movement or rate of force production. Simultaneously, biomechanical feedback is positioned within the framework of motor control and skill learning to truly transform technique. Sports ranging from sprinting to distance running to rock climbing are leveraging these findings to map the determinants of sport-specific performance. As a result, training interventions have become more targeted, for example, prioritizing specific segmental control or the phases of movement that most influence output. This approach contributes to measurable performance improvements on the field (Faggian et al., 2025; Yeadon & Pain, 2023).

As interventions evolve, manual therapy and soft tissue techniques are also being evaluated for their biomechanical implications and impact on sport applications. A recent systematic review examined how myofascial release affects internal mechanics and its functional consequences. The findings suggest potential benefits in certain contexts but emphasize the need for more consistent reporting and measurement standards for effective generalization. This underscores the importance of robust research design when evaluating interventions that are often widely adopted within a community of practice. Thus, translation into performance and injury prevention programs must be careful, based on relevant mechanical indicators and meaningful performance outcomes. Structured evaluation helps avoid overclaiming and ensures interventions truly improve technique. Methodological consistency will clarify when and for whom interventions are effective (França et al., 2024).

The burden of musculoskeletal problems and activity-related injuries remains high globally, underscoring the urgency of solution-oriented biomechanics research. This burden impacts quality of life and performance, while also demanding investment in robust measurement, predictive models, and prevention strategies. Recent books and compendiums summarize advances in understanding injury mechanisms and prevention options driven by motion and load analysis. This knowledge ecosystem provides the foundation for developing safe and rapid technique protocols. By combining intelligent analytics, context-specific feedback, and team collaboration, sports can move toward more adaptive and sustainable practices. Biomechanics, in this regard, provides a bridge between science and practice that can be relied upon for performance and safety (Fan & Lizhen, 2022; Gill et al., 2023).

2 Method

This study uses a literature review approach to analyze the relationship and integration between biomechanics and sports kinesiology in improving athlete performance, from both physiological and mechanical perspectives. This approach was chosen because it provides a comprehensive overview of the latest research developments and findings exploring how biomechanical principles and kinesiological mechanisms work synergistically in the context of training, movement, and injury prevention.

Literature data was obtained from leading international academic databases, including PubMed, Google Scholar, ScienceDirect, BMC, SpringerLink, BMJ Open Sport & Exercise

Medicine, and The Lancet. The search was conducted using a combination of keywords such as Athletic Performance, Biomechanics, Injury Prevention, Movement Efficiency, and Sports Kinesiology. The search focused on articles published between 2020 and 2025 to ensure relevance to current developments.

3 Result

A review of various academic articles shows that the influence of biomechanics on sports kinesiology techniques plays a fundamental role in improving performance and preventing injury in athletes. The integration of these two fields creates a more comprehensive approach to understanding how the human body efficiently generates, controls, and adapts movement. Through the application of biomechanical principles, such as the analysis of forces, joint moments, torques, and mechanical load distribution, researchers can identify optimal movement patterns and detect potential injury risks early. Meanwhile, sports kinesiology provides a framework for interpreting how the neuromuscular system responds to training loads and adapts to changes in technique or specific physiological conditions. The following is a summary of the literature identifying and synthesizing the influence of biomechanics on sports kinesiology techniques:

No.	Focus of Findings: The Influence of Biomechanics on Sports Kinesiology Techniques	Source (Researcher, Year)
1	Teknologi *biomechanical feedback* dapat meningkatkan teknik atlet melalui umpan balik kinematik & kinetik	(Glaizier, 2021)
2	Integrative neuromuscular training (INT) meningkatkan kebugaran atlet dan potensi pencegahan cedera	(Akbar et al., 2022)
3	Beban biomekanik game & latih berkorelasi dengan performa pertandingan (basket)	(Olthof et al., 2021)
4	Program neuromuskular menurunkan faktor risiko biomekanik cedera ACL pada atlet muda	(Schmidt et al., 2023)
5	Aplikasi luas biomekanika dalam optimasi performa, pencegahan cedera, dan rehabilitasi	(Penichet-Tomas, 2024)
6	Peran biomekanika dalam intervensi terapeutik dan pencegahan cedera kronis	(Sacco et al., 2023)
7	Analisis biomekanik dan pelatihan neuromuskular dapat memodifikasi faktor risiko cedera ACL	(Thornton et al., 2023)
8	Efek latihan neuromuskular integratif dalam pencegahan cedera ekstremitas bawah	(Haiting et al., 2022)
9	Biomekanika lari remaja & kontrol sensorimotor implikasi pencegahan cedera	(McSweeney et al., 2021)
10	Aktivitas otot dan parameter biomekanik sprint: meta-analisis	(Pietraszewski et al., 2025)

Research conducted by Glaizier (2021), in the article "Beyond Animated Skeletons," highlights how biomechanical feedback technology—through animated models, motion visualizations, and kinematic and kinetic data dashboards—can be utilized to improve sports technique. This study demonstrates that a motion data-based approach provides a deeper understanding of athletes' movement patterns, but the authors emphasize the need for practical guidelines to translate biomechanical data into relevant training interventions. Contextual feedback directly linked to athletes' bodily sensations has been shown to be more effective than raw data presentation (Glaizier, 2021).

Furthermore, Akbar et al. (2022), in "Effects of Neuromuscular Training," examined the effect of integrative neuromuscular training (INT) on improving physical fitness and preventing injury. The INT program, which included strength, plyometric, stability, and balance training, was shown to improve biomechanical risk variables such as dynamic balance and muscle activation. These research findings support the concept of biomechanical and kinesiological integration, where neuromuscular adaptations serve as a bridge between movement efficiency and reduced injury risk (Akbar et al., 2022).

Meanwhile, a study by Olthof et al. (2021) demonstrated a strong relationship between biomechanical load and athlete performance. The study used inertial sensors (IMUs) on basketball players to measure training and match load, which was then linked to performance statistics such as points and rebounds. The results showed that training load two days before a match influenced biomechanical intensity during competition, indicating that adjusting load based on biomechanical parameters can significantly improve performance (Olthof et al., 2021).

A study by Schmidt et al. (2022), titled "Positive Influence of Neuromuscular Training on Knee Injury Risk," showed that a 12-week neuromuscular intervention in young female handball athletes reduced biomechanical risk factors for ACL injury. Improved postural control and decreased knee valgus moments demonstrated that neuromuscular training was effective in modifying high-risk movements, significantly reducing the likelihood of lower-extremity injuries (Olthof et al., 2023).

A comprehensive study by Penichet-Tomas (2024) broadened the understanding of the application of biomechanics in various sporting contexts. This article explains that the combination of kinematic analysis and dynamics, along with an understanding of anatomy and physiology, results in a holistic approach to performance and injury prevention. Biomechanics is viewed not only as a measurement tool but also as a strategic component in training design, technique evaluation, and rehabilitative interventions (Penichet-Tomas, 2024).

In Sacco et al. (2023), the authors review the impact of biomechanics on the design of therapy and rehabilitation programs for chronic conditions such as osteoarthritis and running injuries. This research confirms that an understanding of mechanical forces and motion analysis can help predict injury progression and improve rehabilitation outcomes through targeted training that considers the adaptive capacity of body tissues (Sacco et al., 2023).

Thornton et al. (2023) discusses how neuromuscular training can alter key biomechanical variables associated with ACL injury risk, such as knee angle and joint reaction forces. Furthermore, implementing these exercises in the post-ACL rehabilitation phase has been shown to reduce the risk of re-injury by strengthening neuromuscular function and increasing joint stability (Thornton et al., 2023).

Research by Haiting et al. (2022) strengthens this evidence with a meta-analysis of 14 randomized controlled trials (RCTs). The analysis showed that integrative neuromuscular training can reduce the risk of lower extremity injuries by approximately 39% with training durations of 16–20 minutes per session, two to three times per week for four to six months. This study emphasizes the importance of training planning based on duration and frequency for maximum biomechanical effectiveness (Haiting et al., 2022).

The article "Adolescent Running Biomechanics" by McSweeney et al. (2021) focuses on young athletes and shows that neuromuscular training can improve running biomechanical patterns and enhance sensorimotor control. Although evidence is limited, this study indicates that biomechanical modifications through kinesiological training starting in adolescence can help reduce injury risk and improve movement quality (McSweeney et al., 2021).

Finally, Pietraszewski et al., (2025) combined data from various EMG, kinematic, and kinetic studies to understand muscle activity during sprinting. The results showed that fatigue significantly influences muscle activation patterns and biomechanical efficiency. Changes in technique during the acceleration and maximum velocity phases indicate the need for biomechanical adjustments in sprint training to maintain optimal performance while preventing overuse injuries (Pietraszewski et al., 2025).

4 Discussion

The findings of various recent studies indicate that implementing an integrative approach between biomechanics and kinesiology significantly impacts athlete performance optimization and reduces injury risk. Research by Ford et al. (2025) demonstrated that combining neuromuscular training with a real-time biofeedback system significantly reduced knee abduction moment (KAM) in young female athletes during landing and cutting movements. This demonstrates that the synergy between biomechanical biofeedback and neuromuscular adaptation allows for more efficient and individualized adjustments to movement technique (Ford et al., 2025).

Consistent with these results, a systematic review by Li & Zhu (2025) confirmed the effectiveness of neuromuscular training in reducing the incidence of lower extremity injuries. This study demonstrated that such training improved biomechanical variables such as knee angle, balance control, and neuromotor coordination. The similarity of these results with previous research indicates that training designed based on an understanding of biomechanics and kinesiology principles plays a crucial role in preventing injury by improving the body's mechanical efficiency (Li & Zhu, 2025).

Research by Wan et al. (2025) supported this argument through meta-analysis results showing that Integrative Neuromuscular Training (INT) significantly improved dynamic balance, jumping ability, sprinting ability, and maximal muscle strength compared to traditional training. This demonstrates that an approach combining biomechanical principles with neuromuscular adaptation not only improves motor performance but also optimizes coordination and movement efficiency (Wan et al., 2025).

In the context of technology application, a study by Hooren et al. (2023) reported that runners using wearable sensors with real-time feedback showed significant improvements in biomechanical efficiency and running economy compared to a control group. These data demonstrate that the use of real-time feedback not only improves biomechanical parameters but also positively influences physiological adaptations, resulting in more stable and energy-efficient performance (Hooren et al., 2024).

These findings are reinforced by research by Van Hooren et al. (2023), which demonstrated that a wearable-based intervention with a sensitive foot pressure system can reduce the incidence of running injuries and improve stride symmetry and body weight distribution. These results demonstrate that real-time biomechanical feedback technology can serve as a means of adaptive technique correction, increasing athletes' proprioceptive awareness, and reducing compensatory movement patterns that can potentially lead to injury (Van Hooren et al., 2024).

From a field implementation perspective, a study by Paravlic et al. (2024) found that implementing a neuromuscular training-based warm-up program reduced injury rates by 37% and improved postural stability and body control in adolescent basketball players. The similarity of these results to previous studies suggests that neuromuscular training is effective not only in developing performance but also as a practical injury prevention measure across various sports (Paravlic et al., 2024).

Research by Hribernik et al. (2022) highlights advances in sensor technology and biomechanical feedback systems. The authors emphasize that the application of real-time biomechanical feedback can accelerate motor learning, improve technique precision, and support post-injury rehabilitation. However, they also note that the greatest challenge lies in integrating biomechanical data with physiological responses to allow for individualized and contextualized interventions (Hribernik et al., 2022).

Overall, these studies demonstrate a consistent, shared finding: that the synergy between biomechanical and kinesiological principles plays a crucial role in enhancing athletic performance, improving movement efficiency, and reducing injury risk. Real-time feedback-based approaches and integrative neuromuscular training have proven effective in linking mechanical measurements with physiological adaptations. Comparative results demonstrate scientific consensus that biomechanics is not only analytical but also applicable and predictive, while kinesiology serves as a foundation for understanding motor control and coordination. Therefore, the integrated application of both approaches results in a more precise, adaptive, and sustainable performance-oriented approach to sports training.

5 Conclusion

Based on the results of literature research, it can be concluded that biomechanics and sports kinesiology have a complementary relationship in improving athlete performance and preventing injury. The integration of both allows for a comprehensive analysis of body mechanics, neuromuscular control, and physiological adaptations during physical activity. The application of biomechanical principles through the analysis of forces, joint moments, and movement patterns provides an objective basis for improving technique and increasing movement efficiency, while kinesiology explains how the muscular and nervous systems work synergistically to maintain coordination and body stability. Approaches based on real-time biomechanical feedback and integrative neuromuscular training have proven effective in enhancing performance, increasing motor awareness, and reducing the risk of musculoskeletal injuries. Thus, the integration of biomechanics and kinesiology provides a scientific foundation for the development of precise, adaptive, and sustainable training programs to support modern athletic performance.

References

Akbar, S., Soh, K. G., Jazaily Mohd Nasiruddin, N., Bashir, M., Cao, S., & Soh, K. L. (2022). *Effects Of Neuromuscular Training On Athletes Physical Fitness In Sports: A Systematic Review. Frontiers in Physiology*, *13*, 939042. https://doi.org/10.3389/fphys.2022.939042

Burki, T. (2025). *The Medicine Of…Football. The Lancet*, *406*(10501), 322–323. https://doi.org/10.1016/S0140-6736(25)01524-7

Faggian, S., Borasio, N., Vecchiato, M., Gatterer, H., Burtscher, M., Battista, F., Brunner, H., Quinto, G., Duregon, F., Ermolao, A., & Neunhaeuserer, D. (2025). *Sport Climbing Performance Determinants And Functional Testing Methods: A Systematic Review*. *Journal of Sport and Health Science*, *14*, 100974. https://doi.org/10.1016/j.jshs.2024.100974

Fan, Y., & Lizhen, W. (2022). *Biomechanics of Injury and Prevention*.

Ford, K. R., Taylor, J. B., Westbrook, A. E., Paterno, M. V., Huang, B., & Nguyen, A.-D. (2025). *Outcomes Of A Randomized Controlled Trial Of Neuromuscular Training With Real-Time Biofeedback In Young Female Athletes. BMC Musculoskeletal Disorders*, *26*(1), 366. https://doi.org/10.1186/s12891-025-08647-3

França, M. E. D., Botti, M. dos S. A., Ide, F. C., Sinhorim, L., Santos, G. M., & Nascimento, I. B. do. (2024). *Effect Of Myofascial Release Techniques On Internal Biomechanics And Their Resultant Application To Sports: A Systematic Review. Journal of Bodywork and Movement Therapies*, *40*, 525–533. https://doi.org/10.1016/j.jbmt.2024.05.003

Gill, T. K., Mittinty, M. M., March, L. M., Steinmetz, J. D., Culbreth, G. T., Cross, M., Kopec, J. A., Woolf, A. D., Haile, L. M., Hagins, H., Ong, K. L., Kopansky-Giles, D. R., Dreinhoefer, K. E., Betteridge, N., Abbasian, M., Abbasifard, M., Abedi, K., Adesina, M. A., Aithala, J. P., … Brooks, P. M. (2023). *Global, Regional, And National Burden Of Other Musculoskeletal Disorders, 1990–2020, And Projections To 2050: A Systematic Analysis Of The Global Burden Of Disease Study 2021. The Lancet Rheumatology*, *5*(11), e670–e682. https://doi.org/10.1016/S2665-9913(23)00232-1

Glaizier, P. S. (2021). *Beyond Animated Skeletons: How Can Biomechanical Feedback Be Used To Enhance Sports Performance? Journal of Biomechanics*, *129*.

Haiting, Z., Cheng, L., Jixiang, X., Hongwen, W., & Shuang, Q. (2022). *Integrative Neuromuscular Training For Injury Prevention Of Lower Extremity In Athletes: A Meta-Analysis. Chinese Journal of Tissue Engineering Research*, *26*(15), 2454–2460.

Hooren, B. V., Willems, P., Plasqui, G., & Meijer, K. (2024). *Changes In Running Economy And Running Technique Following 6 Months Of Running With And Without Wearable-Based Real-Time Feedback. Scandinavian Journal of Medicine & Science in Sports*, *34*(1), e14565. https://doi.org/10.1111/sms.14565

Hribernik, M., Umek, A., Tomažič, S., & Kos, A. (2022). *Review of Real-Time Biomechanical Feedback Systems in Sport and Rehabilitation. Sensors, 22*(8), 3006. https://doi.org/10.3390/s22083006

Hughes, R., Cross, M., Stokes, K., Tobin, D., Power, E., McNally, S., & Pamment, J. (2021). *Novel Biomechanical Injury Risk Score Demonstrates Correlation With Lower Limb Posterior Chain Injury In 50 Elite-Level Rugby Union Athletes. BMJ Open Sport & Exercise Medicine*, *7*(4), e001062. https://doi.org/10.1136/bmjsem-2021-001062

Li, Y., & Zhu, W. (2025). *The Preventive Effects Of Neuromuscular Training On Lower Extremity Sports Injuries In Adolescent And Young Athletes: A Systematic Review And Meta-Analysis*. *The Knee*, *56*, 373–385. https://doi.org/10.1016/j.knee.2025.06.008

McSweeney, S. C., Grävare Silbernagel, K., Gruber, A. H., Heiderscheit, B. C., Krabak, B. J., Rauh, M. J., Tenforde, A. S., Wearing, S. C., Zech, A., & Hollander, K. (2021). *Adolescent Running Biomechanics—Implications for Injury Prevention and Rehabilitation*. *Frontiers in Sports and Active Living*, *3*, 689846. https://doi.org/10.3389/fspor.2021.689846

Olthof, S. B. H., Tureen, T., Tran, L., Brennan, B., Winograd, B., & Zernicke, R. F. (2021). *Biomechanical Loads and Their Effects on Player Performance in NCAA D-I Male Basketball Games. Frontiers in Sports and Active Living*, *3*, 670018. https://doi.org/10.3389/fspor.2021.670018

Paravlic, A. H., Bakalár, P., Puš, K., Pišot, S., Kalc, M., Teraž, K., Šlosar, L., Peskar, M., Marušič, U., & Šimunič, B. (2024). *The Effectiveness Of Neuromuscular Training Warm-Up Program For Injury Prevention In Adolescent Male Basketball Players. Journal of Sports Sciences*, *42*(22), 2083–2092. https://doi.org/10.1080/02640414.2024.2415215

Penichet-Tomas, A. (2024). *Applied Biomechanics in Sports Performance, Injury Prevention, and Rehabilitation. Applied Sciences*, *14*(24), 11623. https://doi.org/10.3390/app142411623

Pietraszewski, P., Maszczyk, A., Zając, A., & Gołaś, A. (2025). *Muscle Activity and Biomechanics of Sprinting: A Meta-Analysis Review. Applied Sciences*, *15*(9), 4959. https://doi.org/10.3390/app15094959

Rahlf, A. L., Hoenig, T., Stürznickel, J., Cremans, K., Fohrmann, D., Sanchez-Alvarado, A., Rolvien, T., & Hollander, K. (2022). *A Machine Learning Approach To Identify Risk Factors For Running-Related Injuries: Study Protocol For A Prospective Longitudinal Cohort Trial. BMC Sports Science, Medicine and Rehabilitation*, *14*(1), 75. https://doi.org/10.1186/s13102-022-00426-0

Rebelo, A., Martinho, D. V., Valente-dos-Santos, J., Coelho-e-Silva, M. J., & Teixeira, D. S. (2023). *From Data To Action: A Scoping Review Of Wearable Technologies And Biomechanical Assessments Informing Injury Prevention Strategies In Sport. BMC Sports Science, Medicine and Rehabilitation*, *15*(1), 169. https://doi.org/10.1186/s13102-023-00783-4

Sacco, I. C. N., Trombini-Souza, F., & Suda, E. Y. (2023). *Impact Of Biomechanics On Therapeutic Interventions And Rehabilitation For Major Chronic Musculoskeletal Conditions:*

A 50-Year Perspective. Journal of Biomechanics, *154*. https://doi.org/10.1016/j.jbiomech.2023.111604

Schmidt, M., Nolte, K., Terschluse, B., Willwacher, S., & Jaitner, T. (2023). P*ositive Influence Of Neuromuscular Training On Knee Injury Risk Factors During Cutting And Landing Tasks In Elite Youth Female Handball Players. German Journal of Exercise and Sport Research*, *53*(1), 19–29. https://doi.org/10.1007/s12662-022-00851-w

Thornton, L., Goodloe, J. B., Groseclose, I., Cross, K., & Diduch, D. R. (2023). *Biomechanical Assessment and Neuromuscular Training to Mitigate Risk of Reinjury After ACLR. Video Journal of Sports Medicine*, *3*(4), 26350254231180637. https://doi.org/10.1177/26350254231180637

Van Hooren, B., Plasqui, G., & Meijer, K. (2024). *The Effect of Wearable-Based Real-Time Feedback on Running Injuries and Running Performance: A Randomized Controlled Trial. The American Journal of Sports Medicine*, *52*(3), 750–765. https://doi.org/10.1177/03635465231222464

Verhagen, E., McGinley, P., & McKay, C. D. (2025). *Beyond Tame Solutions: A New Paradigm For Injury Prevention In Sports*. *BMJ Open Sport & Exercise Medicine*, *11*(2), e002478. https://doi.org/10.1136/bmjsem-2025-002478

Wan, K., Dai, Z., Wong, P., Ho, R. S., & Tam, B. T. (2025). *Comparing the Effects of Integrative Neuromuscular Training and Traditional Physical Fitness Training on Physical Performance Outcomes in Young Athletes: A Systematic Review and Meta-Analysis. Sports Medicine - Open*, *11*(1), 15. https://doi.org/10.1186/s40798-025-00811-2

Yeadon, M. R., & Pain, M. T. G. (2023). *Fifty Years Of Performance-Related Sports Biomechanics Research. Journal of Biomechanics*, *155*, 111666. https://doi.org/10.1016/j.jbiomech.2023.111666