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Y-Balance Test And Its Relationship To Dynamic Balance And Injury Risk: Literature Riview

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ABSTRACT

This study aims to systematically examine the relationship between the Y-Balance Test (YBT) and dynamic balance and injury risk through a qualitative approach using a Systematic Literature Review (SLR) design. Twenty-five national and international articles published between 2020 and 2025 were reviewed using PRISMA guidelines as the basis for the analysis. The study results indicate that the YBT is a reliable instrument for assessing dynamic balance, detecting interlimb asymmetry, and evaluating responses to various training interventions such as core stability, proprioception, and corrective exercises in special populations. However, the YBT's predictive validity for injury risk varies due to sample characteristics, sport type, biomechanical factors, and differences in testing methodology. The synthesis also confirms that YBT scores are influenced by anthropometric factors, leg muscle strength, playing position, and clinical conditions such as flat feet and chronic low back pain. Therefore, interpretation of the results must be contextualized and not generalized. Furthermore, a comparison of the YBT and SEBT indicates that they cannot be used interchangeably due to differences in procedures and movement kinematics. Therefore, a multifactorial approach to injury risk assessment and standardization of YBT implementation are needed to improve evaluation accuracy. Further research is recommended, focusing on longitudinal studies to test the long-term predictive validity and the integration of YBT with other biomechanical parameters in the context of injury prevention and sports coaching.

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INTRODUCTION

Balance is a fundamental component of human movement performance, particularly in sports activities that require dynamic postural stability during movement. In the context of physical education and sports, dynamic balance skills not only play a role in improving movement efficiency and skill performance but are also an important indicator in preventing musculoskeletal injuries, particularly of the lower extremities. Several recent studies confirm that deficits in dynamic postural control are closely associated with an increased risk of non-contact injuries, reduced movement quality, and limited neuromuscular adaptation in athletes and students (Schwiertz et al., 2020; Bhimani et al., 2025).

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Although the importance of dynamic balance measurement has been widely discussed in international literature, field practice shows that physical education teachers and sports coaches in Indonesia rarely utilize standardized, evidence-based balance measurement instruments. Balance measurements are often conducted subjectively, relying on visual observation or static tests that do not adequately represent the demands of balance during movement. Moreover, the use of statistical analysis in some research and practical evaluations does not fully reflect functional balance capabilities in the context of real-life sports activities. This situation indicates a gap between dynamic postural control theory and its implementation in sports education and training (Fadillah & Fitri Yani, 2023; Ayu Rahmah Fadillah et al., 2023).

This discrepancy has the potential to have serious consequences, both in pedagogical and preventive contexts. Without valid and reliable instruments, teachers and coaches risk failing to identify balance limitations in students or athletes early, resulting in less targeted training interventions and injury prevention. Therefore, a measurement approach is needed that can bridge practical needs in the field with a strong scientific foundation.

One instrument that has developed rapidly in the last decade for assessing dynamic balance is the Y-Balance Test (YBT). The YBT is a modification of the Star Excursion Balance Test (SEBT), designed to be more concise, standardized, and easily applied in various sports settings. This instrument measures the ability to maintain postural stability when an individual reaches in three primary directions (anterior, posteromedial, and posterolateral) with one leg as support, thus representing the functional balance demands of sporting activities (Plisky et al., 2021).

International studies consistently report that the YBT has high intra- and inter-rater reliability, as well as good validity in detecting lower extremity asymmetry and neuromuscular dysfunction (Tomás et al., 2022; Zheng et al., 2024). Schwiertz et al. (2020) demonstrated that low YBT scores were positively correlated with an increased risk of non-contact injuries in college athletic students, while Sokulska et al. (2024) confirmed that variations in YBT scores are influenced by sport type, skill level, and limb dominance. These findings strengthen the YBT's position as a relevant functional screening tool in the context of performance and injury prevention.

At the national level, research on the YBT is emerging, although still limited. Yasa and Vitalistyawati (2023) reported that core stability and balance board training significantly improved YBT scores in soccer players. Damayanti et al. (2023) found the perform+ program effective in preventing ankle and foot injuries using the YBT as an evaluation tool. Furthermore, Fadillah and Fitri Yani (2023) confirmed that the YBT can measure improvements in static and dynamic balance in young soccer athletes. Overall, these studies demonstrate the significant potential of the YBT in the Indonesian sports context, both as a training evaluation tool and as an indicator of balance improvement.

Although international and national empirical evidence on the YBT continues to grow, several significant research gaps remain. First, most national studies focus on the effectiveness of specific training programs on improving YBT scores, but have not comprehensively examined the relationship between YBT scores, dynamic balance, and

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long-term injury risk. In other words, the YBT is often treated as a tool for evaluating training outcomes, rather than as a predictive screening instrument for injury.

Second, international studies indicate that the predictive validity of the YBT for injury risk remains contextual and varies across populations (Plisky et al., 2021; Tomás et al., 2022). Factors such as age, gender, anthropometric characteristics, training patterns, and sport demands have been shown to influence the interpretation of YBT scores. However, these aspects have not been widely explored in national research, particularly in the context of physical education and student motor learning. Chattalia (2024) did find a significant association between flatfoot and decreased dynamic balance based on the YBT in secondary school students, but did not elaborate on the role of external factors such as developmental age and training load.

Third, there is a gap between international empirical findings and their application in the Indonesian sports education system. No studies have systematically integrated international research findings with national evidence to generate contextual, practical recommendations for teachers and coaches. Consequently, the use of the Y-Balance Test (YBT) in the field remains sporadic and unstandardized, thus under-utilizing its potential as a dynamic balance measurement tool and injury risk predictor.

Based on these research issues and gaps, this study aims to examine and analyze the relationship between the Y-Balance Test, dynamic balance, and injury risk through a literature review of national and international research from the past five to ten years. Specifically, this study seeks to answer the main question: to what extent can the Y-Balance Test be used as a valid dynamic balance measurement tool and as a predictor of injury risk in the context of physical education and sports?

The novelty of this study lies in its integrative and contextual approach. This study not only summarizes international empirical findings regarding the reliability, validity, and predictive function of the YBT but also critically relates them to national evidence and the realities of practice in Indonesia. Thus, this research is expected to bridge the gap between theory and practice, and produce evidence-based, applicable recommendations for physical education teachers, sports coaches, and sports researchers. Academically, this study contributes to strengthening the position of the YBT as a functional evaluation and screening instrument, while practically providing a scientific basis for the development of a more standardized dynamic balance measurement system relevant to the context of sports education in Indonesia.

METHODS

This study employed a literature review design with a systematic and analytical approach to examine the relationship between the Y-Balance Test (YBT), dynamic balance ability, and injury risk in the context of physical education and sport. This approach was chosen because it is effective in synthesizing empirical evidence across studies, identifying the consistency of findings, and mapping the methodological strengths and limitations of previous research, particularly on dynamic balance assessment instruments and injury screening (Plisky et al., 2021; Tomás et al., 2022).

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Literature Search Strategy

A systematic literature search was conducted using Google Scholar as the primary aggregator, taking into account the coverage of national and international journals. Keywords used included "Y-Balance Test," "dynamic balance," "injury risk," and "physical education," both singly and in Boolean combinations. The publication period was limited to 2020–2025 to ensure the relevance and freshness of the scientific data. Literature sources included national journals indexed by SINTA and reputable international journals indexed by Scopus and DOAJ, as recommended by current scientific review practices (Page et al., 2021).

Inclusion and Exclusion Criteria

Included articles had to meet the following inclusion criteria: (1) peer-reviewed research articles; (2) published in Indonesian or English; (3) explicitly discuss the YBT as a primary or supporting instrument in measuring dynamic balance and/or injury risk; (4) involve human subjects in the context of physical education, competitive sports, or recreational sports; and (5) be available in full text. Articles were excluded if they were non-scientific publications, proceedings without peer review, conceptual opinions without empirical data, or were irrelevant to the study objectives. Based on this selection process, 25 articles were deemed to meet the criteria and were subjected to further analysis.

Data Analysis Procedure

Data analysis was conducted using content analysis with a thematic and comparative approach. Each article was coded based on key characteristics, including study design, sample characteristics, sport or physical education context, YBT implementation procedures, dynamic balance indicators, and findings related to injury risk. This process allowed for the identification of patterns of findings, similarities and differences in results across studies, and methodological trends in the use of YBT as a measurement and predictor of injury (Schwiertz et al., 2020; Sokulska et al., 2024).

Synthesis and Replicability Validity

To enhance credibility and replicability, the analysis results were synthesized narratively and critically by linking the empirical findings to the conceptual framework of dynamic postural control and injury prevention. Interpretation of the results took into account the population context, sport, and moderating variables such as age, skill level, and training patterns, as suggested in recent studies on the predictive validity of YBT (Zheng et al., 2024; Chattalia, 2024). This approach is expected to produce a comprehensive, evidence-based overview that can serve as a methodological reference for future similar research, particularly in the development of dynamic balance assessment instruments in physical education and sport settings.

RESULTS AND DISCUSSION

Result

1. Predictive Validity of the Y-Balance Test and Injury Risk Indicators

The Y-Balance Test (YBT) is a measurement tool used to assess dynamic balance and neuromuscular control to identify individuals at risk of injury. This test is considered

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practical because it can provide an overview of body stability through leg reach patterns in three directions of motion, and is often used in sports injury prevention to detect functional deficits that could potentially increase the risk of non-contact injuries to the lower extremities. However, the predictive validity of the YBT remains debated. Although some studies have shown that low scores or leg reach asymmetry correlate with increased injury risk outcomes, other results have been inconsistent and suggest the influence of factors such as muscle strength, injury history, and population characteristics. Therefore, the YBT is more appropriately used as part of a multifactorial assessment system that considers various biomechanical and physiological aspects.

The Role of Inter-limb Asymmetry as a Predictor of Non-Contact Injuries

Inter-limb asymmetry is a frequently studied indicator for predicting the risk of non-contact injuries in athletes, as functional imbalances between the dominant and non-dominant limbs are believed to reflect impaired neuromuscular control that impacts the body's dynamic stability. Research involving participants from the basketball and volleyball community demonstrates the promising potential of the YBT and the side hop test as predictors. This potential is not only promising but also intriguing, as the YBT and the hop test involve similar lower limb movements in multiple directions, engaging both the medial and lateral aspects of the body (Latifi & Kafshgar, 2024). These findings support the earlier suggestion that unilateral movement asymmetry can be an early sign of increased injury risk due to imbalances in strength and muscle coordination in the lower body.

A similar finding is also demonstrated by a study of university soccer players regarding the potential utility of the YBT as a predictor for evaluating non-contact injuries (Alshehre et al., 2021). This is further reinforced by findings showing that the volleyball players studied generally exhibited asymmetry in lower-limb balance ability, with a relatively even distribution (4 cm) across various directions. In a follow-up study eight months later, 13 athletes experienced non-contact lower-limb injuries, with the most common types of injuries being muscle strains and sprains (Wang et al., 2025).

Meanwhile, a prospective study found that the Single-Leg Hop for Distance Test and the Anterior Reach of the Y-Balance Test were identified as significant predictors, with an 18% increased risk of injury associated with inter-limb asymmetry (Sohrabi & Naderi, 2025). Monitoring inter-limb asymmetry as part of an injury prevention strategy is recommended. From a methodological perspective, it is important to emphasize standardization of YBT implementation, as deficits equal to or greater than 4 cm in anterior and posteromedial reach are associated with a 3.64-3.86 times higher risk of ankle sprain (Masuello et al, 2023).

Overall, these findings indicate that inter-limb asymmetry in the YBT is a sensitive parameter that can be used to detect potential functional imbalances and is an important component in a non-contact injury prediction system.

Correlation of the YBT with Other Functional Tests and Sports Performance

The Y-Balance Test (YBT) is not only used to assess injury risk but is also a relevant tool in evaluating athlete movement function and performance. Several studies have shown that

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YBT results correlate with various other functional tests that assess muscle strength, explosive power, and agility. According to (Latifi & Kafshgar, 2024), although there was no significant correlation between the FMS and hop tests, the study results showed a significant relationship between ΔY (YBT asymmetry) and side hops. These findings suggest that the YBT can reflect lower limb functional ability in the context of sports performance involving unilateral and explosive movements, such as in volleyball and basketball.

Similar results were presented by (Wang et al., 2025), who found a significant correlation between the Y-Balance Test and lower leg strength ($r = 0.356$ to 0.715, $P < 0.05$), so this study shows that neuromuscular activity in muscles such as the vastus medialis and biceps femoris during the hop test reflects the requirement for dynamic stabilization, higher dynamic stability improves landing mechanics in single-leg jumps, reduces the risk of injury and improves performance.

Meanwhile, the following study showed that post-ACL (Anterior Cruciate Ligament) reconstruction YBT scores correlated with functional performance tests and isokinetic measures of muscle strength, but not with static balance, joint laxity, and the Hamstring-Quadriceps ratio (HQ ratio) (Kim et al., 2022). These results indicate that although the YBT does not directly represent maximal strength, it still reflects dynamic functional capacity that contributes to recovery and sports performance. Overall, the findings from these three studies strengthen the YBT's position as a useful tool not only for injury risk screening but also as a supporting indicator in evaluating athletes' functional performance.

Limitations and Recommendations for Using Multifactorial Models in Injury Prediction

Research conducted by Nabilla Fitria Emily and Heri (Nabilla et al, 2021) demonstrated a relationship between dynamic balance through the Y-Balance Test (YBT) and a significant reduction in injury incidence in soccer players, thus supporting the need for a multifactorial approach to injury prediction. Although the Y-Balance Test (YBT) is widely used as a screening tool to assess injury risk, several studies have shown that its predictive validity is limited when used alone. Differences in results between studies are often due to variations in sample characteristics, sport type, and differences in testing methodology.

The Y-Balance Test (YBT) has been shown to exhibit good to excellent reliability, but the literature indicates inconsistent predictive utility for musculoskeletal injuries (Eckart et al., 2025). Therefore, a multifactorial approach that incorporates various indicators such as training load, injury history, and biomechanical parameters is recommended to improve the accuracy of injury risk prediction. Furthermore, (Masuello, 2023) recommends ensuring that the Y-Balance Test (YBT) is standardized, valid, and reliable.

Performance on the YBT-LQ varies by age, gender, and sport; therefore, clinicians should consider these factors when interpreting results to ensure accurate clinical decision-making (Plisky et al., 2021). Meanwhile, the clinical prediction rules demonstrated a high level of accuracy in predicting injury risk, with an Area Under the Curve (AUC) of 0.88, indicating that the combination of YBT scores, number of matches played, and minutes of physical activity can provide a more comprehensive assessment of injury risk than individual variables alone (Alshehre et al., 2021). Based on these findings, the YBT should not be used in isolation but should be part of a multifactorial

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assessment system that considers the functional, biomechanical, and physiological aspects of athletes. This approach is expected to provide a more comprehensive picture of injury risk and support the development of evidence-based prevention strategies.

2. Functional and Anthropometric Factors Affecting Y-Balance Test Scores

The Y-Balance Test (YBT) is widely used to assess dynamic balance; however, its results can be influenced by various functional factors and individual anthropometric characteristics. Factors such as lower limb muscle strength, limb length, body mass index (BMI), and the ratio of limb length to height have been shown to contribute to variations in YBT scores. Differences in functional ability between individuals can also reflect different neuromuscular adaptations based on sport type, playing position, and training habits. Therefore, understanding functional and anthropometric factors is crucial so that interpretation of YBT results is not generalized, but rather contextualized according to the physical profile and movement needs of each athlete population.

Relationship between Lower Limb Muscle Strength and Dynamic Balance (YBT)

Lower limb muscle strength is one of the main functional factors influencing an individual's dynamic balance ability. However, differences in functional ability between individuals based on sport type result in varying correlations. For example, a study conducted on skateboarders found a strong, significant, and inversely proportional relationship, with a correlation coefficient of -0.515 and a significance value of $p = 0.000$ (Made et al., 2024). This negative relationship indicates that increased leg muscle strength is associated with decreased dynamic stability. Biomechanically, skateboarding requires fine motor control and high ankle adaptation to the moving board. Excessive muscle strength or stiffness actually hinders the fine motor control and proprioception (awareness of body position) necessary to maintain extreme dynamic balance in this highly skilled sport.

In contrast, different results were found in surfing, where lower extremity muscle strength significantly impacted dynamic balance in surfers at Badung Beach with a p-value of 0.004 ($p<0.05$) (Luh et al., 2022). These findings suggest that in sports with unique functional demands such as surfing, high isometric strength is required to maintain a squatting position and maintain stability on unstable wave surfaces, and high leg strength is an essential asset for maintaining and improving dynamic balance.

Research results show that post-Anterior Cruciate Ligament Reconstruction (ACLR) YBT scores correlate with functional performance tests and isokinetic measures of muscle strength, but not with static balance, joint laxity, and the Hamstring-to-Quadriceps ratio (HQ)(Kim et al., 2022). This correlation suggests that the Y-Balance Test (YBT) better reflects dynamic neuromuscular control capabilities than passive structural factors such as joint laxity. Although the YBT indirectly measures muscle strength, the ability to achieve maximal range of motion is significantly influenced by lower limb strength and coordination.

The research also suggests that the ability to generate large hip and knee joint moments in the sagittal and frontal planes is a key factor in YBT performance in maintaining stability and dynamic body control (Nelson et al., 2021). Therefore, the better

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the lower limb muscle strength, the higher the dynamic stability and balance, as reflected in the YBT score. This confirms the important role of lower limb muscle strength in supporting functional performance and injury prevention in sports activities.

The Influence of Population Characteristics and Anthropometrics (BMI, Playing Position) on YBT Scores

Research results indicate that Y-Balance (YBT) scores can vary significantly based on population characteristics and individual anthropometric factors. According to research by (Tomás et al., 2022), competition level and playing position in soccer athletes influence YBT scores, with differences in dynamic balance performance clearly visible across categories and positions on the field. Specifically, semi-professional players demonstrated the best composite scores compared to other groups (including amateurs, professionals, and youth). Meanwhile, a comparison between field positions revealed that center-backs performed worse on YBT than wingers and forwards. Therefore, to explain variations in dynamic balance across competition levels, specific consideration of training programs and related covariates should be incorporated, rather than solely relying on competition level.

Furthermore, increasing BMI to the obese category can lead to reduced balance ability in achieving anterior reach and reduced flexibility (Muhammad F et al, 2022). Furthermore, individuals categorized as obese have a greater risk of falling than those in the ideal weight and overweight categories. Consistent with research conducted by (Daryono et al, 2024), the correlation between BMI and leg length and dynamic balance was -0.068, indicating a very weak, negative correlation. A negative correlation indicates that a higher BMI leads to a lower dynamic balance. Meanwhile, the correlation between leg length and dynamic balance was 0.318, indicating a weak, positive correlation. The longer the leg length measurement, the higher the dynamic balance score.

Furthermore, research also shows that individuals with chronic low back pain (CLBP) have lower YBT scores than healthy groups, despite the YBT's excellent reliability (Alshehre et al., 2021). These findings reinforce the evidence that musculoskeletal conditions and clinical population factors influence dynamic balance ability as measured by the YBT. Overall, these results indicate that anthropometric factors such as height, leg length, and body composition, as well as functional condition, need to be considered when interpreting YBT scores to ensure more accurate and contextualized balance assessments, tailored to the characteristics of the population being tested.

3. Efficacy of Exercise Interventions Using the Y-Balance Test as a Measuring Tool for Functional Improvement

The Y-Balance Test (YBT) not only serves as an injury risk screening tool but is also widely used as an evaluation instrument to assess the effectiveness of various exercise programs in improving neuromuscular function and dynamic balance. The use of the YBT in the context of exercise interventions allows researchers and sports practitioners to quantitatively monitor changes in functional ability after specific training sessions. Various interventions, such as balance training, core stability exercises, and proprioceptive training, have been shown to improve YBT scores, indicating positive

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adaptations in the neuromuscular system. Therefore, the YBT can be used not only to detect injuries but also as a valid and reliable measurement tool for assessing the success of exercise programs aimed at improving stability and functional performance.

The Efficacy of a Core Stability Exercise Program in Improving Dynamic Balance (YBT)

Core stability training has been shown to play a significant role in improving dynamic balance and neuromuscular function, as measured by the Y-Balance Test (YBT). One example of this research, which provided core stability exercises to soccer players aged 12-15 years for one month, training three times per week, resulted in increased core muscle strength, which, when measured using the Y-Balance Test, indicated improved dynamic balance ability in the soccer players (Bagus Abdul Rozaq et al, 2022). Furthermore, improved dynamic balance was also correlated with a reduced risk of injury. This is because pelvic and trunk stability are crucial components in the movement of each extremity, and therefore, proximal stability is crucial in preventing lower extremity injuries, such as sprains and strains.

Similar results were also reported by GS (Gs Murti, 2024), core stability exercises improve the balance of abdominal and paravertebral muscles due to the co-activity of the deep muscles of the lower trunk, allowing for control during weight transfer and functional activity of the extremities. Core stability exercises not only improve dancers' dynamic balance but also enhance their physical performance (endurance, strength, and flexibility). These exercises are suitable for both beginners and professionals to enhance their performance.

Meanwhile, a study conducted on extracurricular hip hop dancers (aged 16-20 years and female at SMAN 1 Sukawati) showed a significant improvement in dynamic balance after core stability training. This improvement was demonstrated through a paired-sample t-test, which resulted in an average dynamic balance score of 87.03% before training (pretest) and 88.64% after training (posttest) (Ni Putu Ari Meyani Suriatha Putri et al, 2022). With a sample size of six individuals, this improvement proved statistically significant, as indicated by a significance value of $p = 0.000$. This improvement in dynamic balance was due to the impact of core stability training, designed to strengthen the key muscles responsible for maintaining posture, supporting the body, and moving the body. Core stability training, performed three times a week for four weeks, using three movement patterns (front plank, side plank, and superman), ultimately improved the dancers' ability to control overall body position and movement.

Based on these results, it can be concluded that core stability training is an effective intervention strategy to improve dynamic balance, enhance postural control, and indirectly reduce the risk of lower extremity injuries in various populations of athletes and physical activity participants.

The Role of Corrective Exercise for Special Populations (Flatfoot, Post-Injury, FAI)

Corrective exercise plays a crucial role in improving dynamic balance in populations with special conditions, such as flatfoot, ankle injuries, and functional ankle instability (FAI). According to research by Ummy A'isyah (Nurhayati et al., 2022), through a quasi-experiment with a pretest and post-test two-group design, a total of 32 flatfoot adolescents (mostly boys) were taken as samples using a simple random sampling

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method. Measurements of flatfoot and dynamic balance were carried out using the footprint test, Chippaux Smirax Index, and Y-Balance Test. The results concluded that there was a significant difference in the effect between the Short Foot Exercise (SFE) and Towel Curl Exercise (TCE) interventions on improving dynamic balance in flatfoot adolescents. This is indicated by SFE being much better at isolating the intrinsic muscles of the foot because SFE movements involve a greater contribution from the intrinsic muscles while TCE involves a greater contribution from extrinsic muscles such as the flexor digitorum longus. This increased control of intrinsic muscles is the main mechanism for improving dynamic balance in flatfoot conditions.

Furthermore, research revealed that plyometric training and plyometric training paired with cognitive activity (dual-task training) both improved dynamic balance in futsal players experiencing functional ankle instability (FAI) (Levyana et al., 2024). Although there was no statistically significant difference between the two groups after the intervention, dual-task training proved more effective in addressing functional ankle instability and the subjective experience of feeling "weak ankles" (giving way).

Similar research has also been conducted on children with flat feet (aged 6-12 years), where an intervention consisting of rotational exercises with tibialis posterior strengthening was shown to be beneficial in strengthening muscle strength and improving flat feet. This significant improvement was demonstrated with a statistical value of p = 0.000 (Jehaman et al., 2024). Based on the findings, both interventions were highly effective in improving dynamic balance in patients with flat feet. The first is the towel toe curl exercise, which strengthens the intrinsic muscles of the foot, including the flexor digitorum longus, flexor digitorum brevis, lumbricales, and flexor hallucis longus. This will improve intrinsic muscle function and result in better balance. The second is tibialis posterior strengthening, an exercise to strengthen the tibialis posterior, an extrinsic muscle of the foot. This intervention is carried out gradually to improve muscle strength, control, and stability in the medial ankle, or within the ankle joint.

Furthermore, the following comparative study found the effect of single-leg stand training (p=0.001) and the star excursion balance test (p=0.002) on improving the static balance of soccer athletes after an ankle sprain. However, there was no significant difference between the two methods when looking at Y-Balance Test (YBT) balance scores (Ayu Rahmah Fadillah et al, 2023). Overall, these findings suggest that targeted corrective exercises can improve postural function and dynamic balance, and have the potential to reduce the risk of lower extremity injuries in populations with specific biomechanical impairments.

Testing Standardization and Comparison of the YBT with the SEBT

The Y-Balance Test (YBT) and the Star Excursion Balance Test (SEBT) are two commonly used measurement tools to assess dynamic balance and postural control, but they have procedural differences that impact measurement results. This new study compared the reach distances between the YBT-LQ (Y-Balance Test Lower Quarter) and the SEBT (Star Excursion Balance Test) using a correct protocol. The reported findings will have a substantive impact on clinical practice and highlight that the reach distances

for the YBT-LQ and SEBT are not comparable and, importantly, should not be used interchangeably (Bodden et al., 2024).

Other studies have also shown significant differences in posterolateral and posteromedial reach between the YBT-LQ and MSEBT, as well as between the MYBT-LQ and MSEBT. Conversely, no significant differences were found between the YBT-LQ and MYBT-LQ in any direction. Only the YBT-LQ and MYBT-LQ showed very strong agreement in all directions. This means that MSEBT reach performance differed from the YBT-LQ and MYBT-LQ in the anterior, posteromedial, and posterolateral directions in the study population (Jagger et al., 2020). Therefore, these tests cannot be used interchangeably due to kinematic variations and performance differences. Furthermore, standardized YBT procedures are necessary to maintain the validity of the results. This test is also needed in the context of rehabilitation and critical decision-making regarding return to sport, as well as injury risk evaluation (Masuello et al., 2023). Therefore, the use of the YBT and SEBT must follow standard implementation guidelines so that measurement results can be interpreted accurately and compared across studies and populations. Furthermore, further research is needed to evaluate the relationship between the two instruments in a biomechanical and neuromuscular context, allowing the development of a more integrated, sensitive, and applicable balance measurement model for functional performance assessment and injury prevention.

CONCLUSION

Based on a synthesis of national and international literature, the Y-Balance Test (YBT) has been proven to be a reliable and sensitive instrument for assessing dynamic balance and detecting functional asymmetries of the lower extremities. Empirically, various studies have shown that YBT scores are associated with non-contact injury risk indicators, although the strength of its predictive validity varies and is strongly influenced by population characteristics, sport type, muscle strength level, injury history, and test implementation standards. Findings also confirm that the YBT is correlated with other functional tests such as the hop test and isokinetic strength measurements, and is influenced by anthropometric factors (e.g., BMI), playing position, and specific clinical conditions such as flat feet or chronic low back pain. Therefore, interpretation of YBT results must be contextualized and not generalized across populations.

Conceptually, this study confirms that the YBT is more appropriately placed within a multifactorial evaluation framework, rather than as the sole predictor of injury risk. The main limitations of the existing literature include heterogeneity in study designs, relatively small sample sizes, and the lack of longitudinal data—particularly in Indonesia. Thus, further research is needed to test the predictive validity of the YBT through a long-term design, integrate it with other biomechanical and neuromuscular indicators, and standardize the testing procedures so that the results can be compared and utilized consistently in the context of physical education and sport.

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