Content Validation of Badminton Training Program Model for Young Athletes

By Suratman

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Abstract

Study purpose. Badminton requires integrating technical, tactical, physical, and psychological aspects. For young athletes, mastering basic techniques such as serves, lobs, drop shots, and smashes is very important. Therefore, a validated training programme model is needed to ensure that training activities are more systematic, appropriate to the stage of development, and grounded in scientific evidence. This study aims to test the content validity of a badminton technique training programme model for young athletes, ensuring that each training item accurately reflects the basic technical skills at the early stages of athlete development.

Materials and methods. The study used a content validity design with Aiken's V formula. The instrument consisted of 20 basic badminton technique training items. Validation was carried out by three experts, namely two academics in the field of badminton coaching and one nationally licensed coach. Each item was assessed using a five-point Likert scale, and the results were analysed using Aiken's V index.

Results. The analysis showed that 19 of the 20 items had high content validity (V ≥ 0.83), while one item had moderate validity (V = 0.50). The average Aiken's V index was 0.92, indicating that overall, this training programme model had high content validity. These findings show that the developed programme is relevant to the technical skills needs of young badminton athletes.

Conclusion. This validated training programme model can serve as a framework for coaches to systematically design basic badminton technical training based on scientific evidence. This study provides an initial scientific basis for developing a standardised training model to improve the quality of badminton coaching for young athletes.

Introduction

Badminton is a sport that attracts a wide range of fans and participants worldwide. Its popularity is driven by the nature of the game, which requires a combination of speed, strength, agility, and technical precision in every match (Donie et al., 2023; Zhou et al., 2023). In the international context, this sport continues to undergo rapid development in both training methods and scientific approaches. Various studies confirm that optimal performance is not only determined by physical factors, but also by the integration of technique, tactics, and the mental readiness of athletes (Phomsoupha & Laffaye, 2020). These components must be honed from an early age to form a strong foundation for advanced performance (Radnor et al., 2020). Young athletes who receive structured training interventions tend to have better motor skills and technical abilities at the next level of competition (Bańkosz & Nawara, 2021). Therefore, a scientific approach to training is an important part of a long-term performance development strategy (Varghese, Ruparell, & LaBella, 2022).

In the early stages of athlete development, mastery of basic techniques is a key factor in future playing effectiveness. Techniques such as serves, lobs, drop shots, and smashes are fundamental elements that athletes must master before moving on to more complex playing strategies (Cabello-Manrique, Lorente, Padial-Ruz, & Puga-González, 2022). Good mastery of basic skills also helps optimise tactical decision-making during matches. This is even more important because the early years are a golden period for the development of neuromuscular coordination (Rahmat, 2021). Errors in the training approach at this stage can negatively affect the formation of correct movement patterns. Therefore, an appropriate technical training programme is crucial to the success of long-term development in badminton (Raibowo et al., 2024).

In addition to technical aspects, training approaches must also consider the growth, development, and physiological characteristics of young athletes. This period is marked by rapid changes in the musculoskeletal system and neuromotor abilities. Training programmes that are not in line with the developmental phase can lead to the risk of injury and overtraining, as well as hinder performance improvement (Brenner & Watson, 2024; Mahesvi et al., 2024; Simplicio et al., 2024; Yokochi et al., 2024) Therefore, programme design must be progressive, adaptive, and evidence-based for the skills learning process to be effective (Jiang Wen Ming et al., 2023). Adjusting the intensity, volume, and variety of exercises is essential to ensure that training remains relevant to the athlete's growth needs (Moeskops et al., 2022). A scientific approach to exercise design also contributes to the formation of sustainable exercise habits (Biino et al., 2023a).

Previous studies have examined the effectiveness of coaching training programmes for young athletes. For example, a systematic review by Phomsoupha and Laffaye (2020) emphasises the importance of scientifically validating training models to ensure their suitability for performance demands. Similar findings have also been reported by Wang et al. (2023), who state that validated training programmes can increase the efficiency of technical learning by up to 20% compared with traditional methods. However, most of these studies still focus on physiological and biomechanical aspects without evaluating the quality of the technical training programme's content. In fact, content validity is the initial foundation that determines the relevance of training material to skill development needs (Biino et al., 2023b; Purnomo et al., 2023). This gap indicates the need for research that specifically tests the validity of badminton training programmes for young athletes.

Content validity is an important step in ensuring that the training components developed truly represent the skills required in the performance context. Without robust validation, training programmes risk not covering all relevant technical aspects or even including inappropriate components (Fernandez & Vatcheva, 2022). This can lead to inefficient learning and reduce the quality of young athletes' skill development. On the other hand, high content validity allows coaches to develop training plans with a more focused and systematic structure (Hastuti, Sari, & Andrianto, 2023). This process also helps in objectively evaluating the effectiveness of the training (Kania et al., 2024). Thus, content validity plays a role not only in programme development, but also in the development of long-term coaching strategies (Matas et al., 2025).

In the context of badminton coaching in Indonesia, the need for validated technical training models is becoming increasingly urgent. Coaches often still use conventional approaches that do not account for scientific principles when developing programmes. As a result, the training materials provided may not be relevant to young athletes' developmental needs. This situation has the potential to hinder long-term performance improvement and reduce the competitiveness of athletes at the international level (Varghese et al., 2022b). Therefore, developing training models based on scientific validation can be a strategic solution to improve coaching quality. Validated models will help coaches design programmes that are more effective, measurable, and tailored to athletes' developmental characteristics.

This study aims to address this gap by testing the content validity of badminton technique training programmes for young athletes. The testing was conducted through expert coaching assessments to ensure that each training item represents essential technical skills. The validation results are expected to provide a strong scientific basis for the development of training programmes and to serve as practical guidelines for coaches at various training levels. In addition, the findings of this study are expected to enrich the literature on the development of science-based training models in badminton. With this contribution, this study is not only academically relevant but also has real implications for improving the quality of youth athlete training in a sustainable manner.

Materials and Methods
Research Design

This study utilised a content validity design to assess the validity of a model for a badminton technique training programme for young athletes. This approach was chosen because content validity is a crucial initial stage for ensuring that the programme's training items truly represent the relevant technical skills. The developed programme model consists of 20 basic badminton technique training items, which were then validated by coaching experts and nationally licensed practitioners. Content validity was analysed using Aiken's V formula, which is commonly used to assess the level of agreement among experts on the relevance of an instrument (Aiken, 1985). With this approach, the research results are expected to provide a strong scientific basis for the development of training programmes tailored to the needs of young athletes.

Subjects/Participants

The subjects in this study were three experts with expertise in badminton coaching. They consisted of two sports coaching academics with experience in research and development of training models, and one nationally licensed badminton coach with practical experience in coaching young athletes. Participants were selected purposively, considering that they had the relevant qualifications and experience to assess the suitability of the training programme content. The experts were asked to assess 20 basic badminton technique training items that had

been developed, so that the instrument's content validity could be determined objectively based on their level of agreement.

Instruments

The research instrument consists of a badminton technique training programme model designed to support the development of young athletes. This model includes 20 basic technique exercises covering serving, lobbing, dropshotting, and smashing, which form the foundation of badminton at the early stages of an athlete's development. Each training item is designed to measure technical skill aspects relevant to early-age training needs, including movement effectiveness, variety, and suitability for motor development levels. The instrument was developed through a literature review and consultation with coaching practitioners to ensure material representation. Furthermore, this instrument was validated by experts to assess the extent to which each item corresponds to the technical skill constructs to be measured (Yusoff, 2019).

Validation Procedure

The validation process involved asking experts to assess each basic technique exercise item in the instrument. The assessment was carried out using a five-point Likert scale ranging from 1 (very irrelevant) to 5 (very relevant), reflecting the extent to which the exercise items were considered relevant to the badminton skills required by young athletes. Assessment instructions are provided in writing so that experts have a uniform understanding of the assessment criteria. All assessment results are then summarised as scores, which serve as the basis for calculating the level of agreement among experts. This procedure aims to ensure that each training item in the programme can be evaluated systematically, objectively, and consistently.

Data Analysis Techniques

The data obtained from the experts' assessments were analysed using Aiken's V formula. Each expert scored 20 exercise items using a five-point Likert scale, ranging from 1 (very irrelevant) to 5 (very relevant). The scores were then processed using Aiken's V formula to calculate the content validity index of each instrument item. Aiken's V values range from 0.00 to 1.00, with the following interpretations: 0.00-0.40 (low), 0.41- 0.80 (moderate), and 0.81– 1.00 (high). The calculation was performed manually by referring to Aiken's original formula, so that each item could be evaluated based on the level of agreement among experts. In addition, the overall average Aiken's V value was used to determine the level of content validity of the instrument in general.

Research Ethics

This research was conducted in accordance with research ethics principles. Experts participated in the validation process voluntarily, giving their consent after receiving an explanation of the objectives, procedures, and use of research data. The identities of the experts were kept confidential to ensure the independence of their assessments and avoid potential bias. This research also obtained ethical approval from the research ethics committee at Semarang State University, in accordance with educational and sports research ethics standards. Thus, all stages of the research have met the applicable ethical principles, both in terms of participant involvement and data management.

Results

Content validity analysis of 20 badminton technique training items was conducted using Aiken's V formula. The results showed variations in item validity levels, as presented in Table 1.

Table 1. Content Validity Results of the Badminton Technique Training Programme Instrument

Item	Assessor			S1	S2	S3	∑S	n(c-1)	V	Notes
	Expert 1	Expert 2	Expert 3							
1	2	1	2	1	1	4	6	12	0.50	Moderate
2	5	2	5	4	4	4	12	12	1.00	High
3	4	3	4	3	4	4	11	12	0.92	High
4	5	4	5	4	4	4	12	12	1.00	High
5	5	5	5	4	4	4	12	12	1.00	High
6	5	6	5	4	4	4	12	12	1.00	High
7	5	7	5	4	4	4	12	12	1.00	High
8	5	8	5	4	4	4	12	12	1.00	High
9	5	9	5	4	4	3	11	12	0.92	High
10	5	10	5	4	4	4	12	12	1.00	High
11	5	11	5	4	4	4	12	12	1.00	High
12	5	12	5	4	4	4	12	12	1.00	High
13	4	13	4	3	4	3	10	12	0.83	High
14	5	14	5	4	4	3	11	12	0.92	High
15	5	15	5	4	4	3	11	12	0.92	High
16	5	16	5	4	4	3	11	12	0.92	High
17	4	17	4	3	4	4	11	12	0.92	High
18	4	18	4	3	4	3	10	12	0.83	High
19	4	19	4	3	4	3	10	12	0.83	High
20	4	20	4	3	4	3	10	12	0.83	High
		Average							0.92	High

Aiken's V Value for Each Instrument Item
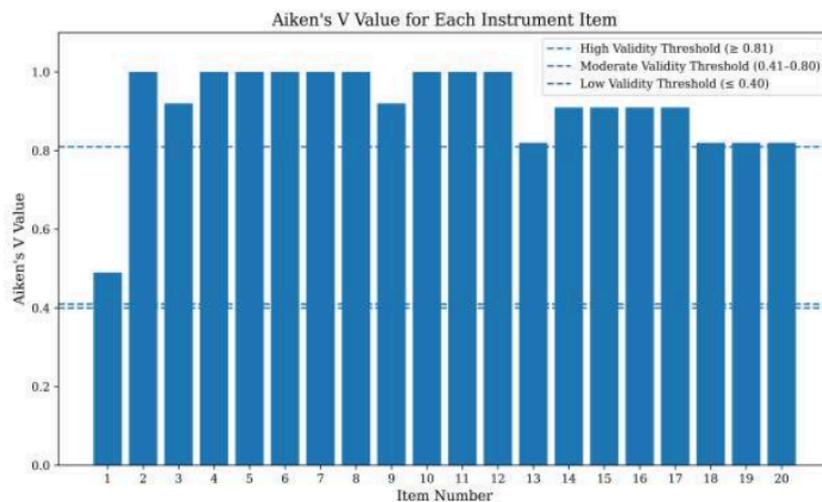
Note. Items with Aiken's V ≥ 0.81 are categorized as highly valid. Items between 0.41–0.80 are moderately valid, and items ≤ 0.40 are considered low validity

Figure 1. Aiken's V value per item of the badminton technique training programme instrument

The distribution of Aiken's V values in Figure 1 shows that most items exceed the 0.81 threshold, indicating high validity. Only one item, the first item, has a value of 0.50 and falls into the moderate category. This pattern confirms the consistency of the experts' assessments of the relevance of the exercise items, with the majority rated as highly relevant to the technical badminton skills required of young athletes.

Discussion

The results of the analysis show that 19 of the 20 items in the instrument fall into the high validity category (V ≥ 0.81) and one item falls into the moderate category (item 1, V = 0.50), with an average Aiken's V of 0.92. These findings indicate a high level of expert agreement on the relevance of most items in the badminton technique training programme model for young athletes. This content validity supports the claim that the compiled items represent the core technical competencies required at the early stages of development. The results also show that the instrument is suitable for use as an initial guideline for developing training programmes. However, the findings do not necessarily guarantee the effectiveness of implementation in the field. Content validity is the first step in a series of instrument testing. Therefore, these results must be followed by reliability tests and field studies to assess the real impact on skill improvement.

Conceptually, the results of this study align with previous studies that emphasise the importance of evidence-based exercise programme design for motor skill development in early childhood (C. Lola & C. Tzetzis, 2021). A systematic review of badminton training also emphasises the need for validated training instruments to improve the efficiency of technique learning (Karyono et al., 2024). Methodological literature on content validity emphasises that expert assessment is a crucial step prior to wider implementation of the scale (Myers, Lee, & Silverman, 2019). Thus, this study fills a practical gap by providing an expert-endorsed training model. This strengthens the empirical basis for trainers who have relied on experience-based practices. However, cross-study comparisons also highlight the importance of adapting to local contexts when adopting instruments (Jayanthi et al., 2022).

The first item that received a moderate score deserves special attention. This score may reflect ambiguity in the wording of the item, the combination of several constructs in one item, or the mismatch between the level of difficulty and the intended stage of development. To improve this, it is recommended to reformulate the item, for example, by breaking down complex items into sub-items, clarifying the operational indicators, and aligning the level of difficulty with the target age range (Brunsvold & Schmitz, 2014). Furthermore, the revised items should be retested by a broader panel of experts and through small field pilots to check their practical feasibility. Qualitative evaluation (brief interviews with trainers) is also useful for capturing aspects that are not recorded in numerical scores (Camomilla et al., 2018; Durand-Bush et al., 2023; Gleason et al., 2021). These steps will improve the accuracy of the items in the context of coaching.

This research methodology has several strengths that are relevant to instrument validation. First, the instrument was developed through a literature review and practitioner consultation, thereby providing a theoretical foundation and practical relevance. Second, experts were selected purposively, ensuring that validators possessed adequate competence in badminton coaching. Third, the use of Aiken's V as an analysis technique provides a quantitative measure of expert agreement that is well established in content validation literature

(Amir, 2015; Guo et al., 2021). The combination of a qualitative-practical approach at the drafting stage and a quantitative approach at the validation stage makes this procedure systematic and transparent. These advantages make the findings more accountable than mere opinion pieces or traditional practices.

However, there are limitations that must be acknowledged and form the basis for further research recommendations. The limited number of validators (n = 3) limits the generalisation of the results. Although the three experts met the minimum criteria for a preliminary study, a larger panel would provide a more stable estimate of validity. Furthermore, this study only addressed content validity without testing inter-rater reliability, test-retest reliability, or construct validity, which would require a larger sample and advanced statistical techniques (e.g., EFA/CFA if items are converted into scales) (Hardesty & Bearden, 2004; Newman et al., 2013). The local context of implementation also limits transferability to different settings without adaptation. Therefore, further studies are recommended: increasing the number of validators, conducting reliability tests, and implementing pilot field studies to measure the impact on skill outcomes and injury incidents (Abdullah & Abdullah, 2025; Haidar et al., 2024).

The practical application of this research is quite straightforward for coaches and training organisers. The validated training model can serve as a framework for preparing Annual Training Plans and periodisation, as well as for training module material for coach development (Custodio et al., 2024; Hardinata et al., 2024). In addition, the validation results can serve as a basis for creating a more systematic skills assessment rubric and a training progression guide. For implementation, it is recommended to disseminate information to coaches through workshops and provide supporting materials (e.g., training examples, intensity parameters, and assessment checklists). At the policy level, this evidence of validity can encourage the adoption of the model into youth athlete development programmes in clubs and schools.

This study provides a strong initial contribution to the development of a badminton training programme model for young athletes, with generally high content validity. The findings show that most items met the relevance criteria according to experts, but there is room for improvement in certain items and for further testing of reliability and implementation effectiveness. The next recommendations are to expand the panel of experts, conduct field pilots, and apply additional quantitative tests to build a comprehensive and robust instrument. With this series of further tests, this model has the potential to become a valid and useful practice guideline for improving the performance of young badminton players.

Conclusion

This study shows that the badminton technique training programme model for young athletes has high content validity with an average Aiken's V index of 0.92. Of the 20 training items, 19 were declared highly valid, and 1 item was classified as moderate. These results confirm that the instrument is suitable for use as a guideline for developing basic technique training programmes. The strong validity also demonstrates that the model can serve as a practical reference for coaches and academics in designing systematic training grounded in scientific evidence and relevant to motor development. This study is still limited by the small number of validators and has not tested reliability or effectiveness in the field. Therefore, further research should involve more experts, test reliability, and assess the impact of programme implementation on young athletes' skills. Overall, these findings make an important contribution to the development of science-based badminton training methodologies and improving the quality of early-age athlete development.

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References

Abdullah, M. M., & Abdullah, S. H. (2025). The relationship between positive illusion and performance skill level among female athletes of Aphrodite Sports club. *Tanjungpura Journal of Coaching Research*, *3*(2), 87–101. https://doi.org/10.26418/tajor.v3i2.90281

Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement.* https://doi.org/10.1177/0013164485451012

Amir, N. (2015). Instrument Development of Self-Confidence for Badminton Athletes. *ANIMA Indonesian Psychological Journal,* *30*(2), 101-110. https://doi.org/10.24123/aipj.v30i2.539

Biino, V., Giustino, V., Gallotta, M. C., Bellafiore, M., Battaglia, G., Lanza, M., Baldari, C., Giuriato, M., Figlioli, F., Guidetti, L., & Schena, F. (2023a). Effects of sports experience on children's gross motor coordination level. *Frontiers in Sports and Active Living.* 5, 1310074. https://doi.org/10.3389/fspor.2023.1310074

Biino, V., Giustino, V., Gallotta, M. C., Bellafiore, M., Battaglia, G., Lanza, M., Baldari, C., Giuriato, M., Figlioli, F., Guidetti, L., & Schena, F. (2023b). Effects of sports experience on children's gross motor coordination level. *Frontiers in Sports and Active Living.* 5, 1310074. https://doi.org/10.3389/fspor.2023.1310074

Brenner, J. S., & Watson, A. (2024). Overuse Injuries, Overtraining, and Burnout in Young Athletes. *Pediatrics.* *153*(2), e2023065129. https://doi.org/10.1542/peds.2023-065129

Brunsvold, M. E., & Schmitz, C. C. (2014). Replicating an established open skills curriculum: Are the same results obtained in a different setting? *Journal of Surgical Education.* *71*(6), e97-e103. https://doi.org/10.1016/j.jsurg.2014.08.001

C. Lola, A., & C. Tzetzis, G. (2021). The Development of Motor and Perceptual Skills in Young Athletes. In *Sport Psychology in Sports, Exercise and Physical Activity.* IntechOpen. https://doi.org/10.5772/intechopen.99245

Cabello-Manrique, D., Lorente, J. A., Padial-Ruz, R., & Puga-González, E. (2022). Play Badminton Forever: A Systematic Review of Health Benefits. In *International Journal of Environmental Research and Public Health.* *19*(15), 9077. https://doi.org/10.3390/ijerph19159077

Camomilla, V., Bergamini, E., Fantozzi, S., & Vannozzi, G. (2018). Trends supporting the in-field use of wearable inertial sensors for sport performance evaluation: A systematic review. In *Sensors (Switzerland).* *18*(3), 873. https://doi.org/10.3390/s18030873

Custodio, J. M., Shukla, M., Tulyakul, S., & Taiar, R. (2024). How ladder drill V-pattern and snake jump exercises impact the agility of basketball players. *Tanjungpura Journal of Coaching Research*, *2*(1), 30–36. https://doi.org/10.26418/tajor.v2i1.72008

Donie, Shapie, M. N. M., Okilanda, A., Edmizal, E., Suryadi, D., & Suganda, M. A. (2023). Concentration, eye coordination and agility: How they influence badminton playing skills. *Journal of Physical Education and Sport,* *23*(12), 3309–3317. https://doi.org/10.7752/jpes.2023.12378

Durand-Bush, N., Baker, J., van den Berg, F., Richard, V., & Bloom, G. A. (2023). The Gold Medal Profile for Sport Psychology (GMP-SP). *Journal of Applied Sport Psychology*. *35*(4), 547-570. https://doi.org/10.1080/10413200.2022.2055224

Fernandez, G. A., & Vatcheva, K. P. (2022). A comparison of statistical methods for modeling count data with an application to hospital length of stay. *BMC Medical Research Methodology*. *22*(1), 211. https://doi.org/10.1186/s12874-022-01685-8

Gleason, B. H., Hornsby, W. G., Suarez, D. G., Nein, M. A., & Stone, M. H. (2021). Troubleshooting a nonresponder: Guidance for the strength and conditioning coach. In *Sports*. *9*(6), 83. https://doi.org/10.3390/sports9060083

Guo, S. Z., Mohamad, N. I., Zakaria, J., Yu, L., & Malek, N. F. A. (2021). Reliability and Validity of Badminton Special Speed Training Method toward Success Score and Time Perception Predictive Skills Performance of Badminton Players. *Journal of Physics: Conference Series*. (Vol. 1793, No. 1, p. 012059). IOP Publishing. https://doi.org/10.1088/1742-6596/1793/1/012059

Haidar, M. D., Dewantara, J., Eken, Ö., Stojanović, S., & Agustina, D. (2024). Proprioceptive neuromuscular facilitation (PNF) stretching in futsal sport: How does it affect recovery pulse rate after high-intensity interval training? *Tanjungpura Journal of Coaching Research*, *2*(1), 23–30. https://doi.org/10.26418/tajor.v2i1.77617

Hardesty, D. M., & Bearden, W. O. (2004). The use of expert judges in scale development. Implications for improving face validity of measures of unobservable constructs. *Journal of Business Research*. *57*(2), 98-107. https://doi.org/10.1016/S0148-2963(01)00295-8

Hardinata, R., Rinto, R., Deski, D., Hartikasari, H., Nofita, T., Hendra, H., Pardi, P., & Cadiente, D. S. A. (2024). Physical fitness analysis of elementary school students: a study to design an exercise program. *Tanjungpura Journal of Coaching Research*, *2*(1), 13–22. https://doi.org/10.26418/tajor.v2i1.76118

Hastuti, T. A., Sari, I. P. T. P., & Andrianto, S. D. (2023). Analysis of the Aiken index to know the content validity of the lesson plan evaluation instrument on physical fitness materials viewed from learning strategies. *In 6th Yogyakarta International Seminar on Health, Physical Education and Sport Science (YISHPESS 2023) (pp. 276-282). Atlantis Press.*. https://doi.org/10.2991/978-94-6463-356-6_31

Jayanthi, N., Schley, S., Cumming, S. P., Myer, G. D., Saffel, H., Hartwig, T., & Gabbett, T. J. (2022). Developmental Training Model for the Sport Specialized Youth Athlete: A Dynamic Strategy for Individualizing Load-Response During Maturation. In *Sports Health*. *14*(1), 142-153. https://doi.org/10.1177/19417381211056088

Jiang Wen Ming, J., Alhussin Alali, A., Abd Malek, N. F., Madarsa, N. I., Baki, M. H., & Mohamad, N. I. (2023). Impact of Hand Grip and Sit-And-Reach Exercises in Children Aged 6-7 Years. *Journal of Coaching and Sports Science*, *2*(2), 86–92. https://doi.org/10.58524/002023227200

Kania, N., Kusumah, Y. S., Dahlan, J. A., Nurlaelah, E., Gürbüz, F., & Bonyah, E. (2024). Constructing and providing content validity evidence through the Aiken's V index based on the experts' judgments of the instrument to measure mathematical problem-solving skills. *REID (Research and Evaluation in Education)*, *10*(1), 64–79. https://doi.org/10.21831/reid.v10i1.71032

Karyono, T. H., Hidayat, R. A., Ihsan, F., Susanto, N., Wijanarko, T., García-Jiménez, J. V., Eken, Ö., Latino, F., & Tafuri, F. (2024). Performance Enhancement Strategies for Badminton Athletes: A Systematic Review. *Retos*, *57*, 379–389. https://doi.org/10.47197/retos.v57.107124

Mahesvi, H., Sukarmin, Y., Suhartini, B., Bartik, P., Hansdorfer-Korzon, R., & Adil, H. M. (2024). How do Ali Satia Grah and the Thai massage method compare? Study on pain and

range of motion of chronic ankle injury. *Tanjungpura Journal of Coaching Research*, *2*(3), 124–130. https://doi.org/10.26418/tajor.v2i3.65878

Matas, S., Lalín, C., Corbi, F., Planas-Anzano, A., Moya, J. M., Mas-Alòs, S., & Peirau-Terés, X. (2025). Content Validity of a New Soccer (Football) Return-to-Play Test: The RONDO-TEST. *Journal of Functional Morphology and Kinesiology*, *10*(1), 1–10. https://doi.org/10.3390/jfmk10010003

Moeskops, S., Oliver, J. L., Read, P. J., Cronin, J. B., Myer, G. D., & Lloyd, R. S. (2022). Practical Strategies for Integrating Strength and Conditioning into Early Specialization Sports. In *Strength and Conditioning Journal*. *44*(1), 34-45. https://doi.org/10.1519/SSC.0000000000000665

Myers, N. D., Lee, S., & Silverman, S. (2019). Measurement in Physical Education and Exercise Science (MPEES): A Brief Report on 2018. *Measurement in Physical Education and Exercise Science*. *23*(1), 1-9. https://doi.org/10.1080/1091367X.2019.1584564

Newman, I., Lim, J., & Pineda, F. (2013). Content Validity Using a Mixed Methods Approach: Its Application and Development Through the Use of a Table of Specifications Methodology. *Journal of Mixed Methods Research*. *7*(3), 243-260. https://doi.org/10.1177/1558689813476922

Phomsoupha, M., & Laffaye, G. (2020). Multiple Repeated-Sprint Ability Test With Four Changes Of Direction For Badminton Players (Part 2): Predicting Skill Level With Anthropometry, Strength, Shuttlecock, And Displacement Velocity. *Journal of Strength and Conditioning Research*. *34*(1), 203-211. https://doi.org/10.1519/JSC.0000000000002397

Purnomo, T. J., Prasetyo, W. E., Lupita, M. N., & Abdulrahman, S. (2023). Evaluation of Sports Coaching Programs in Indonesia Using the Countenance Model. *Journal of Coaching and Sports Science*, *3*(1), 1–13. https://doi.org/10.58524/002024324100

Radnor, J. M., Moeskops, S., Morris, S. J., Mathews, T. A., Kumar, N. T. A., Pullen, B. J., Meyers, R. W., Pedley, J. S., Gould, Z. I., Oliver, J. L., & Lloyd, R. S. (2020). Developing Athletic Motor Skill Competencies in Youth. *Strength and Conditioning Journal*. *42*(6), 54-70. https://doi.org/10.1519/SSC.0000000000000602

Rahmat, A. (2021). Badminton Smash Basic Training Model. *INSPIREE: Indonesian Sport Innovation Review*. *2*(3), 176-185. https://doi.org/10.53905/inspiree.v2i3.49

Raibowo, S., Ilahi, B. R., Yarmani, Y., Sapri, J., Pujianto, D., Danim, S., Kristiawan, M., Okilanda, A., Azhar, S., & Syaputri, W. (2024). Training model for basic badminton techniques using a sport-integrated circuit for student athletes aged 12-15 Years. *Retos*, *61*, 1362–1370. https://doi.org/10.47197/retos.v61.109873

Simplicio, C. L., Purita, J., Murrell, W., Santos, G. S., Santos, R. G. dos, & Lana, J. F. S. D. (2024). Physiotherapy techniques used in injury treatment: a systematic review of tennis elbow. *Tanjungpura Journal of Coaching Research*, *2*(3), 114–123. https://doi.org/10.26418/tajor.v2i3.86823

Varghese, M., Ruparell, S., & LaBella, C. (2022a). Youth Athlete Development Models: A Narrative Review. In *Sports Health*. *14*(1), 20-29. https://doi.org/10.1177/19417381211055396

Varghese, M., Ruparell, S., & LaBella, C. (2022b). Youth Athlete Development Models: A Narrative Review. In *Sports Health*. *14*(1), 20-29. https://doi.org/10.1177/19417381211055396

Yokochi, M., Nakamura, M., Iwata, A., Kaneko, R., Morishita, S., & Oi, N. (2024). The effect of massage on the plantar flexor muscles during the fixation period in postoperative patients with an ankle fracture. *Journal of Bodywork and Movement Therapies*, *37*, 183–187. https://doi.org/10.1016/j.jbmt.2023.11.045

Yusoff, M. S. B. (2019). ABC of Content Validation and Content Validity Index Calculation. *Education in Medicine Journal. 11*(2), 49-54. https://doi.org/10.21315/eimj2019.11.2.6

Zhou, X., Imai, K., Chen, Z., Liu, X., Watanabe, E., & Zeng, H. (2023). The Characteristics of Badminton-Related Pain in Pre-Adolescent and Adolescent Badminton Players. *Children, 10*(9), 1501. https://doi.org/10.3390/children10091501

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