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Development of A Basic Service Technique Training Model Using The Thigh In Teqball PJKR Students Class of 2025

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ABSTRACT

This study aimed to develop a basic service technique training model using the thigh in teqball for Physical Education, Health, and Recreation (PJKR) students of the Class of 2025. The research employed a Research and Development (R&D) approach adapted from Borg and Gall's ten-step model, encompassing needs analysis, product planning, initial product development, expert validation, small-scale field testing, product revision, large-scale field testing, and final product refinement. Data were collected using a rating scale questionnaire administered to two teqball experts, one learning expert, and student participants involved in the trial stages. The results of expert validation indicated a feasibility score of 71%, suggesting that the developed training model met the criteria for content validity, technical appropriateness, and instructional relevance. Furthermore, the small group trial involving 15 students resulted in a higher feasibility percentage of 77%, while the large group trial with 20 students resulted in a score of 71%. All results fall within the "feasible for use" category, confirming the practicality and applicability of the model in real learning settings. Conceptually, the training model was designed based on the principles of sport-specific training, motor learning, and the technical demands of teqball, particularly the biomechanical characteristics of thigh-based serving. Empirically, the findings demonstrate that the model facilitates better understanding, execution, and consistency of thigh serve techniques among PJKR students. Given that teqball is a relatively new sport in Indonesia, this training model provides an innovative and evidence-based alternative to support structured learning and early-stage athlete development. Therefore, the developed model has the potential to serve as a practical reference for teqball instruction in higher education and sports training contexts.

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A. Conception and design of the study;
B. Acquisition of data;
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D. Manuscript preparation;
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INTRODUCTION

An effective training model is the primary foundation for improving athlete performance because it systematically and sustainably explains the methods, relationships between variables, and general conditions required to achieve training

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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goals (Detu et al., 2024). In the context of modern sports development, structured training program planning is crucial because athlete development relies not only on physical aspects but also includes integrated technical, tactical, and mental components (Arwandi et al., 2022). Athletes trained without a systematic approach tend to experience performance stagnation and a higher risk of injury.

Developing a training model requires a comprehensive design that incorporates holistic physical condition components, such as endurance, strength, explosive power, speed, flexibility, agility, balance, and coordination, to align with the specific demands of each sport (Putra et al., 2023). While general training principles are universal, the specific training needs of each sport have distinct characteristics and cannot be generalized (Basri, 2020). Therefore, the training model must be tailored to the biomechanical, physiological, and technical characteristics of the sport being developed.

Teqball, as a new sport in Indonesia, faces significant challenges in athlete development, particularly the limited availability of evidence-based training models for basic techniques. One of the fundamental skills in teqball is the serve, as it serves as the opening act of the game and is a key prerequisite for scoring points (Setyawan, 2019). However, mastery of serving techniques—particularly thigh serves—is not yet supported by standardized and validated training models, particularly among Physical Education, Health, and Recreation (PJKR) students.

Conceptually, training is defined as a repetitive and planned process aimed at improving individual capacity to achieve optimal performance (Moh et al., 2018). Modern training models no longer focus solely on technique repetition but emphasize simulation of real-world match conditions to more effectively transfer skills to competitive performance (Detu et al., 2024). Recent research shows that training models based on specific techniques and game contexts can improve movement efficiency, technical accuracy, and athlete mental readiness (Putra et al., 2023; Arwandi et al., 2022).

In ball-based sports, mastery of serving techniques has been shown to provide a tactical advantage from the start of a rally and significantly contributes to game control (Septiasari, 2021). Empirical studies in new sports and modified games have shown that developing expert-validated basic technique training models can improve understanding of movement biomechanics and performance consistency in beginner to intermediate athletes (Mahfud et al., 2020; Syahputra, 2020).

Teqball itself has developed in more than 40 countries and has been internationally recognized with world championships since 2014 (Syahban et al., 2025). In Indonesia, teqball was officially introduced at the 2018 Asian Games and facilitated by the establishment of INATEQ in 2019. However, the development of teqball achievements and the scientific basis in Indonesia are still relatively behind those of other countries, particularly in the study of athletes' specific physical and technical conditions (Syahban et al., 2025).

Although international literature has discussed training models, physical conditioning, and basic techniques in various sports, scientific studies specifically developing thigh serve training models for teqball are still very limited, particularly in the

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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Indonesian context. Existing research tends to be descriptive or focuses on general aspects of sports development, without integrating athlete needs analysis, expert validation, and systematic testing into a single applicable training model.

Furthermore, most teqball research emphasizes the history, organization, and popularization of the sport, while the technical-biomechanical and pedagogical dimensions of training receive less attention. Yet, teqball is categorized as a high-intensity, power- and speed-based sport, with short activity durations that demand high levels of coordination and precision (Syahban et al., 2025). The lack of a structured thigh serve training model has the potential to hinder the development of novice athletes and PJKR students as future coaches and sports practitioners.

Based on these research issues and gaps, this study aims to develop a training model for basic thigh serve techniques in teqball for Physical Education and Sports (PJKR) students in the class of 2025. This model is systematically developed, needs-based, and expertly validated. This model is expected to improve students' understanding of technique, movement effectiveness, and physical and mental readiness to optimally execute teqball serves.

The novelty of this research lies in: (1) developing a specific and contextual teqball thigh serve training model for PJKR students; (2) integrating a Research and Development (R&D) approach with expert validation and phased trials; and (3) providing applicable training products as a reference for teqball coaching in physical education and sports environments in Indonesia.

Therefore, this research not only contributes to the enrichment of the scientific literature on teqball but also has practical implications for curriculum development, the development of novice athletes, and accelerating the progress of the national sport of teqball.

METHODS

This study employed a Research and Development (R&D) approach, which aims to develop, validate, and test the feasibility of a training product for effective use in educational and sports contexts (Sekreningsih Nita et al., 2023; Rizki Yuliandra & Fahrizqi, 2019). The R&D approach was chosen because it is relevant for producing applicable products based on field needs, while also bridging the gap between theoretical studies and practical implementation in sports learning (Ramadan, 2018; Mahfud et al., 2020). In the context of sports skills development, this method is considered effective in producing systematic, valid training models that are appropriate to the characteristics of students and the demands of the sport (Putra et al., 2023; Detu et al., 2024).

The development model used refers to Borg and Gall, which emphasizes a gradual and continuous process from needs analysis to final product implementation. The research stages included: (1) needs analysis, (2) planning, (3) initial product development, (4) initial field trials, (5) main product revision, (6) main field trials, (7) operational product

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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revision, (8) operational trials, (9) final product revision, and (10) dissemination and implementation. This stepwise approach allowed for a systematic evaluation of the product's quality, practicality, and feasibility before widespread use (Syahputra, 2020; Liloi & Kungku, 2024).

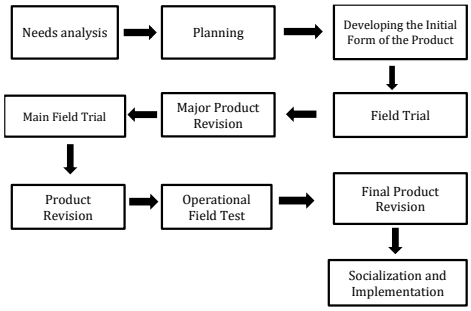

Figure 1.
Development Step Chart

The needs analysis stage was conducted through initial observations and questionnaires distributed to PJKR students from the 2025 intake to identify the level of need for developing a basic foot serve technique training model in teqball. The results of the needs analysis served as the basis for planning and designing the training product, which included learning objectives, training sequences, movement variations, and evaluation indicators. The initial product development was then realized in the form of a teqball foot serve technique training guide, supplemented with technical instructions, biomechanical principles of movement, and progressive training stages.

The research subjects consisted of PJKR students from the class of 2025, with two trial stages: a small group trial (n = 15) and a large group trial (n = 20). Subject selection was based on the students' characteristics as prospective educators and sports practitioners who require systematic mastery of basic teqball techniques. The research instrument used was a rating scale questionnaire administered to subject matter experts, learning experts, and trial participants to assess aspects of content suitability, clarity of presentation, ease of use, and relevance of the exercises to teqball learning needs.

Data analysis was conducted using descriptive percentage analysis, commonly used in development research to assess the level of product feasibility (Liloi & Kungku, 2024). The assessment results were classified into four categories: 80–100% (suitable for use), 60–79% (fairly suitable for use), 50–59% (requires revision), and <50% (not suitable and requires replacement). Data from the validation and trial served as the basis for product revisions to obtain a valid, practical, and ready-to-implement basic teqball foot serve technique training model.

Table 1.
Percentage classification

No	%	Classification	Meaning
1	80%-100%	80%-100%	Used
2	60%-79%	60%-79%	Used
3	50%-59%	50%-59%	Replaced
4	< 50%	< 50%	Replaced

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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RESULTS AND DISCUSSION

Result

The results of this development research refer to the R&D (Research and Development) development model from Borg and Gall which consists of 10 research steps. To obtain data for the first and second phases of trials, the researcher used a data collection method in the form of a questionnaire for (1) the first phase of trials with 15 students, (2) the second phase of trials with 20 students, and for evaluation in the form of a questionnaire for three experts, namely two teqball sports experts and one for learning experts, the trial subject was the percentage technique.

This data is an assessment of the model produced by 3 experts.BThe following is a recapitulation of the expert judgment values

Table 2.
Recapitulation of expert judgment

No	Expert Judgment	Value (Percentage)
1	Teqball sports expert 1	71%
2	Teqball sports expert 2	71%
3	Learning expert	71%
Average		**71%**

Data from the results of the first phase of the trial (Small Group)

The variables that are aspects of observation regarding the development of a service training model using the thigh according to the evaluation of the first stage trial (small group) are presented in table 3, as follows..

Table 4 Data from the results of the first stage of the trial (small group)

No	Aspect	X	Xi	Score %
1	How did you do the exercise in picture 1?	43	60	72%
2	How do you carry out the exercise in picture 1 that you have done?	44	60	73%
3	LThe exercises in Figure 1 that you have done are useful in playing teqball	50	60	83%
4	How did you do the exercise in picture 2?	49	60	82%
5	How do you carry out the exercise in picture 2 that you have done?	46	60	77%
6	LThe exercises in picture 2 that you have done are useful in playing teqball	50	60	83%
7	How did you do the exercise in picture 3?	44	60	73%
8	How do you carry out the exercise in picture 3 that you have done?	46	60	77%
9	LThe exercises in Figure 3 that you have done are useful in playing teqball	44	60	73%
10	How did you do the exercise in picture 4?	42	60	70%
11	How do you carry out the exercise in Figure 4 that you have done?	46	60	77%
12	LThe exercises in Figure 4 that you have done are useful in playing Teqball	48	60	80%
13	How did you do the exercise in Figure 5?	44	60	73%
14	How do you carry out the exercise in Figure 5 that you have done?	50	60	83%
15	LThe exercises in Figure 5 that you have done are useful in playing teqball	45	60	75%
16	How did you do the exercise in Figure 6?	51	60	85%
17	How do you carry out the exercise in figure 6 that you have done?	47	60	78%
18	LThe exercises in Figure 6 that you have done are useful in playing teqball	39	60	65%
Total		**688**	**1,080**	**77%**

The table aboveis a data analysis carried out based on the evaluation data from the first stage trial (small group) each of which is described in table 4 of the results of the

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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first stage trial analysis that the total score (∑X is 688 and the total number of respondents (∑Xi) is 1,080 so the percentage is 77%.

Based on the results of the analysis of the first stage trial (small group), the results were that 77% of the criteria were determined and it can be said that the development of the training model for the teqball game of PJKr students met the criteria for use.60%-79% so it can be used.

Phase II trial data (Large Group)

The variables that are aspects of observation regarding the development of a service training model using the thigh according to the evaluation of the phase II trial (Large Group) are presented in table 4 as follows.

Table 5 Data from the results of the phase II trial (Large group)

No	Aspect	X	Xi	Score %
1	How did you do the exercise in picture 1?	58	80	73%
2	How do you carry out the exercise in picture 1 that you have done?	58	80	73%
3	LThe exercises in Figure 1 that you have done are useful in playing teqball	56	80	70%
4	How did you do the exercise in picture 2?	56	80	70%
5	How do you carry out the exercise in picture 2 that you have done?	56	80	70%
6	LThe exercises in picture 2 that you have done are useful in playing teqball	58	80	73%
7	How did you do the exercise in picture 3?	56	80	70%
8	How do you carry out the exercise in picture 3 that you have done?	62	80	78%
9	LThe exercises in Figure 3 that you have done are useful in playing teqball	58	80	73%
10	How did you do the exercise in picture 4?	57	80	71%
11	How do you carry out the exercise in Figure 4 that you have done?	58	80	73%
12	LThe exercises in Figure 4 that you have done are useful in playing Teqball	51	80	64%
13	How did you do the exercise in Figure 5?	54	80	68%
14	How do you carry out the exercise in Figure 5 that you have done?	59	80	74%
15	LThe exercises in Figure 5 that you have done are useful in playing teqball	56	80	70%
	Total	**853**	**1,200**	**71%**

Based on table 5, the data from the analysis of the phase II trial (Large Group) shows that the total score (∑x) is 853 and the total number of respondents (∑xi) is 1,200 so the percentage is 71%. Based on the analysis that has been done on the responses/assessments from the phase II trial, the result is 71% of the determined criteria and it can be done that the development of the basic thigh service technique training model for PJKR students of the 2025 class meets the criteria (60%-79%) so it can be used.

Discussion

This study aimed to develop a training model for basic thigh serve techniques in teqball for PJKR students in the class of 2025. The results showed that the developed training model was categorized as "suitable for use," with expert validation scores of 71%, small group trials of 77%, and large group trials of 71%. These findings confirm that the developed training model meets the criteria for content suitability, technical suitability, and applicability in the context of teqball learning in higher education.

The validation results by two teqball experts and one learning expert, which yielded an average score of 71%, indicate that the training model aligns with the learning

Abdul Ghani Basith[1A-E*], Sardiman[2B-D], Didik Purwanto[3B-D], Rivalwan[4B-D]
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objectives of teqball techniques, particularly in terms of thigh serve mechanics, progressive training sequences, and suitability to the characteristics of PJKR students. These findings align with the view that training model development should be based on an analysis of the needs of the sport and the characteristics of the participants, rather than simply adapting from other sports (Putra et al., 2023; Arwandi et al., 2022). Specifically designed training models have been shown to be more effective in improving technical understanding and movement consistency in novice athletes (Syahputra, 2020; Mahfud et al., 2020).

The higher feasibility percentage in small-group trials (77%) compared to large-group trials (71%) indicates that on a limited scale, the training model is easier to control, understand, and implement. This corroborates previous research findings that the initial effectiveness of a training model is often more optimal in small groups due to more intensive instructional interaction and more targeted feedback (Detu et al., 2024; Moh et al., 2018). Although there was a slight decrease in the percentage in large-group trials, the value remained within the feasibility category, indicating that the training model remains relevant and applicable in learning contexts with larger numbers of participants.

Conceptually, serving is a fundamental skill in teqball because it serves as the starting point of every rally and determines control of the game from the outset (Setyawan, 2019; Septiasari, 2021). Using the thigh as a serving medium requires neuromuscular coordination, dynamic balance, and precise control of the ball's rebound angle. Therefore, developing a systematic and progressive thigh serve training model is crucial to help students gradually understand the biomechanical principles of movement and technical strategies (Basri, 2020; Putra et al., 2023). The findings of this study indicate that the developed training model is able to meet these needs, as reflected in the positive responses of trial participants who rated the training as easy to understand and helpful in mastering thigh serve technique.

The results of this study are also relevant to the characteristics of teqball as a new, high-intensity sport that combines elements of strength, speed, coordination, and precision in a relatively short activity duration (Syahban et al., 2025). In the context of a new sport, limited training references are often a major obstacle in developing athletes and learning basic techniques. Therefore, the existence of an academically validated training model plays a strategic role in accelerating the learning process and standardizing techniques (Detu et al., 2024; Ramadan, 2018).

From a pedagogical perspective, this training model aligns with the principles of learning by doing and motor learning, where structured repetition and exercise variation play a crucial role in developing efficient and stable movement patterns (Moh et al., 2018; Liloi & Kungku, 2024). PJKR students, as future sports educators and coaches, require a training model that is not only technically effective but also easily replicated and retaught in the context of physical education and sports coaching. Therefore, the product developed in this study has high practical value.

Overall, the findings of this study corroborate the literature emphasizing that developing an R&D-based training model is an appropriate approach to producing

contextual, valid, and applicable training products (Mahfud et al., 2020; Syahputra, 2020). However, this study is limited by its sample size and has not quantitatively tested the model's effectiveness on improving serving performance. Therefore, further research is recommended to examine the impact of this training model on the accuracy, consistency, and effectiveness of thigh serves in more competitive teqball match situations.

CONCLUSION

This research successfully produced a training model for basic thigh serve techniques in teqball that was declared feasible and usable based on expert validation and field trials. Validation conducted by two teqball experts and one learning expert yielded an average score of 71%, which falls within the usability category. The small group trial achieved a 77% score, while the large group trial achieved 71%, both meeting the feasibility criteria in the 60%–79% range. These findings empirically indicate that the developed training model possesses adequate content quality, technical suitability, and applicability in the context of teqball learning.

Conceptually, this training model was designed based on the principles of sport-specific training, motor skills learning, and the actual needs of the 2025 intake of PJKR students. The resulting model has been proven to help students understand the mechanics of movement and stages of thigh serve techniques more systematically, is easy to practice, and is relevant to the characteristics of teqball. Furthermore, the simplicity and flexibility of the training model make it easy to implement in learning activities and basic training.

This research also emphasizes the importance of developing a structured, research-based training model, especially considering that teqball is still a relatively new sport in Indonesia and requires ongoing coaching innovation. Therefore, the developed training model can be a practical alternative solution to improve the quality of teqball instruction in physical education settings and support a more systematic and scientific development process for novice athletes.

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Thanks are also extended to the 2025 PJKR students who actively participated as research subjects, both in small and large group trials. Their involvement provided objective empirical data and served as a crucial basis for the evaluation and revision of

the training model. Furthermore, the authors appreciate the institutional support from the Physical Education, Health, and Recreation Study Program, which facilitated the implementation of this research.

Finally, the author hopes that the results of this study can provide a real contribution to the development of sports coaching science, especially in the development and learning of teqball, as well as become a reference for research and innovation in sports training in the future.

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