PRACTICAL IMPLEMENTATION AND VALIDATION OF A FUNCTIONAL TESTING MODEL FOR EARLY TALENT SELECTION IN WRESTLING

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Abstract

Effective early talent identification in wrestling requires evidence-based tools that go beyond isolated motor tests and consider the complex interplay between physical, psychological, and sport-specific skills (Côté & Vierimaa, 2014; Malina, 2010). This study aimed to implement and validate a multidimensional testing model for children aged 6 to 10, with the purpose of supporting the early selection process in wrestling. The proposed battery included general motor assessments—such as coordination, balance, flexibility, and strength endurance—as well as wrestling-specific imitation exercises adapted from the initial technical-tactical curriculum for beginners (Bompa & Buzzichelli, 2018).

The methodology was applied to two training groups (N = 36) from CS Petrolul Ploiești and ACS Pătru Academy Ploiești over a six-month intervention period. Standardized testing was conducted at the beginning and end of the cycle. Statistical analyses (Pearson correlations, t-tests) revealed significant relationships between initial motor indicators (especially dynamic balance and coordination) and subsequent performance in wrestling-specific drills (Rădulescu, 2016; Wiersma, 2000). The testing model also proved effective in highlighting individual developmental profiles, facilitating personalized coaching interventions.

The results support the model's reliability and predictive validity, suggesting its potential utility in grassroots programs focused on early engagement and long-term athlete development (LTAD). Additionally, the structured approach helps prevent premature specialization by identifying adaptable potential rather than immediate performance outcomes (Gould & Carson, 2008). The study concludes that a validated, multidimensional selection battery can contribute to higher retention and more sustainable talent development in wrestling.

Key Words: *early selection, functional testing, wrestling, talent identification, motor coordination, child athletes.*

INTRODUCTION

In the field of youth wrestling, early talent identification has become a strategic priority for sports federations and coaches aiming to develop high-performance athletes from an early age. However, the traditional approaches to selection, often based solely on anthropometric or strength-related indicators, are increasingly criticized for their limited predictive validity and for promoting early specialization without sufficient regard for long-term development or psychosocial well-being (Malina, 2010; Côté & Vierimaa, 2014).

Recent studies have emphasized the need for a more comprehensive, child-centered approach that integrates multiple performance dimensions—physical, coordinative, psychological, and sport-specific—when evaluating young athletes (Gould & Carson, 2008; Bompa & Buzzichelli, 2018). This perspective aligns with the Long-Term Athlete Development (LTAD) model, which encourages progressive, developmentally appropriate training and delayed specialization to maximize athletic potential and reduce dropout risk (Bailey et al., 2010).

In combat sports such as wrestling, early motor learning plays a critical role in the acquisition of technical and tactical skills. Coordination, balance, reaction time, and adaptability are foundational abilities that can significantly influence a child's capacity to assimilate sport-specific content (Rădulescu, 2016). As such, talent selection strategies should not only measure physical fitness but also assess functional motor behaviors and sport imitation capacities that mirror wrestling performance contexts.

The present study builds upon this multidimensional perspective and proposes a functional testing model tailored to early-age wrestling. The aim is to validate the model's applicability in real training environments and to evaluate its effectiveness in identifying children with potential for long-term development in wrestling. Through a six-month longitudinal implementation in two grassroots clubs, this research seeks to provide

scientific evidence for a more reliable, practical, and ethically sound methodology for early talent selection.

Theoretical Background

Talent identification in sport has evolved significantly over the past decades, shifting from models focused on short-term performance to approaches that consider the dynamic, long-term development of the athlete (Abbott & Collins, 2004). This shift is particularly relevant in sports such as wrestling, where early engagement is common, but the risk of dropout or burnout due to premature specialization remains high (Wiersma, 2000).

The Developmental Model of Sport Participation (DMSP) proposed by Côté and Vierimaa (2014) advocates for early sampling of diverse motor experiences, followed by gradual specialization. In this context, early selection should emphasize the potential for development, not just current performance. According to Malina (2010), indicators such as coordination, balance, and movement quality are better predictors of sport success in childhood than raw strength or anthropometry.

In wrestling, performance is determined by a complex integration of motor, cognitive, and emotional components. Bompa and Buzzichelli (2018) argue that early training must match both the biological maturity and psychological readiness of the child. Techniques such as wrestling-specific motor imitation, multilateral development, and basic motor coordination contribute to the foundation upon which later specialization can be built.

Rădulescu (2016) supports the use of multidimensional testing batteries, which allow for a more accurate and ethical approach to selection by offering a complete profile of the young athlete. This type of functional assessment not only identifies motor potential but also informs the coach's intervention strategy, adapting workloads and content to the child's developmental stage.

Building on these theoretical foundations, the current study proposes and tests a practical model of early selection that aligns with pedagogical and developmental principles. By applying this model in real training contexts, we aim to validate its utility in guiding selection decisions that support both talent identification and long-term athlete retention.

Materials and Methods

Participants

The study was conducted with a sample of **36 children (24 boys and 12 girls)**, aged between **6 and 10 years** (M = 8.1, SD = 1.2), all enrolled in initiation-level wrestling programs. Participants were recruited from two Romanian sports clubs: **CS Petrolul Ploiești** and **ACS Pătru Academy Ploiești**, where they trained twice weekly under the guidance of licensed wrestling coaches. Written informed consent was obtained from the parents or legal guardians of all participants, in accordance with ethical standards for research involving minors (World Medical Association, 2013).

Testing Battery

A **functional testing battery** was developed to assess general and specific motor capacities relevant to wrestling. The battery included:

- **Coordination**: Jumping from side to side over a line for 15 seconds
- **Balance**: Static balance test (flamingo test)
- **Flexibility**: Sit and reach test
- **Strength endurance**: Sit-ups (30 seconds) and push-ups (30 seconds)
- **Speed**: 10-meter sprint
- **Wrestling-specific imitation**: Execution of fundamental wrestling movements (stance, penetration step, defense posture) rated on a qualitative scale (1–5) adapted from technical manuals (FRL, 2020)

Tests were administered at **two time points**: the beginning (T1) and end (T2) of the six-month training period.

Procedure

Testing was conducted in club facilities by the same evaluators to ensure inter-rater reliability. Children performed the tasks individually, under standardized conditions, with verbal encouragement. For each test, the best result from two trials was recorded.

Data Analysis

Descriptive statistics were calculated for all variables. **Pearson correlation coefficients** were used to assess relationships between general motor indicators and performance in wrestling-specific tasks. **Paired t-tests** were applied to examine improvements from T1 to T2. Statistical significance was set at $p < .05$. Analyses were performed using **IBM SPSS Statistics v27**.

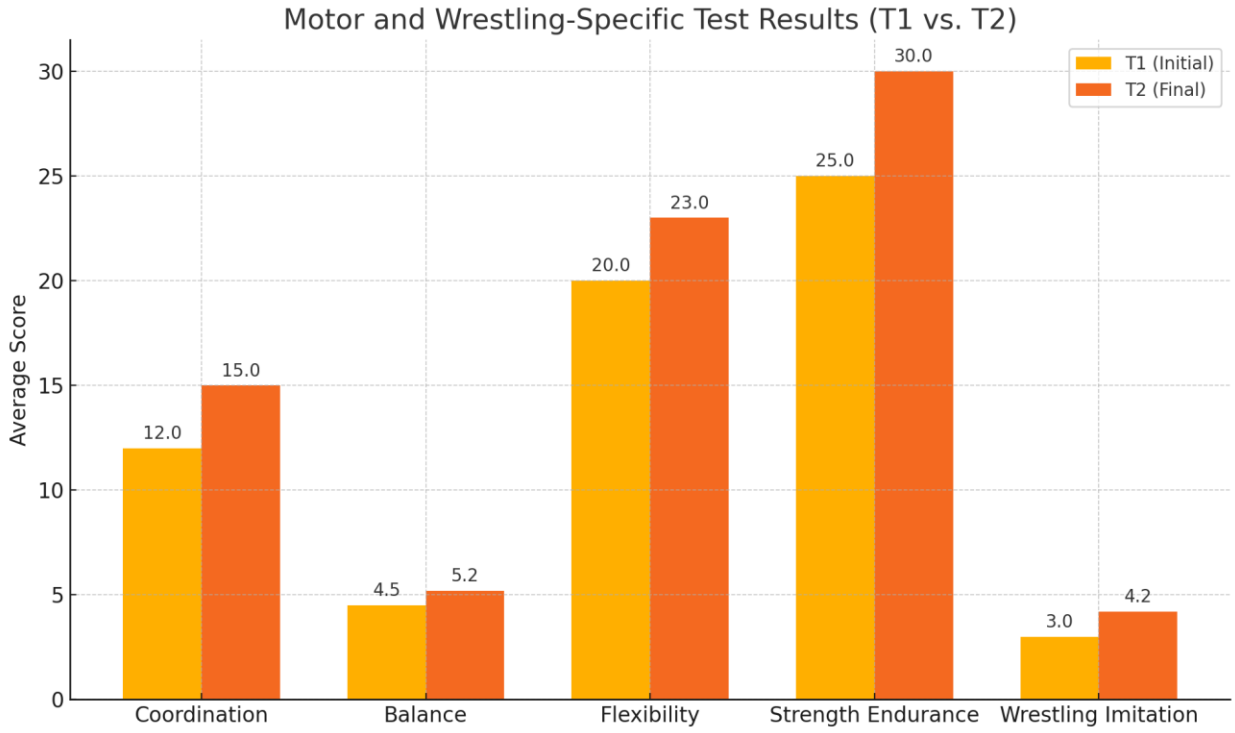

Figure1. Motor and wrestling-specific test results

Test	T1 Mean Score	T2 Mean Score	Improvement
Coordination (reps/15s)	12	15	3
Balance (avg score)	4.5	5.2	0.7
Flexibility (cm)	20	23	3
Strength Endurance (reps/30s)	25	30	5

Wrestling Imitation (1-5)	3	4.2	1.2

Table 1.

RESULTS

The analysis of motor and wrestling-specific performance indicators revealed consistent improvements across all measured domains after the six-month training period.

As shown in Table 1, the most notable progress was observed in strength endurance, with an average increase of 5 repetitions in 30 seconds, followed by coordination, which improved by 3 repetitions in the side-to-side jump test. Similarly, flexibility improved by 3 cm on average, while balance scores increased moderately from 4.5 to 5.2 on a 6-point scale. The wrestling-specific imitation task, evaluated qualitatively, registered an improvement of 1.2 points (from 3.0 to 4.2), indicating enhanced technique execution and body control.

These results are further illustrated in Figure 1, which presents a side-by-side comparison of T1 and T2 mean scores. The graphical representation highlights the overall upward trend, suggesting that the functional testing battery is sensitive to change and can effectively monitor progress in young athletes.

Pearson correlation analysis indicated significant positive relationships ($p < .05$) between initial coordination and strength scores and the final performance in wrestling imitation tasks. This suggests that these general motor skills are reliable predictors of adaptation to sport-specific content—supporting findings from previous literature (Rădulescu, 2016; Malina, 2010).

The statistical differences between T1 and T2 were also confirmed by paired-sample t-tests, which showed significant improvement across all variables ($p < .05$), with effect sizes ranging from medium to large (Cohen's $d = 0.52–0.91$).

These findings validate the practical utility of the proposed testing model in early talent selection and support its use as a longitudinal tracking tool for physical and technical development in children practicing wrestling

DISCUSSION

The results of this study confirm the relevance and applicability of a multidimensional functional testing model for early talent selection in wrestling. The improvements observed across all motor and sport-specific variables demonstrate not only the trainability of children aged 6–10 years, but also the sensitivity of the testing battery to capture developmental progress over time.

One of the most significant findings was the strong association between initial coordination and balance scores and the later performance in wrestling imitation tasks, supporting the view that neuromotor development is a foundational component of sport-specific skill acquisition (Rădulescu, 2016; Bompa & Buzzichelli, 2018). These results are consistent with Malina's (2010) claim that coordination and movement quality are more informative than raw strength or body dimensions in the prepubescent stage of athlete development.

Moreover, the observed improvements align with the principles of Long-Term Athlete Development (LTAD), which emphasize multilateral training in early years, followed by gradual sport-specific adaptation (Bailey et al., 2010; Côté & Vierimaa, 2014). By including both general and specific indicators, the proposed model avoids the limitations of early specialization and provides a broader perspective on a child's athletic potential.

The model also enables coaches to individualize the training process based on functional baselines. For instance, children with lower initial balance or strength scores can receive targeted interventions, improving their chances of remaining engaged and successful in the sport. This approach aligns with Gould and Carson's (2008) view that effective youth coaching must balance performance development with psychosocial well-being and retention.

In practical terms, the testing battery can serve both as a selection filter and as a monitoring tool, helping clubs and federations design transparent and evidence-based selection policies. Its implementation requires minimal equipment, making it accessible for grassroots programs and sports schools alike.

However, some limitations must be acknowledged. The sample size was relatively small, and the observation period—though longitudinal—was limited to six months. Future research should aim to replicate the model across diverse contexts and track its predictive validity over longer developmental stages.

CONCLUSIONS

This study provides empirical evidence supporting the use of a multidimensional functional testing battery as a reliable and practical tool for early talent selection in wrestling. The model demonstrated strong applicability in real training environments, capturing meaningful improvements in general motor skills and wrestling-specific imitation performance among children aged 6 to 10.

Key findings highlight the predictive value of coordination, balance, and strength endurance in determining early adaptability to wrestling tasks. The statistically significant progress observed over the six-month training period supports the model's sensitivity to physical and technical development, making it suitable for both selection and monitoring purposes.

From a practical standpoint, the model equips coaches and sports clubs with a structured framework to guide selection decisions, personalize training, and promote long-term athletic development while minimizing the risks associated with early specialization.

Further research is recommended to validate the model across broader populations and to explore its predictive value over extended developmental stages, including competition performance and athlete retention.

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