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# Talent Identification in Track and Field Throwing Events: Biological Determinants, Future Directions, and a Foresight Approach

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## ABSTRACT

Talent identification in track and field throwing events remains one of the most difficult challenges in youth sport because early performance can be inflated by maturation, body size, and training opportunity rather than by long-term performance potential. At the same time, the throwing disciplines shot put, discus, hammer throw, and javelin depend on a distinctive cluster of biological characteristics that make them attractive targets for scientific screening. This narrative review examines the evidence on biological determinants of throwing performance and then connects that evidence to future directions in talent identification and to a foresight-oriented model for athlete development. The review argues that anthropometry, lean mass, explosive strength, reactive power, rate of force development, and event-specific coordination are all important, but none should be interpreted in isolation. Instead, those indicators should be read against developmental confounders such as biological maturation and relative age. The literature consistently shows that junior success has weak predictive value for senior excellence and that early talent-promotion systems often reward short-term advantage more than long-term potential. Accordingly, this article proposes that talent identification in throwing should move away from one-time selection batteries and toward longitudinal, multidimensional athlete profiling. A foresight approach is especially useful because it reframes talent identification as a process of managing uncertainty rather than claiming certainty about the future. Such a model encourages repeated monitoring, data integration, fairness-aware interpretation, and ethical caution regarding body composition surveillance and genetic testing. The review concludes that future-ready throwing pathways should seek not to identify a finished champion in adolescence, but to recognize adaptable developmental potential across time and context.

**Keywords:** talent identification, track and field, throwing events, biological determinants, maturation, foresight

## Introduction

Talent identification remains one of the most discussed and most contested themes in contemporary sport science. National federations and talent systems continue to invest heavily in the promise that young athletes with the highest future potential can be recognized early and guided into specialized pathways. However, the broader literature has shown

that this promise is only partly supported by evidence. In their widely cited review, [Vaeyens et al. \(2008\)](#) argued that traditional cross-sectional talent models are poorly suited to the dynamic and multidimensional nature of sports development. A decade later, [Johnston et al. \(2018\)](#) reached a similarly cautious conclusion in a systematic review, noting that the evidence base for talent identification was limited, heterogeneous, and frequently methodologically weak. More recent conceptual work has continued this critique, emphasizing that talent systems often confuse current performance with future potential and tend to underappreciate uncertainty, non-linearity, and delayed development ([Till & Baker, 2020](#)).

These general concerns become especially important in track and field throwing events. Shot put, discus, hammer throw, and javelin are often grouped together in practice, yet they differ meaningfully in technique, implement characteristics, coordination demands, run-up or rotational mechanics, and speed-strength requirements. At the same time, all four disciplines place obvious value on certain biological characteristics, including body size, segment leverage, lean mass, maximal strength, explosive power, and the capacity to generate high release velocities. Because these qualities can be measured with relative ease, throwing events are especially susceptible to a reductionist form of talent identification in which young athletes are screened mainly through anthropometric and physical test batteries. That approach may appear efficient, but it creates two risks: it can reward temporary maturational advantage, and it can conceal the fact that different events may require different performance pathways ([Zaras et al., 2021](#); [Zhao & Zhao, 2023](#)).

The problem is not that biological assessment is irrelevant. On the contrary, the biology of throwers matters a great deal. The problem is that biology is often interpreted too simplistically. A tall and powerful adolescent may look like an obvious future thrower, but that appearance can be misleading if the athlete is biologically advanced relative to peers or if the selection process fails to account for trainability, technical development, and long-term adaptation. Contemporary talent scholarship has repeatedly emphasized that early selections are error-prone and that poor early decisions have real consequences, including dropout, lost opportunity, and inefficient resource allocation ([Baker et al., 2020](#); [Till & Baker, 2020](#)). These concerns are highly relevant to throwing events, where visible size and strength advantages can strongly influence coach judgment.

Another reason for caution is that the transition from junior to senior success is far weaker than many applied systems assume. Recent meta-analytic evidence indicates that junior performance has little predictive value for later senior performance, while some developmental patterns that are associated with junior success may even relate negatively to senior outcomes ([Barth et al., 2024](#)). Similarly, early participation in talent-promotion systems appears beneficial for short-term junior results but disadvantageous for long-term senior outcomes in many contexts ([Güllich & Barth, 2024](#)). In practical terms, this means that talent identification in youth throwing should not be based on the search for the best current thrower alone. It should instead aim to recognize developmental potential across time. This article addresses that challenge through a narrative review with a foresight perspective. It has three aims. First, it synthesizes the main biological determinants relevant to throwing performance. Second, it examines why those determinants can be misread in applied talent-identification practice. Third, it proposes future directions for a more adaptive and ethically grounded model of throwing talent identification. The core argument is straightforward: the most scientifically defensible approach is not early certainty, but structured uncertainty management through repeated, multidimensional, and context-sensitive profiling ([Leite et al., 2021](#)).

## Review Design and Conceptual Scope

This article is a narrative review rather than a formal systematic review or meta-analysis. The purpose is not to claim exhaustive coverage of every publication on throwing performance, but to integrate several strands of evidence that are directly relevant to talent identification in throwing events. The review was organized around four evidence domains: foundational talent-identification scholarship, throwing-specific biological literature, developmental confounders such as maturation and relative age, and applied/ethical literature relevant to future-oriented talent systems. Priority was given to peer-reviewed reviews, editorials, consensus statements, and recent original studies that help bridge theory and practice.

The conceptual definition of talent identification used here differs from simple performance ranking. In many applied contexts, athletes are labeled as “talented” because they are currently superior to their peers on competition results or test scores. Yet the literature has increasingly argued that talent identification should be understood as the estimation of future developmental capacity under suitable conditions, not merely the measurement of current output (Till & Baker, 2020; Vaeyens et al., 2008). This distinction is essential in youth throwing because temporary developmental advantages may create false impressions of long-term superiority. A foresight perspective extends this logic. Rather than asking only which variables correlate with present performance, it asks how talent systems can remain robust under uncertainty, social change, and scientific evolution. That perspective is useful in athletics because the field is already being reshaped by better longitudinal monitoring, performance analytics, increasing interest in multidisciplinary profiling, and ethical questions surrounding athlete data. In this sense, foresight does not predict the future with certainty; it helps design talent systems that are more resilient when the future remains uncertain (Leite et al., 2021).

### Biological Determinants of Throwing Performance

The biological basis of throwing performance has been synthesized most directly by Zaras et al. (2021), who concluded that competitive throwing depends on a combination of anthropometric characteristics, lean body mass, neural activation, and explosive neuromuscular function. Importantly, this does not mean that one ideal profile applies across all events or all ages. The throwing disciplines share a family resemblance, but their success models are not identical. Javelin throwing places greater emphasis on speed, transfer through the kinetic chain, and precise release mechanics, whereas shot put and hammer tend to privilege greater absolute force production and larger body size. Discus occupies an intermediate space in which rotational coordination and release mechanics combine with strength and leverage. A biologically informed talent model therefore has to remain event-specific.

#### *Anthropometry and body size*

Anthropometric characteristics are the most obvious starting point for talent identification in throwers. Body height, body mass, segment lengths, reach, and related leverage variables all influence mechanical possibilities in throwing. These traits can affect release conditions, force application, and how efficiently an athlete can organize the movement. However, the literature suggests that anthropometry should be treated as an enabling constraint rather than as an independent proof of talent. In adolescent throwers, Zhao and Zhao (2023) found meaningful relationships between anthropometric variables, physical fitness, and specific throwing strength, but their findings also showed that age, sex, and discipline all matter. The practical lesson is that a “large body” has different developmental meanings in a 14-year-old javelin thrower than in a 17-year-old shot putter.

#### *Body composition, lean mass, and muscular development*

Body composition is often used informally in athlete screening, particularly in events where force production matters. For throwers, lean mass is typically more relevant than body mass alone because it better reflects the muscular substrate for strength and power development. Zaras et al. (2021) identified lean body mass as one of the strongest biological correlates of performance, especially in events requiring large absolute force production. Nevertheless, body composition should not be over-interpreted during youth selection. The recent best-practice review by Mathisen et al. (2023) concluded that body composition, on its own, does not contribute meaningfully to early talent identification and that no singular cut-off can be treated as a robust marker of future performance advantage.

#### *Strength, explosive power, and rate of force development*

Release velocity is the dominant mechanical determinant of throwing distance, and the biological basis of high release velocity lies largely in the athlete’s ability to generate large forces quickly. For that reason, maximal strength, explosive

strength, and rate of force development are central biological considerations in throwing performance. [Zaras et al. \(2021\)](#) highlighted neural activation and type II fiber dominance as relevant to high-level throwing, while several applied studies point to field-based power tests as useful indicators of present readiness. In the German talent-identification study, tests such as the drop jump, countermovement jump, and backward overhead shot throw helped differentiate squad levels in certain discipline blocks and age groups, especially in throwing, sprint/hurdles, and jumping categories ([Severin et al., 2025](#)).

#### *Event-specific coordination and kinetic-chain organization*

Although throwers are often evaluated through physical testing, throwing is not reducible to strength and body size. Technical organization and intersegmental timing are essential. Javelin in particular depends on high-speed kinetic-chain sequencing and fine release control, while the rotational events demand complex coordination under high angular velocities. The coach-based study by [Žuvela et al. \(2024\)](#) is informative here: across 35 elite coaches, maximum strength and explosive power were consistently rated as important, but their practical meaning differed by event. This supports a key principle for talent identification: the same physical attribute may carry different significance depending on the technical logic of the discipline.

#### *Developmental Confounders in Youth Throwing*

One of the central weaknesses of many talent systems is that they underestimate developmental confounders. In youth sport, the most important of these are biological maturation and relative age. Throwing events are especially sensitive to both because size and power are visible and often rewarded immediately. A mature 15-year-old can dominate a competition or test battery for reasons that have little to do with eventual senior ceiling. If evaluators treat that dominance as evidence of superior talent, the system will systematically favour early developers.

#### *Biological maturation*

Research across sports has repeatedly warned that growth and maturation can distort coach judgment and selection outcomes ([Leite et al., 2021](#); [Till & Baker, 2020](#)). In throwing, the risk is obvious: increases in height, body mass, limb leverage, lean mass, and force output often occur during adolescence, and those gains can temporarily magnify performance. A thrower who matures earlier may appear unusually gifted, even when a later-maturing peer has greater eventual trainability or technical promise. Because of this, maturation should be treated as an essential interpretive variable in talent identification rather than as background information. Put differently, an unexplained test score in adolescence is rarely a neutral measure; it is partly a developmental measure.

#### *Relative age effect*

Relative age effects create a second layer of bias. Athletes born early in the selection year are often older, more physically developed, and more experienced than peers born later in the same annual age group. In youth track and field, [Brustio et al. \(2024\)](#) showed that corrective adjustment procedures can help account for relative-age differences across multiple events. More generally, the presence of relative age effects in youth athletics means that annual-group rankings should not be interpreted as if they were developmentally neutral. This matters in throwing because a few months of age can coincide with meaningful differences in maturation, coordination, and force production during adolescence.

#### *Junior success and the illusion of predictability*

Perhaps the strongest challenge to traditional talent identification comes from the junior-to-senior transition literature. [Barth et al. \(2024\)](#) reported that junior performance has very little, if any, predictive value for senior performance in

Olympic sports. Likewise, [Güllich and Barth \(2024\)](#) found that early talent-promotion involvement tends to improve junior performance while relating negatively to later senior performance. These findings do not mean that junior success is irrelevant, but they do mean that early dominance should not be mistaken for reliable foresight.

### Future Directions for Evidence-Based Talent Identification

The future of throwing talent identification should be multidimensional, longitudinal, and explicitly uncertainty-aware. This means moving beyond one-off batteries and toward systems that combine biological, motor, technical, and contextual information across time. The basic components of such a system are already visible in the literature, but they are often used separately rather than as an integrated framework.

#### *Longitudinal profiling rather than single-event screening*

The strongest practical recommendation that emerges from the literature is the need to privilege trajectories over snapshots. Foundational talent scholarship has long argued that sport talent is dynamic ([Vaeyens et al., 2008](#)), and contemporary reviews continue to call for more longitudinal approaches ([Baker et al., 2020](#); [Leite et al., 2021](#)). In throwing, longitudinal profiling would mean repeated monitoring of anthropometry, maturation, strength, power, discipline-specific throws, technical adaptation, and competition progression. It would also mean using those repeated observations to ask whether the athlete is adapting in a stable and healthy manner, not only whether the athlete is currently ahead.

#### *Multidimensional integration*

A second future direction is better integration of information. Biological tests are valuable, but their meaning changes when they are interpreted together. For example, a relatively modest throw distance may be less concerning if the athlete is late maturing, technically improving quickly, and showing strong gains in power tests. Conversely, a large current throw may be less impressive if it is supported mainly by early maturation with little evidence of technical growth. The future therefore lies not in more isolated tests, but in more intelligent combinations of tests.

#### *The role of coach judgment*

A future-ready model should not attempt to eliminate coach judgment. The literature instead suggests that coach expertise should be structured, documented, and combined with objective information. [Žuvela et al. \(2024\)](#) showed that elite coaches hold event-sensitive views of the strength and power qualities that underpin success in javelin, hammer, discus, and shot put. That expertise remains indispensable. However, unstructured coach intuition can also be biased by current size, competition ranking, or the visual impressiveness of certain athletes. The goal should therefore be informed judgment rather than intuition alone.

#### *Fairness and athlete retention*

A further future direction concerns fairness. Talent systems are often assessed by whom they select, but they should also be judged by whom they lose. Editorial and conceptual work in the field has stressed that many talent systems remain inefficient and biased, in part because they privilege immediate output over developmental potential ([Leite et al., 2021](#); [Till & Baker, 2020](#)). In throwing, longer observation windows for late maturers, explicit relative-age corrections, and more cautious deselection policies would likely improve both fairness and efficiency.

### A Foresight Approach

A foresight approach reframes talent identification from a narrow prediction exercise into a structured process of preparing for multiple developmental futures. It accepts that no combination of tests can eliminate uncertainty, especially

in adolescence. Instead, it asks how systems can make better decisions under uncertainty. In throwing events, this means building selection and development environments that are flexible, evidence-informed, and robust to developmental variation.

### *From fixed labels to adaptive potential*

The first foresight principle is that athletes should not be treated as holders or non-holders of a fixed quantity called talent. The literature increasingly presents talent as a relational and developmental phenomenon rather than a stable trait waiting to be discovered (Baker et al., 2020; Till & Baker, 2020). For throwing, this means that selection language should shift from “identified talent” toward “currently promising developmental profile.” Such a shift may seem semantic, but it has practical consequences: it encourages continued monitoring, protects against overconfidence, and reduces the tendency to deselect too early.

### *Data governance and ethical limits*

The second foresight principle is ethical governance. As talent systems become more data-rich, the risks of overreach increase. Body-composition data, maturation estimates, and high-frequency performance monitoring can all be useful, but they also require careful governance and contextual sensitivity (Mathisen et al., 2023). The same is true of genomics. The consensus statement led by Webborn et al. (2015) concluded that direct-to-consumer genetic testing has no role in talent identification. That conclusion remains highly relevant because the attraction of biological precision can easily exceed the actual predictive value of the science. A foresight-oriented throwing system should therefore reject genetic screening for talent purposes and use emerging biological tools only when validity, utility, and ethical proportionality are clearly established.

### *Health, sustainability, and long-term development*

The third foresight principle is that healthy development and successful development should not be separated. A system that produces short-term youth results at the cost of burnout, exclusion, or unhealthy monitoring practices is not future-ready. The junior-to-senior evidence itself supports this: early success and early system embedding are not reliable guarantees of adult excellence (Barth et al., 2024; Güllich & Barth, 2024). A sustainable throwing pathway therefore values resilience, adaptable training responses, and the preservation of athlete engagement over time.

### *Scenario-based thinking for throwing pathways*

Finally, foresight encourages scenario-based thinking. Instead of assuming one predictable developmental route, coaches and federations can consider multiple plausible futures for a young thrower. One athlete may have early anthropometric advantage but modest long-term improvement. Another may lag physically in mid-adolescence but accelerate later. A third may shift events as coordination, size, or power characteristics change. The more a system can tolerate these alternative developmental scenarios, the more likely it is to retain genuine long-term potential. In practical terms, foresight in throwing means designing pathways that are adaptable enough to respond when the athlete’s developmental story does not follow the simplest early script.

### **Practical Implications for Coaches and Federations**

For applied settings, several principles follow from this review. First, anthropometry, lean mass, and physical tests should be interpreted as informative but non-decisive indicators. Second, all youth evaluations in throwing should incorporate some estimate or practical interpretation of maturation and relative age. Third, repeated testing should matter more than isolated rankings. Fourth, coaches should document technical learning rate and response to training rather than

focusing exclusively on current throwing distance. Fifth, body-composition monitoring should be health-protective and multidisciplinary, not selection-driven. Sixth, genetic testing should be excluded from talent-identification practice (Webborn et al., 2015). A practical battery for youth throwers could include event-relevant anthropometrics, countermovement jump or other explosive power tests, medicine-ball or shot-based overhead throw tests, sprint and jump indicators where appropriate, discipline-specific technical evaluation, and developmental notes on maturation and training age. Yet the critical point is not the list of tests itself; it is the logic of interpretation. No single measurement should be allowed to stand for “talent.” The value of a test lies in what it contributes to a repeated and multidimensional profile. For federations, the review also suggests a policy implication: talent systems should be evaluated not only by the number of successful senior athletes they eventually produce, but also by their false-negative rate, athlete-retention profile, and fairness across maturational and relative-age subgroups. A system that loses too many late developers may appear efficient in the short term while actually wasting long-term talent.

## Conclusion

Talent identification in track and field throwing events should not be reduced to the search for the biggest, strongest, or currently best-performing adolescent. The evidence shows that biological determinants such as anthropometry, lean mass, strength, and explosive neuromuscular qualities are unquestionably relevant to throwing performance. At the same time, those determinants are developmentally unstable in youth and can be distorted by maturation, relative age, and early training opportunity. This makes simple selection logic scientifically weak and practically risky. The more defensible alternative is a longitudinal and multidimensional model that reads biological information in context and treats talent as developmental potential rather than a fixed early attribute. A foresight approach strengthens that model by reminding practitioners that the goal is not to remove uncertainty, but to make better decisions under uncertainty. In throwing events, that means repeated profiling, event-sensitive interpretation, structured coach judgment, fairness-aware policy, and ethical restraint regarding intrusive or weakly validated biological screening. Future-ready systems will be those that lose fewer potentially excellent athletes because they mistake temporary developmental advantage for destiny.

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## Authors' Contributions

Ali Rahmani contributed to the conceptual framing of the manuscript and overall coordination. Mahdi Naderinasab contributed to scientific structuring, review oversight, and correspondence preparation. Hossein Kalhor contributed to content review and disciplinary interpretation. Abbas Biniiaz contributed to manuscript refinement and critical revision. Zahra Nobakht contributed to scientific editing and final academic review. All authors reviewed and approved the final version of the manuscript. This statement should be confirmed by the authors before submission.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## AI use statement

Artificial intelligence was used only as a language-support and drafting-assistance tool during manuscript preparation. The authors remained fully responsible for the scientific content, verification of references, interpretation of the literature, and approval of the final manuscript.

## Ethical Considerations

This manuscript is a narrative review of published literature and did not involve the direct recruitment of human participants, access to identifiable private data, or experimental procedures conducted by the authors. Therefore, formal institutional ethics approval and informed consent were not required.

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No original dataset was generated for this review. All referenced materials are available through the cited journals, publishers, and DOI links.

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## References

- Baker, J., Wilson, S., Johnston, K., Dehghansai, N., Koenigsberg, A., de Vegt, S., & Wattie, N. (2020). Talent research in sport 1990-2018: A scoping review. *Frontiers in Psychology, 11*, 607710. <https://doi.org/10.3389/fpsyg.2020.607710>
- Barth, M., Güllich, A., Macnamara, B. N., & Hambrick, D. Z. (2024). Quantifying the extent to which junior performance predicts senior performance in Olympic sports: A systematic review and meta-analysis. *Sports Medicine, 54*(1), 95-104. <https://doi.org/10.1007/s40279-023-01906-0>
- Brustio, P. R., Lupo, C., Ungureanu, A. N., Rainis, M., Boccia, G., Cavaggioni, L., Pizzagalli, F., Bortoli, L., & Robazza, C. (2024). Mitigating against relative age effects in youth Track & Field: Validating corrective adjustment procedures across multiple events. *Journal of Science and Medicine in Sport, 27*(9). <https://doi.org/10.1016/j.jsams.2024.06.008>
- Güllich, A., & Barth, M. (2024). Effects of early talent promotion on junior and senior performance: A systematic review and meta-analysis. *Sports Medicine, 54*(5), 1179-1205. <https://doi.org/10.1007/s40279-023-01957-3>
- Johnston, K., Wattie, N., Schorer, J., & Baker, J. (2018). Talent identification in sport: A systematic review. *Sports Medicine, 48*(1), 97-109. <https://doi.org/10.1007/s40279-017-0803-2>
- Leite, N., Calvo, A. L., Cumming, S., Gonçalves, B., & Calleja-Gonzalez, J. (2021). Editorial: Talent identification and development in sports performance. *Frontiers in Sports and Active Living, 3*, 729167. <https://doi.org/10.3389/fspor.2021.729167>
- Mathisen, T. F., Ackland, T., Burke, L. M., Constantini, N., Haudum, J., Macnaughton, L. S., Meyer, N. L., Mountjoy, M., Slater, G., & Sundgot-Borgen, J. (2023). Best practice recommendations for body composition considerations in sport to reduce health and performance risks: A critical review, original survey and expert opinion by a subgroup of the IOC consensus on Relative Energy Deficiency in Sport (REDs). *British Journal of Sports Medicine, 57*(17), 1148-1159. <https://doi.org/10.1136/bjsports-2023-106812>
- Severin, J., Abel, T., & Schapschröer, M. (2025). Evaluating talent identification in junior track and field athletes in Germany: Insights from sport motor and anthropometric testing. *German Journal of Exercise and Sport Research, 55*(3), 499-510. <https://doi.org/10.1007/s12662-025-01053-w>
- Till, K., & Baker, J. (2020). Challenges and [possible] solutions to optimizing talent identification and development in sport. *Frontiers in Psychology, 11*, 664. <https://doi.org/10.3389/fpsyg.2020.00664>
- Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport: Current models and future directions. *Sports Medicine, 38*(9), 703-714. <https://doi.org/10.2165/00007256-200838090-00001>
- Webborn, N., Williams, A. G., McNamee, M., Bouchard, C., Pitsiladis, Y., Ahmetov, I., Ashley, E. A., Byrne, N., Camporesi, S., Collins, M., Dijkstra, P., Eynon, N., Fuku, N., Garton, F., Kambouris, M., Kruus, K., Lucia, A., Maase, K., Moran, C., . . . Wang, Y. (2015). Direct-to-consumer genetic testing for predicting sports performance and talent identification: Consensus statement. *British Journal of Sports Medicine, 49*(23), 1486-1491. <https://doi.org/10.1136/bjsports-2015-095343>
- Zaras, N., Stasinaki, A. N., & Terzis, G. (2021). Biological determinants of track and field throwing performance. *Journal of Functional Morphology and Kinesiology, 6*(2), 40. <https://doi.org/10.3390/jfmk6020040>
- Zhao, Y., & Zhao, K. (2023). Anthropometric measurements, physical fitness performance and specific throwing strength in adolescent track-and-field throwers: Age, sex and sport discipline. *Applied Sciences, 13*(18), 10118. <https://doi.org/10.3390/app131810118>
- Žuvela, F., Milić, M., Jakovljević, G., & Milić, J. (2024). Predictors of efficiency in throwing disciplines: Insights from 35 elite coaches. *Applied Sciences, 14*(24), 11837. <https://doi.org/10.3390/app142411837>