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Research Article

From Grassroots to Elite Sport: A Critical Review of Talent Identification and Development in India

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Abstract

Background: Talent identification and development are central to athletes' progression from grassroots participation to sustained elite performance. In India, research has generated useful evidence concerning athlete characteristics, performance assessment and development support, but evidence across the complete athlete pathway remains fragmented.

Objective: This review critically examines how sporting potential is identified, selected, developed, retained and progressed from grassroots to elite sport in India, with attention to physical, physiological, technical, psychological, maturation-related and environmental factors.

Methods: A critical review design with a scoping and thematic approach was used. Indian studies and relevant international literature concerning talent identification, talent development, athlete pathways, maturation, development environments and junior-to-senior transition were synthesised. The review emphasises the distinction between descriptive performance profiling and prospective prediction of future elite performance.

Results: Indian evidence is weighted toward cross-sectional or stage-specific assessment, particularly anthropometric, physical and physiological profiling. Indian sports-science literature also highlights the importance of integrated support and longitudinal athlete tracking. International evidence challenges deterministic early selection and emphasizes maturation, context, development environment and probabilistic estimation of potential.

Conclusion: Indian talent identification should be conceptualized as an iterative, multidimensional and longitudinal process embedded within an appropriate development environment. A grassroots-to-elite framework is proposed integrating broad detection, multidimensional identification, individualised development, sports-science support, repeated monitoring and targeted junior-to-senior transition support. The framework is conceptual and requires empirical validation.

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KEYWORDS: Talent identification; talent development; athlete pathway; grassroots sport; elite sport; India; biological maturation; junior-to-senior transition.

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1. INTRODUCTION

Talent identification (TID) refers broadly to processes used to detect and assess athletes who may possess characteristics relevant to future sporting success, whereas talent development (TD) concerns the training and environmental processes through which potential may be converted into higher-level performance. These processes are related but should not be treated as interchangeable. Contemporary scholarship increasingly emphasises dynamic, probabilistic and context-dependent approaches to talent identification and development (Morganti et al., 2024; Reeves et al., 2026; Kelly et al., 2026).

A central problem is that youth performance does not necessarily represent future potential. Current performance reflects biological maturation, training history, coaching, competition exposure, psychological characteristics and developmental opportunity. Research on early talent promotion and career progression cautions against assuming that early success is a reliable proxy for later senior achievement (Güllich & Barth, 2024; Cripps et al., 2019).

This issue is particularly important in India, where sporting opportunities span schools, community settings, universities, academies, clubs and high-performance structures, while access to facilities, specialist coaching, competition and sports science can vary substantially. The athletes who become visible to selectors may therefore not represent the complete population of individuals with sporting potential.

Indian sports-science literature provides useful evidence on athlete profiling and development. Khanna and Manna (2024) emphasise integrated physiological and sports-science support for elite Indian athletes, while Saha (2024) highlights the need to track talented athletes throughout their developmental trajectories. Sharma et al. (2017) provide an example of Indian athlete profiling through anthropometric analysis in young national players. These studies are informative for performance profiling, but they should not be interpreted as establishing prospective prediction of senior success.

The central critical proposition of this review is therefore: identifying characteristics of successful athletes is not equivalent to identifying future successful athletes.

1.1 Aim

To critically examine how sporting talent is identified, selected, developed, retained and progressed from grassroots to elite levels in India.

1.2 Research Questions

What talent identification and development approaches are currently used or reported across the Indian sporting pathway?

What physical, physiological, technical, psychological, maturation-related and environmental factors are considered in identifying and developing sporting potential?

What systemic challenges and barriers affect progression and retention of talented athletes in India?

What evidence-based strategies could strengthen the transition from grassroots participation to sustained senior sporting performance in India?

2. Conceptual Foundations of Talent Identification and Development

The pathway considered in this review is: grassroots participation → talent detection → talent identification → talent selection → athlete development → junior elite → junior-to-senior transition → senior elite/international performance.

Detection concerns finding individuals who may possess relevant potential; identification involves more systematic assessment; selection determines access to a development pathway; and development concerns the processes through which potential may be converted into performance.

Contemporary scholarship increasingly describes talent development as probabilistic, dynamic and context-dependent. Morganti et al. (2024) contrast deterministic and probabilistic approaches, Sedeaud et al. (2025) emphasise estimation of potential, and Reeves et al. (2026) and Kelly et al. (2026) emphasise complexity, context and athlete-centred development.

Talent identification should therefore not be evaluated solely by its ability to identify high-performing young athletes, but by its capacity to recognise developmental potential and support athletes through a longitudinal pathway toward sustained senior-level performance.

3. METHODOLOGICAL APPROACH

This review adopts a critical review design with a scoping and thematic approach to map and critically interpret evidence concerning talent identification and development across India's grassroots-to-elite sporting pathway. The design was selected because the Indian literature is heterogeneous in sport, age, competitive level, study design and outcome measurement, making quantitative aggregation inappropriate. The review therefore emphasises evidence mapping, conceptual comparison and theme-level critical appraisal rather than pooled effect estimation.

3.1 Scope and Eligibility

The population included children, adolescents, youth, developing and elite athletes in India, with coaches and pathway stakeholders considered where directly relevant. The concept included talent detection, identification, selection, development, athlete pathways, performance profiling, developmental monitoring, retention and junior-to-senior transition. The context included schools, colleges and universities, community sport, academies, state and national development structures, clubs and high-performance environments.

Relevant international literature was included when it directly informed interpretation of the Indian evidence, particularly concerning biological maturation, relative age, current performance versus future potential, development environments, athlete transitions and predictive validity. Studies unrelated to sporting talent, without meaningful Indian or pathway relevance, or focused on unrelated medical or exercise topics were excluded.

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3.2 Search Strategy

Searches were conducted across scholarly sources used for sports science and health research, including Scopus, Web of Science, PubMed/MEDLINE, SPORTDiscus where available, and supplementary Google Scholar searching. The search covered literature published from 2000 through September 2026 and was conducted in English. Search concepts combined terms for talent identification and development ("talent identification", "talent detection", "talent selection", "talent development", "athlete development", "athlete pathway*", and "long-term athlete development"), sport/performance terms (sport*, athlete*, athletic*, "high performance", "elite sport"), India-related terms (India, Indian, "Indian athlete*", "Indian sport*"), and developmental factors including maturation, anthropometry, physiology, psychology, coaching, socioeconomic conditions, gender and development environment. A representative search formulation was: ("talent identification" OR "talent detection" OR "talent development" OR "athlete development" OR "athlete pathway*") AND (sport* OR athlete* OR "high performance") AND (India OR Indian). Reference-list and citation chasing were used to locate relevant studies and contextual sources that were not readily retrieved by database searching, including selected book chapters on Indian sports science.

Records were screened for relevance to the predefined population, concept and Indian context, followed by full-text assessment where relevance could not be established from the title and abstract. Because this review was not prospectively registered and a formal screening log with auditable record counts was not retained, exact numbers of records identified, screened and included are not reported. This limitation is stated explicitly rather than reconstructed retrospectively. Non-indexed Indian material and selected book chapters were retained only when they provided direct contextual or developmental relevance and were distinguished from peer-reviewed empirical studies.

3.3 Thematic Synthesis

Evidence was organised around ten themes: characteristics of the Indian evidence base; physical and anthropometric factors; physiological factors; technical and tactical factors; psychological characteristics; biological maturation and relative age; development environments; socioeconomic, geographical and gender-related factors; retention and junior-to-senior transition; and longitudinal evidence and predictive validity.

Studies were interpreted according to their pathway contribution and methodological strength. Descriptive profiling provides information about athletes at a particular stage; identification or selection studies examine discrimination among groups; prospective studies test whether earlier characteristics predict later outcomes; and longitudinal pathway studies examine progression, retention and senior outcomes over time. Critical appraisal considered study design, sample characteristics, sport specificity, measurement approach, outcome definition, maturation effects and whether findings were descriptive or genuinely predictive. Across the Indian literature, small or selective samples, cross-sectional designs, limited follow-up and heterogeneous outcome measures frequently constrain inference about long-term talent potential.

4. RESULTS AND THEMATIC SYNTHESIS

4.1 Characteristics of the Indian Evidence Base

The available Indian literature is heterogeneous and spans anthropometric profiling, physical and physiological assessment, sport-specific performance, grassroots talent-detection proposals and sports-science support. The directly identifiable Indian evidence located for this review remains comparatively limited and is concentrated in specific sports and developmental contexts rather than in nationally representative longitudinal cohorts. Much of the evidence examines athletes who have already reached a selected or competitive level, which limits inference about how well early characteristics predict later senior success. Accordingly, the conclusions below distinguish Indian empirical evidence from international evidence used to interpret mechanisms and methodological issues. Where direct Indian evidence is sparse, this is treated as an evidence gap rather than as evidence of absence.

4.2 Physical and Anthropometric Characteristics

Sharma, H. B., Gandhi, S., Meitei, K. K., et al. (2017). Anthropometric basis of vertical jump performance: A study in young Indian national players. Journal of Clinical and Diagnostic Research, 11(2), CC01–CC05. https://doi.org/10.7860/JCDR/2017/23497.9290

4.3 Physiological Characteristics

Physiological assessment can contribute information concerning aerobic and anaerobic capacity, muscular strength and power, speed, repeated-effort ability and recovery. Khanna and Manna (2024) emphasise integrated physiological and sports-science support for elite Indian athletes, while Saha (2024) places physiological factors within interactions involving training, maturation, technical and tactical skills, psychological factors and environment. Physiological testing should therefore be one component of multidimensional assessment rather than a stand-alone predictor.

4.4 Technical and Tactical Characteristics

Technical ability is highly sport-specific. Successful performance may depend on technical execution, perception, decision-making, tactical understanding and adaptation to changing competitive situations. International evidence supports multidimensional assessment involving technical, physiological, tactical and psychological characteristics (Forsman et al., 2016; Unnithan et al., 2012). Barraclough et al. (2024) further distinguish potential, performance and athleticism.

4.5 Psychological Characteristics

Motivation, self-regulation, resilience, confidence, coping and adaptability can influence progression and retention. These characteristics should not be treated as immutable traits measured once during selection. Psychological development occurs within changing training, competition, educational and

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social environments. In an Indian TID–TD system, psychological assessment is therefore better positioned as part of ongoing development planning, with counselling, mental-skills support and wellbeing monitoring used to identify support needs rather than simply to exclude athletes. Direct Indian evidence linking psychological screening at youth level with later senior outcomes remains limited, so international literature is used primarily to support the developmental principle.

4.6 Biological Maturation and Relative Age

Athletes of the same chronological age can differ substantially in biological maturity, body size, strength and speed. Early maturation may provide temporary performance advantages and influence selection (Ford et al., 2012; Hill et al., 2023). Selection can then reinforce these differences by providing selected athletes with better coaching and competition. Indian pathways should therefore consider maturity status, growth patterns, relative age and individual performance trajectories.

4.7 Development Environments

Talent does not develop in isolation. Coaching quality, training design, competition, facilities, strength and conditioning, nutrition, sports medicine, psychological support, education and family circumstances can shape development. Hubli et al. (2026) identify financial constraints as a major barrier in low socioeconomic contexts and highlight supportive coach and staff relationships as facilitators.

4.8 Socioeconomic, Geographical and Gender-Related Factors

Observed elite talent is not necessarily equivalent to the total underlying talent pool. Economically disadvantaged or geographically remote athletes may have fewer opportunities to access specialist coaching, equipment, transport, competition and sports-science support. Gender-related constraints may similarly influence participation, retention and progression. Recent international synthesis indicates that deprivation can affect access to developmental resources and that supportive coach and staff relationships can facilitate progression; however, the extent and mechanisms of these effects require more India-specific longitudinal research. For India, equitable detection therefore requires outreach and opportunity structures that reduce the probability that access constraints are mistaken for low potential.

4.9 Athlete Retention and the Junior-to-Senior Transition

The junior-to-senior transition is a critical but comparatively underexamined stage. The literature identified for this review did not provide a sufficiently developed body of Indian prospective evidence that directly tracks large cohorts from junior selection into sustained senior performance. Youth success therefore cannot be assumed to translate automatically into senior success. Athletes encounter greater competitive demands alongside education, employment, financial pressures, injury and recovery demands, psychosocial changes and potential discontinuities in coaching or support. International transition research provides a useful conceptual basis, but the Indian transition should be investigated directly rather than inferred from non-Indian systems.

4.10 Longitudinal Evidence and Predictive Validity

A cross-sectional study asks what characteristics distinguish athletes who are successful now. A prospective study asks whether earlier characteristics predict later outcomes. A longitudinal pathway study asks how athlete characteristics, environment, selection, retention and performance interact over time. The available Indian evidence provides useful descriptive information, whereas prospective and longitudinal evidence linking early assessment to senior outcomes appears comparatively limited, consistent with Saha (2024).

Table 1. Summary of Key Indian Studies Relevant to Talent Identification and Development

Study	Sport/context	Evidence type	Pathway contribution	Key interpretation	Key limitation for TID inference
Hanjabam Barun Sharma et al. (2017)	Young Indian national hockey and cycling players	Cross-sectional empirical	Anthropometric/physical profiling	Useful for performance associations; not long-term prediction	Cross-sectional; performance associations do not establish prospective talent prediction.
Parasaram & Salve (2023)	Grassroots shooting in India	Conceptual/applied methodology	Talent detection/identification	Highlights potentially overlooked grassroots talent; requires validation	Proposed methodology; requires empirical validation and longitudinal outcome testing.
Khanna & Manna (2024)	Elite Indian athletes/multiple sports	Conceptual review chapter	Development/sports science	Supports integrated interdisciplinary provision	Contextual/development chapter; not a prospective evaluation of pathway outcomes.
Saha (2024)	Indian sport/multiple sports	Review chapter	Development/transition	Highlights need for longitudinal athlete tracking	Review chapter; supports longitudinal monitoring but does not itself provide a longitudinal cohort.

Note. Studies with insufficiently verified bibliographic information were excluded from the core reference list.

5. DISCUSSION

5.1 From Current Performance to Future Potential

A central issue is the distinction between current performance and future potential. Young athletes who perform exceptionally well at a particular age are not necessarily those who ultimately achieve senior excellence. Current performance reflects maturation, training history, coaching exposure, competition experience and developmental opportunity. Selection based

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primarily on a single time point may therefore favour temporarily advantaged athletes.

The Indian evidence provides useful performance profiles, but much less evidence that early anthropometric or physiological characteristics prospectively identify future senior elite athletes. Accordingly, talent identification should be iterative, multidimensional and developmental.

5.2 From Talent Identification to Talent Development

Identification creates an opportunity, while development determines whether that opportunity is converted into higher-level performance. Coaching, training, competition, sports science, education, family support, financial stability and psychosocial conditions can alter an athlete's trajectory. Psychological and socioeconomic factors should therefore not sit outside the TID model as descriptive background variables: they can influence who is able to enter, remain in and progress through the pathway. In practice, assessment should trigger an individualised development plan and support response, rather than functioning only as a ranking mechanism.

5.3 The Maturation Problem

Biological maturation creates a strong argument against rigid age-based selection. If early maturation produces temporary performance advantages, selection may reward developmental timing rather than long-term potential. Repeated assessment, maturity-informed interpretation and monitoring of individual trajectories can reduce the risk of excluding later-maturing athletes.

5.4 The Development-Environment Problem

Observed performance reflects both athlete characteristics and developmental opportunity. A potentially talented athlete without access to coaching, competition, equipment, nutrition or sports medicine may never demonstrate the performance required for selection. The system should therefore distinguish potential from the opportunities available to demonstrate it.

5.5 The Junior-to-Senior Conversion Problem

The ultimate test of a talent pathway is how successfully athletes progress through it. A pathway can lose athletes at every transition. Junior-to-senior progression should therefore be treated as an active developmental phase requiring transition planning, psychosocial and educational support, injury management, competition opportunities and continuity of coaching and sports science.

6. Proposed Indian Grassroots-to-Elite TID–TD Framework

The framework below connects broad participation and detection with multidimensional identification, individualised development, longitudinal monitoring and senior performance. It is a conceptual framework requiring empirical validation, not a validated predictive model.

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Table 1. Summary of key Indian studies relevant to talent identification and development

Study (Year)	Sport	Participants	Evidence type	Main variables/ focus	Pathway stage(s)	Main contribution	Key limitation(s)
Hanjabam Barun Sharma et al. (2017)	Hockey, Cycling	54 national-level players (32 males), 11–21 years	Cross-sectional	Anthropometric characteristics, vertical jump	Identification (performance profiling)	Demonstrated relationships between anthropometry and physical performance in young Indian national players.	Cross-sectional design; cannot predict future elite performance.
Jeyaraman & Kalidasan (2012)	Badminton	84 male intercollegiate players, 18–24 years	Cross-sectional (predictive model)	Anthropometric, physical and physiological variables	Identification (performance prediction)	Developed a prediction equation for playing ability among Indian intercollegiate players.	Limited to collegiate level; external validity and long-term prediction not established.
Kalidasan (2013)	Field hockey	Players (level not specified)	Cross-sectional	Position-wise anthropometric profile	Identification (performance profiling)	Provided position-specific anthropometric data for field hockey players.	Sample and amthodological details limited; no longitudinal follow-up.
Ivin Jabakumar, Suresh Kumar & Kalidasan (2011)	Field hockey	30 male undergraduates, 17–20 years	Intervention (quasi-experimental)	E-content based coaching, fundamental skills	Development	Showed that e-content based coaching can improve fundamental hockey skills.	Not a talent-identification study; small sample; short intervention period.
Parasaram & Salve (2023)	Shooting	Grassroots talent (methodology paper)	Conceptual/ applied model	Grassroots identification methodology	Detection / Identification	Proposed a methodology for identifying raw sporting talent in India, particularly from small towns and rural areas.	Practical implementation and long-term outcomes not yet empirically validated.
Khanna & Manna (2024)	Multiple sports (elite)	Elite Indian athletes (conceptual chapter)	Conceptual/ review	Physiological support, sports science integration	Development (elite)	Highlighted the importance of integrated physiological and sports-science support for Indian elite athletes.	Not a predictive study; conceptual discussion rather than empirical data.
Saha (2024)	Multiple sports	Not sport-specific (review chapter)	Conceptual/ review	Performance optimization, maturation, training, environment	Development / Transition	Identified the need for longitudinal tracking of Indian athletes and emphasized multiple environmental factors.	Not an empirical longitudinal study; highlights need for future research.

Table 2. Proposed Indian grassroots-to-elite talent identification and development pathway

Stage	Primary purpose	Assessment/support strategies	Expected outcome(s)
1. Grassroots participation	Increase participation and provide exposure to a wide population.	• Community programmes • Schools and colleges • Local competitions • Awareness and inclusion	• Broader talent pool • Increased access • Diverse participation
2. Talent detection	Identify individuals who demonstrate potential.	• Broad screening • Basic physical and skill assessment • Talent camps • Outreach in rural/underserved areas	• Potential athletes identified • Increased visibility of hidden talent
3. Talent identification	Characterize potential using multidimensional assessment.	• Physical and anthropometric measures • Physiological testing • Technical and tactical assessment • Psychological evaluation • Biological maturation status	• Pathway placement • Individual development plans
4. Development	Convert potential into improving performance.	• Structured coaching and training • Strength and conditioning • Nutrition and recovery • Sports medicine • Psychological support • Education support	• Performance improvement • Continued engagement
5. Monitoring and reassessment	Track development and update assessments.	• Regular testing and evaluation • Performance analysis • Maturation assessment • Review of development environment	• Evidence-based progression • Early identification of risk factors
6. Junior elite development	Provide high-level competitive development.	• State, national and international junior competitions • Advanced coaching • Increased sports-science support	• Junior performance success • Preparation for senior level
7. Junior-to-senior transition	Support the transition to senior competition.	• Transition planning • Psychosocial and educational support • Career guidance • Injury prevention and management	• Successful senior entry • Retention in the pathway
8. Senior elite performance	Achieve and sustain international performance.	• Integrated high-performance support • Specialist coaching and competition • Ongoing sports science and medical support • Wellbeing and dual-career support	• Sustained senior performance • International representation

Figure 1. Indian Grassroots-to-Elite Talent Identification and Development Framework

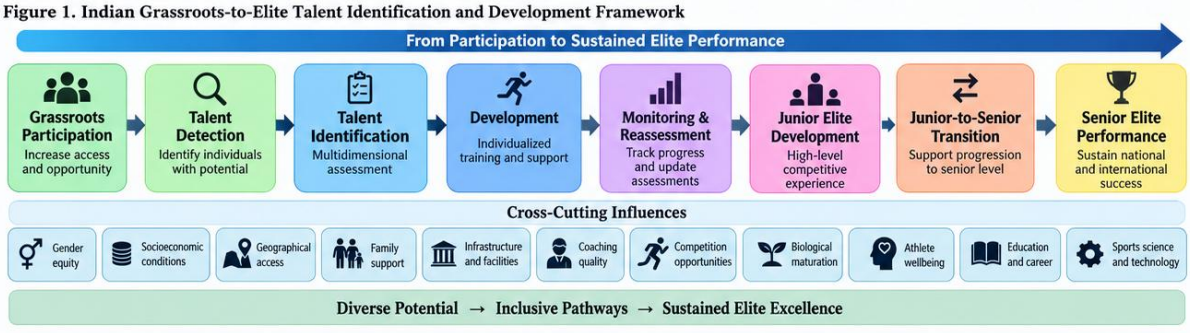


Figure 1. Indian Grassroots-to-Elite Talent Identification and Development Framework

Note. Cross-cutting influences include gender equity, socioeconomic conditions, geographical access, family support, infrastructure, coaching, competition, biological maturation, athlete wellbeing, education/career and sports science/technology.

Table 2. Proposed Indian Grassroots-to-Elite Talent Identification and Development Pathway

Stage	Purpose	Assessment/support	Expected outcome	Evidence basis
1. Grassroots participation	Increase participation and exposure	Schools; community programmes; local competitions; inclusion	Broader and more diverse talent pool	Participation/access principles; Indian context requires further mapping.
2. Talent detection	Identify individuals showing potential	Broad screening; basic physical/skill assessment; outreach	Potential athletes identified	Parasaram & Salve (2023); broad detection principle.
3. Talent identification	Characterise potential multidimensionally	Physical, physiological, technical/tactical, psychological and maturation assessment	Pathway placement and development plan	Sharma et al. (2017) plus international multidimensional TID evidence.
4. Development	Convert potential into performance.	Coaching; strength and conditioning; nutrition; medicine; recovery; psychology; education	Performance improvement and engagement	Khanna & Manna (2024), Saha (2024) plus international TD evidence.
5. Monitoring and reassessment	Track developmental trajectory	Repeated testing; performance analysis; maturation and environment review	Evidence-based progression	International longitudinal/probabilistic TID evidence; Indian gap supports

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				reassessment.
6. Junior elite development	Provide advanced competition	Junior competition; advanced coaching; sports-science support	Junior progression and senior preparation	International athlete-development evidence; Indian pathway evidence remains fragmented.
7. Junior-to-senior transition	Support progression to senior level	Transition planning; psychosocial/educational support; career and injury support	Senior entry and pathway retention	International transition literature; direct Indian prospective evidence is sparse.
8. Senior elite performance	Achieve and sustain high-level performance.	Integrated high-performance coaching, sports science, medicine and wellbeing	Sustained senior/international performance	Senior performance and retention are proposed pathway endpoints.

Note. This is a generic conceptual pathway and should be adapted to sport- and context-specific demands; its components and outcomes require empirical validation in Indian settings.

6.1 Empirical Basis, Indian Contextualization and Testability

The framework is derived by triangulating three evidence strands. First, Indian studies provide context-specific information on performance profiling, grassroots detection and the need for integrated sports-science support (Table 1). Second, international evidence indicates that talent identification is probabilistic and developmental, and that maturation, relative age and development environments can influence selection and progression. Third, transition research indicates that progression between developmental stages should be treated as an active process requiring support rather than as an automatic consequence of junior success. The framework therefore combines evidence-supported principles rather than claiming that every stage has already been empirically validated in India.

Its principal India-specific contribution is the explicit integration of access and equity, multidimensional reassessment, development-environment support and junior-to-senior conversion within one pathway. It is intended as a testable organising model, not as a prescriptive national policy. Potential use cases include pathway audits, academy or federation programme design, identification-protocol evaluation and longitudinal cohort studies. Evaluation should compare pathways using retention, progression, junior-to-senior conversion, athlete wellbeing, representation of under-served groups and sustained senior performance. Sport-specific adaptation will be necessary because the relative importance of physical, technical, tactical, psychological and maturation-related characteristics differs across sports.

7. Implications for Indian Sport

Use repeated rather than single-stage assessment, particularly during adolescence.

Combine physical, physiological, technical, tactical, psychological and maturation-related information.

Interpret performance in relation to training history and developmental opportunity.

Expand detection into rural, economically disadvantaged and otherwise underrepresented populations.

Integrate coaching, sports science, health, nutrition, psychology and educational support within development pathways.

Make junior-to-senior transition support a formal component of athlete development.

Evaluate pathways through retention, progression and sustained senior outcomes rather than early selection numbers alone.

8. Research Agenda

Prospective longitudinal studies following athletes from early identification to senior performance.

Biological maturation and relative-age research within Indian youth sport.

Junior-to-senior transition studies examining progression, retention, dropout and well-being.

Development-environment research examining coaching, competition, infrastructure and sports science.

Equity research addressing socioeconomic, geographical and gender-related loss of potential.

Longitudinal athlete databases using standardised and sport-relevant measures.

Probabilistic and sport-specific prediction models rather than deterministic early-selection thresholds.

Validation of machine learning and other technologies against meaningful long-term outcomes, with attention to data quality and bias.

The central research question should shift from “Who is the best young athlete now?” to “Who has the potential to develop, under what conditions, and how successfully can that development be sustained?”

9. LIMITATIONS

The Indian evidence base is heterogeneous in sport, age, competitive level, methodology and outcome measurement, limiting direct comparison. Much of the literature concerns specific characteristics or development components rather than complete athlete pathways. Common methodological constraints include small or highly selected samples, cross-sectional designs, inconsistent definitions of talent or success, limited control for biological maturation and training history, and a shortage of prospective follow-up to senior outcomes. The search approach also has limitations because English-language literature was emphasised and non-indexed material may not have been captured comprehensively. Exact screening counts were not retained because the review was not prospectively registered with a formal audit trail. Consequently, the synthesis should be interpreted as a structured critical mapping of accessible evidence rather than an exhaustive estimate of all Indian TID–TD research. The proposed framework is conceptual and requires empirical validation.

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10. CONCLUSION

Talent identification and development in India should be understood as a longitudinal pathway from participation to sustained elite performance rather than a one-time process of selecting high-performing young athletes. Indian research has generated useful sport-specific information on anthropometric, physical and physiological characteristics and has highlighted the importance of integrated sports-science support. However, prospective evidence linking early identification with senior-level success remains limited.

Current performance should not be treated as a direct proxy for future potential. Biological maturation, training history, developmental environment, access to opportunity and psychosocial factors can all influence an athlete's trajectory. Effective identification consequently requires repeated, multidimensional assessment embedded within an appropriate development environment.

The proposed framework connects grassroots participation, detection, identification, development, monitoring and junior-to-senior transition within a single pathway. Its effectiveness should ultimately be judged by meaningful long-term outcomes rather than early selection numbers.

The goal is not only to select the best young athletes, but to convert diverse sporting potential into sustained senior excellence.

Declarations

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Conflict of interest: The author declares no conflict of interest.

Data availability: No new datasets were generated or analysed. The review synthesises previously published literature.

Ethics approval: Not applicable; no human participants or primary data were involved.

Author contributions: The author was responsible for the conception, literature synthesis, interpretation and preparation of the manuscript.

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