

Weighing risks against rewards: a call for thoughtful implementation of growth and maturity monitoring in high-level youth football

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As clinicians, coaches, researchers and sports administrators, we must have young athletes' best interests in mind when implementing measures aimed at protecting their health or optimising their development. Systematically obtaining relevant data to support decision-making is generally considered a valuable complement to sound clinical reasoning and application of general training principles, yet some procedures are inherently sensitive. Monitoring somatic growth (ie, changes in size) and biological maturation (ie, progression towards an adult state) are common in high-level youth football (in particular, in boys' academies). However, popular methods for estimating maturity status (eg, maturity offset or percentage of predicted adult height) require body weight to be included in their equations,¹ raising concerns regarding the potential negative consequences of frequently weighing players. This editorial aims to highlight the risks and rewards of growth and maturation monitoring involving bodyweight assessments, critically examining its benefits and potential harms, while providing practical considerations for ethical and effective implementation in youth football.

POTENTIAL REWARDS WITH GROWTH AND MATURITY MONITORING

Maturity status can differ substantially (eg, a range in skeletal age of 5–6 years²) between players in the same chronological age group. This can result in temporary advantages in size and physical capability for early maturing players.² Although largely determined by genetic factors, maturity timing appears to affect selection for male academies and national teams (early maturing players are over-represented and late maturing players are less frequently observed) after the onset of puberty.^{3,4} This may indicate systemic exclusion of players who mature later, limiting their developmental opportunities. The effects of female puberty on performance and selection are less clear. Discrepancies in maturity status can further impact early- and late-maturing players' athletic development if players are not challenged adequately or provided with appropriate individual tailored training plans.¹

Monitoring growth and maturity may contribute to the mitigation of injury risk. A review commissioned by the International Olympic Committee (IOC) recommended implementation of such initiatives, as their findings indicated that injury patterns change with maturity status, where players are more susceptible to injuries around the adolescent growth spurt.⁵ These injuries could have both short- and long-term health consequences (eg, subsequent injuries and long-standing pain). Information on players' growth/maturity status would appear to be beneficial to proactively implement protective measures. While leading academies have considered this for many years with anecdotal success, there is a shortage of scientific evidence on whether adjustments based on growth/maturity indicators can reduce the impact of injuries. A recent study provided evidence that tailored training

for players based on symptoms and growth/maturity indicators can reduce injury burden considerably⁶; however, higher-quality research is required to confirm this.

RISKS ASSOCIATED WITH FREQUENT WEIGHING OF ADOLESCENTS

Routinely weighing players to estimate maturity status is in contrast with concerns raised by researchers and clinicians who emphasise safeguarding athletes from undue preoccupation with body weight (eg, higher or lower than their peers or their own desired weight). Fostering a climate with positive body image may subsequently reduce issues such as eating disorders, disordered eating, and Relative Energy Deficiency in Sport (REDs). This awareness is necessary, as a recent study demonstrated that among 'trained' or 'elite' adolescent athletes, 6%–7% of males and 9%–11% of females were classified as having an eating disorder diagnosis.⁷ The authors highlighted that the prevalence of eating disorders in male athletes has increased during the last decade, potentially due to increased focus on male body appearance on social media. Routine weighing may be a concern also for some players without any eating disorder symptoms, evoking contradictory emotions that potentially contribute to negative associations with sports participation—or even drop-out.

The psychological impact of weighing for maturity estimations, or the direct causality between weight monitoring for health purposes and the development of eating disorders, has not been documented. Weighing, however, can be problematic. For example, mandatory team weighing and frequent self-weighing have been associated with body concerns in collegiate athletes.⁸ Evidence from schools also suggests that some children may experience distress, although most children do not have a problem with weight screening.⁹ Frequently placing adolescents on a scale, therefore, requires consideration and care in the context of growth/maturity monitoring. Furthermore, a subgroup of the IOC consensus on REDs advises against routine assessments of body composition to reduce health risks.¹⁰ Although these experts are open to assessments when medically indicated for tracking growth and development, they do not address weighing as part of maturity estimations for grouping athletes (eg,

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bio-banding), training prescription, or injury prevention.

CONSIDERATIONS FOR IMPLEMENTING GROWTH AND MATURITY MONITORING

Many organisations implement growth/maturity monitoring thoughtfully; however, our experience suggests that others could improve their practices. We therefore highlight some aspects to consider and encourage others to expand on these (figure 1).

The foundation of our suggested model (the first level of figure 1) emphasises that monitoring has limited value unless it is embedded within a well-functioning training environment. In practice, this means that training is systematically planned and grounded in established knowledge and best practice for the specific age group. Systems for sensitively detecting health problems and general strength and conditioning programmes should also be in place. The second level highlights the importance of education. A shared understanding of growth and maturation is critical to align stakeholders and support consistent, developmentally appropriate decision-making. Accordingly, this topic should be included in coaching certifications, sport science curricula, and sports physiotherapy/medicine specialisations. While these initiatives are presented as fundamental steps in our simplified model, it is important to highlight that they should be informed by growth and maturity data in a setting with sufficient resources and expertise.

The third level of the model emphasises that a growth/maturity monitoring initiative must be founded on

a clear objective and adequate scientific rationale and contain a robust plan for handling data and the specific corresponding actions they trigger (eg, grouping of players, individualised training). The rationale and plan should be shared and discussed with parents, players, coaches and stakeholders to improve understanding and build trust. It should be possible for players/parents to opt out of assessments, and one should consider screening for 'high-risk' individuals (including a pathway for individuals who may react negatively). The fourth level concerns measurement quality and safeguarding. Data should ideally be collected in a clinical setting by a healthcare professional or a qualified practitioner with a sound understanding of body image issues, REDs and disordered eating. This could contribute to destigmatising the weighing process and provide an opportunity to educate players about normal bodily changes (eg, weight gain) that are expected and desired outcomes of growth and maturation. Finally, growth and maturity monitoring should only be conducted once all preceding levels are adequately addressed and followed. Only results that initiate specific actions (eg, growth spurt status, maturity timing) should be communicated to the athlete, to emphasise that the weight in itself is not the aim of the assessments. All communication and data sharing must be done considerately and confidentially.¹⁰

CONCLUSION

Monitoring growth and maturity can provide valuable information to clinicians and practitioners in high-level youth

football environments but should never be conducted in isolation. Initiatives must be embedded in holistic frameworks for youth development and health promotion, supported by education of coaches, parents and players. Responsible implementation requires qualified personnel, structured procedures and sufficient resources to responsively act on findings. Concerns regarding weighing are legitimate and must be addressed when considering growth/maturity monitoring. When appropriate expertise and safeguards are in place, and assessments are applied with methodological rigour and ethical care, they can contribute to greater developmental fairness, reduce injury risk and support long-term healthy sports participation. We hope this editorial informs discussions on local, national or international strategies and policies aimed at supporting young players in the best possible way.

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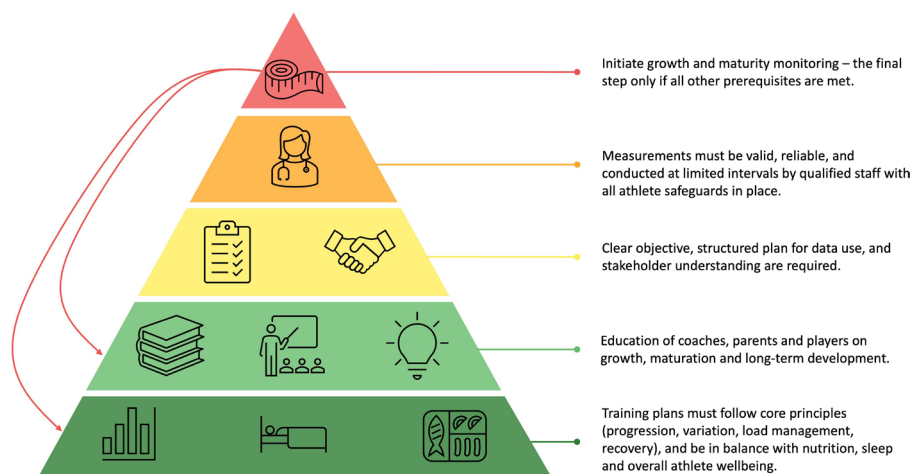


Figure 1 A proposed hierarchy of considerations for growth/maturity monitoring in high-level youth football. In a setting with sufficient resources and expertise, growth and maturity data should inform the first steps in this model.

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