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Youth Football

The role of maturation in Talent Identification in Football

Coaches that are involved in talent identification (TID) or any other selection process in youth football have had experienced the problem of deciding/accounting if and how age and maturation affected their selection.

What does that mean?

There are two major problems that are connected.

1) Cut-off days for selection

As it is in many clubs (or even further in national teams), two-year-bands (U19, U17, U15 etc.) are used to group players. In a club setting, every second year the players (born in the same year) are in a favorable position, as they are in the "older" age group. However, with regards to the World Cup Cycles, a player that is born in the "younger" year of a World Cup Cycle will always remain in that group. Imaging a player that is born on the 31st of December (of the younger year) needs to compete against a player that is born on 1st of January (of the older year). As a result, two years of development are between them, and here I don't necessarily mean only physical (which was shown to increase with age (1-3 *- see references below*), but also psychological, and technical and tactical. How is the younger player able to compete with the older? Probably he is not, except he is an early mature and the older player is a late maturer. This basically brings us to the second problem: Maturation.

2) Maturation

Generally, maturation refers to qualitative changes of the player's body, such as the change of cartilage to bones or the appearance of pubic hair or menstruation (4). The major difference to growth is, that growth is linked to observable changes in quantity - measureable changes in height, weight and fat percentage (5). Maturation is a major player influence physiological attributes of players and therefore also physical capacities such as anaerobic endurance, power, speed etc.

As a result, older and/or more mature players often have the advantage of being bigger, stronger and faster, might therefore be more successful, which results in greater motivation and commitment. On the contraire, younger and/or less mature players were seen as less talented (6) and were seen to drop out due to low perceived competence and lack of success (7, 8).

Overall these processes may result in an uneven birth-date distribution in the selection process, which is commonly known as “relative age effect” (RAE). The RAE effect is common in youth football and present in (more or less) every country (5, 9-14).

As I stated earlier, age and/or maturation might influence selection. It was furthermore seen that early maturers were more represented in selected teams than normal or late maturers (15-17).

However, the RAE diminishes with age (12) showing less presence (18) in senior football.

The effect of maturation on physical, physiological and technical ability in youth football players

Having stated the influence of age and or maturation on physiological changes in performances above, it seems warrant to account for maturational status in the talent identification process to ensure “equality” (19, 20). Greater maturity was related to greater body size, explosive performance (jumping and sprinting) (19, 21) and endurance performance (in 13-16 year olds).

Maturation (and years in football) was also shown to effect technical skills (ball control, passing, dribbling, shooting) of youth footballers (20).

However, it seems that maturity seemed to have a larger contribution to physiological performance compared to technical abilities. (20).

Controlling for maturity to predict future success?

If assessed, it is possible to statistically control for maturity status of players and it was seen that elite and/or sub-elite players were (still) found to be leaner (19, 22), faster (19), more agile (19), more powerful (19, 22) and had greater aerobic power (19) compared to non-elite players in various age groups.

Interestingly, height and mass were still seen as important factors, but also physiological characteristics, between players that attained professional level compared to those remaining amateur (1). Furthermore, aerobic endurance between the age of 14-18 was shown to discriminate between future professional players and non-professional players (23), especially at a later stage in the players development (16+). However, prediction future success through physical (height and mass) and physiological parameter (endurance, speed etc) was also deemed impossible (1, 19, 23) when analyzing the data differently, showing that continuous monitoring (not only for physical and physiological performances, but also cognitive-perceptive abilities (24, 25)) seems vital in the youth developing process.

Of the technical abilities, it seems that (especially) dribbling were seen as a sensitive measurement to detect future professional players (9, 19), from as early as 14 years of age (26).

How to assess maturation

There are multiple ways to assess maturation, such as:

x-rays can be used to determine late vs. on-time vs. early maturers = substract chronological age from skeletal age. A positive score shows an early mature, a negative score shows a later mature (15)

Magnetic resonance imaging (MRI) has been used on a FIFA level to check for "real" age of youth footballers (27, 28)

Tanner stages, categorized stages of pubic hair (and breast development for girls) that were shown consistent with skeletal maturation by Tanner (29).

Self-assessment was used to determined skeletal maturity. Girls and boys were asked to rate themselves with regards to pictures of different Tanner stages (30-32).

Hormonal assessment through blood or saliva analysis, as acceleration and level of strength and power was related to circulating androgen (such as testosterone) and insulin like growth factor (22).

Peak height velocity (PHV) is described as a marked increase in height and more or less linked to the adolescent growth spurt. Gender specific prediction equations were used to determine age from PHV (33). Furthermore, the equation were then used to distinguish between pre- vs. mid- vs. post-PHV participants (34).

Predicted adult height was also used to assess maturity (35, 36). The maturity status of players can be expressed as a z-score (37)and then interpreted to estimate maturity status: on time (z-score between -1.0 and +1.0); late (z-score below -1.0)and early (z-score greater than +1.0) (36). This might be very interesting for goalkeeping coaches, as the equation actually provide the predicted adult height of the player.

Conclusion

With regards to the cut-off days and possible affects to the RAE, we would like to refer to a nice paper by Meylan et al. (5) who listed possible solutions.

Talent identification must take individual maturation into account and therefore physical, physiological and technical (as well as psychological/mental) characteristics needs to be monitored consistently in developing footballers. On-time and late maturers who are described as "talented" need to be able to stay within an elite academy (longer) in order to catch-up physically (14). It is even thought that in combination with their most-likely overcompensating of other areas (greater perseverance and motivation)(38) it seems more probable to have a future professional players.

If used properly (and in combination with maturation) physical, physiological and technical (as well

as psychological/metal) monitoring offers a possibility to reduce errors in identifying the “wrong talents”. However, it is still debated if it predicts future success in professional football.

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