PREDICTING ADULT HEIGHT AND PROFILING IN TOP-LEVEL YOUNG BASKETBALL PLAYERS

SERBIAN EXPERIENCE

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Presentation Plan

1. Introduction
2. Assessment of maturation
3. Prediction of adult height by skeletal age
4. Other methods for predicting AH
5. Serbian experience
6. Conclusions
7. Future steps and ideas

Is the height the most important selection criterion for basketball?

Average height of NBA players is 2.02 m (2012)
Average height of NBA All-Star roster is 2.00 m (2012)

If we could precisely estimate how tall the young player will be as an adult, we could assign him the right position during sport development

173 cm at age 13
97th percentile for height

Listed adult height 198 cm
97th percentile for height
Growth case scenarios

Age 13, stature = 1.73 m [P97]

Because of wrong position assignment at young age due to accelerant stature (particularly in growth-accelerators at age 13 to 15) and further inappropriate technical/tactical adaptation to new position of previously dominant young player Serbia lost 5 young National team players in the past couple of years!!

Children height is a valid indicator of children growth. Children height per se is NOT a valid indicator of adult stature. Chronological age is a poor marker of biological maturity.

CHRONOLOGICAL AGE ≠ BIOLOGICAL AGE

Maturation estimation methods

- Assessment of dental age
- Assessment of sexual maturation
- Assessment of somatic maturation
- Assessment of biochemical markers
- Assessment of dental age
Prediction of adult height
THROUGH SKELETAL AGE ASSESSMENT

- Pediatrics / endocrinology / physical education
  - Assessment of children growth (e.g. when stature of child is unusual for age)
  - Less than 3rd percentile or above 97th percentile
- Sport science
  - Talent identification
  - Development of young player
  - Player assignment
- Estimates stature at 18 years
- Random and systematic errors
  - Average value, normal height
  - Accuracy affected by various factors
  - Timing and intensity of the pubescent spurt

Methods of prediction

- All methods predict the percentage of adult stature achieved
- Bayley-Pinneau method
  - Comparing the skeletal age of subject with Greulich-Pyle skeletal age standards
  - Applicable to males from 7 to 18.5 years and females from 6 to 18 years

- Roche-Wainer-Thissen method
  - Regression equations including stature and weight of a child, mid-parent stature and Greulich-Pyle skeletal age
  - Applicable to males from 1 to 16 years and females from 1 to 14 years

- Tanner-Whitehouse method
  - TW skeletal ages and present stature as predictors
  - Applicable to children 6 years and older
  - Mid-parent stature used as a correction factor

Other methods for AH prediction

- Prediction from anthropometric data (e.g. Beunen-Malina method)
- Prediction from body mass index
- Prediction from bone age
- Prediction from dental age

Our experience

- First selection criterion for basketball in Serbia and former Yugoslavia – HEIGHT
- Question No. 1: HOW TALL THE YOUNG PLAYER WILL BE AS AN ADULT?
- Question No. 2: WHAT IS THE BEST TIME TO PREDICT ADULT HEIGHT?
- Question No. 3: WHAT IS THE AVERAGE ERROR OF ESTIMATION?
Our experience

- Modified Tanner-Whitehouse method
- Twelve years of assessment with 536 basketball players assessed and re-assessed
- Adult stature prediction with average error of 2.2 cm
- Average age for prediction in basketball: 12.3 ± 3.4 years

Conclusions

- HEIGHT as selection criterion for BB should be correlated with BIOLOGICAL AGE
- BIOLOGICAL AGE could be assessed by SKELETAL AGE
- Answer No. 1: HIGHER ADULT STATURE AT GROWTH-DELAYED BOYS
- Answer No. 2: BEST TIME TO PREDICT ADULT HEIGHT IS AT 12+ YEARS
- Answer No. 3: AVERAGE ERROR OF ESTIMATION IS ABOUT 3 CM

Future steps and ideas

- Education on significance of AH prediction in youth basketball
- Inclusion of AH prediction in regular testing in youth basketball
- International studies comparing effectiveness for AH prediction in basketball
- Development of European radiographic atlas for skeletal age assessment in sport
- Development of web-based scientific portal on adult height prediction in basketball
- Development of valid non-invasive method for AH estimation