

Long-Term Athlete Development: Exploring key factor three –developmental age

The bio-banding experience

October 17, 2017

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SAVE THE DATES!

November 1 - 4:30 – 7pm (MST), Calgary, Alberta

Meeting: Quality Sport Knowledge Exchange for NSOs, PTSOs & LSOs

December 5 - 1:00-2:30pm (EST), Online

Webinar: The Next Generation of LTAD Look Like? Integrating Research and Experience, Presented by Colin Higgs and Paul Jurbala

December 12 - 1:00-2:30pm (EST), Online

Webinar Meeting: LTAD Progress Tracker Update for NSOs & PTSOs

January 23 - All Day, Gatineau, Quebec

Event: NSO & MSO LTAD Leads Day

For more information contact:

carolyn@sportforlife.ca OR sarah@sportforlife.ca

Housekeeping Items

Hide/show
control panel



Full screen



Raise hand



Ask your question



The image shows a screenshot of a webinar interface. On the left, a vertical control panel contains four icons: a right-pointing arrow, a microphone with a slash, a full-screen icon, and a hand-raising icon. To the right, a window titled 'Audio' is open, showing 'Sound Check' status and options for 'Computer audio' (selected) and 'Phone call'. Below this, a 'MUTED' indicator is shown with a microphone icon. A dropdown menu shows 'Microphone (Realtek High Defin...' and a volume slider is visible. Another dropdown shows 'Speaker/Headphone (Realtek H...'. Below the audio settings is a 'Questions' section with a message: 'Thank you for joining us today. The webinar will begin shortly. For more information about Sport for Life, please visit www.sportforlife.ca'. There is a text input field with the placeholder '[Enter a question for staff]' and a 'Send' button. At the bottom, the text reads 'Inclusive Physical Literacy Webinar ID: 258-073-763' and the 'GoToWebinar' logo.



Our Presenters

10 Key Factors Influencing Long-Term Athlete Development

1. Physical Literacy
2. Specialization
3. Developmental Age
4. Sensitive Periods
5. Mental, Cognitive and Emotional Development
6. Periodization
7. Competition
8. Excellence Takes Time
9. System Alignment and Integration
10. Continuous Improvement – Kaizen





“Kid Goes Beast Mode” (9 yr old)

(Canberra Player of the tournament Sept 2016)



The early maturing athlete...

Advantages:

- Physical size (stature and mass)
 lean mass  fat mass
- Superior strength, speed, power
- More likely to be selected
- More likely to be appointed as leaders
- More likely to receive better coaching and support

Disadvantages:

- Challenged less to develop technical skills
- Coaches expect physical presence from athlete
- Coping with excessive demands and unrealistic performance expectations

Overview

- ✓ The growth, development, maturation journey?
- ✓ What is developmentally appropriate?
- ✓ What is bio-banding?
- ✓ Why and how is bio-banding being used?
- ✓ What additional information is required?
- ✓ Ideas for implementation?
- ✓ Q&A

THE ATHLETE DEVELOPMENT SHOW

WITH DR. CRAIG HARRISON



Sean Cumming, PhD
Senior Lecturer
University of Bath

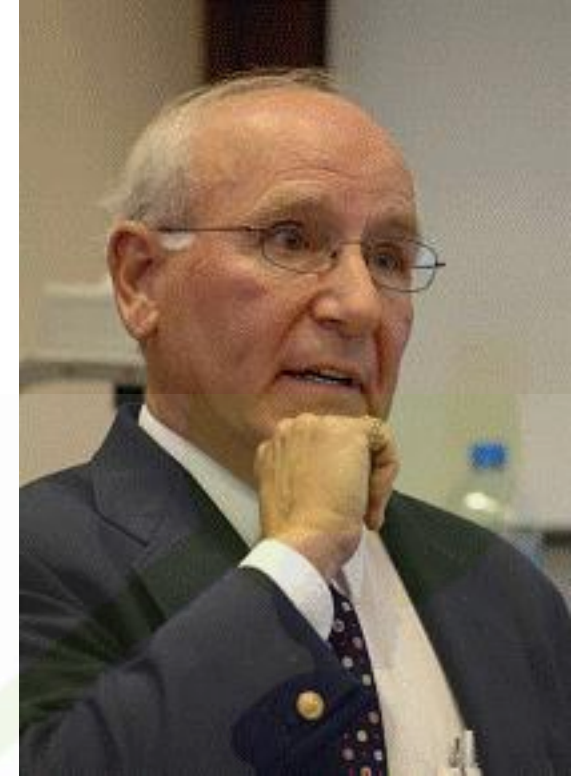
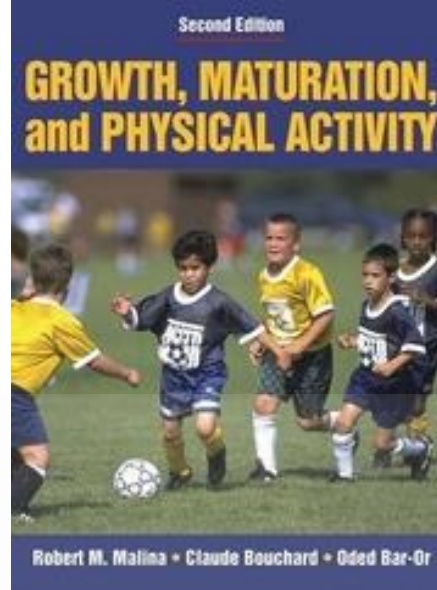


UNIVERSITY OF
BATH

 Sport for Life



Adam Baxter-Jones, PhD
Full Professor
University of Saskatchewan



Robert Malina, PhD
Professor Emeritus
University of Texas at Austin



The University of Texas at Austin



UEFA



No. 162

DIRECT

NOVEMBER 2016
OFFICIAL PUBLICATION
OF THE UNION OF EUROPEAN
FOOTBALL ASSOCIATIONS

BIGGER SHOULDN'T MEAN BETTER

How a player's date of birth can
Coaches from across Europe

'Football's biggest issue': the struggle facing boys rejected by academies

Thousands of players wash through the system every year, their dreams of a professional career shattered.
Are clubs doing enough to look after them?

David Conn

Friday 6 October 2017 12.00 BST

INTERVIEW

Clarence Seedorf,
UEFA ambassador for
diversity and change

EURO 2016 LEGACY

A sustainable and socially
responsible EURO

CLUB COMPETITIONS

Ever greater
financial returns



HOW TO REMEDY THE RELATIVE AGE EFFECT?

Whether you were born at the beginning or the end of the year can have a huge influence on your future football career. Known as the relative age effect, this problem is now being tackled by a growing number of coaches.



The growth, development, maturation journey

(A. Baxter-Jones)

- at birth \cong 30% of adult height
- at 24 (♂) and 18 (♀) months \cong 50% of adult height
- at PHV \cong 92% of adult height

“Being an early or late maturer does not predict final adult height” (A Baxter-Jones)

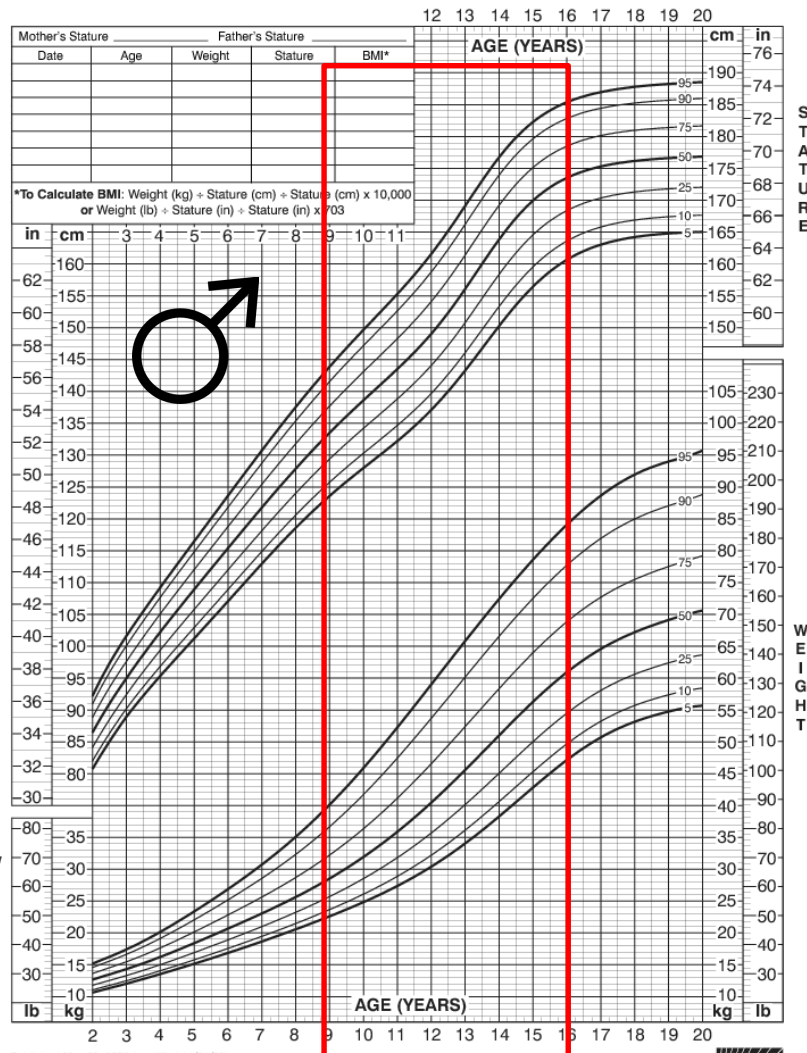
Growth charts

2 to 20 years: Boys

Stature-for-age and Weight-for-age percentiles

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RECORD # _____

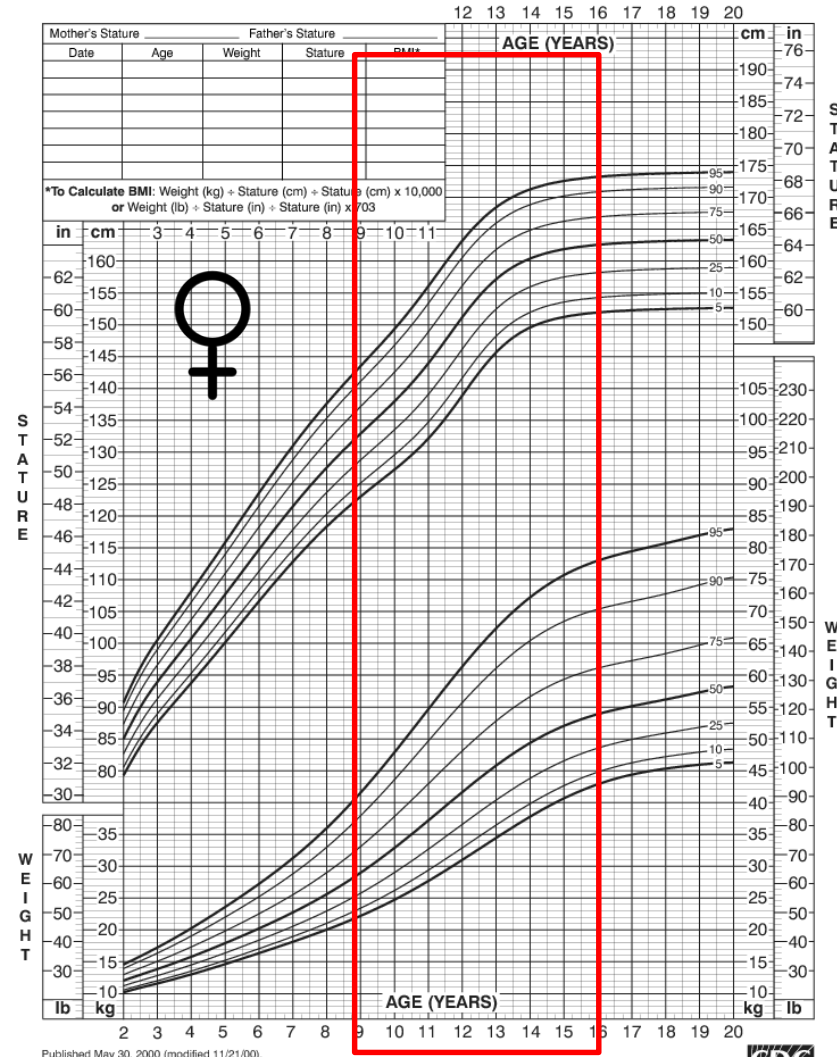


2 to 20 years: Girls

Stature-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



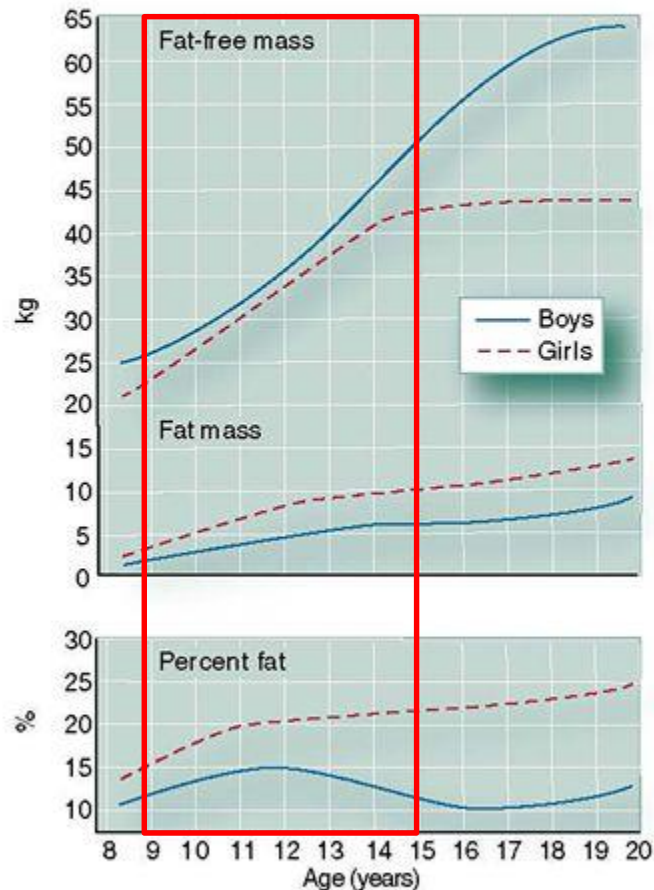
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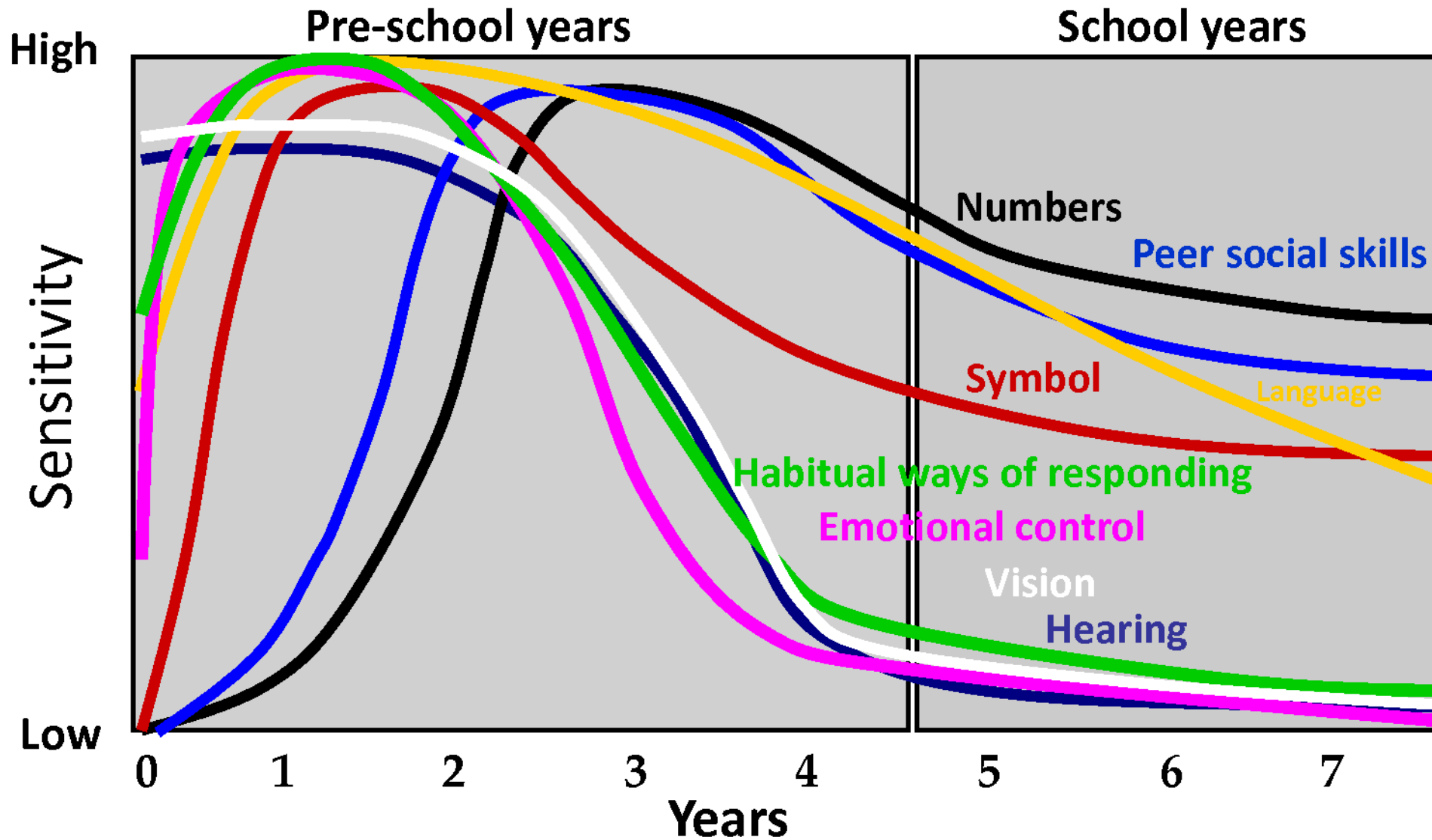
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Changes in Percent Fat, Fat Mass, and Fat-Free Mass for Females and Males From Birth to 20 Years of Age



Reprinted, by permission, from R.M. Malina, C. Bouchard, and O. Bar-Or, 2004, *Growth, maturation, and physical activity*, 2nd ed. (Champaign, IL: Human Kinetics), 114.

Sensitive Periods in Early Brain Development



Biological maturation

Within the same chronological age group, inter-individual variability is **LARGE**.

Progress toward maturity **VARIES**:

- **Tempo** (rate of change) skeletal age contrasted to chronological age (identifies delayed, on time, advanced)
- **Timing** (when events occur)

Success = Biology x Psychology (“coachability”) x
Trainability

(Malina et al 2010)

Biological maturity assessment?

- Skeletal age (x-ray of wrist bones)
- Secondary sex characteristics
- Estimated age of PHV
- Maturity offset (estimate of maturity timing when used before PHV)
- ***Percentage of predicted adult stature (estimate of maturity status)***



**What is
developmentally
appropriate?**

What is Developmentally Appropriate Sport?

Active & Healthy Magazine

Vol. 19 No. 2 2012

Children are not mini-adults:

1. Their minds and bodies work differently than adults
2. Movement development requires variety and free play
3. Children play sport for fun





Bio-banding in Sport: Applications to Competition, Talent Identification, and Strength and Conditioning of Youth Athletes (Cumming et al Strength & Conditioning Journal 2017)

“Bio-banding is the process of grouping athletes on the basis of attributes associated with growth and maturation. Athletes of the same chronological age vary considerably in the timing of maturation with some maturing in advance or delay of their peers. The timing of maturation has important applications for competition, talent identification, and training.”

Not Relative Age Effect!

Why is bio-banding being used?

Cumming et al (2017)



“Individual differences in growth and maturation may contribute to competitive inequity and increased risk of injury, especially for athletes who are constitutionally small and/or delayed in maturation.”

Bio-banding is not “all or none”

While groups are created on the basis of physical characteristics -- must still consider psychological and/or technical skills

For example – early maturing boy with poor technical competence and/or psychological maturity might not play with older athletes.

Another example – late maturing boy who is thriving within his age group is unlikely to benefit from competing against peers who are younger but of similar maturity.

Cumming et al (2017)

How is percent of adult height calculated?

Khamis & Roche (Pediatrics 1994)

- Current stature
- Current weight
- Mid-parent stature
- accurate measurement is central to the protocol for estimating predicted adult stature

Those responsible for gathering assessments must be appropriately trained and qualified

How is predicted adult height calculated?

Predicted adult stature = $\beta_0 + \beta_1$ stature + β_2 weight + β_3 mid-parent stature

Tables provide coefficients ($\beta_0 \beta_1 \beta_2 \beta_3$) for boys and girls between ages of 4-17.5 years.

Predicted adult stature then converted to a percent.

Khamis & Roche (Pediatrics 1994)



Example

Player A

Age = 13.5 years

Height = 172.5 cm

Weight = 55 kg

Mother height = 175.4

Father height = 177.8

Mid-parent = 176.6

Predicted adult height = 188.5

Percent of predicted = 91.5%

Player B

Age = 13.5 years

Height = 172.5 cm

Weight = 55 kg

Mother height = 167.6

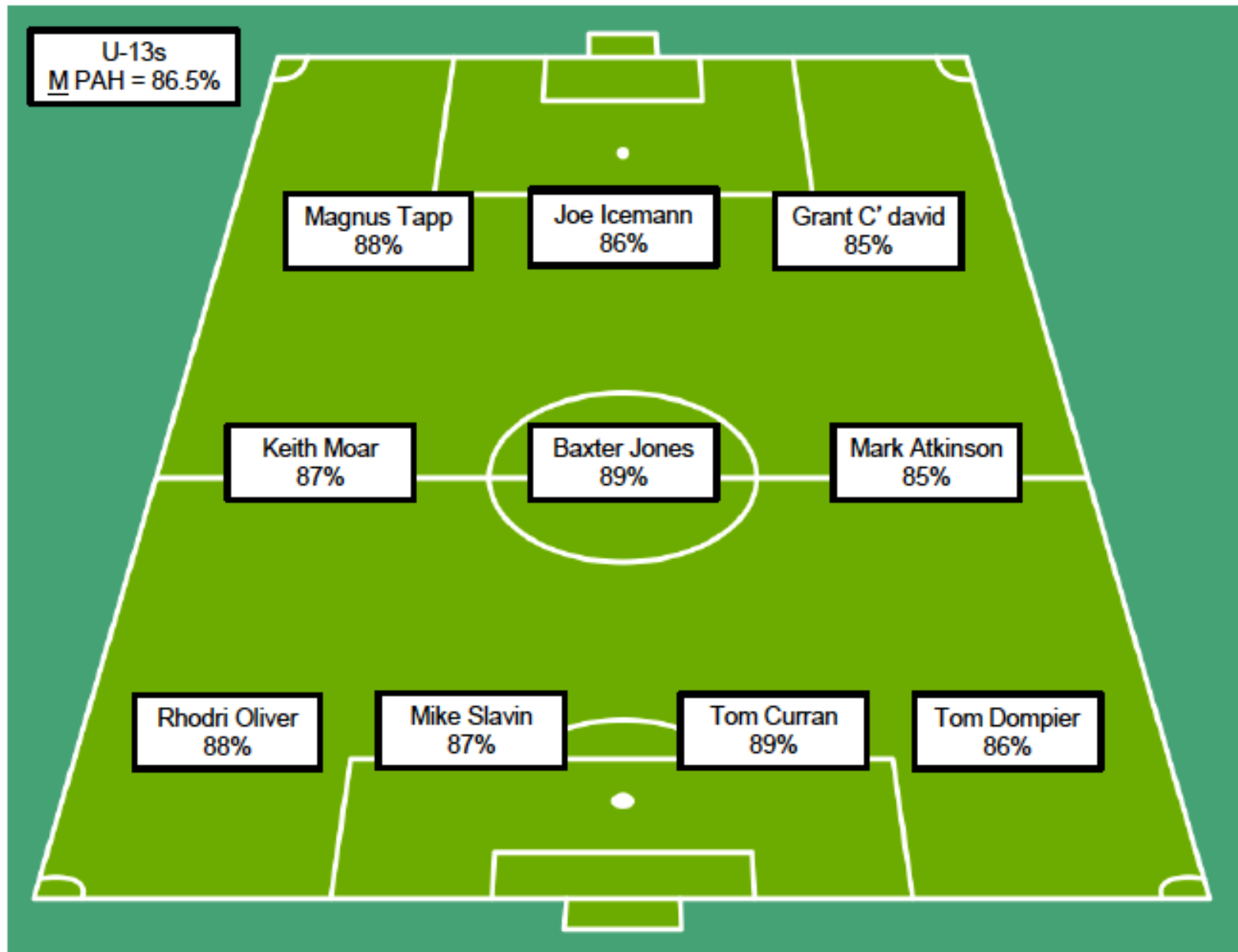
Father height = 172.7

Mid-parent = 170.2

Predicted adult height = 184.7

Percent of predicted = 93.4%

Biological Maturation in Young Athletes



How is bio-banding being used?

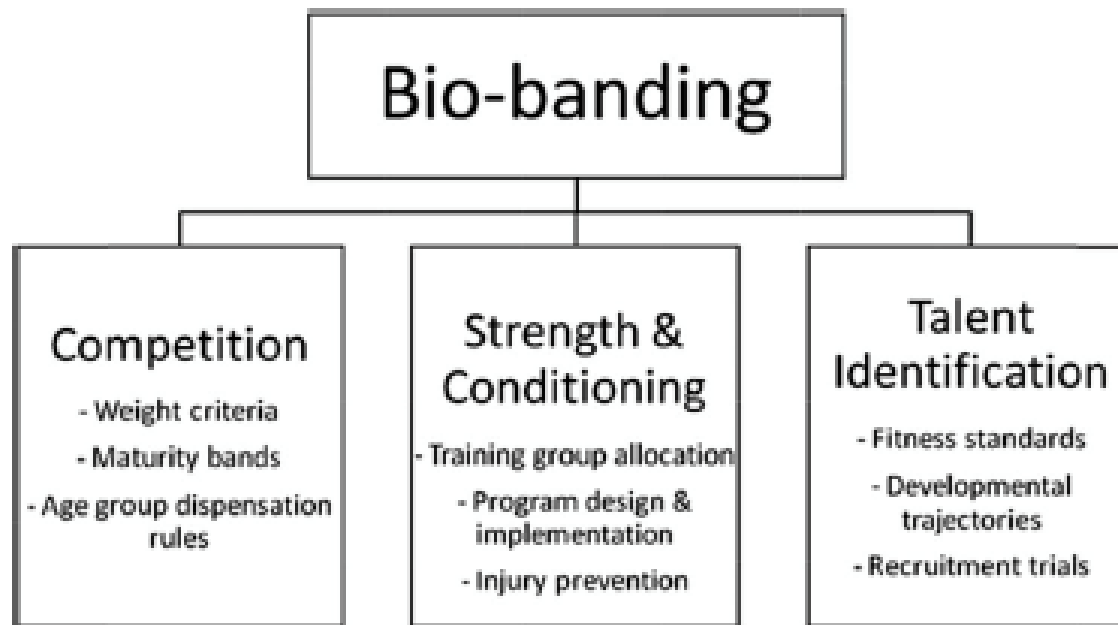


Figure 1. A contemporary model of bio-banding for youth sports.

(Cumming et al 2017)

Bio-banding and competition

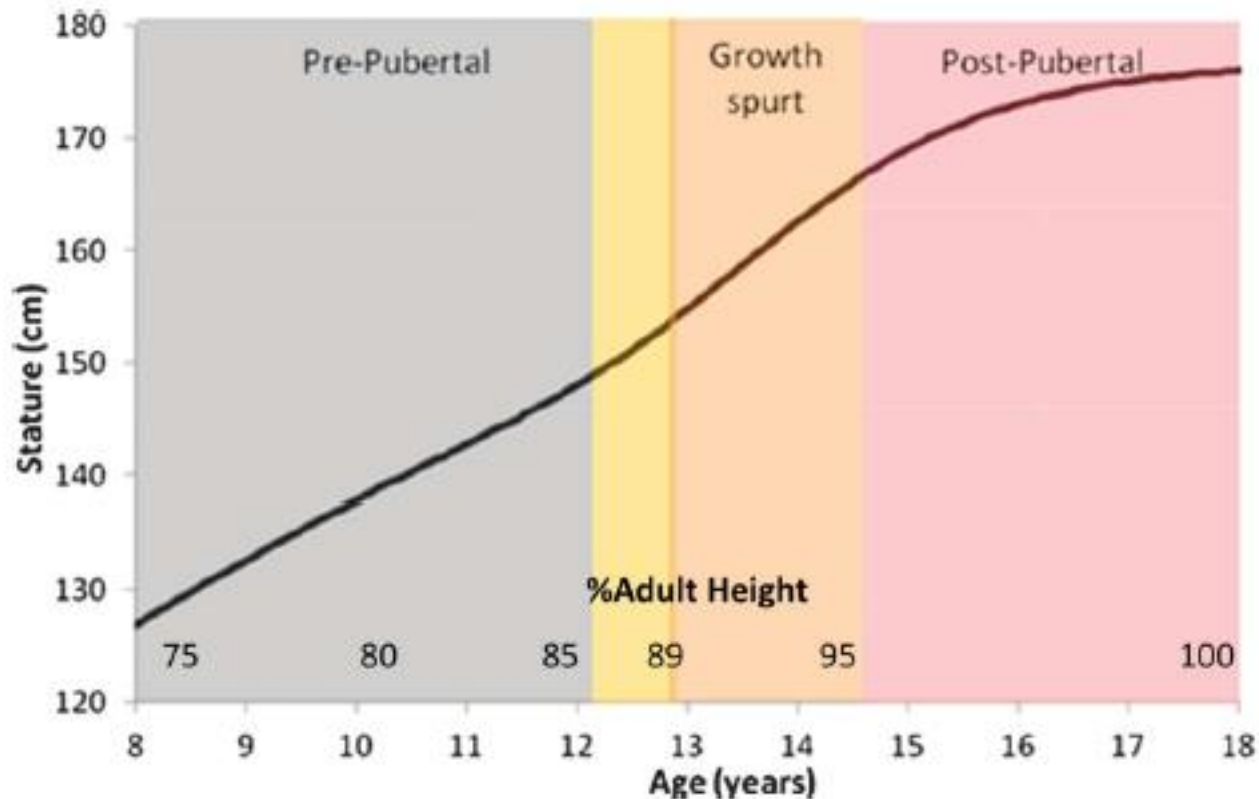


Figure 2. Bio-bands of maturity for an individual male based on cumulative growth and percentage of adult height.

(Cumming et al 2017)

Early and late maturing players described their experiences as positive -- bio-banded games presented them with unique challenges and a more diverse learning experience.

Late maturing players

- less physically challenging
- benefits to having more chance to use and demonstrate their complete skills set (i.e., physical technical and tactical),
- demonstrate impact and take control of the game
- step into leadership

Early maturing players

- more physically challenging required game adjustment (emphasize technique, teamwork, and tactics)
- provided ideal preparation for competing at a higher level
- opportunity to learn from, and be mentored by, older players

(Cumming et al 2017)

“Underdog” hypothesis?

Gibbs et al (2012) “youth who experience the greatest physical challenges are more likely to develop the technical and psychological attributes necessary for success at the adult professional level.”

Only works if:

- challenge is manageable
- athlete is recruited into and/or retained by the system. (Cumming et al 2017)

Current data shows late maturing and born in the fourth quarter players are 20 times more likely to be de-selected (Johnson 2015)

Additional information required

- Longer term follow up (retention of athletes, injury tracking and prevention, deliberate athlete transfer, others)
- Implementation in less financially rich environments
- GPS
- Implementation in school setting
- Others?



Bio-banding and talent identification and confirmation

“There is a risk in overinvesting in youth who are physically most capable at the expense of those who may have the most potential as adults....maturity associated differences in size and function observed in adolescence are often attenuated or reversed in adulthood.”



(Cumming et al 2017)

Bio-Banding Summary

Bio-banding is one of many tools that can be used to better understand and promote the development and well-being of young athletes. It is not a substitute for age group training or competitions; rather, bio-banding is an adjunct activity that has the potential to challenge the athlete in a unique manner and to create a more diverse and developmentally appropriate learning environment.”

Good programs might include the provision of both age group and bio banded activities (hybrid approach)

- offer athletes a more diverse, multifaceted, and developmentally sensitive learning stimulus

Implementation

Moving into action:

**We know what practices we want to change,
now what?**

Important considerations:

1. Adapt the knowledge to your local setting
2. Identify barriers and facilitators of implementation in your local setting
3. Select & tailor implementation strategies to target goals, barriers and to enable facilitators of change

Adapt the knowledge to your local setting

Why is this important?

Background knowledge

- Identify specific practice problems relevant to your setting?
- What evidence do you have that there is/could be a problem?
- What are the needs of your setting?
- What are the priorities set out by your setting?
- What policies or resources could hinder or facilitate aspects of the evidence in your setting?
- What is the scope of practice of the target group in your setting?
- Does the evidence fit with the delivery models in your setting?
- Could this practice be sustained over time based on the priorities of your setting and target group of athletes/players?

Barriers to implementation

- Management = time and personnel
- Time = \$\$\$
- Personnel with knowledge
- Locked down in competition
- Locked down in registration process



Facilitators to implementation

- Latitude to implement
- Support from Board
- Qualified personnel
- Well planned programs
- Database (measurements)
- Access to athletes regularly
- Flexibility to move athletes



Strategies to implementation

- Adjust to local settings
- Progressive approach
- Hybrid approach
- Communication with parents
- Build a network of champions to increase opportunities
- Transparency



Resources

Peer review articles

Bailey R (2012) What is developmentally appropriate sport? Active and Healthy Magazine 19(2):21-24.

Cumming S et al (2017) Bio-banding in Sport: Applications to Competition, Talent Identification, and Strength and Conditioning of Youth Athletes. Strength and Conditioning Journal 39(2):34-47

Podcasts and Videos

Athlete Development Show (episode #10)

<http://news.autmillennium.org.nz/athlete-development/ep-10-dr-sean-cumming/>

Pacey Performance (episode #147)

<https://www.strengthofscience.com/pacey-performance-podcast/pacey-performance-podcast-147-sean-cumming/>

Young Athlete Forum (Switzerland 2017) <http://yaf2017.org/videos/>

Thank You

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Sport for Life

Q & A

Hide/show
control panel



Full screen



Raise hand



Ask your question



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