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CONFERENCE 2023
JANUARY 4 – 6, 2023
Charlotte, NC & Online | 2.0 CEUs
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How Youth Get Faster

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CONFLICT OF INTEREST STATEMENT

I have no actual or potential conflict of interest in relation to this presentation.


MICHAEL JOHNSON


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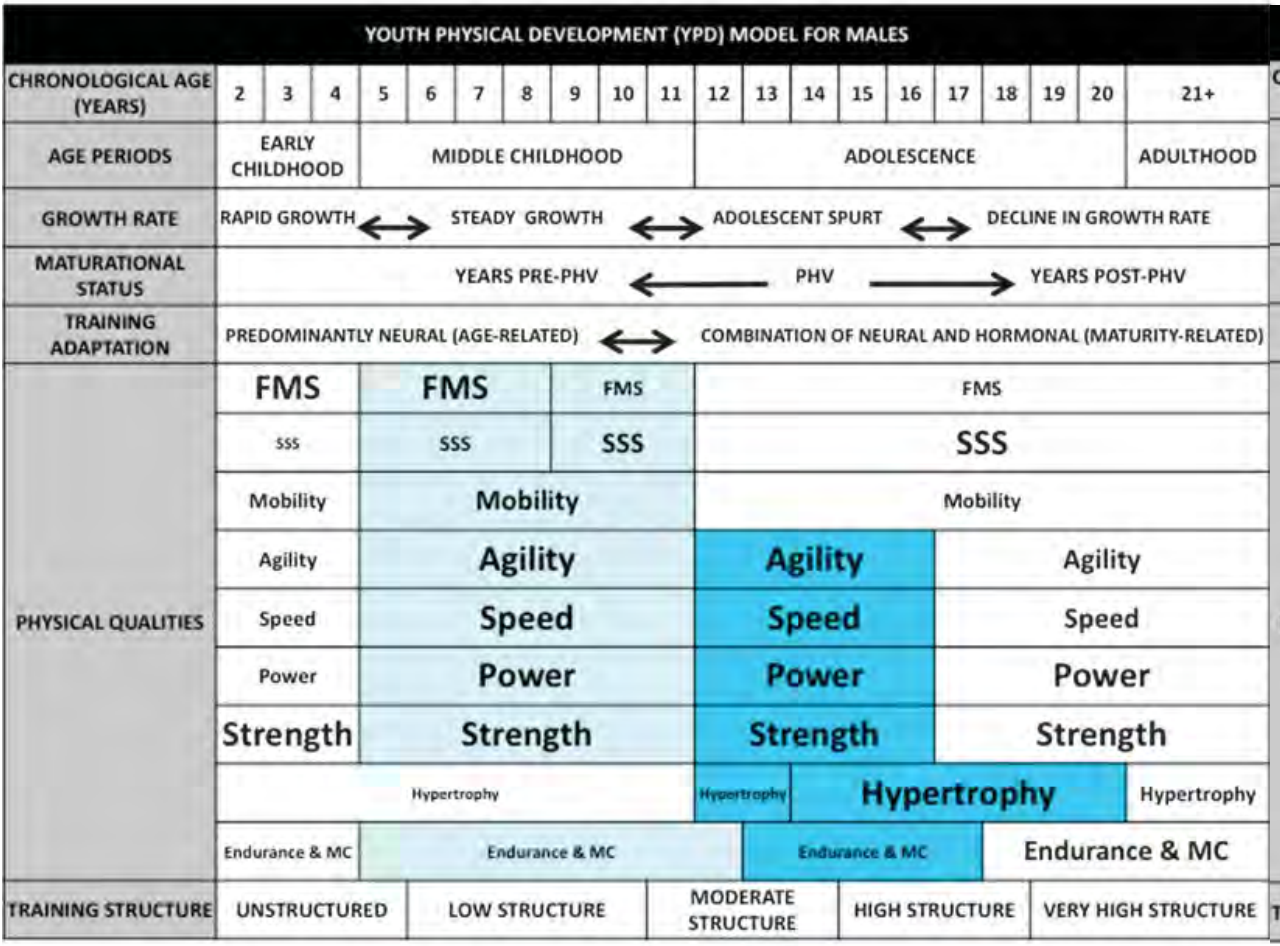
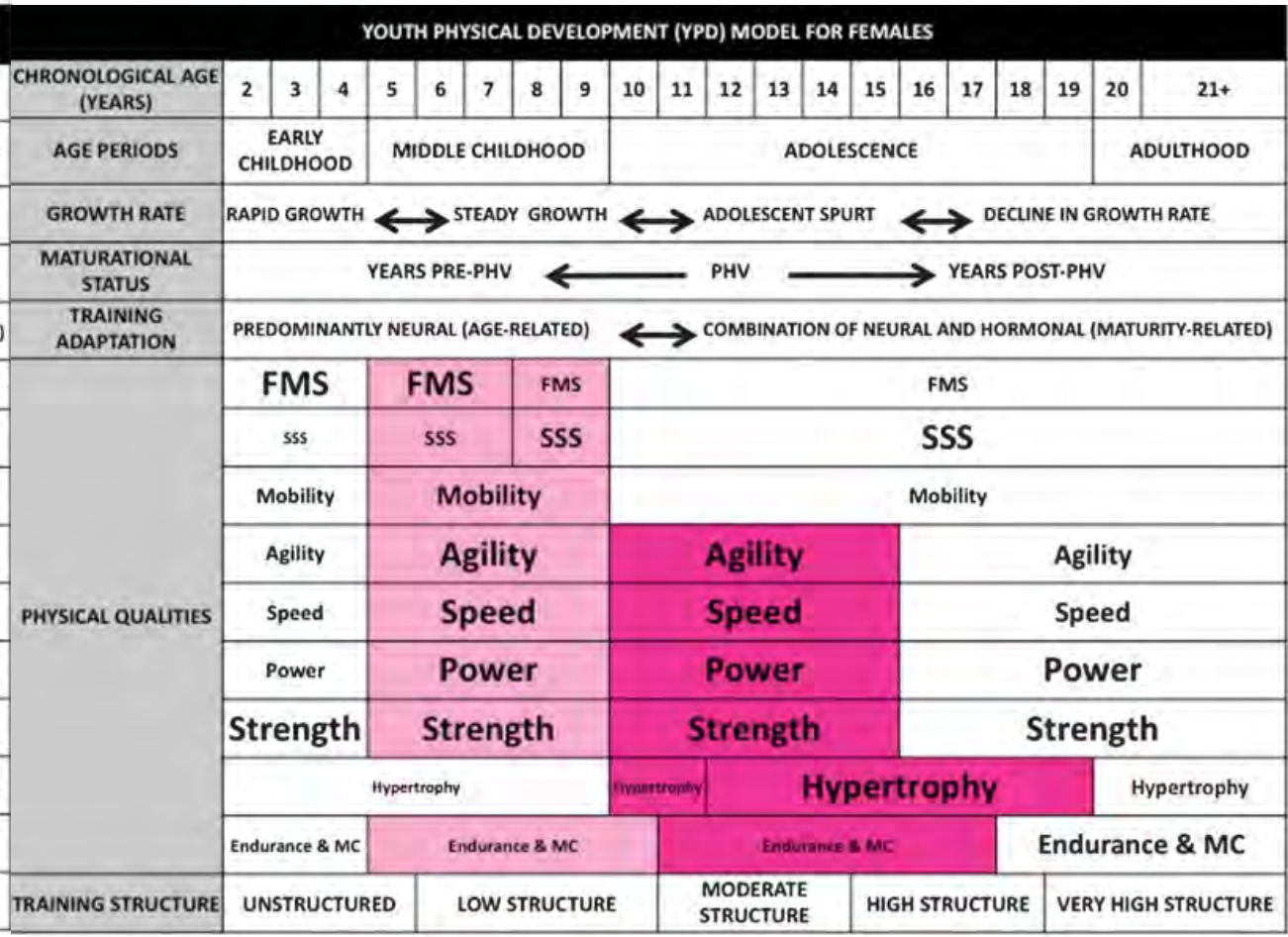
Speed is KING: The Importance of Sprinting

- Sprinting is the exercise of all exercises
- It shows ALL elements of athleticism
  - stability, mobility, motor coordination, skill, speed, strength/force, reactivity, rhythm
- At age 18 you've gained 75% of your speed, but only 50% of your strength
- Improvements and success in running could result in long-term physical activity through the life via physical competency

LTAD Model for Average Developers

The Youth Physical Development Model: A New Approach to Long-Term Athletic Development; Lloyd & Oliver





Font size refers to importance; light blue or pink boxes refer to preadolescent periods of adaptation, dark blue or pink boxes refer to adolescent periods of adaptation. FMS = fundamental movement skills; MC = metabolic conditioning; PHV = peak height velocity; SSS = sport-specific skills; YPD = youth physical development.

PHV & the Mirwald Equation

- **Peak Height Velocity (PHV):** maximum rate of growth during the adolescent spurt, used as indication of maturity.
  - Average boys 13.5 years; Average girls 11.5 years
  - There are early & late developers

- **Mirwald Equation:** assess biological maturity to prescribe proper training based on LTAD.
  - Seated & standing height
  - DOB
  - Biological gender
  - Weight
  - Date of measurement

Email me for calculator and equation

New Insights Into the Development of Maximal Sprint Speed in Male Youth

Robert W. Meyers, PhD,[1] Jon L. Oliver, PhD,[1,2] Michael G. Hughes, PhD,[1] Rhodri S. Lloyd, PhD,[1,2] and John B. Cronin, PhD[2,3]
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Anthropometry & Maximal Sprint Performance

Findings

- Increased body mass from growth spurt had negative influence on speed, step length, GCT, flight time
- Leg length helped step length in post-PHV boys

Applications

- Offset negative influence of increases body mass
- Strength train to reduce fat mass and increase force in mid-PHV and post-PHV

Kinetics of Maximal Sprint Performance

Findings

- Max force and power relative to mass important for sprint performance in all groups for step length
- Vertical force important to overcome increases in mass gained during and post-PHV
- Those that could utilize SSC and produce force were fastest

Applications

- Strength train
- Resisted running, however no sled towing/pushing with pre-PHV
- Vertical & horizontal plyometrics

Kinematics of Maximal Sprint Performance

Findings

- Step length increase = leg length increase, seen during PHV
- Pre-PHV reliant on step frequency vs post-PHV reliant on step length
- Increases in muscle, strength, and power during PHV helps explain the step length increases during PHV

Applications

- Speed = Step Length x Step Frequency
- Plyometrics most effective for positive neuromuscular adaptations for pre-PHV for sprint performance (step frequency)
- Strength and plyometric training best combo for sprint performance for post-PHV (step length reliant)

Age-Specific Training Suggestions

Pre-PHV

- Bias to MaxV
- Train minimal GCT & high step frequency
- Avoid resisted running
- Vertical plyometrics
- Bouncy reactive plyometrics
- Teach basic mechanics with drills & videos
- Make it about LEARNING & FUN with competitive games & speed radars

Mid-PHV

~11.5 girls ~13.5 boys

- Blend of MaxV & Accel
- Train step length
- Strive to overcome body mass challenges
- Learn to resistance train
- Horizontal & vertical plyometrics
- Light resisted running for those proficient
- Speed-strength on continuum
- TEACH & DEVELOP

Post-PHV

- More accel work, but still maintain MaxV
- Train step length & force production
- Resistance train for max strength & power
- Contrast training with plyometrics & resistance training
- Light to heavy resisted running
- Get individualized with start positions
- More STRUCTURED & SPECIFIC

References

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