The Importance of Strength & Conditioning for Developing Athletes: Background and Practical Recommendations

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“Who’s this guy?”

• **Education:**
  - West Virginia University – B.A. (2010)
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• **Coaching:**
  - Tennis, Baseball, Basketball, Weightlifting, Figure Skating, SWAT, etc.
Outline

• Part I: “Kids these days…”
  • Trends in:
    • Obesity & physical activity
    • Sport participation & specialization
  • Influencing societal factors
• Possible solutions
• S&C as an answer
• Part II: Practical recommendations
“Kids these days...”

• “...are weaker, slower, and heavier than their peers of yesteryear.” (Faigenbaum et al., 2018)

• Alarming trends in childhood obesity (Hedley et al., 2004)
  • “Over the last 20 years, obesity rates in US children and youth have skyrocketed.” (Pate et al., 2006)

• Less access to PE (CDC, 2004)
• More dependent on tech
  • Possible link to sedentary behavior? (Anderson et al., 1998)
“Kids these days…”

• Still play a lot of sports!
  • Potential consequences of these societal trends?
    • Under-prepared for sporting tasks?

*Figure 28.1: Participants in high school sports by sex and number of high school students in grades 9 through 12 in the United States from 1971 to 2000.*

“Kids these days...”

• Are more likely to specialize in a particular sport!
  • “Early specialization” defined as committing to a single sport 8 months of the year “to the exclusion of participation in other sports” prior to 12 years of age (LaParade et al., 2016)
  • Specialization rates increase with age (Jayanthi et al., 2012)
  • Associated with overuse injuries, social isolation, and, ultimately, burnout and sports withdrawal (Cote et al., 2009; Jayanthi et al., 2013; Malina, 2010; Myer et al., 2015)
However, it’s important to remember...

<table>
<thead>
<tr>
<th>Biological</th>
<th>Psychological</th>
<th>Social</th>
<th>Physical environment</th>
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<tbody>
<tr>
<td>Heredity</td>
<td>Self-efficacy</td>
<td>Parental attitudes and behaviors</td>
<td>Area of residence</td>
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<tr>
<td>Sex</td>
<td>Self-concept for activity</td>
<td>Peer attitudes and behaviors</td>
<td>Availability of facilities</td>
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<td>Adiposity and nutritional status</td>
<td>Perception of barriers to activity</td>
<td>Socioeconomic status</td>
<td>Safety considerations</td>
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<td>Health status</td>
<td>Perception of physical competence</td>
<td>Time spent on viewing television</td>
<td>Day of the week and holidays</td>
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<td>Sexual maturity</td>
<td>Attitudes about activity</td>
<td>Time spent on computer games</td>
<td>Season of the year</td>
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<tr>
<td>Proficiency in motor skills</td>
<td>Beliefs about activity</td>
<td>Cultural values</td>
<td>Climate</td>
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<td>Physical fitness</td>
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Some of the associations are established whereas others are suggested.

Taken from Malina et al., 2004
How might we combat these problems?

• **Sport sampling and deliberate play** *(Cote et al., 2009)*
  - May promote transfer of pattern recall skills from one sport to another *(Abernethy et al., 2005)*
  - Discourage specialization until late adolescence
    - Can encourage this, but largely out of our control
      - Unless you’re a sport coach, in which case this *may* be under your control

• **A periodized and well-rounded strength & conditioning program** *(Myer et al., 2015; Faigenbaum & McFarland, 2016; Lloyd et al., 2016)*
  - Must be implemented under the supervision of a qualified professional
The Importance of Strength

• Defined as: the ability of the neuromuscular system to produce force against an external object

• Reduced injury potential
  • Increased force output
    • Ability to deal with outside/imposed forces
  • Increases tensile strength of muscle and connective tissue
  • Increased RFD

• Improved balance

• Increased bone mineral density through the training process (Wolff’s Law)

• Can positively influence the mastery of motor skills (Stone, 2015; Lloyd et al., 2016)
Part II: S&C: The Practical Side

I. Getting Started
II. Logistical Concerns
III. Programming Concerns
IV. Periodization
V. Monitoring

• DISCLAIMER: This presentation does not include a program you can steal
Getting Started

• What you need:
  • A certified coach
  • CSCS, USAW, SCCC
  • Patience and an open mind
    • These are not miniature adults (even if they look like it)
    • Meet them at their level (which can vary wildly)
      • More on this later...
Logistics

• Number of athletes
  • Athlete:Coach ratio, available supervision

• Space and equipment available
  • Sharing facilities and equipment across the athletic department
  • The need for open communication and understanding
Programming

• What is it?
  • Exercise selection
    • Not just weight room stuff:
      • Conditioning
      • Agility
      • Relevant sport-specific technique work
    • Sets and Reps
  • Load

• Major Concerns:
  • Training age
  • Common injuries for the sport
    • Mechanism of injury
  • Determinants of sporting success
Programming Concerns: Training Age

• Basically: how long have they been training?

• Influences all aspects of programming:
  • Exercise selection
  • Volume & Loading
  • Instruction

• Also can influence rate of adaption to training (Faigenbaum, 2008)
Programming Concerns: Common Injuries

The Big 3 Questions for your sport:

1. What are they?
2. How do they happen?
   - Contact vs. Non
   - What movements or portions of movements have elevated risk?
3. How can we reduce the risk?

Example: Baseball pitching, rotator cuff injury

Figure 2. Forces applied to the arm at the shoulder in anterior-posterior (AP), superior-inferior (SI), and compression (C) directions. The instants of foot contact (FC), maximum external rotation (MER), ball release (REL), and maximum internal rotation (MIR) torque are shown.

(Fleisig et al., 1995)
Programming Concerns: Determinants of Success

• What is the difference between winners and losers?
  • Always multifaceted

• How can we bridge that gap through training?
  • Technique or physiology

• Overly simplistic example: Sprint Speed
  • SL x SF = SprntSpd
  • ↑SL x SF = ↑SprntSpd
    (Weyand et al., 2000)
Periodization

• Deals with timelines and fitness phases and the manipulation of intensities to manage fatigue and maximize adaptation (Stone, 2015)
  • MUST take into account all aspects of team training – resistance training doesn’t exist in an alternate dimension

• A central concern in the arrangement and organization of an annual training plan

• Will be a major portion of the practical discussion
Monitoring

• Testing gives you:
  • markers of progress
  • feedback on your plan

• Typical tests to use:
  • Anthropometry
    • Ht, Wt, Girths, %BF, BMI...
  • 1RM, or other RMs
    • Training age considerations
  • Max Reps (push-ups, sit-ups, etc)
  • Vertical Jump
  • Sprints (10, 30, 40, 60 yds, etc.)
  • 300m Shuttle
  • 1.5 Mile run
Still to come: Practical Discussion

• Possible Topics:
  • Equipment – essential and optional
  • Exercise instruction and progression
  • Designing a basic Annual Plan

• Come with questions!
  • We can talk about whatever you want
References


