BUFF ON THE BEACH:

PERFORMANCE ENHANCING SUBSTANCES IN THE PEDIATRIC POPULATION

Michele LaBotz MD FAAP
Council on Sports Medicine and Fitness

InterMed Sports Medicine
Portland, Maine

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WHAT ABOUT YOUR PRACTICE?
(ROUND NUMBERS FOR EASY MATH)

- Primary care pediatric panel size: 2000
  - Adolescents ~ 20%
    - 400 adolescents
- Numbers of patients who have used:
  - Protein supplements: 110
  - Creatine: 65
  - Anabolic steroid: 25

EAT-2010; Monitoring the Future, 2013; Partnership Attitude Tracking Survey, 2013;

OVERVIEW

Who are these patients?

What are they using?

Why should I care?

What should I do about it?

TERMINOLOGY

- Performance Enhancing Substances (PES)
  - Traditional terminology
  - Includes supplements and drugs
  - Used for enhancement of
    - Athletic performance
      - "Traditional"
    - Cognitive performance
      - More recent

TERMINOLOGY

- Appearance and Performance Enhancing Substances (APES) or Appearance and Performance Enhancing Drugs (APEDS)
  - Recognition that many of these substances used in efforts to improve appearance
    - Weight loss
    - Increased muscularity

WHO USES THIS STUFF?

- Body dissatisfaction/dysmorphia
- Higher BMI
- Training in commercial gym
- Exposure to appearance-focused fitness media
  - Not sport-reporting media
- Athletes >non-athletes (OR 1.5)

PATTERNS OF USE

- By sex: boys much higher rates of use of substances to increase strength and muscularity as compared to girls
  - Girls much higher rates nonprescription diet pills
- By sexual orientation: gay and bisexual adolescent boys with 6x higher rates anabolic steroid use than heterosexual boys
- By race/ethnicity: several studies with increased rates of anabolic use in certain Asian and Hispanic populations

How often have you done each of the following things in order to increase your muscle size or tone during the past year?

-Changed my eating

-Exercised more

-Used protein powder or shakes

-Used steroids

-Used other muscle-building substance (such as creatine, amino acids, hydroxyl methylbutyrate (HMP), DHEA, or growth hormone)

MUSCLE ENHANCING BEHAVIOR

- Boys
  - Change diet: 69%
    - Sometimes/often: 43%
  - Exercise more: 90%
    - Sometimes/often: 80%
- Girls
  - Change diet: 62%
    - Sometimes/often: 43%
  - Exercise more: 80%
    - Sometimes/often: 63%

Eisenberg ME, Wall M, Neumark-Sztainer D. Pediatrics 130(6): 2012

PROTEIN SUPPLEMENTATION

- Students who report any use of protein supplements
  - Boys
    - Middle school: 30%
    - High school: 39%
  - Girls
    - Middle school: 25%
    - High school: 18%

Eisenberg ME, Wall M, Neumark-Sztainer D. Pediatrics 130(6): 2012

PROTEIN SUPPLEMENTATION

- Percent who report any use of protein supplements
  - Sports teams
    - Boys: 39.6% athletes vs 25.5% non-athletes
    - Girls: 24.2% athletes vs 18.2% non-athletes

Eisenberg ME, Wall M, Neumark-Sztainer D. Pediatrics 130(6): 2012

CREATINE

- 2013 Monitoring the Future creatine use in males during 2012-3:
  - 8th grade: 3%
  - 10th grade: 11%
  - 12th grade: 18%
- Female use ~10% that of males

ANABOLIC AGENTS

- Anabolic steroids
  - Reported use rates high school students: 7%
    - 2013 Partnership Attitude Tracking Survey
- Anabolic prohormones
  - Reported use rates 8th/10th/12th graders: <2%
    - 2014 Monitoring the Future Survey

CAFFEINE

- 73% children consume caffeine on any given day

	Caffeine amount in mg
Median daily intake 12-19 yo	40
12 ounce cola drink	~ 35
8 oz brewed coffee	100-200
8 oz Red Bull	75-80
5 hour energy shot	200

Branum AM, Rossen LM, Schoendorf KC. Pediatrics 133: 386-9, 2014

CAFFEINE AND OTHER STIMULANTS

- "Thermogenic aids"
  - High doses of caffeine or herbal stimulant
  - Typically sold as weight loss aids
- Non-prescription diet pill use 8th-12th grade
  - Females: 11%
  - Males: 4%

OTHER STIMULANTS

- Diversion of ADHD meds appears as dominant source
  - 12th graders in 2013 Monitoring the Future question on non-prescribed use of amphetamines
    - Lifetime: 12%
    - Monthly: 4%
  - Overall, athletes not at higher risk for use
    - But, some athlete groups with higher prevalence

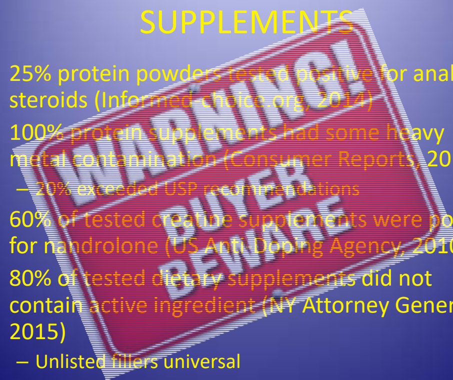
Veliz P, Boyd C. J Stud Alcohol Drug, 2013

WHY SHOULD WE CARE?

SUPPLEMENTS

- Dietary Supplement Health and Education Act of 1994
  - a.k.a. DSHEA
- Dietary supplements not subject to same FDA oversight as foods or drugs
  - Manufacture
  - Labeling
  - Marketing

SUPPLEMENTS



- 25% protein powders tested positive for anabolic steroids (Informed-choice.org, 2014)
- 100% protein supplements had some heavy metal contamination (Consumer Reports, 2010)
  - 20% exceeded USP recommendations
- 60% of tested creatine supplements were positive for nandrolone (US Anti-Doping Agency, 2010)
- 80% of tested dietary supplements did not contain active ingredient (NY Attorney General , 2015)
  - Unlisted fillers universal

DRUGS

- Anabolic steroids/prohormones
  - Schedule 3
- Most stimulants/ADHD medications
  - Schedule 2
- Many adolescents and families not aware of the legal consequences of non-prescribed possession and use of these agents

ANABOLIC STEROID RISKS

- Physicians often focus on
  - Liver dysfunction
    - Cholestatic jaundice
    - Tumors
  - Lipid changes
    - Decreased HDL/increased LDL
  - Cardiomyopathy
  - Dependence
  - Aggression/mood changes
  - Long term effects on brain remodeling
    - Unique to adolescents

ANABOLIC STEROID RISKS

- Of greater concern to users
  - Acne
    - Esp severe on back
  - Gynecomastia
    - Irreversible
    - May be using estrogen blockers to prevent
  - Male pattern baldness
    - Irreversible
  - Premature physeal closure
    - Decreased final adult height

WHAT SHOULD WE DO ABOUT IT?

OPPORTUNITIES

- Routine health maintenance examination
- Problem office visits
  - Anxiety/headaches
  - Acne
  - Weight-related concerns
  - Fatigue
  - Musculoskeletal related injury
- Social opportunities

PRACTICE APPROACH

- Ask-tell-ask
  - Request permission to discuss
    - e.g. "Do you mind if I tell you…"
  - Share information
  - Inquire about impact
    - e.g. "What do you think about that?"

PES VS "OTHER" SUBSTANCE USE

- PES use is goal-directed
  - Different approach than for recreational drug use
- Potential benefit significantly outweighs dissuasive factors
- More effective to focus on lack of benefit
  - Rather than potential adverse consequences

Goulet C, Valois P, Buist A, Cote M. Clin J Sport Med 20(4): 243-8, 2010.

THE "YES" MESSAGE

- Improved strength and muscle gains rely upon:
  - Good nutrition
  - Resistance training
    - Including high intensity
  - Adequate rest/recovery
    - Muscle growth occurs during this time
      - Esp. 36-48 hours after hard workout

HOW TO GAIN 2 POUNDS IN 1 WEEK**

- Increase calories by 550-700 kcal/day
- Adequate protein
- Appropriate intensity of strength training
  - Sets of 6-12 repetitions
  - 3-6 sets/exercise
  - 6-9 exercises total

** Only applies after pubertal onset.

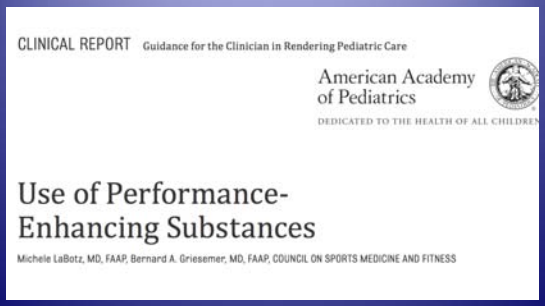
KEY NUTRITION POINTS PROTEIN

- Needs typically met in varied meat-eating diet
  - Up to 1.7 gr protein/kg body weight in athletic adolescent
    - 150 lb athlete may need up to ~115 gr protein/day
      - Most meat contains ~ 25 gr protein/3 ounce serving
      - Milk contains ~ 1gr protein/fluid ounce
      - Carnation instant breakfast: 26 gr protein/16 oz
        - » Protein supplements 25-35 gr protein/16 oz

ADVICE FOR PARENTS

- Get involved and stay connected
  - Aware of social climate at school, on team and at gym
  - Aware of media impact (websites, magazines)
  - Ask directly about use
  - Use news stories as starting point

PES CLINICAL REPORT


CLINICAL REPORT Guidance for the Clinician in Rendering Pediatric Care

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN

Use of Performance-Enhancing Substances

Michele LaBotz, MD, FAAP, Bernard A. Griesemer, MD, FAAP, COUNCIL ON SPORTS MEDICINE AND FITNESS

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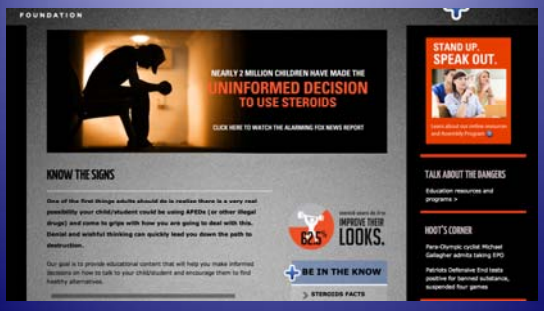

TAKE HOME MESSAGES

- Muscle-enhancing activity very common in adolescence
- Stimulant use for weight loss and/or cognitive enhancement
- Ask-tell-ask
- "Yes" messages important when addressing PES

THANK YOU