Proper Nutrition and Exercise for the Adolescent

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INTRODUCTION

Adolescence:

● Period between 10-19 years
● Divided into three stages
  1. Early - rapid growth, onset of puberty
  2. Middle - autonomy
  3. Later - making important decisions
CONTROVERSY

- Delicate age
- Hormonal changes
- Low self-esteem and insecurities
- Worry about bodily changes
- Athletic pressure

**Purpose:** To examine the relationship between body dissatisfaction and attitudes towards drug use in sport in order to inform education and health promotion programs.
MATERIALS AND METHODS

Materials: Questionnaires

Methods: 1148 male adolescents (age range 11-21 years) in Australia who completed a self-report questionnaire that measured:

1) Weight change behaviors, supplement use, body dissatisfaction (Male Body Attitudes Scale; MBAS)
2) Attitudes towards doping in sport (Performance Enhancing Attitudes Survey; PEAS)
RESULTS

Adolescent boys who reported using supplements and dietary products (vitamins, minerals, protein powders, sports drinks, energy drinks) were more likely to have higher levels of body dissatisfaction and to be more supportive of the use of drugs in sport.
Discussion: Body image prevention programming for adolescent boys (functional aspect aspect of their body) are different from girls (aesthetic reasons).

Implications: Preventive programs should aim effective ways to build muscle and increase sports performance without the use of doping.

Limitations: Words, concepts and lack of comfort in this questionnaire, which might have resulted in inaccurate reporting of supplements.

**Purpose:**
- To examine the association between sport variables & DE in male/females in elite aesthetic sports
Methods/Materials:

- All Participants:
  - Average 14 y/o, Controls & Athletes sex- & age-matched, 96 in each group
  - Age, wt., ht., exercise, questionnaire - Eating Attitudes Test-26 & Eating Disorder Inventory

- Athletes:
  - Ice & roller-skate figure skating, diving, gymnastics & rhythmic gymnastics, ballet
  - Contour Drawing Rating Scale, ATHLETE-Scale Drive for Thinness & Performance, Appearance-Related Social Pressure
Results:

● Athletes & girls (p<0.001) more likely to have DE vs. non-athletes & boys
● Girls had greater body dissatisfaction (p<0.001) vs. boys
● Higher rates of DE in aesthetic sport athletes, emphasis on increased risk in both genders
Conclusion/Discussion:
- Body dissatisfaction constant in both groups - seek out other sports-related variables that contribute to greater rate of DE in athletes
- Issue with sports system - athletes strive to improve performance by stressing leanness → DE
- Source of social pressure - evaluate in future research → improvement within system
- Focus on females & males, rather than just females
- Cross-sectional study
- Participant bias in answering questionnaires

**Purpose:** The primary purpose of this study was to assess the eating attitudes and dietary intakes of elite adolescent female figure skaters to assess the possible nutritional risks that are generally prevalent in this competitive population.
MATERIALS AND METHODS

Participants: 36 elite adolescent female figure skaters

Methods:
- Self administered 3-day food diary
- Physical activity records during training season
- Training camp
  - EAT-40
  - Fasting blood samples
  - Height/Weight measurements
Eating Attitudes Test (EAT-40)©

Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the form below as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

Sample Code: 

### Part A: Complete the following questions:

1) Birth Date: Month ▼ Day ▼ Year ▼  
2) Gender: ☐ Male  ☐ Female

3) Height: Feet ▼ Inches ▼

4) Current Weight (lbs.):  
5) Highest Weight (excluding pregnancy):  
6) Lowest Adult Weight:  
7) Ideal Weight:  

### Part B: Check a response for each of the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Always:</th>
<th>Usually:</th>
<th>Often:</th>
<th>Sometimes:</th>
<th>Rarely:</th>
<th>Never:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Like eating with other people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Prepare foods for others but do not eat what I cook.</td>
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<td></td>
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<tr>
<td>3. Become anxious prior to eating.</td>
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<tr>
<td>4. Am terrified about being overweight.</td>
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</tr>
</tbody>
</table>
# RESULTS

**Table 2 Mean daily nutrient intakes of elite adolescent female figure skaters (n = 34)**

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Elite skaters Mean ± SD</th>
<th>NHANES 1999–2000 (12-19y) Mean ± SEM</th>
<th>% NHANES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>1491 ± 471</td>
<td>1993 ± 45.7a</td>
<td>75%</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>55.8 ± 19.5</td>
<td>67 ± 1.2a</td>
<td>84%</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>234.8 ± 70.8</td>
<td>277 ± 3b</td>
<td>85%</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>40.2 ± 21.9</td>
<td>43 ± 1a</td>
<td>93%</td>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>13.8 ± 7.5</td>
<td>24 ± 0.3b</td>
<td>58%</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>763.3 ± 438.1</td>
<td>793 ± 26.5c</td>
<td>96%</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>11.6 ± 4.7</td>
<td>13.4 ± 0.4c</td>
<td>87%</td>
</tr>
<tr>
<td>Phosphorus (mg)</td>
<td>737.4 ± 345.7</td>
<td>1093 ± 27.3c</td>
<td>67%</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>183.0 ± 86.8</td>
<td>216 ± 5.7c</td>
<td>85%</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>5.5 ± 2.8</td>
<td>9.6 ± 0.29c</td>
<td>57%</td>
</tr>
<tr>
<td>Vitamin D (mcg)</td>
<td>2.8 ± 2.6</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vitamin B12 (mcg)</td>
<td>2.2 ± 1.6</td>
<td>3.4 ± 0.2d</td>
<td>65%</td>
</tr>
</tbody>
</table>
RESULTS

- Moderate risk of disordered eating
- BMIs - normal range
- 70% did not report recent weight loss
- EAT-40 score – normal (25% - EAT-40 score >30)
- 24% high risk
- Mean energy intake: 1491 kcal/day
  - 61.6% CHO, 14.6% protein, 23.7% fat
  - 1/36 classified as “underweight”
RESULTS

- 38% considered themselves overweight
- 22% told by others they were overweight
- Nutrition education necessary to inform athletes and training staff on guidelines for athletes.
- Focus on helping skaters learn methods to maintain optimal weight-for-height while meeting physical demands.
DISCUSSION AND IMPLICATIONS

Discussion: Moderate risk of disordered intake among this sample of elite adolescent female skaters but skaters should be encouraged to keep energy intakes in line to ensure adequate nutrient intake needed to growth, development, and training.

Implications: The skaters most had appropriate weights for heights but energy intake among the sampled athletes was generally low.
LIMITATIONS

- Small sample size
- Reliance on self-reported data and use of three-day food records
- 2 month hiatus between data collection and training camp
- Data collected during training season, not reflective of off-season food intake
Purpose: The purpose of the study was to compare different factors associated with unhealthy eating behaviors in athletes, and nonathletes in both genders.

Sample size: 580 athletes, 362 non-athletes, 11-19 years old
MATERIALS AND METHODS

Instruments:

- Eating Attitudes Tests (EAT_26)
  - The items measured three subscales of diet, bulimia, and oral self-control
- Body fat (calliper)
- Demographic aspects (age, gender, type of sports, training hours)
RESULTS

26.1% of female non-athletes
18.1% of female athletes
15.3% of male non-athlete
14.4% of male athletes

Table 2. Mean and standard deviation of the Eating Attitudes Test-26 subscales by gender and group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Female Athletes</th>
<th>Female Non-athletes</th>
<th>Male Athletes</th>
<th>Male Non-athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Diet</td>
<td>7.42</td>
<td>0.39</td>
<td>7.96</td>
<td>0.49</td>
</tr>
<tr>
<td>Bulimia</td>
<td>2.95</td>
<td>0.24</td>
<td>2.21</td>
<td>0.20</td>
</tr>
<tr>
<td>Oral self-control</td>
<td>4.61</td>
<td>0.25</td>
<td>4.76</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>4.52</td>
<td>0.38</td>
<td>6.75</td>
<td>0.54</td>
</tr>
<tr>
<td></td>
<td>1.30</td>
<td>0.22</td>
<td>1.93</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>3.47</td>
<td>0.23</td>
<td>3.59</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*P < 0.05 compared to group female athletes.
*P < 0.05 compared to the group female non-athletes.
*P < 0.05 compared to group male athletes.
*P < 0.05 compared to the group non-athlete males.
RESULTS

- Athletes regardless of group were older and had less body fat percentage than non-athletes.
- The results indicate that females are more likely to develop unhealthy eating behaviors, regardless of the group.
- Athletes were less influenced than non-athletes with regard to food intake and eating disorder symptoms.
DISCUSSION AND LIMITATION

Discussion:
● Dietary restriction seems to be more common in female nonathletes
● Inconsistency between the literature results

Limitation:
● Use of self report
● Measuring fat mass via doubly indirect method
ARTICLE 5


**Purpose:** to determine relationships among food intake, biochemical parameters and body composition in adolescent female swimmers, with and without disordered eating (DE).

**Participants:** 77 female athletes (11-19 years old), from swim clubs who had reached the 2005-2006 5th ranking position in the state championships in Rio De Janeiro.
MATERIALS AND METHODS

**Materials:**
- Three questionnaires:
  - Eating Attitudes Test-26 (EAT-26), Bulimic Investigatory Test, Edinburgh (BITE), and Body Shape Questionnaire (BSQ)
  - DXA
  - 3-day non-consecutive dietary recall

**Methods:**
- DE was determined using questionnaires, DXA for body composition, and recall for nutrient intake.
- Nutrients analyzed: protein, CHO, fat, calcium, iron, folic acid, zinc, vit C, B12
- Intake was compared to ACSM and ADA recommendations
Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the form below as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

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<th>Never:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I Am terrified about being overweight.</td>
<td></td>
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<tr>
<td>2.</td>
<td>I Avoid eating when I am hungry.</td>
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<td>3.</td>
<td>I Find myself preoccupied with food.</td>
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<td>4.</td>
<td>I Have gone on eating binges where I feel that I may not be able to stop.</td>
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<td>5.</td>
<td>I Cut my food into small pieces.</td>
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<td>6.</td>
<td>I Aware of the calorie content of foods that I eat.</td>
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<td>7.</td>
<td>I Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)</td>
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<td>8.</td>
<td>I Feel that others would prefer if I ate more.</td>
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<td>9.</td>
<td>I Vomit after I have eaten.</td>
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<td>10.</td>
<td>I Feel extremely guilty after eating.</td>
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<td>11.</td>
<td>I Am occupied with a desire to be thinner.</td>
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<td>12.</td>
<td>I Think about burning up calories when I exercise.</td>
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<tr>
<td>13.</td>
<td>I Other people think that I am too thin.</td>
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<td></td>
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<tr>
<td>14.</td>
<td>I Am preoccupied with the thought of having fat on my body.</td>
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<tr>
<td>15.</td>
<td>I Take longer than others to eat my meals.</td>
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<tr>
<td>16.</td>
<td>I Avoid foods with sugar in them.</td>
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<td>17.</td>
<td>I Eat diet foods.</td>
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<td>18.</td>
<td>I Feel that food controls my life.</td>
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<td>19.</td>
<td>I Display self-control around food.</td>
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<tr>
<td>20.</td>
<td>I Feel that others pressure me to eat.</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>21.</td>
<td>I Give too much time and thought to food.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>I Feel uncomfortable after eating sweets.</td>
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<td></td>
<td></td>
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<tr>
<td>23.</td>
<td>I Engage in dieting behavior.</td>
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<td></td>
<td></td>
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<tr>
<td>24.</td>
<td>I Like my stomach to be empty.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>I Have the impulse to vomit after meals.</td>
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<td></td>
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</tbody>
</table>

Eating Attitudes Test (EAT-26)
BSQ

We should like to know how you have been feeling about your appearance over the PAST FOUR WEEKS. Please read each question and circle the appropriate number to the right. Please answer all the questions.

OVER THE PAST FOUR WEEKS:

1. Has feeling bored made you brood about your shape? ............................................ 1 2 3 4 5 6
2. Have you thought that your thighs, hips or bottom are too large for the rest of you? .................................................................................................................. 1 2 3 4 5 6
3. Have you felt so bad about your shape that you have cried? ................................. 1 2 3 4 5 6
4. Have you avoided running because your flesh might wobble? .......................... 1 2 3 4 5 6
5. Has being with thin women made you feel self-conscious about your shape? .......................................................................................................................... 1 2 3 4 5 6
6. Have you worried about your thighs spreading out when sitting down? ........... 1 2 3 4 5 6
RESULTS

• 44.2% were found to have some DE behavior
• 24.7% were found to have tried fasting, laxatives, diuretics, or purging as a means for weight loss

• **DE-positive participants:**
  • Higher percent body fat
  • Decreased protein intake (11-14 y/o)
  • Decreased calcium intake (15-19 y/o)
RESULTS

Table 4
Energy consumption adequacy, macronutrients, and micronutrients of adolescent female swimmers, according to age strata

<table>
<thead>
<tr>
<th>Adequacy, % (n)</th>
<th>11–14 y</th>
<th>15–19 y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DE positive (n = 18)</td>
<td>DE negative (n = 25)</td>
</tr>
<tr>
<td>Energy (kcal · kg⁻¹ FFM · d⁻¹)</td>
<td>72.2% (13)</td>
<td>88.0% (22)</td>
</tr>
<tr>
<td>Carbohydrate (g · kg⁻¹ · d⁻¹)</td>
<td>11.1% (2)</td>
<td>28.0% (7)</td>
</tr>
<tr>
<td>Protein (g · kg⁻¹ · d⁻¹)</td>
<td>27.8% (5)</td>
<td>20.0% (5)</td>
</tr>
<tr>
<td>Fat (%)</td>
<td>88.9% (16)</td>
<td>92.0% (23)</td>
</tr>
<tr>
<td>Calcium (mg/d)</td>
<td>27.8% (5)</td>
<td>24.0% (6)</td>
</tr>
<tr>
<td>Zinc (mg/d)</td>
<td>50.0% (9)</td>
<td>36.0% (9)</td>
</tr>
<tr>
<td>Iron (mg/d)</td>
<td>88.9% (16)</td>
<td>100% (25)</td>
</tr>
<tr>
<td>Folate (µg/d)</td>
<td>44.4% (8)</td>
<td>28.0% (7)</td>
</tr>
<tr>
<td>Vitamin B12 (µg/d)</td>
<td>50.0% (9)</td>
<td>64.0% (16)</td>
</tr>
<tr>
<td>Vitamin C (mg/d)</td>
<td>66.7% (12)</td>
<td>48.0% (12)</td>
</tr>
</tbody>
</table>

DE, disordered eating; FFM, fat-free mass
**Implications:** Female adolescent athletes with DE are more likely to have increased body fat, decreased protein consumption, and decreased calcium consumption compared with DE-negative adolescent athletes.

**Limitations:** Estimation errors, omittance of hormones as biochemical markers, no male participants.
REFERENCES


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