Step-By-Step Process for Helping Athletes Achieve Optimal Performance Weight and Body Composition

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**Question:** Does ‘weight’ give you the information you need to predict performance?

Higher Weight, Lower Fat  
Higher Weight, Higher Fat  
Lower Weight, Higher Fat  
Lower Weight, Lower Fat

Physics suggests that “total mass” is important in some sports/position, but quickness/velocity is also important.

**Consider:** For every kg increase in mass, an exponential increase in power is needed to move it.
Question: Is muscle mass per unit height a good predictor of performance?

Lower muscle : height ratio

Increasing muscle mass, without a concomitant reduction in fat mass may help an athlete perform better, but may not be sufficient to win.

High muscle : height ratio
Major Contributing Inhibitors To Poor Nutrition in Athletes

ORGANIZATION

• **Event Sponsorships**: products available to athletes that may not be optimal

• **Credentialed Nutritionists/Dietitians Unavailable**: No expert at training/competition. Bad advice given by others

• **National Governing Bodies**: Perpetuation of bad behavior with NO oversight.

• **Supplements**: Purveyors ‘pushing’ supplements with convincing advertisements

• **Bad “Rules”**: Training venues that inhibit easy availability of appropriate foods/beverages.
KNOWLEDGE

- Inappropriate Modeling: Copying admired athletes.
- Belief vs. Science: Thinking of nutrition as a ‘belief’ system and not a science.
- Misattribution of Perceived Benefit: Consuming certain foods/beverages may not help for the reasons they believe.
- “Good” and “Bad” Foods: Oversimplification results in problems
- Magic Bullet: Looking for the easy fix.
Major Contributing Inhibitors To Poor Nutrition in Athletes, Continued...

TRADITION

• **Sport Traditions**: Perpetuation of coach/sport induced nutrition-related problems.

• **Weight Focus**: Excessive focus on “weight”, when the focus should be on “body composition” and “strength:weight ratio”

• **Protein Solves Everything**: High protein intake will successfully resolve all potential nutrition problems.

• **Reliance on Supplements**: Lowers food intake and creates WADA issues

Relay, Athens Olympic Games 2004
Supplement ‘Issues’

• Taken in large amounts, some supplements may result in opposite of desired effect.

• Many supplements have banned substances not listed on the label.
Dieting To Achieve ‘Weight’ Goals Predisposes to Fatness


- The fraction of weight loss as fat-free mass increases
- Feedback signals from depletion of both fat and FFM through effects on energy intake and adaptive thermogenesis
- A faster rate of fat recovery relative to FFM recovery is a feature of body composition autoregulation
  - High rates of dieting and weight loss recidivism raise concerns..
    - Increased risk for eating disorders
    - Low bone density
Macroeconomic View of Energy Balance
(...and the basis for most ‘weight loss’ programs)

Traditional Energy Balance View

Positive Energy Balance=Wt Gain
(i.e., greater intake than expenditure)

Energy Intake (24 hours)

Energy Expenditure (24 hours)

Ratio

Energy Balance

Negative Energy Balance=Wt Loss
(i.e., greater expenditure than intake)

3500 kcal = 1 lb?

NO!

Random consumption of protein does not work to improve musculature

**Before**

EB: 24 hr=-458 kcal (Total Kcal In=3134)
EB: Hr Cat=22; Hr Ana=2
EB: Largest Def=-1824 kcal

**Prot**: 1.93 g/kg (246 g; 32% tot kcal)
Actual: 0.55 g/kg (70 g)

**After**

EB: 24 hr=-109 kcal (Total Kcal In=3617)
EB: Hr Cat=12; Hr Ana=12
EB: Largest Def=-541 kcal

**Prot**: 1.60 g/kg (205 g; 22% tot kcal)
Actual: 1.48 g/kg (190 g)
Would you treat these as the same?

Never more than 40 grams of sugar (160 kcal) at one time

90 grams of sugar (360 kcal) at one time

Totals sugar intakes are the same
Some background realities to consider when trying to help athletes achieve an optimal performance physique

Humans are amazingly **effective fat manufacturing machines**. Eat too much food, you make fat. Eat too little food, you lose muscle and make fat.

Humans are always finding ways to become **more energy efficient**. Exercise more and we eventually find a way to burn less energy to do this exercise. Energy (kcal) is precious.

‘**Weight**’ is the wrong measure for virtually everything that it is commonly used for. It's all about fat mass vs. fat-free (i.e., lean) mass.

**Low calorie diets are doomed to fail.** Adaptive thermogenesis leads to same weight on lower energy intake, but the resultant weight has higher fat mass that makes you look bigger.

There are **many ways to increase insulin** and make more fat besides eating refined carbohydrates (i.e., sugar), including letting yourself get really hungry and/or eating large meals.

The body's reaction to an **inadequate energy** intake is to lower the tissue that needs energy: Lean Mass (...not fat mass).
STEP-BY-STEP RECOMMENDATIONS

1. Know the sport...Each sport is very different
   • A gymnast may have a higher strength:weight ratio than a strong football lineman, but ‘size’ is also important.
   • Is there a cohort within the sport the athlete can eat with. Nutrition recommendations are more likely to succeed if the athlete environment is supportive.

2. Talk, talk, talk...Get to know the athlete
   • Artificial body composition goals doom the athlete to try ineffective strategies.
   • Relative Energy Deficiency in Sport (RED-S) is a common product of poorly established goals.
   • What is the athlete’s family/home/living situation?
   • Is the nutrition problem related to a family/girlfriend/boyfriend problem?
3. Use body composition assessment methods that have good repeat-measure reliability (small standard error between measures.)

- You are more interested in how the athlete is changing rather than how the athlete compares to population standards.
- Self-assessment is fine (i.e., worn devices), provided the athlete does not become obsessed with values.

**Example: Skinfold measures taken on the same athlete.**

- High between-measurer repeat-measure error
- Low single-measurer repeat-measure error
- Assessing a population (i.e., team), use multiple measurers to eliminate ‘fixed’ error
- Assessing an individual (i.e., player), use single measurer for more accurate delta score.
4. **Take baseline measures on 1\(^{st}\) visit**
   - Consider the measures as part of a ‘trend’. Focus on the delta (change) score.
   - If possible, create a Z-score nomogram specific to the sport/team so you (the nutrition professional) knows where the player is on each critical value.

5. **Make recommendations carefully**
   - Be careful about setting goals or strategies too early.
   - Three measures, at a minimum, may be needed to establish a trend from which goals and strategies can be developed.
   - Make no comparisons to other players...Only make recommendations relative to how the player is changing. (Ego vs. Task Oriented)
In this example, athlete is more than 1 SD below the mean in body fat %, and more than 1 standard deviation above the mean in lean mass %.

**Translation:** You are working with someone much leaner than typical for the team/position, etc.
6. Real-time visual feedback is extremely useful

- Numbers are nice, but figures are better to help the athlete put the numbers into perspective
7. Particularly with weight-sensitive sports, try to keep the assessment reports/conversation positive.

- Reporting high body fat % to an athlete may initiate a reduced eating pattern that is counter-productive, often resulting in a greater loss of lean mass than fat mass.
- An alternative is reporting on lean mass %, and encouraging the athlete to *increase* lean mass.
- Goal: Lower Body fat % may translate into dieting
- Goal: Increase Lean mass % may translate into eating more often, more carefully, etc. with more conversation.
8. Encourage the athletes to keep the information confidential.
   • Shared information can become counterproductive.
     • i.e., “Ha, ha, I have more muscle than you do!”
     • i.e., “My body fat level is lower than yours!”

9. Use supplements/ergogenic aids carefully. Some work, but the mindset that ‘more than enough is better than enough’ is pervasive.
   • **Example:** Improved nitric oxide production is useful for both performance and for reducing body fat levels. However, too much beet juice can interfere with consumption of other necessary nutrients.
   • **Example:** Higher protein is only useful if consumed in amounts and in intervals that optimize tissue utilization.
10. Allow flexibility, avoid ‘guilt’

- Use the 90-10 rule
  - Do the right thing 90% of the time; the rest of the time have ‘fun’!
- Would you really tell a player attending a birthday party to avoid eating the cake?
THANK YOU!

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