Weight-making Strategies in Boxing

Where a Nutritionist can Really Earn their Crust!

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Overview

• Physiological Demands of Boxing and Making Weight
• Integrated Nutritional and Training Strategies
• Knowledge of the Sport, it’s History, Traditions and Cultures
  • Multidisciplinary Concerns
  • Case Studies
Physiological Demands of Boxing

• Aerobic Power
• Anaerobic Capacity
  – Intermittent Sport
• Strength
• Speed
• Muscular Power
• High Energy Expenditure (0.2Kcal/min/Kg) – (Morton et al, 2010)
  – (Ghosh et al., 1995; Smith, 2006; Guidetti, et al. 2002)
Why sweat-it?

The Rationale for Weight-Making

- Weight categorised – no excess weight
- Being “big for the weight”
  - Range
  - Strength – Neuronal Factors
- Although possibly harmful, gradual weight-making can improve power and performance in combat sports (Fogelholm, 1993)
- Compromise between negative effects of weight-making and benefits from having size/strength advantages
Particular Challenges of Making Weight

- Performance Detriments
  - Aerobic Power (Vo2)
  - Anaerobic Power/Lactate Threshold
  - Strength (particularly upper body)
    - (webster 1990)
  - Punching force and frequency
    - (Smith, 2001)
- Reduced metabolic rate – even with fat loss (Johnstone, 2005)
- Catabolism
  - Gluconeogenesis
- Inflammation
  - Chronic illness, Alzheimer’s
- Dehydration
  - Trauma: Ventricular Volume seen to shrink by 30% - (Dickson, 2005)
Training for Making weight

• Depleted State and Steady State
  – Long duration – large Energy Cost
  – Submaximal exercise more dependent on fat
  – Endurance exercise induces adaptation to oxidise fat more readily
  – HOWEVER – NOT SPECIFIC TO OUR TYPE OF FITNESS!!!
Upping the Ante – High Intensity

• Exercise intensity frequently correlated with leanness (Yoshioka, et al., 2001)
  – ??? similar/lower energy costs of exercise, higher energy intakes - ???

• BMR
  – EPOC
  – Mitochondrial Biogenesis

• Sport-specific
Physiological Basis for Macronutrient Requirements

• Protein
  – Energy-restriction, coupled with exercise stimulates gluconeogenesis - PROTEIN NOW USED AS A FUEL WITHIN THE BODY!
  – High protein diets maintain LBM despite energy-deficits (Pikosky et al., 2008)
  – High thermic Effect (30% calories used!)
  – Leucine supports anti-catabolic effects of insulin, with MUSCLE/PROTEIN-SPECIFIC EFFECTS (Norton & Layman, 2006)
  – Increasing Glutamine intake will support immunological function and oppose inflammatory effects (sacks, 1999)
  – Essential for enhancing training adaptations
Case Study


- 9 Day weight-loss (2Kg)
- “Free weight-making” (low pro <0.9g/day) Vs Intake 2g Pro/Kg/day
- Higher protein groups consumed far more calories in 2nd half (1200Kcal Vs 800Kcal) – more gradual losses
- Net Protein Breakdown ONLY seen in low Pro groups
Carb is Not the Enemy (But Demands Respect)!

• Carbohydrate essential for high-intensity effort
• INTENSITY of exercise correlated with leanness despite higher ENERGY and CARB intakes (more so than DURATION)(Yoshioka, et al., 2001)

• Gradual weight loss in Judoists showed an improvement in power compared to acute weight loss – Carb intake was 31% higher (240g Vs 180g), representing 50-60% intake (Fogelholm, 1993)

• COMPROMISE WITH CARBS
  – Professional Boxer maintained strength and performance on 2.5g/Kg/day (Morton, 2010)
Fats – Essential!

- Essential Fats needed to regulate inflammation, hormone production and cell-signalling
- Cognitive benefits – 30% of Dry Mass of Brain!
- Omega-3 seen to ease inflammatory conditions in athletes, as well overtraining (Mickleborough et al., 2003)

- Circulating fat stimulates fat oxidation

FAT ADAPTATION HAS SHOWN EXTREMELY PROMISING RESULTS...BUT

- Although High Fat diets cause adaptations to increase fat oxidation, these only show performance benefits for medium-intensity exercise (Stepto et al., 2002; Lambert et al., 1994)
  - Not compatible with High CHO intakes
  - Not suitable for boxing
Case Study


• 12 week Training Camp
• 9.4Kg Lost
• Macros (per Kg)
  – CHO – 2-2.5g
  – PRO – 2-2.5g
  – Fat – 0.75g

Maintained performance in all strength measures
Meal Frequency

• Small Frequent Meals

• Rationale
  – No Protein Storage
  – blood-sugar regulation
  – Satiety

• 6 meals Vs 2 Meals per day (1200Kcal) in weight-making boxers (Iwao 1996)

• Less LBM loss and nitrogen imbalance from frequent meal pattern
Cycling Macro-Nutrients

Macronutrient Cycling

- Carb intake
- Protein intake
- Fat intake

Day

Mon Tue Wed Thu Fri Sat Sun

Intensity

0 2 4 6 8 10 12

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Supplementation for Weight-making and Boxing

• Protein – high leucine/glutamine formulas
  – Easier to achieve high protein requirement and maintain energy deficit
  – Leucine supports anti-catabolic effects of insulin, with MUSCLE/PROTEIN-SPECIFIC EFFECTS (Norton & Layman, 2006)

• Creatine
  – Improves repeated sprint performance, body-comp and power (Juhn, 1998)
  – *Water retention should be closely monitored throughout supplementation to account for additional weight*

• BCAAs/EAAs
  – 10-15g protein needed for adaptation, but same effects can be obtained with 5g EAAs, reducing energy intake despite anabolic stimulus (Borsheim & Tipton 2002)

• BCAAs seen to prevent power and strength losses throughout weight-making (Mourier et al. 1997)

• Caffeine
  – Enhances fat utilisation during exercise (Ivy & Costill, et al. 1979)
Supplementation for Weight-making and Boxing

- **Omega-3**
  - Anti-catabolic effects from supplementation, as well as prevention of inflammatory disorders from training/overtraining (Mickleborough et al., 2003)

- **Hi Strength Multivitamin**
  - Most athletes *easily* consume RDIs *(Validity of RDIs?!: Vit-D)*
  - Weigh-making athletes *almost always deficient*
    - Many boxers below even RDIs for *most/all* micronutrients, with particular risk for Vitamins E, D, Folate, Magnesium and Zinc – (Simatos, 2005)

- **MCTs – Coconoil**
  - Increases BMR and fat oxidation (Seaton, 1986)

- **Beta-alanine**
  - Supports anaerobic exercise and repeated sprint performance (Stout, 2006)
Getting Humility Knocked into You...

• Boxers may not be the brightest (?)... BUT...

• Always respect cultures in sport
Sweating Down – Feeling the Heat

- Heat Dissipation and sweat-glands increase energy expenditure (Cheung & McLellan, 1998)
- If rehydration is optimised, acute dehydration of 4-5% bodyweight often has no negative impact on performance in weight controlled sports (Slater, 2007)
- Some boxers adapt to frequent dehydration – lose from periphery, not plasma! (Smith, 2001)
- Morton did a second intervention, maintaining 2Kg more LBM and acutely dehydrating for weigh-in
  - Strength and power increased 10% throughout training-camp
RECOVERY: Rehydration

• To adequately rehydrate, you should aim to **drink one and a half times what you sweat-out before weigh-in/in a session**:  
  If you know you sweat-out 2Kg, then you need to drink 3L; if you sweat-out 3Kg, then you need to drink 4.5L
• Not only will dehydration affect your muscles’ ability to function, but the loss of salts may eventually affect your nerve-function, reactions and concentration.
• Salts will increase water retention and support neural function
• Rehydration drinks/*drinking alongside meals* is ideal
• Hydration can also involve “liquid meal replacement” after weigh-in, which also contains salts, carbs and protein to help hydration
• Pre fight: 500 ml of water or sports-drink in the 90 minutes before the fight
• During a fight: sip water without feeling bloated in the corner between rounds: rehydration within the first 45 min not essential for performance
CARB LOADING

- Post weigh-in: 10g.CHO Per-Kg per-day over the day of the fight (E.g. 700g for a 70kg athlete)
- Previous days’ CHO-restriction will have increased GLUT4 receptors and capacity for glycogen synthesis
  - Extra Glycogen (CHO) Storage IN MUSCLE!!
- Weight-gain up to 2 kg/Supports hydration
- Cut back on fiber and make use of compact sources of carbohydrate – bars/breads/powders etc

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<tr>
<th>Fight-Day Example for a 70kg athlete – adapt for your own weight/tastes</th>
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<td>7am: Breakfast (Post weigh-in)</td>
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<td>8 scoops recovery meal replacement (Pro Recover) or Large, white Peanutbutter &amp; jam sandwich with 2x500ml Lucozade &amp; 1L water</td>
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<td>140g (Simple/High-GI)</td>
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Conclusions

...The Final Bell

• Vary training, but make sure we’re on target
• Cycling (not cycling!) a good strategy
• High protein a necessity
• Moderate carb – Vary according to individual’s weight-demands and training
• Supplement to ensure sufficient micronutrients
• Ergogenic supplements particularly suited for boxers
• Fats may help fat-loss
• Listen and Learn!