MAKING WEIGHT FOR COMBAT SPORTS

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OVERVIEW

• Overview of weight category sports

• Nutritional management of weight category sport athletes:
  Acute weight loss
  Post weigh-in recovery

• Case study
It is not uncommon for athletes in weight category sports to attempt to reduce their body mass in order to qualify to compete in weight divisions below their day-to-day or training weight.

*Chronically* athletes use body fat reduction.

*Acutely* athletes typically resort to starvation and dehydration.

When taken to the extreme the results can be disastrous.
Although combat sports athletes are perhaps the most well known in terms of those who cut weight, this situation exists in other sports, including light weight rowing and weightlifting.

In working with these athletes, dietitians and sports science practitioners generally consider:

- The physiological demands of the sport, both in competition and training
- The fueling and recovery requirement of the sport, both in competition and training
- How to best optimize body composition to aid success
- The requirement to make weight at a weigh-in. The specifics of the weigh-in will differ between the weight category sports
<table>
<thead>
<tr>
<th>Sport</th>
<th>Recovery time frame</th>
<th>Other weigh-in details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light weight rowing</td>
<td>1 - 2 h</td>
<td>Weigh-in each day of multiday competition</td>
</tr>
<tr>
<td>Weightlifting</td>
<td>~2 h</td>
<td></td>
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<tr>
<td>Judo</td>
<td>~16 – 20 h</td>
<td>Cannot be &gt; 5% above weight division morning of competition</td>
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<tr>
<td>Taekwondo</td>
<td>~16 – 20 h</td>
<td></td>
</tr>
<tr>
<td>Wrestling (international)</td>
<td>~3 – 10 h</td>
<td>Recently changed, and may differ between styles/ organizations</td>
</tr>
<tr>
<td>Amateur boxing</td>
<td>~3 – 10 h</td>
<td>Weigh-in each morning of multiday competition</td>
</tr>
<tr>
<td>Pro boxing</td>
<td>~24 – 30 h</td>
<td></td>
</tr>
<tr>
<td>Pro mixed martial arts (UFC)</td>
<td>~24 – 30 h</td>
<td>“Window” to make weight may differ between organizations</td>
</tr>
<tr>
<td>Brazilian jiu-jitsu (IBJJF)</td>
<td>~15 – 60 m</td>
<td>May require multiple weigh-ins, depending on competition</td>
</tr>
<tr>
<td>Collegiate wrestling</td>
<td>1 - 2 h</td>
<td></td>
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</table>
Why is all this important? Why do we care about the differences in weigh-in details? Shouldn't athletes be well fueled and adequately hydrate around the clock? Shouldn’t we advise against cutting weight?

- Simply advising against cutting weight doesn’t work.
- Doesn’t make sense to the athlete given the norms of the sports.
- Research doesn’t support this as the optimal way to achieve competitive success. In fact the opposite is true. There is mounting indirect evidence to suggest that cutting weight and competing in lighter weight divisions increases competitive performance.
Athletes derive a sense of “sport identity” and the feeling of being “real athletes” from cutting weight.

The majority of wrestlers believe that making weight is a major activity and important aspect of their sport.

The process of making weight may create an increased sense of focus and commitment.
PRAGMATISM
avoid significant negative health outcomes, optimize competitive performance, and educate athletes.

EDUCATION
set realistic expectations, optimize acute weight loss, optimize recovery.

RECOVERY
Normally recovery means attenuating fatigue or damage caused via training.

In weight category sports this remains true, however when it comes to competition time, need think about attenuating “damage” cause via weight cutting.
Less damage caused = Less recovery required

Optimized acute weight loss = Easier post weigh-in recovery
Once fully grown, the components of body mass we have control over are:

- **Muscle**
- **Fat**
- **Gut content**
- **Water**
- **Glycogen**

(Hair & Nails, but not a significant part of weight)
Long Term Weight Change (weeks-months)

- Body Fat (~0.5 kg/wk)
- Muscle (<1 kg/month)

Short Term Weight Change (hours – days)

- Fluid/Glycogen (>5 kg in ~1-2 days)
- Gut Contents (~1-2 kg in 1-3 days)
<table>
<thead>
<tr>
<th>Method</th>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting, laxatives, bowel preparation formula</td>
<td>Loss of 1-2% BM in 1 day</td>
<td>-Decreased cardiovascular performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Water loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Electrolyte loss</td>
</tr>
<tr>
<td>Food restriction / fasting</td>
<td>Loss of 1-2%BM in 2 days (likely from gut content and glycogen)</td>
<td>Decreased energy/ macronutrient/ micronutrient intake</td>
</tr>
<tr>
<td>Low residue/ low fiber diet</td>
<td>Loss of 1-2%BM in 2-4 days</td>
<td>Decreased satiety</td>
</tr>
</tbody>
</table>
Used for 2-3 days immediately before weigh-in

**Low Fiber**

- No Fruit
- Limited Veggies
- No nuts, seeds

Do choose white breads, rice, pasta and low-fiber cereals.

Food weight and energy density is important – aim for high energy, low weight food.
LOW RESIDUE DIET: EVIDENCE

- No studies specifically on low residue/low fiber and weight loss.
- A linear relationship exists between fiber reduction and bowel cleanliness in pre-colonoscopy patients.
- A low-fiber diet for even 2 days helps cleanse the bowel.
- 7 days equally as effective in cleansing the bowel as a bowel preparation formula.
- Bowel preparation formula shown ~1.5% BM loss.
- Recent work suggests ~2 days for majority of benefit (~1.5%BM loss).

### MANIPULATING BODY WATER

<table>
<thead>
<tr>
<th>Method</th>
<th>Benefits</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active sweating</td>
<td>- Can be easily incorporated into existing training sessions</td>
<td>- Additional unfamiliar exercise may induce fatigue/soreness</td>
</tr>
<tr>
<td></td>
<td>- Maintain plasma volume better than passive sweating</td>
<td>- High intensity exercise can impact on gastric emptying/ GI distress</td>
</tr>
<tr>
<td>Passive sweating</td>
<td>- Relatively easy method of weight loss</td>
<td>Preferential loss of fluid from plasma</td>
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<tr>
<td></td>
<td>- May relax athlete/improve mood</td>
<td></td>
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<tr>
<td>Fluid restriction</td>
<td>Less physiological disturbances than other methods of dehydration</td>
<td>Perceptual discomfort</td>
</tr>
<tr>
<td>Glycogen depletion</td>
<td>Loss of ~2% BM in 2-7 days with maintenance of strength/power in short duration events</td>
<td>- Reduction in anaerobic performance lasting &gt; ~5 min if not replaced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Limited recovery time frames may require aggressive recovery plans</td>
</tr>
<tr>
<td>Magnitude</td>
<td>Benefits</td>
<td>Drawbacks</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Mild dehydration (&lt; 3% BM loss)</strong></td>
<td>Achievable in 1-3 h</td>
<td>-Mild to moderate performance effects if not replaced</td>
</tr>
<tr>
<td></td>
<td>Can restore fluid balance in ≤4 h</td>
<td>-Limited recovery time frames may require aggressive recovery plans</td>
</tr>
<tr>
<td><strong>Moderate dehydration (3-6% BM loss)</strong></td>
<td>Largest manipulatable compartment of BM</td>
<td>-Moderate to severe performance effects if not replaced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Maybe difficult to restore losses in short time frame</td>
</tr>
<tr>
<td><strong>Severe dehydration (&gt; 6% BM loss)</strong></td>
<td>Largest manipulatable compartment of BM</td>
<td>-Severe performance effects if not replaced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Maybe difficult to restore losses even with extended time frames</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-May be dangerous to health</td>
</tr>
</tbody>
</table>
Manipulating Body Water: Sodium

Role of sodium in rehydration is well understood \(^1\),\(^2\)

Effect of sodium reduction on body fluid loss less clear

Low-sodium diet (<500 mg) for 5d reduced BM 1-2% in hypertensives, however no interim measures were taken \(^3\)

Change in intake from 3300mg to 700mg reduced BM ~1% in 24 h, however energy intake was also reduced \(^4\)
Summary: Long Term vs Short Term

Chronic energy deficit
Body fat
Gut contents
Glycogen
Low carbohydrate
Low fiber
Low sodium
Low fluid / sweat
Food weight

Days before weigh in
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0
or more
GUIDELINES FOR ACUTE WEIGHT LOSS RECOVERY
GOAL: Restoring fluid losses to ≤ 2% of euhydrated BM

Replace 125-150% of fluid losses, with electrolytes (from food or fluid) $^{1,2,3}$. 

Increased energy intake will delay gastric emptying $^1$.

Maximize gastric emptying

600-900mL bolus immediately post weigh-in $^1$

Additional boluses ~15-20min.
Fully saturated stores likely not required, but full depletion will limit performance ¹

General recos: 5-7g/kg/d (mod training), 7-10g/kg/d (CHO loading) ²

Specific recos: 5-10g/kg/d (post weigh-in) ²

Total CHO intake has greatest impact on glycogen synthesis ³

Protein can assist when CHO is sub optimal ⁴

For restoration and GI comfort given short time frames: High GI CHO > Low GI³

If no glycogen depletion, aggressive CHO intake not required
Reintroduction of fiber/large fat intakes can be problematic \textsuperscript{1,2}.

Athletes often want to avoid consuming solids (and/or fluids) close to competition.

Ideally recovery will be achieved several hours before competition:
- Not always possible
- Gut comfort likely takes priority over recovery
- Familiar foods should be prioritized
Athlete feels prepared, comfortable, confident and ready:
≥1g/kg CHO ~ 2-3 h pre-event

Ideally recovery has been addressed:
≤2% BM hypohydration
Moderate glycogen stores

Glycogen stores maximized if time permits and deemed important.
Currently 215 lbs (one week out), needs to be 205lbs (~4.6%BM)
Weigh-in Saturday morning at least 3 h prior to first match:

- No glycogen depletion
- Low fiber from Wednesday morning
- Low sodium from Thursday
- Slightly reduced fluid Thursday night after training
- Woke up 211 lbs Friday morning
- 150mL (5 oz.) coffee for breakfast, almost no fluid until weigh-in (<100mL, 3.5 oz.)
- Low weight food all day (protein bars, pancake, fried eggs)
- Light training Friday evening to sweat
- Woke up 206 lbs Saturday morning
- 15-minute jog on treadmill with extra layers; 204.5 lbs
- Still 2 h until weigh-in, 0.5lb (250g) under weight
- Breakfast; protein/CHO bar (65g) + 2 pieces of bread with butter & honey (~110g) (~120g CHO (1.2g/kg), 30g pro, 700kcal)
### POST WEIGH-IN RECOVERY

<table>
<thead>
<tr>
<th>Post weigh-in</th>
<th>Food/drink</th>
<th>Protein (g)</th>
<th>CHO (g)</th>
<th>Sodium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate</td>
<td>750 mL electrolyte (sodium) water, white bread peanut butter sandwich</td>
<td>5</td>
<td>40</td>
<td>975</td>
</tr>
<tr>
<td>+20 min</td>
<td>250 mL electrolyte (sodium) water</td>
<td>0</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>+40 min</td>
<td>500 mL protein shake + white bread peanut butter sandwich</td>
<td>25</td>
<td>45</td>
<td>900</td>
</tr>
<tr>
<td>+60 min</td>
<td>250 mL electrolyte (sodium) water</td>
<td>0</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>+80 min</td>
<td>500 mL sweetened low-fat iced coffee</td>
<td>10</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>+120 min</td>
<td>500 mL electrolyte (sodium) water, white bread peanut butter sandwich</td>
<td>5</td>
<td>40</td>
<td>650</td>
</tr>
<tr>
<td>TOTAL</td>
<td>&gt; 2750mL fluid (~100% of deficit)</td>
<td>45</td>
<td>165 (1.7/kg)</td>
<td>2875</td>
</tr>
</tbody>
</table>
## Table 1. Key pre weigh-in acute weight loss and post weigh-in recovery/pre competition dietary recommendations

<table>
<thead>
<tr>
<th>Component</th>
<th>Pre Weigh-In Acute Weight Loss</th>
<th>Post Weigh-In Recovery / Pre Competition</th>
</tr>
</thead>
</table>
| Carbohydrate | Maintain habitual intake if glycogen depletion is not a goal  
OR  
< 50 g/d for 3-7 d if glycogen depletion is a goal | 1 g/kg BM 2-3 h prior to competition  
+  
5-10 g/kg BM post weigh-in (if glycogen depletion has occurred) |
| Fluid     | Decreased 24 h prior to weigh-in  
(Exact degree of fluid restriction/ requirement for additional sweating will depend on magnitude of fluid loss required) | 125-150% of fluid losses consumed as 600-900 ml (20-30 oz) bolus immediately post weigh-in, with remainder consumed at regular intervals (every ~15-20 min) while GI comfort persists |
| Sodium    | < 500 mg/d                                                                                     | ≥ 50 mmol/L (if consuming only fluid)  
OR  
≥ 1150 mg (from either food and/or fluid) for every liter (34 oz) of fluid |
| Fiber     | < 10 g/d                                                                                       | < 10 g/d                                                                                                 |
KEY TAKEAWAYS

✓ Simply advising against weight-cutting doesn’t work. Need to work with athletes to do this safely and effectively within the norms of the sport.

✓ Several methods exist to manipulate gut content and body water.

✓ Weigh-in recovery should include rehydration and glycogen replenishment while managing gut discomfort.