



## NUTRITIONAL CONSIDERATIONS TO SUPPORT ATHLETES' COGNITIVE PERFORMANCE AND WELL-BEING: A PRACTITIONER'S POINT OF VIEW

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Dietary strategies, when correctly applied, may reduce mental fatigue, improve mental clarity, mood and wellbeing of the athletes.<sup>1-3</sup> Identifying sports, triggering factors and situations where cognitive performance is impaired enables targeted nutritional interventions. However, the pros and cons of each strategy should be carefully evaluated.

### SPORTS AND SETTINGS THAT INDUCE MENTAL FATIGUE:

- Long race duration with high power output (i.e.g triathlon, race walking)<sup>4</sup>
- Cold & shivering (ling training hours at glacier, i.e., alpine skiers)<sup>5, 6</sup>
- Heat & humidity (i.e., tennis, soccer)<sup>6, 7</sup>

### Potential Countermeasures:

- Adequate fluid and carbohydrate intake (avoid hyperthermia and hypoglycemia)<sup>8, 9</sup>
- Cold beverages in the heat, warm beverages in the cold (for thermal comfort)<sup>7, 10</sup>
- Caffeine<sup>11, 12</sup>
- CHO mouthwash<sup>13-15</sup>
- Menthol mouthwash/ingestion<sup>16, 17</sup>
- Bitter tastant, BCAA, tyrosine<sup>10, 18-20</sup>

STRENGTH OF  
SCIENTIFIC  
EVIDENCE

### Important considerations:

- Overshooting CHO intake may induce GI distress. However consuming multiple transportable CHO and training the gut may help to reduce the GI complaints.<sup>21</sup>
- Ice slurry ingestion (though acutely cooling) may reduce sweat rate and amplify increase in core temperature<sup>22</sup>
- Frequent CHO during race is practically difficult (disturbs ventilation)
- Caffeine ingestion morning vs evening race, and/or consecutive days (recovery, sleep) and impact on pacing strategy and possibility to impair myocardial blood flow and induce arrhythmias<sup>23-25</sup>
- Menthol ingestion may impair the ability to consume the required amount of fluid
- Strength of scientific evidence

### SPORTS WHERE MENTAL ALERTNESS IS ESPECIALLY IMPORTANT:

- Sports that require sustained concentration and precision (i.e., golf, shooting, curling)
- Switching from physically to mentally demanding tasks (i.e., biathlon, orienteering)

### Potential Countermeasures to Avoid Reduced Mental Alertness:

- Appropriate timing and composition of ingested foods and beverages to ensure stable s-glucose
- Caffeine<sup>11, 12, 26</sup>
- Menthol<sup>16, 17</sup>
- Polyphenols (by improved cerebral blood flow)<sup>27, 28</sup>
- Nootropics (i.e., Ginkgo Biloba, ginseng)<sup>20, 29</sup>

STRENGTH OF  
SCIENTIFIC  
EVIDENCE

### Important considerations:

- The need for fueling during race days with little metabolic demand (separating mental tiredness from physical tiredness)
- Caffeine induces trembling, shaking, trouble controlling competition nerves and pacing. Requires trialing of dose, source and timing of ingestion, and perhaps the genotype (CYP1A2) for optimal impact<sup>12</sup>
- Supplement contamination issues (avoid violating the WADA code)<sup>30</sup>
- Strength of scientific evidence

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### SPORTS AND SETTINGS THAT CHALLENGE MOOD AND WELLBEING:

- Heavy training load (i.e., cross country skiing, distance running, swimming, triathlon, cycling)<sup>31,32</sup>
- Low energy availability (i.e., endurance sports)<sup>32,33</sup>
- Weight regulation and weight cutting (i.e., weight class sports and esthetic sports)<sup>34,35</sup>
- Long periods away from home and usual diet/cuisine
- Monotonous dining/cafeteria menu

### Potential Countermeasures:

- Adequate energy intake (> 45 kcal/kg LBM/day)<sup>9</sup>
- Adequate carbohydrate intake (> 8g /kg BW/day)<sup>9,36</sup>
- Careful plan and close monitoring of appropriate weight regulation
- CHO mouth rinse, caffeine, ice cubes etc during acute weight making prior to weigh-in<sup>14,37</sup>
- Bring staple foods (and comfort foods) from home country to camps and competitions<sup>38</sup>
- Establish a recovery room with access to large variety of foods
- Social dining, change the dining setting every once in a while, throw a recovery party
- Consider prebiotic-rich foods, and probiotic-enriched foods or supplements that help to establish beneficial gut microbiota and impact athletes' mood (via gut-brain axis)<sup>39-41</sup>

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