

## Practical tips to manage travel fatigue and jet lag in athletes

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Travel forms an integral part of modern-day athletes lives. The interrelated effects of travel fatigue, jet lag and increased risk of illness, are likely to affect performance unless managed appropriately.<sup>1</sup> Travel fatigue follows any long journey and resolve following a good night's sleep, but can accumulate with frequent travel.<sup>2</sup> Jet lag ensues misalignment between the internal circadian rhythms and new destination time after rapid travel across more than 3 time-zones,<sup>2-4</sup> resulting in sleep disruption, daytime fatigue and gastrointestinal disturbances.<sup>3,5</sup> Sleep loss appears to be central to the detrimental impact of long-haul travel on performance.<sup>5</sup> Additionally, circadian rhythms of numerous psychological and physiological variables with a typical early-morning nadir and late afternoon peak, will be misaligned to the new destination time, which, depending on time of competition, could affect performance directly.<sup>5</sup>

Recovery from jet lag requires resynchronisation of the human circadian systems to the new light-dark cycle.<sup>2</sup> Various peripheral rhythms resynchronise at different rates but internal desynchronisation progressively disappear as all rhythms synchronise to local time,<sup>5</sup> probably explaining why athletes often feel worse on day 2-4 compared to day 1 of arrival. The circadian system needs to either advance (east travel) or delay (west travel) depending on travel direction.<sup>2</sup> Eastward travel is generally tougher as endogenous circadian rhythms have an ~25h period making it harder to advance than delay your circadian system.<sup>3</sup> Resynchronisation takes approximately 1 and 0.5 days respectively per east and west time-zone crossed.<sup>3</sup> Athletes require a comprehensive travel management plan to minimise impact on performance.<sup>4</sup>

Most evidence on travel fatigue and jet lag management is from non-athletic populations in laboratory settings.<sup>3</sup> Interventions commonly promoted include: light exposure/avoidance, sleep, exercise, nutrition, melatonin, stimulants and sedatives.<sup>3</sup> Their application and timing depends on number of time-zones crossed, travel direction, length of stay and individual chronotype.<sup>2</sup> Illness prevention may seem unrelated to travel fatigue and jet lag management, but if an athlete contracts illness both conditions may be aggravated.<sup>4</sup> Based on currently available evidence, practical tips include (Figure 1 explains detail):

### **1. Pre-travel**

- Protect sleep - minimise accumulation of sleep debt and/or bank sleep.<sup>1,5-6</sup>
- Determine core body temperature minimum (CBTmin) as the majority of jet lag interventions are based around this.<sup>2</sup> Assessing CBTmin requires continuous CBT measurement (e.g. ingestible temperature pill), but are invasive, time-consuming, and costly. In the field, an estimated value







Figure 1: How to manage travel fatigue and jet lag in athletes

can be calculated based on habitual timing of sleep and wake.<sup>2</sup> If travelling with a team, individualised timing of interventions is not feasible. Currently the best practice-led option is to calculate the teams' average CBTmin and apply interventions accordingly.<sup>2</sup>

- In individual cases with known gastrointestinal disturbances, the team doctor may consider to use probiotics.<sup>4</sup>

## **2. During travel**

- Protect sleep - maximise rest and sleep during a 'sleep window' corresponding to night-time at place of departure and when it is easier to initiate sleep.<sup>1,5</sup> Sedative usage should be individualised and only by doctor's order.
- Implement illness prevention strategies.<sup>4</sup> Avoid touching areas known to carry micro-organisms, and frequently wipe those areas clean e.g. tray table.
- Drink to thirst, avoid alcohol and caffeine, and ensure frequent movement around the plane.<sup>4</sup>

## **3. Post-Travel**

- Plan light exposure and/or avoidance around CBTmin, depending on timing for east vs. west.<sup>2</sup>
- If feasible, coincide training sessions with light exposure. Although sunlight is the best option, indoor training with the aid of artificial light may be an alternative when dark outside. Keep training intensity low for the first few days building up to higher intensity and skill-specific training.<sup>2</sup>
- Melatonin has both chronobiotic (circadian phase-shifting) and hypnotic (sleep-inducing) properties. Product availability, dosages and purity differ between countries. Team doctors should be cautious and preferably use known products.<sup>7</sup> The efficacy of melatonin for the treatment of jet lag has recently been questioned.
- Protect sleep - follow a sleep schedule and adjust sleep timings as the body clock adjusts to the new time-zone. Utilise sleep hygiene interventions and supplement night-time sleep with a daytime nap (this can correspond with light avoidance).<sup>1</sup> Sedatives, specifically short-acting (e.g. Zolpidem 10mg), may be an option in athletes previously tolerating the drug with no adverse events.<sup>4</sup> Athletes should adhere to the most recent World Anti-Doping Agency regulations for all pharmacological interventions.
- Implement illness prevention strategies.<sup>4</sup>
- Caffeine may be used to increase alertness and manage daytime fatigue.<sup>7</sup>

- Meal-timing and meal-composition may help to reduce jet lag symptoms. Schedule meals according to destination time. Consume protein-rich meals to help with alertness and carbohydrate-rich meals to induce drowsiness.<sup>8</sup>

We recommend that practitioners focus first on the easier to implement interventions that help treat the symptoms of jet lag (i.e. protecting sleep) and prevent illness, before employing more difficult interventions such as accelerating the adjustment of the circadian system to the new time-zone. Considering cost of travel research, multi-centre studies should be conducted utilising standardised, simple measures in athletes who travel frequently.

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