

Long-haul flights and Super Rugby performance: what the science says

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Super Rugby is arguably the highest expression of rugby at club level in the world. Its next closest rival in the world of international competitive rugby at club level is the European Rugby Champions Cup (Heineken

Champions Cup). Super Rugby involves teams from South Africa, Argentina, New Zealand, Australia and Japan. As the competition is conducted in multiple countries, teams have to travel frequently throughout the six months long season.

Travel is [commonly perceived](#) as "[the](#)" [major factor](#) affecting a team's performance. Losing away games reduces the chances of finishing high on the ladder or hosting a grand final. Ultimately, it affects the team's chance of winning. For example, through the 23 years of the competition, only six visiting teams have won the title and only twice has that occurred following international [travel](#) to play the final.

We [set out to establish](#) whether this perception was scientifically correct. To better understand the complex relationship between regular air travel and athletes' psycho-physiological response and performance, we investigated the impact of travel on performance during the first 21 years of Super Rugby (1996-2016).

We directly monitored players from four teams following long-haul trans-meridian travel. The findings of our research show that long-haul travel influenced team performance. However, the away-match disadvantage is likely to be the main cause of these negative effects on match outcomes. Fatigue related to long-haul travel is suggested to have a larger impact on players' individual performance when overseas.

[The away-match disadvantage](#) is a combination of factors, such as crowd support and potential officials' bias that deteriorates the psychological and behavioural states of athletes, along with their performance, when a match is played away.

Although travel and the away-match disadvantage have a similar effect on all teams, when a match is played against a 'weaker' opponent, [team statistics](#) – like the number of carries, tackles and tries—are only

minimally impaired, even following trans-meridian travel. Even if the technical skills and physical performance of players are not particularly affected by travel, playing away from home may affect [tactical and strategic aspects](#) of Super Rugby matches, and negatively influence match outcomes.

Jet lag and travel fatigue

There is ample anecdotal support that frequent travel can negatively affect travellers because of travel fatigue and jet lag. [Travel fatigue](#) is a state of weariness that accrues after a single trip and accumulates over time. [Jet lag](#) occurs when the [circadian rhythms](#), which are the rhythmic pattern of all the physiological functions and systems of the human body, are not synchronised with the external clock.

This typically happens after rapid travel across time-zones. Jet lag is a common complaint reported by travellers crossing more than three time zones during their journey. [Symptoms of jet lag](#) include sleep disturbances, fatigue, changes in mood and a deficit in cognitive skills. All of these may detract from an athlete's peak performance.

So how does this play out for athletes like those competing in Super Rugby?

Varying factors

[Performance](#) is complex and may be influenced by many different factors, including travel.

Over the history of Super Rugby it appears quite clear that travel, especially across multiple time zones, had a [negative impact](#) on the winning capability of the teams. However, travel fatigue itself had only a

[limited impact](#) on team performance.

Super Rugby teams reach the match venue at least one day prior to the match and a full night of rest is usually [enough to recover](#) from the effects of travel fatigue. Similarly, crossing time zones appears to [minimally impair performance](#). However, the direction of travel largely dictates the magnitude of this impairment: eastward travel is slightly more detrimental than westward travel. As such, for example, a team travelling from South Africa towards Australia or New Zealand will struggle more than a team travelling from South Africa towards Argentina.

This is because eastward travel requires a phase advance of the [circadian rhythms](#) while travelling westward requires a phase delay. Circadian rhythms are, on average, slightly [longer than 24 hours](#) and the human body shows a natural tendency to drift slightly each day. As such, it is [easier to cope with a delay](#) rather than an advance in time.

This means the symptoms of jet lag are [more severe](#) after eastward travel, the time required to recover [is longer](#) and performance [more impaired](#).

Impaired performance

A number of [specific strategies](#) are commonly used by all teams to try and reduce the negative effects of travel. Compression garments can help in reducing travel fatigue and reduce the risk of cramping or even deep vein [thrombosis](#) whilst travelling.

Other strategies, mostly based on [melatonin supplementation](#), can help reduce the effect of jet-lag upon arrival. Although these strategies help the team in successfully dealing with long-haul travel, team performance when overseas [is still impaired](#).

Travel is an intrinsic feature of Super Rugby but travel variables are too many to control and therefore there is not a final solution to address all travel related issues. However, our findings suggest that, for the most part, teams appear to be successfully dealing with long-haul travel. Now they should focus on reducing the effects of the away-match disadvantage—for instance by improving players' behavioural response when competing away from home or implementing different game plans.

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