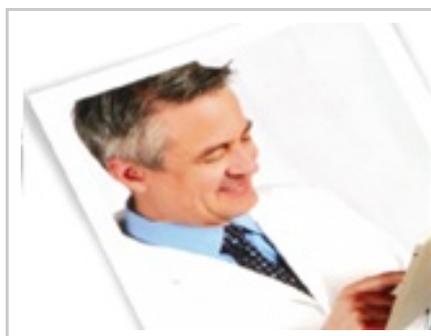


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Effect of Low-Dose Temazepam on Physiological Variables and Performance Tests Following a Westerly Flight Across Five Time Zones

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Abstract

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Rapid travel across multiple time zones disturbs circadian rhythms and induces “jet lag”. The aims of this study were 1) to monitor a selection of subjective, physiological and performance variables in elite athletes and sedentary subjects following a westerly flight across five time zones, and 2) to examine whether the promotion of sleep by means of a low-dose benzodiazepine drug influences these responses to transmeridian travel.

Subjects comprised eight members of the British men's gymnastics squad, aged 18 - 30 years, and nine members of the British Olympic Association's support staff, aged 24 - 55 years (4 females, 5 males). Subjects were pair-matched for age, sex and athleticism (apart from one person) and assigned to either the treatment (n = 9) or placebo (n = 8) group. All subjects travelled from U.K., arriving at Tallahassee, Florida, at approximately 22:00 hours local time. A test battery was administered to the subjects at 07:00, 12:00, 17:00 and 21:00 hours on the first full day of arrival (this was designated day one) and then on alternate days (day 3, day 5 and day 7). Immediately before retiring to bed on days 1, 2 and 3, subjects were administered, in a double-blind fashion, either 10 mg of temazepam or a placebo. Measures in the test battery included sleep quality, sleep length, subjective jet lag (one-to-ten simple analogue scale), tympanic temperature, one-, two-, four- and eight-choice reaction time, grip strength (left and right), leg strength and back strength. Over the 24 h of each test day, subjects also recorded the volume of each urine voided. Data were analysed with a repeated measures general linear model. Alpha was set at 0.01 to control for type I errors with multiple dependent variables.

Mean subjective jet lag reduced from 4.6 units to baseline, and mean sleep quality improved by 2.0 units from day 1 to day 5 ($P < 0.001$), after which no further alterations were noted. Subjective jet lag, left and right grip strength and choice reaction time all showed post-flight day \times time of day interactions ($P < 0.01$). On day 1, these variables deteriorated as the day progressed to the worst recorded values. On days 3, 5 and 7, diurnal variations with the conventional high in the early evening and morning-to-evening differences of about 10 % were evident. There was a trend for the reduction in subjective jet lag over the post-flight days to be more rapid following ingestion of a low dose of temazepam ($P = 0.037$). We cannot rule out the possibility that this could be a type I error, since none of the treatment by day interactions reached the alpha level of significance (set at 0.01). The morning-to-evening variations of body temperature and grip strength were greater in the young athletes than in the older sedentary support staff ($P < 0.01$). Sleep quality was greater in the athletic subjects after the first full day in Tallahassee. These results suggest that the nightly administration of a low dose (10 mg) of temazepam has little influence on the recovery of subjective, physiological and performance measures following a westward flight across five time zones. In both the treatment and control groups, subjective jet lag and performance were worst in the evening of the first full day after arrival, and the young athletes slept better than the older support staff that same night. This illustrates the importance of monitoring jet lag symptoms and performance variables at different times of day following a flight to a new time zone.

Key words:

Circadian rhythm, jet lag, performance, hypnotic drugs, exercise.



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