The effect of prior resistance training on sleep patterns

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A considerable amount of research is aimed at developing competition-based factors in an attempt to stretch the boundaries of physical performance; particularly the integral role played by training and recovery. The training of a competing athlete, particularly resistance training is an integral component of their overall performance regime, but the physiological consequence upon the body is remarkable. The mechanical damage induced by resistance training upon the muscle endeavours to stress the muscles to a stage where muscular hypertrophy is produced as an adaptation to exercise. Due to the arduous nature of an athlete's resistance training regime, adequate recovery is essential. One such method is post-training recovery sleep. Post-exercise sleep containing slow-wave sleep (SWS) has been shown to have restorative properties through a positive correlation with growth hormone (GH) secretion, which may be substantially beneficial to the competing athlete. What is not known is the optimal timing of a recovery sleep in relation to enhancing the restorative function of sleep. This repeated measures, cross-over design study that examined the effect of prior resistance exercise training on sleep patterns, with particular attention focused on the interval between training and sleep, and the circadian timing of sleep. Four athletes, characterized as regular nappers or non-nappers initially underwent a familiarization session, then 4 individual experimental conditions consisting of a resistance training session followed by a recovery sleep session. Each experimental condition was separated by a 48-hr minimum. Resistance training was separated by either a 1 or 2-hr interval, with an early morning (10h30) or late morning (11h30) recovery nap sleep. The four conditions were carried out in a random order. Subjects exercised for 1.5-hr employing multi-joint compound movements aimed at recruiting the five major muscle groups in the human body. The exercise intensity was standardized at 80% of their one repetition maximum (1-RM), a weight which induced volitional fatigue after ten repetitions. Each exercise was allocated 3 sets. Following training, subjects undertook a 90 minute sleep session, according to the early or late circadian timing, with polysomnographic recordings. Post-training and pre-sleep measures of heart rate and core temperature were recorded as indices of sympathetic drive, a factor that may hinder sleep. The current pilot results indicate a trend relating to the 2-hr interval compared to the 1-hr interval separating training and sleep in relation to improvements in slow wave sleep (SWS), sleep efficiency and total sleep time (TST), with a reduction in sleep onset latency (SOL) and total wake time (TWT). A trend in improvement was also observed in the early, compared to late morning circadian timing of sleep in relation to the amount of SWS (7.6 ± 8.8 min vs. 5.3 ± 8.7 min). The early morning circadian timing of sleep showed favourable increases in sleep efficiency and TST, and decreases in TWT by 21% and SOL by 60%. Neither the interval between training and recovery sleep nor circadian timing of the sleep session showed an effect on REM sleep. Results revealing improvements in SWS, TST, TWT and SOL were isolated to those subjects who regularly partake in daytime napping and absent in those characterized as non-nappers. Non-nappers did however demonstrate *nap habituation*, as evidenced by a progressive improvement in sleep variables with each successive condition, irrespective of time or interval. These results infer that the 2-hr interval between training and sleep and the earlier circadian timing of sleep promote trends pertaining to enhanced sleep quality. However improvement is primarily isolated to those who regularly engage in daytime napping. A larger sample size was required for these trends to achieve statistical significance.