OBJECTIVE SLEEP CHARACTERISTICS OF YOUNG ELITE FEMALE GYMNASTS: A CASE SERIES REPORT

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Abstract

Purpose: Sleep is considered one of the most important recuperation techniques for elite athletes, with its specific features implicating different aspects of learning skills and physical recuperation. The aims of this study were (1) to assess objectively the sleep characteristics of elite gymnasts and (2) to correlate these findings with their age.

Methods: Twelve elite female gymnasts (15 ± 1 years old; VO2MAX 53 ± 1 ml/min·kg−1; 307 ± 12 training hours/week) underwent a nocturnal polysomnography (PSG) after a regular training day (6–6.5 h of training). The PSG was scored according to the guidelines of the American Academy of Sleep Medicine (AASM). Time in bed (min), Total Sleep Time (TST, min), Sleep Efficiency (SE, %), Non Rapid Eye Movement 1 (NREM1, %), NREM2 (%) Slow Wave Sleep (SWS, %), REM (%), Wake After Sleep Onset (WASO, min), Sleep Onset Latency (SOL, min), Awakening Index (A/No), and Apnea-Hypopnea Index (AHI) were measured and analyzed. Furthermore, the gymnasts completed the Epworth Sleepiness Scale (ESS) and Pittsburgh Sleep Quality Index (PSQI). Sleep parameters were correlated with age using a Pearson Correlation.

Results: The following objective values were attained: time in bed 468 ± 13 min, TST 437 ± 27 min, SE 895 ± 4.3 %, NREM 4.9 ± 36 %, NREM1 38.7 ± 10.2 %, SWS 36.9 ± 11.4 %, REM 19.5 ± 38.8 %, WASO 32.4 ± 9.2 min, SOL 18.3 ± 16.5 min, Awakening Index 161.6 ± 6.3 h, Apnea-Hypopnea Index 0.9 ± 0.8 /h, Epworth Sleepiness Scale 5.3 ± 2.5 (4/4), PSQI 26 ± 19 (21/2). Age-matched correlations for PSWS (r = −0.693, P = 0.019) and arousals from SWS (r = −0.622, P = 0.039) were found. The younger the gymnasts, the higher the PSWS was found, with higher amounts of arousals from SWS in the younger gymnasts.

Discussion: Objective sleep assessments through PSG in elite female athletes suggest a higher amount of SWS compared to non-elite athlete peers (Suppi et al., Ped Ex Sci. 2016; 28: S88-593) as a salient feature in their sleep architecture. This may represent an advantage towards higher performance, as sleep deficits are related with lower performance. Hence, it needs to be explored whether a thorough analysis of elite athletes’ sleep should be incorporated in health screenings.

Abbreviations

- TST: Total Sleep Time
- SE: Sleep Efficiency
- SOL: Sleep Onset Latency
- WASO: Wake After Sleep Onset
- AHI: Apnea-Hypopnea Index
- SWS: Slow Wave Sleep
- ESS: Epworth Sleepiness Scale
- PSQI: Pittsburgh Sleep Quality Index
- AHI: Apnea-Hypopnea Index
- SOL: Sleep Onset Latency

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References


Objectives

- Objective sleep
- Subjective sleep
- ESS normal
- PSQI 1: gymnast with poor sleep quality

Conclusions

Higher SWS in elite female gymnasts compared to young non-elite athletes

→ High training intensity & volume?
→ Genetic predisposition?
→ Combination?