REFERENCE

1. Willox M, Elphick HE, *et al*. Custom-made 3D printed masks for children using non-invasive ventilation: a feasibility study of production method and testing of outcomes in adult volunteers. *J Med Eng Technol*. 2020 Jul;**44**(5):213–223.

O11 IRREGULAR SLEEP/WAKE PATTERNS IN STUDENT-ATHLETES

Sandy Wilson*, Stephen Draper, Martin Jones, John Parker. *Hartpury University, Hartpury, UK*

10.1136/bmjresp-2023-BSSconf.11

Introduction Student-athletes are exposed to a range of academic-related and sport-related risk factors that can threaten healthy sleep practices.[1 2] Emerging evidence has shown that student-athletes display a high prevalence of short sleep durations and poor perceived sleep quality.[3] However, empirical research has primarily reported sleep outcomes over a set monitoring period rather than assessing day-to-day variability in sleep patterns. Therefore, this study aimed to use the Sleep Regularity Index (SRI) to assess sleep variability in student-athletes and examine the impact of training and competition on sleep outcomes.[4]

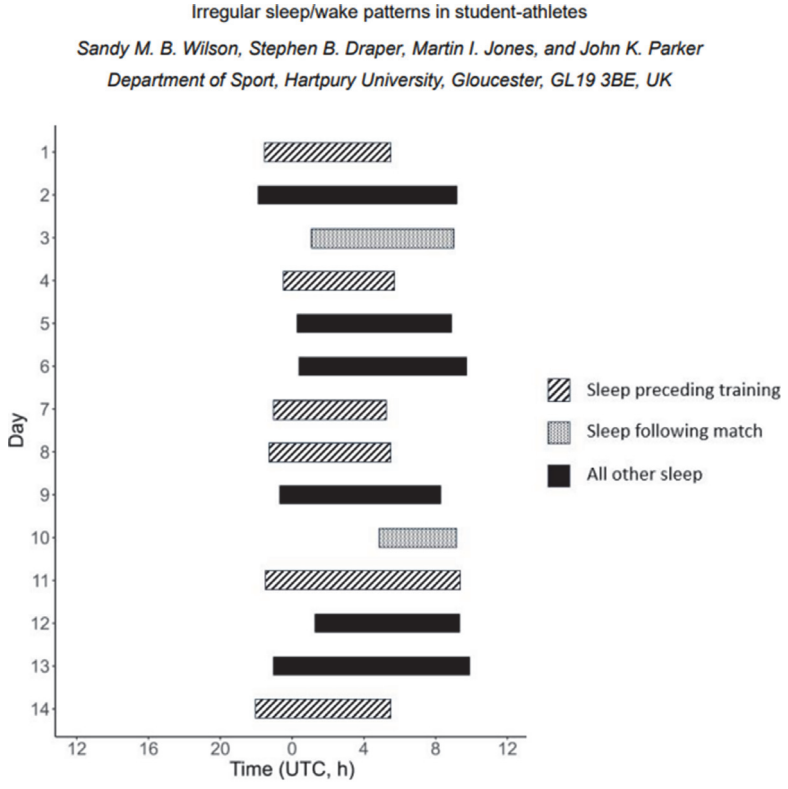
Methods Rugby Union student-athletes (n = 10, all male) from a single University were recruited with no diagnosed sleep disorder and with a sleep difficulty score <12 on the Athlete Sleep Screening Questionnaire.[5] Actigraphy monitors (GENEActiv, Activinsights, Cambridge, UK) were worn for 14 consecutive nights. Data were collected during normal teaching weeks and in-season with both morning training and evening matches. Sleep/wake and SRI were assessed using open-source GGIR and sleepreg packages on R software.[6]

Results Preliminary results showed that participants had an average sleep duration of 6.85 ± 0.46hr. Nights preceding morning training were of shorter duration with earlier sleep onset and offset, while nights following evening matches were of shorter duration with later sleep onset and offset (table 1). The SRI across participants was 72.0 ± 5.4, with a range of 65.4 – 80.0 (figure 1).

Discussion The findings support previous research indicating that training and competition can impair sleep in athlete populations. Sleep regularity was substantially lower than observed in elite athletes.[7] Furthermore, despite only considering nocturnal sleep, the observed SRI was lower than previous research that also included daytime napping, that is typically more erratic in placement and duration.[4 8] The impact of training and match scheduling on sleep should be considered, and alterations may reduce sleep irregularity in student-athletes.

REFERENCES

1. Kroshus E, Wagner J, Wyrick D, Athey A, Bell L, Benjamin HJ, Grandner MA, Kline CE, Mohler JM, Roxanne Prichard J, Watson NF, Hainline B. Wake up call for collegiate athlete sleep: Narrative review and consensus recommendations from the NCAA Interassociation Task Force on Sleep and Wellness. *British Journal of Sports Medicine*, 2019;**53**(12):731–736. https://doi.org/10.1136/bjsports-2019-100590
2. Brauer AA, Athey AB, Ross MJ, Grandner MA. Sleep and health among collegiate student athletes. *Chest*, 2019;**156**(6):1234–1245. https://doi.org/10.1016/j.chest.2019.08.1921
3. Mah CD, Kezirian EJ, Marcello BM, Dement WC. Poor sleep quality and insufficient sleep of a collegiate student-athlete population. *Sleep Health*, 2018;**4**(3):251–257. https://doi.org/10.1016/j.sleh.2018.02.005
4. Phillips AJK, Clerx WM, O'Brien CS, Sano A, Barger LK, Picard RW, Lockley SW, Klerman EB, Czeisler CA. Irregular sleep/wake patterns are associated with poorer academic performance and delayed circadian and sleep/wake timing. *Scientific Reports*, 2017;**7**(1):3216. https://doi.org/10.1038/s41598-017-03171-4
5. Samuels C, James L, Lawson D, Meeuwisse W. The Athlete Sleep Screening Questionnaire: A new tool for assessing and managing sleep in elite athletes. *British*



Abstract O11 Figure 1 Raster plot of sleep onset and offset for a participant with irregular sleep (SRI: 65.4)

Abstract O11 Table 1 Results of independent t-tests of differences between sleep outcomes on nights preceding training days and following match days compared to all other nights

	Sleep preceding training				Sleep following match			
	Training	No training	*t*	ES (g ± 95% CI)	Match	No match	*t*	ES (g ± 95% CI)
Sleep duration (hr)	6.41 ± 1.24	7.15 ± 1.49	3.02*	0.53 ± 0.35	5.85 ± 1.26	6.97 ± 1.41	3.01*	0.80 ± 0.53
Sleep onset (hh:mm)	23:06 ± 00:49	00:27 ± 01:38	5.66*	1.00 ± 0.37	02:16 ± 01:25	23:31 ± 01:10	-8.54*	2.27 ± 0.59
Sleep offset (hh:mm)	06:28 ± 01:22	08:41 ± 01:11	9.87*	1.74 ± 0.41	08:51 ± 00:46	07:34 ± 01:43	-2.99*	0.79 ± 0.53

Sleep outcomes presented as mean ± SD, ES presented as Hedges' *g* ± 95%CI. *p <.01

Journal of Sports Medicine, 2016;**50**(7):418–422. https://doi.org/10.1136/bjsports-2014-094332
6. Migueles JH, Rowlands AV, Huber F, Sabia S, Van Hees VT. GGIR: A research community-driven open source R package for generating physical activity and sleep outcomes from multi-day raw accelerometer data. *Journal for the Measurement of Physical Behaviour*, 2019;**2**(3):188–196. https://doi.org/10.1123/jmpb.2018-0063
7. Halson SL, Johnston RD, Piromalli L, Lalor BJ, Cormack S, Roach GD, Sargent C. Sleep regularity and predictors of sleep efficiency and sleep duration in elite team sport athletes. *Sports Medicine – Open*, 2022;**8**(1):79. https://doi.org/10.1186/s40798-022-00470-7
8. Windred DP, Stone JE, McGlashan E, Cain SW, Phillips A. Attitudes towards sleep as a time commitment are associated with sleep regularity. *Behavioral Sleep Medicine*, 2021;**19**(6):732–742. https://doi.org/10.1080/15402002.2020.1860989

P1 THE UTILITY OF SLEEP STUDIES AND TREATMENT OPTIONS IN CHILDREN WITH PRADER – WILLI SYNDROME IN THE GROWTH HORMONE ERA

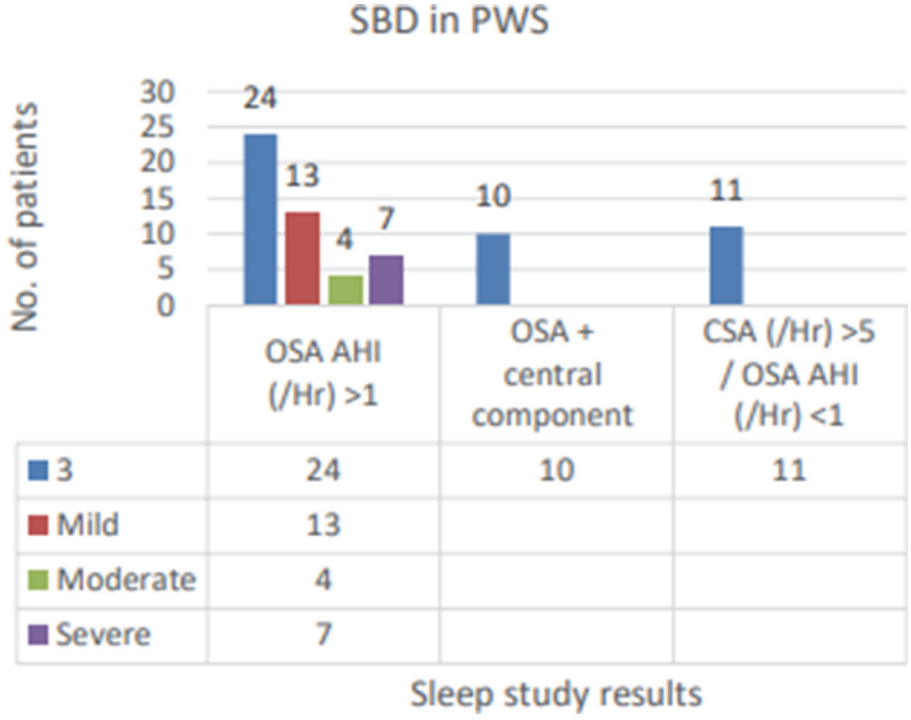
Rebecca Lennon*, Elise Buchan, Paul Burns, Ross Langley, Guftar Shaikh. *Royal Hospital for Children NHS Greater Glasgow and Clyde, Glasgow*

10.1136/bmjresp-2023-BSSconf.12

Introduction Prader – Willi Syndrome (PWS) is a rare genetic multisystem disorder, with high prevalence of sleep disordered breathing (SDB). Treatments include; non-invasive ventilation (NIV), oxygen therapy and adenotonsillectomy. Growth Hormone (GH) therapy is also now being used at an earlier age and may potentially worsen SDB due to adenotonsillar hypertrophy. Our primary aim was to evaluate cardio-respiratory sleep study (CRSS) results from PWS patient's pre and post GH. A secondary aim was to evaluate the use of NIV as a treatment option in this population.

Methods This was a retrospective study. Results from CRSS, pre and post GH initiation from 2013 to present were included. Main outcomes were apnoea hypopnoea index (AHI), the nature of the SDB and treatment provided.

Results 38 patients were included - 20 males, 18 females (mean age: 4.1 [2.8, 5.5], weight mean Z score: 0.1 [-0.72, 0.92]). 92% demonstrated SDB, 69% had Obstructive Sleep Apnoea (OSA) and 31% had Central Sleep Apnoea (CSA) (figure 1). There was no significant difference ($P > 0.05$) in OSA indices pre and post GH. Five patients (mean age: 2.98 [1.14, 4.82]) developed moderate/severe OSA, on average 16 months after starting GH. All had a subsequent adenotonsillectomy. 24% of the total patient population were established on NIV following an abnormal CRSS. Seven of the nine patients have remained on long term NIV. The incidence of treatment



Abstract P1 Figure 1 SDB in PWS patients, including OSA and CSA