Bachelor and Master (M.Sc. & M.Ed.) thesis in the field of sleep, ANS and sports-related concussions

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Process & research proposal:

1. Contact via mail to fix a first appointment (Email should include: study course, deadline for the thesis (e.g., final grade in Sept 2021) and the topic you are interested in and why?)
2. Prepare a research proposal and send it in one day before the first scheduled meeting

Further information about the project:
https://www.bisp-surf.de/Record/PR020181200143
https://www.drks.de/drks_web/navigate.do?navigationId=trial.HTML&TRIAL_ID=DRKS00019929

Details can be found on the second page!

Topic 1

Title: Subjective sleep quality and quantity following sport-related concussion

Research question: Does subjective sleep quality and quantity during RTS after sport-related concussion differ from matched controls?

Topic 2

Title: Nocturnal heart rate (variability) of healthy men: Comparing “4-hour analysis”, “hour-by-hour-analysis” and “whole-night-mean”

Research question: Does nocturnal HR(V) from healthy men differ when using different analysis?

Topic 3

Title: Recovery during Sleep – Assessing ANS activity before and after sleep

Research question: Do parameters of ANS activity differ in evening and morning supine resting measurements?

Topic 1: Subjective sleep quality and quantity following sport-related concussion

Research question: Does subjective sleep quality and quantity during RTS after sport-related concussion differ from matched controls?

- Subjective sleep quality: restfulness of sleep, sleep onset latency, WASO (Wake up after sleep onset) (Sleep diary from the German Society for Sleep Research and Sleep medicine)
- Subjective sleep quantity: sleep duration and daytime naps (Sleep diary from the German Society for Sleep Research and Sleep medicine)

Literature:

Hoffman, N. L., O'Connor, P. J., Schmidt, M. D., Lynall, R. C., & Schmidt, J. D. (2019). Differences in sleep between concussed and nonconcussed college students: a matched case–control study. Sleep, 42(2), zsy222.

Jaffee, M. S., Winter, W. C., Jones, C. C., & Ling, G. (2015). Sleep disturbances in athletic concussion. Brain injury, 29(2), 221-227.

Kostyun, R. O., Milewski, M. D., & Hafeez, I. (2015). Sleep disturbance and neurocognitive function during the recovery from a sport-related concussion in adolescents. The American journal of sports medicine, 43(3), 633-640.

Ludwig, R., D'Silva, L., Vaduvathiriyan, P., Rippee, M. A., & Siengsukon, C. (2020). Sleep disturbances in the acute stage of concussion are associated with poorer long-term recovery: A systematic review. Pm&r, 12(5), 500-511.

Murdaugh, D. L., Ono, K. E., Reisner, A., & Burns, T. G. (2018). Assessment of sleep quantity and sleep disturbances during recovery from sports-related concussion in youth athletes. Archives of physical medicine and rehabilitation, 99(5), 960-966.

Topic 2: Nocturnal heart rate (variability) of healthy men: Comparing "4-hour analysis", "hour-by-hour-analysis" and "whole-night-mean"

Research question: Does nocturnal HR(V) from healthy men differ when using different analysis?

- HR(V): HR, RMSSD, HF, LF/HF ratio
- ➔ Using Kubios Premium

Literature:

Chouchou, F., & Desseilles, M. (2014). Heart rate variability: a tool to explore the sleeping brain?. Frontiers in neuroscience, 8, 402.

Costa, J. A., Brito, J., Nakamura, F. Y., Oliveira, E. M., & Rebelo, A. N. (2018). Effects of late-night training on "slow-wave sleep episode" and hour-by-hour-derived nocturnal cardiac autonomic activity in female soccer players. International journal of sports physiology and performance, 13(5), 638-644.

Dupuy, O., Bherer, L., Audiffren, M., & Bosquet, L. (2013). Night and postexercise cardiac autonomic control in functional overreaching. Applied Physiology, Nutrition, and Metabolism, 38(2), 200-208.

Halson, S. L., & Juliff, L. E. (2017). Sleep, sport, and the brain. Progress in brain research, 234, 13-31.

Myllymäki, T., Rusko, H., Syväoja, H., Juuti, T., Kinnunen, M. L., & Kyröläinen, H. (2012). Effects of exercise intensity and duration on nocturnal heart rate variability and sleep quality. European journal of applied physiology, 112(3), 801-809.

Topic 3: Recovery during Sleep – Assessing ANS activity before and after sleep

Research question: Do parameters of ANS activity differ in evening and morning supine resting measurements? [Optional: Group comparison Concussion vs. Controls]

- Heart Rate, HRV (RMSSD), electrodermal activity (meanEDA)
- Individual changes (e.g., in %) from pre (evening) to post (morning) sleep
- ➔ Resting measurement: 3 min supine (Empatica E4)

Literature:

Boudreau, P., Yeh, W. H., Dumont, G. A., & Boivin, D. B. (2012). A circadian rhythm in heart rate variability contributes to the increased cardiac sympathovagal response to awakening in the morning. Chronobiology international, 29(6), 757-768.

Chouchou, F., & Desseilles, M. (2014). Heart rate variability: a tool to explore the sleeping brain?. Frontiers in neuroscience, 8, 402.

Buchheit, M. (2014). Monitoring training status with HR measures: do all roads lead to Rome?. Frontiers in physiology, 5, 73.

Natarajan, A., Pantelopoulos, A., Emir-Farinas, H., & Natarajan, P. (2020). Heart rate variability with photoplethysmography in 8 million individuals: a cross-sectional study. The Lancet Digital Health, 2(12), e650-e657.

Sano, A., Picard, R. W., & Stickgold, R. (2014). Quantitative analysis of wrist electrodermal activity during sleep. International Journal of Psychophysiology, 94(3), 382-389.