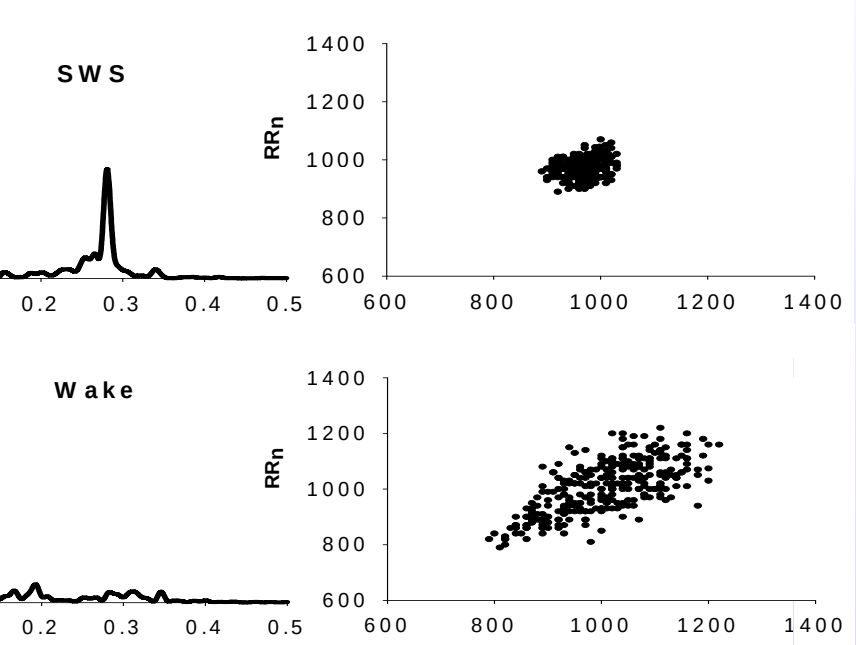
ercise is a key component of health maintenance and morbidity . The cardioprotective effect of endurance training is attributed to commonly reported in trained individuals. However, a training-induced agal-related indexes has not been systematically observed, and a gal to sympathetic predominance has been reported with increased , overload, or the stress of a world competition, which could mask the se. Our purpose was then to investigate the effect on HRV of moderate l training in condition free of any stressful stimuli or overload.

5 ± 3.0 yr) took part in the study and were dispatched in three groups ning load using the Baecke questionnaire (1): sedentary subjects (SED, <4; displaying less than 2 h a week of physical activity; n = 12); ubjects (MT, sport score between 6 and 10; having from 4 to 6 h of ity a week -running, university sports-; n = 10); and highly-trained ore >15; following more than 18 h of intensive aerobic training a week riathlon-; n = 9). To ensure the absence of overload or stressful stimuli ts were confronted with sleep quality and the profile of mood state sing fatigue and the psycho-emotional state of the subjects. Following one habituation night, cardiac and sleep recordings were made during t in a soundproof, air-conditioned sleep room from 20:00 to 07:00 h. onary segments in the first SWS episode lasting at least 15 min were R and HRV indexes during sleep (Fig. 2), as the standard deviation of (SDNN), the root-mean-square differences of successive normal R-R he low and high frequency power (LF and HF), and the normalized HF of spectral analysis. Night data where completed by 5-min segment rning, the subjects staying in bed after awakening, and breathing at a with an electronic metronome (12 cycles.min-1).

e and stress level checked by questionnaire were identical for all the signs of overtraining in the highly-trained participants (Table 1 and 2). 5-min Poincaré plot with regard to its related power spectra of R-R cording condition. During SWS, a significant ($p<0.05$) increase in ized vagal-related HRV indexes was observed in moderately-trained l to controls, which did not persist in highly-trained athletes (Fig 2). xes during waking periods, compared to controls, all the absolute HRV ncreased in moderately-trained individuals ($p<0.05$), but not in highly- rt rate was similar for moderately-trained and sedentary subjects, but) lower in highly-trained athletes in both recording conditions.



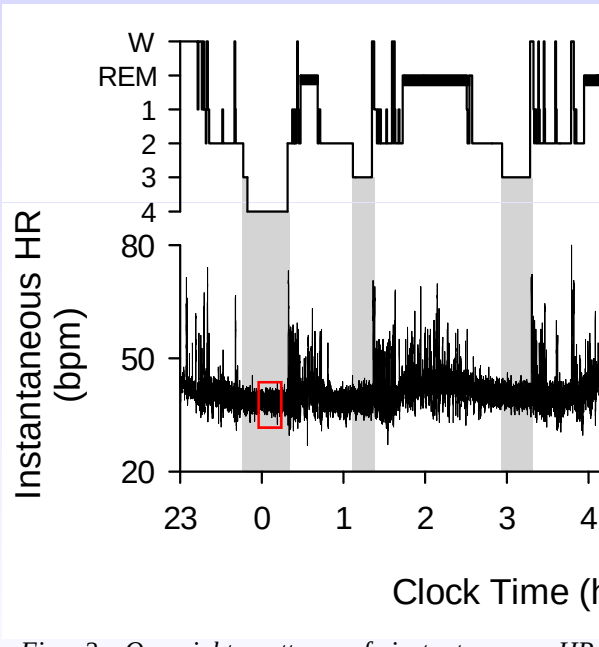


Fig. 2. Overnight pattern of instantaneous HR hypnogram, where the alternance of the distinct stage wake (W), REM sleep (REM), stage 1 (1) and 2 (2), ar

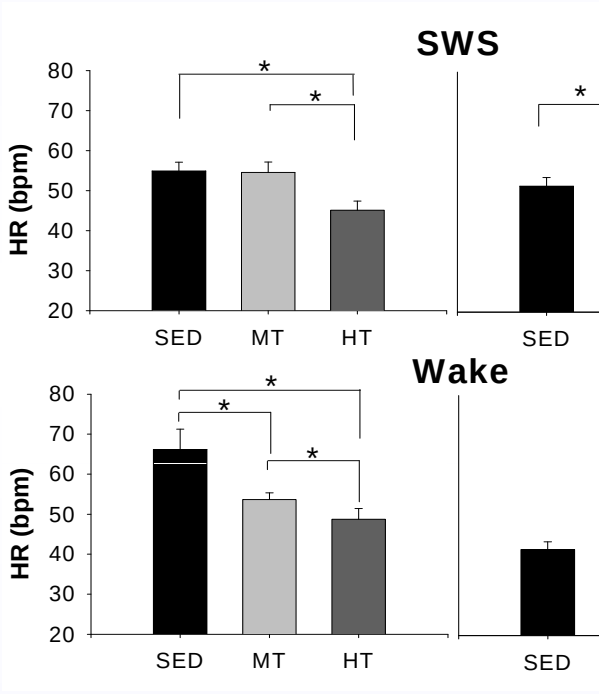


Fig. 3. Mean (± SEM) heart rate (HR) and normali during wake in the morning and during slow wave sleep cycle in sedentary (SED), moderately-trained (MT subjects: normalized high frequency power HF/(L frequency and HF high frequency power.

Sleep quality index	SED	
Sleep efficiency (%)	91.9 ± 1.2	94.

Table 1. Mean (± SEM) values of sleep paramet sedentary; MT, moderately-trained; and HT, high efficiency = total sleep time divided by time in bed.

POMS	SED	MT
Vigor	58.4 ± 1.7	57.4 ± 3.
Fatigue	43.7 ± 1.6	44.5 ± 1.

Table 2. Mean values (± SEM) of two intermediate sc states questionnaire (POMS)(2) for each group. SED,