Article (1st Author)	Sport (Profile)	Intervention	Duration (weeks)	Sleep quality parameter(s)
1993 Hill [30]	Soccer (n = 7; F) Age: 22 ± 2 y	Jet lag effects (From USA to Taiwan: ~14h travelling across 16 time-zones)	01	**1 to 5 rating scale using anchors of 1 = "terrible-hardly slept at all" to 5 ="great-woke up relaxed and refreshed".** In a daily log, the time went to bed and woke up were recorded as well as the quality of sleep was rated. The authors reported that "this is an unpublished scale we have developed but which has not been validated" (No reference was provided).
1999 Hoffman [31]	Basketball (n = 10; M) Age: 26 ± 4 y	Effects of a training camp during preseason	04	**0 to 4 rating scale using anchors of 0 = "extremely good"; 1 = "good"; 2 = "moderate"; 3 = "poor"; and 4 = "very poor".** The following question was used: "How has the quality of your sleep this past week been?" No information on validity and reliability. (No reference was provided).
2002 Cardinali [32]	Soccer (n = 22; M) Age: 30 ± 9 y	Jet lag effects (From Argentina to Japan: ~23h travelling across 12 time-zones)	01	**A 10-cm long line rated from 0 to 10 (visual analogue scale).** Sleep log diaries to evaluate overall quality of sleep, time to bed, time wake, number of awakening episodes and general sleep information. No information on validity and reliability (No reference was provided).
2003 George [100]	American Footbal (n = 52; M) Age: 26 ± 3 y	Describe clinical features of players at risk for sleep-disordered breathing	N/A	**Epworth Sleepiness Scale, Stanford Sleepiness Scale and Polysomnography (Medcare Embla/Somnologica system).** Subjects were asked to complete the Epworth Sleepiness Scale (Johns, 2001) and the Stanford Sleepiness Scale (Hoddes et al., 1973). Registered polysomnographic technologists from the staff of SleepTech LLC. For consistency, the same technologists recorded all on-site studies. These scales were developed by respective authors and the polysomnography is considered a gold standard.
2004 Richmond [33]	Australian Football (n = 10; M) Age: 23 ± 2 y	Effect of interstate air travel on the quality and quantity of sleep	N/R	**Actigraphy (Micro Mini-Motion Logger; Ambulatory Monitoring) and 1 to 5 rating scale.** Sleep pattern was assessed by measuring sleep duration, sleep efficiency, number of wakings and total wake time after sleep onset using a wrist-worn actigraph. Information on validity and reliability of the instrument was provided. Subjective sleep quality was

Continued from ESM Table 3

				assessed using a scale of sleep rating. No information on validity and reliability (No reference was provided).
2007 Polman [34]	Rugby League (n = 12; M) Age: 27 ± 4 y	Determine whether changes in psychological mood states were linked to game outcome	04	**1 to 5 rating scale using anchors of 1 = ‘‘much worse’’ to 5 = ‘‘much better’’.** Participants were requested to rate the quality of their sleep in comparison with what they would rate as a normal. No information on validity and reliability (No reference was provided).
2007 Richmond [35]	Australian Football (n = 19; M) Age: 24 ± 3 y	Effect of interstate travel on the sleep patterns and performance	N/R	**Actigraphy (Micro Mini-Motion Logger; Ambulatory Monitoring) and 1 to 5 rating scale using anchors of 1 = “very poor” to 5 = “very good”.** Sleep pattern was assessed by measuring sleep duration, sleep efficiency, number of wakings and total wake time after sleep onset using a wrist-worn actigraph. The authors reported on validity and reliability of same actigraph in previous paper. Subjective sleep quality was assessed using a scale of sleep rating (No reference was provided).
2007 Zerguini [36]	Soccer (n = 55; M) Age: 17-34 y	Impact of Ramadan on physical performance	04	**0 to 4 rating scale**. Usual; Better; Slightly worse; Substantially worse. No information on validity and reliability (No reference was provided).
2008 Coutts [37]	Rugby League (n = 20; M) Age: 24 ± 4 y	Monitoring changes in perceived stress and recovery during intensified training	07	**RESTQ-Sport: 0 to 6 scale using anchors of 0 = “never” and 6 = “always”.** It is used to indicate how often the respondent participated in stress- or recovery-associated activities during the previous 72h. Information on validity and reliability of the instrument was provided (Kellmann; Kallus, 1999, 2001; Kellmann; Giinther, 2000).
2008 Leiper [38]	Soccer (n = 87; M) Age: 18 ± 1 y	Investigated the psychosomatic factors in football players undertaking their usual training and competitive schedule during Ramadan	07	**Question: “How was your sleep last night?” (better/same/worse).** No information on validity and reliability (No reference was provided).
2009 Brand [39]	Soccer (n = 36; M) Age: 15 ± 1 y	Investigated the impact of football sports on the sleep patterns	N/A	**Pittsburgh Sleep Quality Index (PSQI).** The German adaptation was taken from it and allowed reporting sleep and sleep-related information consecutively and not retrospectively (Backhaus; Riemann, 1996; Buysse et al., 1989). Information on validity and reliability of the instrument was provided.

Continued from ESM Table 3

2009 Wilson [40]	Soccer (n = 10; M) Age: 25 ± 3 y	How the timing of sleep was influenced by fasting diurnal requirements during Ramadan	08	**Actigraphy (Cambridge Neurotechnology).** Actimeter watch (Bedtimes, wake-up times, and sleep durations are all expressed in minutes). No information on validity and reliability.
2010 Brand [41]	Soccer (n = 12; M) Age: 16 ± 1 y	Compare sleep-EEG patterns of vigorous exercisers and controls	N/A	**Sleep-EEG recordings (Fp2-A1; Somnowatch) and Pittsburgh Sleep Quality Index (PSQI).** Sleep-EEG registration was performed following a day without exercise. A sleep log was based on the PSQI (Buysse et al., 1989). Participants were asked to fill out the log twice a day for a week, in the evening and in the morning. Information on validity and reliability of the PSQI was provided, but it not for the Sleep-EEG.
2010 Killen [42]	Rugby League (n = 36; M) Age: 17-32 y	Examine the relationship between training load and incidence of injury during a preseason training period	14	**1 to 10 rating scale using anchors of 1 = "being extremely poor" and 10 = "being excellent".** These ratings were recorded immediately before 2 training sessions each week. Information on reliability was provided, but it not for the validity (No reference was provided).
2010 Rice [43]	American Football (n = 137; M) Age: 27 ± 3 y	Sleep-disordered breathing in the National Football League players	N/A	**Portable sleep apnea monitoring (ApneaLink) and sleep-apnea screening questionnaire.** Hypopnea was defined as a decrease in airflow by 50% to 80% of baseline that lasted at least 10 seconds. Information on validity and reliability of the instrument was provided. In the questionnaire, the specific domains assessed were self reported snoring, apneas, daytime sleepiness; and sleep time (No reference was provided).
2011 Mah [44]	Basketball (n = 11; M) Age: 19 ± 1 y	The effects of sleep extension on the athletic performance	09	**Actigraphy (AW-64, Philips Respironics) and Epworth Sleepiness Scale.** Actigraphy devices were worn on the wrist corresponding to the subject's dominant hand 24 h/day except during practices and games. Epworth Sleepiness Scale was administered during the baseline and at the end of sleep extension (Johns, 1991). Information on validity and reliability of the instruments were provided. .
2012 Brink [45]	Soccer (n = 87; M) Age: 17 ± 1 y	Monitor sport-specific performance and assess the stress-recovery balance in overreached players	08	**RESTQ-Sport: 0 to 6 scale using anchors of 0 = "never" and 6 = "always".** The Dutch version of the Recovery–Stress Questionnaire for Athletes (RESTQ-Sport) was administered monthly to assess the

Continued from ESM Table 3

				psychosocial stress–recovery balance of players (Nederhof et al., 2008). Information on validity and reliability of the instrument was provided.
2012 Chamari [46]	Soccer (n = 42; M) Age: 24 ± 4 y	Injury rates in professional soccer players during Ramadan	24	**1 to 7 rating scale.** Before each training session and match. Based on Hooper and Mackinnon (1995).
2012 Herrera [47]	Soccer (n = 9; M) Age: 26 ± 4 y	Assess subjective sleep quality, symptoms of insomnia, and daytime sleepiness during Ramadan	05	**Pittsburgh Sleep Quality Index, Insomnia Severity Index, and Epworth Sleepiness Scale.** The Arabic version of the study questionnaires were self administered one week before Ramadan and during the last week of Ramadan (Suleiman et al., 2010). Information on validity and reliability of the instruments were provided.
2012 Zhao [48]	Basketball (n = 20; F) Age: 19 ± 4 y	Effect of red light on sleep quality and endurance performance	02	**Pittsburgh Sleep Quality Index.** Score ranges from 0 to 21, and higher scores reflect poorer-quality sleep. It was measured by the Chinese version (Buysse et al., 1989). Information on validity and reliability of the instrument was provided.
2013 Bahnert [101]	Australian Football (n = 44; M) Age: 23 ± 4 y	Associations between post-game recovery protocols and physical and perceptual recovery, and game performance	23	**1 to 5 rating scale with 1 representing the positive end of the continuum.** The rating scale was completed daily. No information on validity and reliability (No reference was provided).
2013 Beaven [49]	Rugby Union (n = 25; M) Age: 25 ± 3 y	Assess the effectiveness of compression garments and an electrostimulation device at assisting in recovery during pre-season	06	**5-points rating scale with high, middle, and low anchors (Awesome, OK, Shocking).** Questionnaires were completed on Mondays, Wednesdays and Fridays throughout the training blocks. No information on validity and reliability (No reference was provided).
2013 Buchheit [50]	Australian Football (n = 18; M) Age: 22 ± 2 y	Usefulness of selected physiological and perceptual measures to monitor fitness, fatigue and running performance during a pre-season	02	**1 to 5 rating scale using anchors of 1 = "poor" and 5 = "very good".** The questionnaire was completed daily upon awakening. Based on Hooper and Mackinnon (1995).
2013 Di Fronso [51]	Basketball (n = 28; M/F) Age: 24 ± 9 y	Examine differences in stress and recovery across gender and time (pre-season and play-offs)	09	**RESTQ-Sport: 0 to 6 scale using anchors of 0 = "never" and 6 = "always".** Each player completed the RESTQ-Sport (Italian version) in the preseason phase (test) after a training period of 21 days, again at the end of the season during the play-off phase (retest) (Tessitore et al., 2008). Assessments took

Continued from ESM Table 3

				place in a quiet location near training facilities. Information on validity and reliability of the instrument was provided
2013 Gastin [52]	Australian Football (n = 27; M) Age: 24 ± 3 y	Using subjective ratings of physical and psychological wellness to assess the ecological validity of such a monitoring approach	26	**1 to 5 rating scale using anchors of 1 = "feeling as good as possible" and 5 = "feeling as bad as possible".** Players subjectively rated each item as they arrived at the training or competition venue. Based on Hooper et al (1995). Information on validity and reliability of the instrument was provided.
2013 Haddad [53]	Soccer (n = 22; M) Age: 18 ± 1 y	Influence of the Hooper Index taken before each training session on RPE during standard effort in young players during weekly classic microcycles	06	**1 to 7 rating scale using anchors of 1 = "very, very good" and 7 = "very, very bad".** Approximately 15 minutes before each training session, each player was asked to rate subjectively concerning the night preceding the evaluation. Based on Hooper and Mackinnon (1995).
2013 McNamara [54]	Cricket (n = 26; M) Age: 18 ± 1 y	Described the endocrine, neuromuscular, and perceptual fatigue associated with playing this sport	08	**1 to 5 rating scale.** Subjective perceptions of well-being were reported for each training session and throughout each day of competition. Based on Hooper and Mackinnon (1995). Information on reliability of the instrument was provided.
2013 Roach [55]	Soccer (n = 26; M) Age: 17 ± 1 y	Examine potential adaptations in sleep after an eastward time zone change of 10 h in sea-level natives and after descending from high altitude to near sea level in high-altitude natives.	N/A	**Actigraphy (Actical Z-series; Philips Respironics) and 1 to 5 rating scale using anchors of 1 = "very poor" and 5 = "very good".** Each player wore an activity monitor, on the same wrist throughout the study, except when showering or competing in matches. Information on validity and reliability of the instrument was provided (Weiss et al, 2010). Sleep diaries were used to record three pieces of information for night-time sleeps and daytime naps: start date/time, end date/time and subjective sleep quality. No information on validity and reliability as well as reference for rating scale were provided.
2013 Thompson [56]	Soccer (n = 22; F) Age: 26 ± 4 y	Supplementary bright light for reducing jet lag effects (From USA to Portugal: 7h travelling across 5-8 time-zones)	01	**Liverpool jet-lag questionnaire with subjective ratings of jet-lag on a visual analogue scale with a score 0 = "no jet-lag" and 10 = "very bad jet-lag" as well as the sleep quality ratings on −5 to +5 scale with 0 representing 'normal'**. These questionnaire data were taken following the physical measurements and after meal consumption. Information on validity and reliability of the instrument

Continued from ESM Table 3

				was provided by Waterhouse et al. (2000).
2014 Abedelmalek [57]	Soccer (n = 36; M) Age: 22 ± 1 y	Effects of partial sleep deprivation and racial variation on muscle power and fatigue	01	**Actigraphy (Actiwatch sleep; Cambridge Neurotechnology).** Actimetric devices were worn on the non-dominant arm from 20:00h the day before the first test session until the end of the experiment. No information on validity and reliability.
2014 Abeln [58]	Soccer (n = 18; M) Age: 16 ± 1 y	Sleep quality of top athletes can be improved by auditory brainwave entrainment and whether this leads to enhancements of post-sleep psychophysical states (sleep deprivation)	10	**1 to 10 rating scale using anchors of 1 = "very bad" and 10 = "very very good", Sleep diary and Self Assessment questionnaire of Sleep and Awakening quality (SSA).** First, participants were asked to fill out a sleep diary and rating scale including the following questions: at what time did I go to bed?; How long did it take until I fell asleep?; I think I woke up...times during the night. I think, I have been awake...hours and...minutes. I think I woke up at...in the morning. I think I did sleep...hours and...minutes in total this night. I did get up at... No information on validity and reliability (No reference were provided for them). For sleep ratings, the SSA developed and validated by Saletu et al. (1987) was used. The SSA includes 20 questions concerning sleep and awakening quality as well as somatic complaints. The subject has to choose the answer between 1 = "no", 2 = ''a little'', 3 = ''moderately'' or 4 = ''a lot'', depending on the last night and current feelings after wakeup.
2014 Fowler [102]	Soccer (n = 6; M) Age: 20-26 y	Effects of short-haul air travel (3.1–7.5h) on competition performance and subsequent recovery.	12	**Actigraphy (ReadiBand, Fatigue Science), 1 to 7 rating scale using anchors of 1 = "very very good" and 7 = "very very bad", Stanford Sleepiness Scale and RESTQ-Sport.** Sleep patterns were assessed using Actigraphy watches worn on players' nondominant wrist 2 days before, the day of, and 2 days after each match (No information on validity and reliability). Two days before, the day of, and 2 days after each match were applied the perceived sleep quality (Based on Hooper et al., 1995) and the Stanford Sleepiness Scale of 1 (feeling active/alert/wide awake) to 8 (asleep) (Hoddes et al., 1972). To assess players' stress-recovery balance, the Recovery-Stress Questionnaire for Athletes (RESTQ-19 Sport) (Kellman et al., 2001) was completed at the same time points. In addition, fatigue and sleepiness were recorded immediately before

Continued from ESM Table 3

				and immediately after outbound and return travel.
2014 Robey [59]	Soccer (n = 12; M) Age: 19 ± 1 y	Effects of early evening high-intensity training sessions over an extended training phase on the sleep	07	**Actigraphy (Spectrums; Phillips Respironics, n = 9 and Micro Mini-Motion Loggers; Ambulatory Monitoring, n = 3), Karolinska Sleepiness Scale and 1 to 5 rating scale using anchors of 1 = "very good" and 5 = "very poor".** Actigraphy data were obtained from the home environment (Tuesday through to Thursday night), with athletes instructed to put on the actigraphs at least 30 min prior to 'lights out' and to keep them on for a similar time after waking up. Information on validity and reliability of the instrument was provided. Same for Karolinska 9-point sleepiness, where the athletes rated their sleepiness on a scale before bedtime and upon waking (1 = "extremely alert" and 9 = "extremely sleepy–fighting sleep"; Akerstedt, 1990). On the other hand, the sleep quality on a 5-point scale has not information on validity and reliability (No reference was provided for it).
2014 Tulppo [60]	Ice Hockey (n = 22; M) Age: 25 ± 5 y	Effects of bright light treatment on psychomotor speed in athletes	04	**Visual analog scale (VAS; scale: 0–10).** The quality of sleep was studied every morning at home. No information on validity and reliability (No reference was provided).
2015 Buchheit [61]	Australian Football (n = 36; M) Age: 24 ± 4 y	Quantify the physiological, psychometric, and performance effects of a 2 weeks Christmas break	06	**1 to 5 rating scale using anchors of 1 = "poor" and 5 = "very good".** The questionnaire was completed daily upon awakening. Based on Hooper and Mackinnon (1995).
2015 Fowler [62]	Soccer (n = 16; M) Age: 27 ± 2 y	Jet lag effects (From Australia to Japan: 10h travelling across 1 time-zone)	02	**Actigraphy (Philips Respironics), Liverpool jet-lag questionnaire with sleep quality ratings on −5 to +5 scale with 0 representing 'normal' and 1 to 5 rating scale using anchors of 1 = "poor" and 5 = "very good".** Wrist activity monitors worn on the same wrist 2 days before, the day of, and 5 days after travel. The Liverpool John Moore's University jet-lag questionnaire, which is based on a series of questions on a visual analog scale, was completed at a standardized time (9 AM) on the day of and 5 days after travel (Waterhouse et al., 2000). Information on validity and reliability of these instruments were provided. The questionnaire was completed daily upon awakening. Based on Hooper and Mackinnon

Continued from ESM Table 3

				(1995).
2015 Juliff [63]	Team Sports (n = 210; M/F) Age: 24 ± 5 y	Identify sleep complaints of athletes prior to competitions and determine whether complaints were confined to competition periods	N/A	**Competitive Sports and Sleep Questionnaire and the Pittsburgh Sleep Quality Index.** The Competitive Sports and Sleep questionnaire is a sport specific questionnaire used to assess sleep habits and dreams of athletes prior to important competitions and games (Erlacher et al., 2011). The validated Pittsburgh Sleep Quality Index has been used throughout numerous sleep studies as a standardised sleep questionnaire estimating general sleep quality (Buysse et al., 1989).
2015 Lastella [11]	Team Sports (n = 58; M/F) Age: 23 ± 3 y	Investigate the habitual sleep/wake behaviour of elite athletes, and to compare the differences in sleep between athletes from individual and team sports	01	**Actigraphy (Philips Respironics).** The sleep diary indicated the participant was lying down attempting to sleep and the activity counts derived from the activity monitor were sufficiently low to indicate that the participant was immobile. Information on validity and reliability of the instrument was provided.
2015 Laux [64]	Soccer (n = 22; M) Age: 26 ± 5 y	Examine the contribution of stress and recovery variables as assessed with the RESTQ-Sport to the risk of injury	60	**RESTQ-Sport: 0 to 6 scale using anchors of 0 = "never" and 6 = "always".** We used the German version of the RESTQ-Sport with 52 items (Kellmann & Kallus, 2000). The RESTQ-Sport was always completed 2 days before the first national league match in the month on the weekend independent of the number of matches per week (from January 2010 until April 2011). Information on validity and reliability of the instrument was provided.
2015 Moreno [65]	Basketball (n = 6; M) Age: 20 ± 2 y	Analyze the relationship between certain recovery behaviors used by athletes	N/R	**Total Quality Recovery action (TQRact).** Where the "Sleep and Rest" were assessed as "Full night of quality sleep" = 3 points and "Nap during the day" = 1 point (Kenttä; Hassmén, 1998). Information on validity and reliability of the instrument was provided.
2015 Noon [66]	Soccer (n = 40; M) Age: 17 ± 1 y	Assess player perceptions of well-being and physical performance to the high training loads	42	**-3 to 3 rating scale using anchors of -3 = very poor, 0 = "normal" and 3 = "very good".** The questionnaire was developed by the club over the previous two seasons as a performance management tool to assess readiness to train. At 9 am prior to training, each player completed it using a dry wipe marker pen on an A4 laminated white board located above their changing area (Rains et al., 2012) (No information on validity and reliability).

Continued from ESM Table 3

2015 Shearer [67]	Rugby Union (n = 28; M) Age: 24 ± 3 y	Effects of competition on the sleep patterns of athletes	04	**Actigraphy (Respironics Actiware 5; Philips Respironics).** Actigraph data were recorded two days prior to each of the selected matches until 3 days postmatch to observe sleep behaviour and whether it was altered with respect to competition. Information on validity and reliability of the instrument was provided.
2015 Souissi [68]	Soccer (n = 14; M) Age: 24 ± 2 y	Effects of caffeine ingestion and partial sleep deprivation at the end of night on cognitive and physical performance	01	**Actigraphy (Actiwatch; Cambridge Neurotechnology).** Actimetric devices were worn on the non-dominant arm from 20:00 h the day before the first test session until the end of the experiment (No information on validity and reliability).
2015 Staunton [69]	Basketball (n = 12; F) Age: N/R	Monitor sleep patterns of elite athletes	17	**Actigraphy (Actigraph GT3-x).** Devices were worn throughout all training sessions, daily activities and sleep and only removed when exposed to water (i.e., washing and swimming) or when downloading data (~1 hour per week). Information on validity and reliability of the instrument was provided.
2015 Thorpe [70]	Soccer (n = 10; M) Age: 19 ± 1 y	Quantify the relationships between daily training load and a range of potential measures of fatigue	03	**1 to 7 rating scale using anchors of 1 = "very very poor" and 7 = "very very good".** A psychometric questionnaire was used daily to assess general indicators of player wellness. The questionnaire was composed of 3 questions relating to perceived sleep quality (Hooper et al, 1995). Information on reliability of the instrument was provided.
2016 Andrade [71]	Volleyball (n = 277; M/F) Age: 19 ± 6 y	Analyzed the relationships between sleep quality, mood, and game results in the elite athletes	N/A	**1 to 5 rating scale using anchors of 1 = "very bad", 2 = "bad", 3 = "regular", 4 = "good" and 5 = "excellent".** The question on self-reported sleep quality was "How would you evaluate the quality of your sleep in the past few days?" (Brandt et al., 2014). Information on validity and reliability of the instrument was provided.
2016 Buchheit [72]	Soccer (n = 12; M) Age: 25 ± 5 y	Examine in elite soccer players after 24h flying across 6 time zones (3 flights) some psychometric and physiological responses to a preseason competitive camp in the heat	03	**1 to 5 rating scale using anchors of 1 = "poor" and 5 = "very good".** The questionnaire was completed daily upon awakening. Based on Hooper and Mackinnon (1995).

Continued from ESM Table 3

2016 Dennis [73]	Australian Football (n = 22; M) Age: 24 ± 3 y	Examine the potential relationship between sleep duration and efficiency and injury incidence in elite athlete	52	**Actigraphy (Readiband, Fatigue Science).** Each week, players wore an actigraph for 5 nights: the 3 nights before a game, the night of the game and the night after the game. When travelling away (interstate: 1-2 time zones crossed), players spent the 2 nights before a game in an unfamiliar environment. Information on validity and reliability of the instrument was provided.
2016 Dobrosielski [103]	American Football (n = 51; M) Age: 20 ± 1 y	Estimating the prevalence of sleep-disordered breathing	N/A	**Epworth Sleepiness Scale and Photoplethysmography (Morpheus Ox; WideMed).** The Epworth Sleepiness Scale is avalidated 8-item questionnaire that measures subjective sleepiness. Each question is scored from 0 to 3. High risk for daytime sleepiness was defined as a total score > 10 (Johns, 1991). Photoplethysmography based sleep-monitoring device to be worn for one night. An athletic trainer provided instructions for home use. This device uses a pulse oximeter to detect blood volume changes in the microvascular bed of the fingertip, and proprietary software (Amir et al., 2012). Information on validity and reliability of the instruments were provided.
2016 Eagles [104]	Rugby Union (n = 10; M) Age: 24 ± 3 y	Monitor changes in sleep quantity and efficiency of elite athletes over a twelve night period	02	**Actigraphy (BodyMedia; SenseWear).** Subjects were instructed to place the armband on their upper left triceps regions of their arm with the writing facing the correct way up. Information on validity and reliability of the instrument was provided.
2016 Fessi [74]	Soccer (n = 17; M) Age: 24 ± 3 y	Changes of the psychophysical state and feeling of wellness of professional athletes	13	**1 to 7 rating scale using anchors of 1 = "very very good" and 7 = "very very bad".** Before the first daily training session, each player was asked to respond subjectively the questionnaire. Based on Hooper and Mackinnon (1995).
2016 Fowler [75]	Rugby League (n = 18; M) Age: 24 ± 3 y	Jet lag effects (From Australia to UK: 24h travelling across 11 time-zones)	02	**0 to 10 rating scale using anchors of 0 = "insomnia" and 10 = "excellent" and Liverpool John Moore's University jet-lag questionnaire.** Rating scale procedure was collected at a standardized time (07:00 local time) 2 days before and 2, 6, and 8 days after travel. No information on validity and reliability (No reference was provided).

Continued from ESM Table 3

				The Liverpool John Moore's University jet-lag questionnaire was completed at a standardized time (9:00 AM local time) on the day before and 2, 6, and 8 days after travel (Waterhouse et al., 2000) (Information on validity and reliability of the instrument was provided).
2016 Fullagar [77]	Soccer (n = 14; M) Age: N/R	Effect of an acute sleep hygiene strategy on physical and perceptual recovery of players following a late-night soccer match	02	**Actigraphy (BodyMedia; SenseWear) and 0 to 6 rating scale using anchors of 0 = "not at all recovered" and 6 = "absolutely recovered".** Each of the three days prior to each game (mean baseline), the night of (match night) and the night following (match night + 1), objective and subjective sleep data were collected. Subjective measures included perceived sleep restfulness (very restful, pretty restful, average, hardly restful and not at all restful) and general recovery state upon waking (Kölling et al., 2014). Information on validity of the instruments were provided.
2016 Fullagar [78]	Soccer (n = 15; M) Age: 26 ± 5 y	Jet lag effects (From UK to South America: 18h travelling across -4 time-zones)	02	**Actigraphy (Readiband; Fatigue Science), Liverpool John Moore's Jet-lag Questionnaire (LJMJQ), RESTQ-Sport and 1 to 5 rating scale using anchors of 1 = "very restful" and 5 = "not at all restful".** The actigraphs were utilized during outbound and return travel, and every night on the tour (worn continuously except during training and matches). LJMJQ was completed both prior to boarding on the day of outbound travel (baseline) and before training (same time each day) on days 2, 4, 6 and 10 (Leatherwood, Dragoo, 2013). The total stress-recovery score were assessed by RESTQ-Sport (Kellmann; Kallus, 2001) and the Likert scale was used to assess sleep restfulness (Kölling et al., 2014). Information on validity and reliability of the instruments were provided. However, Kolling et al (2014) just published on validity.
2016 Fullagar [76]	Soccer (n = 16; M) Age: 26 ± 8 y	Impaired sleep and recovery after night matches	03	**Subjective sleep questionnaire (Regman) and 1 to 5 rating scale using anchors of 1 = "very restful" and 5 = "not at all restful".** A subjective sleep questionnaire was used to assess players' sleep habits, perceptual fatigue and stress prior to and following training and matches. This questionnaire was previously created as part of the Regman

Continued from ESM Table 3

				recovery project. The RegMan -Optimization of Training and Competition: Management of Regeneration in Elite Sports project (IIA1-081901/12-16) which was initiated and funded by the German Federal Institute of Sport Science (Kölling et al., 2015). The morning section was used to ascertain information about the previous night's sleep including questions relating to "restfulness" (Kölling et al., 2014). Information on validity and reliability of the Regman was provided. However, Kolling et al (2014) just published on validity.
2016 Gallo [79]	Australian Football (n = 36; M) Age: 22 ± 3 y	Relationship between self-reported pre-training wellness scores and exercise intensity in subsequent skill-based training sessions	10	**1 to 7 rating scale using anchors of 1 = "strongly disagree" and 7 = "strongly agree".** Players were instructed to complete a customised perceived wellness questionnaire before any physical training, on each morning of the study period, except days off. Based on Hooper and Mackinnon (1995).
2016 Gouttebarge [81]	Soccer (n = 384; M) Age: 27 ± 5 y	Determine the 12-month incidence and comorbidity of symptoms of common mental disorders among professional athletes	N/A	**Patient-Reported Outcomes Measurement Information System (PROMIS).** The PROMIS was used to verify sleep disturbance in the previous 4 weeks (baseline) and in the previous 6 months (follow-up) was assessed through 4 single questions (eg, "Have you recently had problems sleeping?") scored on a 5-point scale (from "not at all" to "very much"). Information on validity and reliability of the instrument was provided by Yu et al., 2011.
2016 Gouttebarge [80]	Soccer (n = 540; M) Age: 27 ± 4 y	Verify if the severe musculoskeletal injuries are associated with symptoms of common mental disorders among professional athletes	N/A	**Patient-Reported Outcomes Measurement Information System (PROMIS).** Derived from the validated PROMIS (short form), sleeping disturbance in the previous 4 weeks was assessed through two single questions (e.g. 'Did you recently have some problem to sleep?') scored on a 4-point scale (0 for favourable answers, 1 for unfavourable answers). Information on validity and reliability of the instrument was provided by Yu et al., 2011.
2016 Gouttebarge [82]	Gaelic Football (n = 204; M) Age: 25 ± 4 y	Epidemiology of symptoms of common mental disorders among elite athletes	N/A	**Patient-Reported Outcomes Measurement Information System (PROMIS).** Based on the PROMIS (short form), sleep disturbance was assessed through four single questions (e.g., 'Did you recently have some problem to sleep?') scored on a 5-point scale (from 'not at all' to 'very much').

Continued from ESM Table 3

				Information on validity and reliability of the instrument was provided by Yu et al., 2011.
2017 Caia [83]	Rugby League (n = 45; M) Age: 22 ± 2 y	Examined the sleep intra-individual variability of rugby league athletes across senior and junior levels during one week of the competitive season	N/A	**Actigraphy (Actiwatch 2; Phillips Respironics) and 1 to 5 rating scale using anchors of 1 = "very poor" and 5 = "very good".** For this study, participants wore the monitor on their non-dominant wrist, and were advised to wear the monitor at all times except when training (Information on validity and reliability of the instrument was provided). Simultaneous to the use of wrist actigraphy devices, participants completed a self-report sleep diary (Kushida et al. 2001). This diary required participants to record the bed time and get-up time of all sleep periods, in addition to ranking their subjective sleep quality on a five-point Likert scale (1 = "very poor", 2 = "poor", 3 = "average", 4 = "good", 5 = "very good") (No reference was provided for it).
2017 Fowler [85]	Soccer (n = 22; M) Age: 26 ± 4 y	Jet lag effects (From Australia to Brazil: 19h travelling 11 across time-zones)	02	**Liverpool John Moore"s University (LJMU) and self-report diaries.** The LSMU jet-lag questionnaire was completed immediately prior to travel (12:00 AEST) and at a standardized time (19:00 BRT; 08:00 +1 day AEST) for five days following travel (Waterhouse, 2000) (Information on validity and reliability of the instrument was provided). The self-report diaries, from which the following dependent variables were derived; Bed time, Sleep-onset time, Wake time, Get-up time, Time in bed, Sleep onset latency, Sleep duration, Sleep efficiency were based on Sargent et al. (2001) (No information on validity and reliability).
2017 Fowler [84]	Soccer (n = 20; M) Age: 16 ± 1 y	Assess sleep patterns, quantity and quality in youth athletes during pre-season	03	**Actigraphy (wActiSleep+, Actigraph).** Wrist (non-dominant) actigraphy data analysis determined when players were awake and asleep (Information on validity and reliability of the instrument was provided).
2017 Fuller [86]	Australian Football and Rugby League (n = 21; M) Age: 23 ± 3 y	Examine validity and bias of the sleep-wake thresholds for processing Actical sleep data in team sport athletes	02	**Actigraphy (Actical Z series; Philips Respironics) and Polysomnography (Compumedics Siesta 802 system; Compumedics).** Actigraphy data were collected using the monitors worn on the non-dominant wrist. This study was to provide information on validity and reliability of the instrument. Polysomnography was recorded following the

Continued from ESM Table 3

				technical specifications of the American Academy of Sleep Medicine manual for the scoring of sleep and associated events (Iber et al., 2007). It has been considered the gold standard for sleep assessments.
2017 Gouttebarge [87]	Ice Hockey (n = 81; M) Age: 26 ± 5 y	Symptoms of common mental disorders among current and retired professional athletes	N/A	**Patient-Reported Outcomes Measurement Information System (PROMIS).** Based on the PROMIS (short form), sleep disturbance was assessed through four single questions (e.g., 'Did you recently have some problem to sleep?') scored on a 5-point scale (from 'not at all' to 'very much'). Information on validity and reliability of the instrument was provided by Yu et al., 2011.
2017 Ihsan [88]	Field Hockey (n = 12; M) Age: 22 ± 2 y	Associations between pre-game wellness and changes in match running performance	01	**1 to 10 rating scale.** The wellness questionnaires were adapted from the modified CR-10 scale, which prompted the players to answer leading question: "how well did you sleep?". For analysis, sleep data were recoded to 0 being the positive and 10 being the negative end of the continuum (i.e. 10 = 0, 1 = 9, 2 = 8, etc.). No information on validity and reliability (No reference was provided).
2017 Jones [89]	Netball (n = 8; F) Age: 18 ± 1 y	Investigate the influence of different tasks performed on electronic devices in the evening on pre-sleep alertness, subsequent sleep quality and next-day athletic performance.	05	**Insomnia Severity Index (ISI), Pittsburgh Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), 7-day sleep diary and Polysomnography.** Prior to attending their first session, participants completed a range of (online) baseline questionnaires: ISI (Bastien, 2001), PSQI (Buysse, et al., 1989), ESS (Johns, 1991). Additionally, participants completed a 7-day sleep diary (No reference was provided). In the Polysomnography, all sensors were positioned according to the American Academy of Sleep Medicine (AASM) recommendations (Berry et al., 2012), aside from the ECG placements where the AASM alternative placement was used. Information on validity and reliability of the instruments were provided, except for 7-day sleep diary.
2017 Kiliç [90]	Soccer (n = 384; M) Age: 27 ± 5 y	Explore the interaction between severe musculoskeletal time-loss injuries and symptoms of common mental disorders in professional	N/A	**Patient-Reported Outcomes Measurement Information System (PROMIS).** The PROMIS was used to verify sleep disturbance in the previous 4 weeks (baseline) and in the previous 6 months (follow-up) was assessed through 4 single questions

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				(eg, “Have you recently had problems sleeping?”) scored on a 5-point scale (from “not at all” to “very much”). Information on validity and reliability of the instrument was provided by Yu et al., 2011.
2017 Kim [91]	American Football (n = 40; M) Age: 18 ± 1 y	Determine the cardiovascular physiologic correlates of sleep disordered breathing	N/A	**Peripheral arterial tonometry (PAT, WatchPAT-200; Itamar Medical).** PAT was used to measure sleep quality, a validated surrogate for polysomnography. In brief, this is a forearm-mounted device with 2 finger probes, a pneumo-optical sensor measuring PAT and pulse oximeter. Overnight, the device recorded the PAT signal, oxyhemoglobin saturation, and sleepwake states. Sleep-time detection was determined by total recording time minus invalid signals and wake time, and internal algorithms were used to differentiate respiratory events (Bar et al., 2003; Zou et al., 2006).
2017 Li [92]	Blind Soccer (n = 60; M) Age: 23 ± 4 y	Understand the sleep characteristics among top blind athletes and its association with training volumes	N/A	**Pittsburgh Sleep Quality Index (PSQI).** The Pittsburgh Sleep Quality Index (PSQI) with 19 items was applied to assess participants’ general sleep quality (Buysse et al. 1989). The reliability and validity of the Chinese version of PSQI has been supported (Zhao et al. 2012).
2017 O’Donnell [93]	Netball (n = 26; F) Age: 23 ± 6 y	Effects of a single sleep hygiene education session on the sleep quality and quantity of female athletes	03	**Actigraphy (Readiband; Fatigue Science).** Participants were each allocated an actigraph at the start of the first week (day one - PRE). The participants were instructed to wear the actigraph on their non-dominant wrist, for 14 days. Information on validity and reliability of the instrument was provided.
2017 Pitchford [105]	Australian Football (n = 19; M) Age: 22 ± 4 y	Effects of a change in training environment on the sleep characteristics of elite athletes	02	**Actigraphy (Actiwatch 2; Phillips Respironics, n = 8; Actigraph wGTX3; Actigraph, n = 11) and 1 to 10 rating scale using anchors of 1 = “worst possible” and 10 = “best possible”.** Wrist-watch activity devices were used interchangeably during the Home period and, as such, cross-device validity was assessed. A custom designed daily subjective wellness questionnaire was completed each morning prior to daily training activities. Based on Hooper and Mackinnon (1995). Information on validity and reliability of the instruments were provided.

Continued from ESM Table 3

2017 Van Ryswyk [94]	Australian Football (n = 25; M) Age: 24 ± 2 y	Improve well-being and performance indicators in a group of professional athletes via a six-week sleep optimisation programme	06	**Actigraphy (Actiwatch 1 and 2; Phillips Respironics), Epworth Sleepiness Scale (ESS), Pittsburgh Sleep Quality Index (PSQI) and sleep diary.** Day time naps were included in total sleep time calculations for both sleep diaries and actigraphy data. The devices were worn by participants on their non-dominant wrists at all times. During week one, and at the conclusion of the six week intervention period, the questionnaires ESS (Johns, 1991) and PSQI (Buysse, et al., 1989) were used to assess various aspects of sleep and related outcomes. Information on validity and reliability of the instruments were provided, except for sleep diary (No reference was provided for it).
2017 Staunton [95]	Basketball (n = 17; F) Age: N/R	Assess sleep patterns and associations between sleep and match performance in elite female athletes	30	**Actigraphy (Actigraph GT3-x; Actigraph).** The devices were worn on the non-dominant wrist. Information on validity and reliability of the instrument was provided.
2017 Thorpe [96]	Soccer (n = 10; F) Age: 19 ± 1 y	Influence of changes in acute training load on daily sensitivity of morning measured fatigue variables in elite athletes	03	**1 to 7 rating scale using anchors of 1 = "very very poor" and 7 = "very very good".** A psychometric questionnaire was used daily to assess general indicators of player wellness. The questionnaire was composed of 3 questions relating to perceived sleep quality (Hooper et al, 1995). Information on reliability of the instrument was provided.
2017 Tsunoda [97]	Wheelchair Basketball (n = 17; F) Age: 31 ± 9 y	Investigate characteristics of sleep and psychological mood in female athletes	N/A	**Pittsburgh Sleep Quality Index (PSQI).** Although the original version of the PSQI assesses sleep states during the past month (Buysse, et al., 1989), to match the recall period used with the POMS-SF, the authors asked about sleep during the past week with Japanese version (Doi et al., 2001). Information on validity and reliability of the instrument was provided.
2017 Tuomilehto [98]	Ice Hockey (n = 107; M) Age: 17-40 y	Evaluate the quality of sleep and the prevalence of sleep disorders as well as the impact of a structured sleep counseling protocol in professional athletes	52	**Polysomnography (SomnoScreen, Plus Somnomedics; Randersacker), Basic Nordic sleep questionnaire and 1 to 10 rating scale using anchors of 1 = "worst possible" and 10 = "best possible".** An overnight full polysomnography was

Continued from ESM Table 3

				conducted in accordance with accepted guidelines (Berry et al., 2014). Recordings were manually evaluated by the same certified sleep technician based on the recommended guidelines of the American Academy of Sleep Medicine (2014). All the participants who underwent the procedure were examined by a sleep medicine expert. The questions in the sleep questionnaire were based on previous validated questionnaires (Basic Nordic sleep questionnaire) that have been used to screen for sleep disturbances with some amendments related to athletic performance (Partinen; Gislason, 1995). Furthermore, the participants were asked to self-estimate the average quality of their nocturnal sleep (a linear scale 0–10) (No reference was provided).
2017 Whitworth-Turner [99]	Soccer (n = 11; M) Age: 18 ± 1 y	Investigation looked to evaluate a practical sleep hygiene strategy (10-min showering at ~40°C before lights out), within a group of 11 youth athletes in comparison to normal sleeping conditions (control)	02	**Actigraphy (WS; Zeo) and 1 to 5 rating scale using anchors of 1 = "very poor" and 5 = "very good".** To establish the measurement of sleep, a device was utilised on a nightly basis. This device has previously been shown to provide a viable assessment of the key metrics inherent in habitual sleep monitoring. Information on validity and reliability of the instrument was provided (Shambroom et al., 2012). The participants also provided a sleep record using an adapted version of the consensus sleep diary (Carney et al., 2012). This data included perceived sleep onset latency, a recall of awakenings and a subjective sleep quality rating (How would you rate the quality of your sleep? 1 = "Very poor", 2 = "Poor", 3 = "Fair", 4 = "Good", 5 = "Very good"). In addition, the authors of the Consensus Sleep Diary: Standardizing Prospective Sleep Self-Monitoring (Carney et al., 2012) suggested which it still needs to be tested, refined, and validated.

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