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REVIEW ON AWARENESS OF SLEEP AND SPORTS PERFORMANCE

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Abstract

Sleep is basic and common biological activity in human beings. Sleep is vital for recovery for recovering or replenishments of energy loss during daily functional activities. Sports involve expending excess energy more than required for day-to-day operations. Hence extended sleep becomes mandatory for replenishment of expended energy during sporting activities. However, real time scenario depicts athletes get lesser sleep than normally required taxing the physiological system, predisposing chronic injury and hindering sports performance. Sleep deprivation has a significant impact on various physiological systems such as cardio respiratory, nervous and endocrine system. Sleep extension has benefits in sports performance despite the variety of sports.

Key Words: *Sleep extension, Sleep deprivation, Micro-sleep, Sports performance, Physiology*

1) INTRODUCTION

Sleep is one of the most indispensable biological activities of human beings. It is a method during which the bodily tissues recover from metabolic processes operative throughout the day and set up the body for effective physiological performance the following day [1]. The impact of sleep on various physiological systems and vice versa has been acknowledged since ancient times [2]. The performance of elite athletes depends on neuromotor performance, efficient cortical control, intellectual, motor memory, coordination, visual cueing, balance, focus, cardio respiratory endurance, hormonal control and efficient energy metabolism [4]. Recent years have seen technological advances in physiological measurement of sleep [3]. Sports performance is multifaceted. Recent literature investigates the physiological and psychological impact of sleep over sports performance [5-16].

As sleep affects cardio respiratory endurance [9,10], neuromotor performance [11], mood, focus and metabolisms. It is logical to think sports performance shall be largely affected by sleep if deprived or fragmented [12]. Further it can be hypothesized that over-training with sleepless nights and travel [13], micro-sleep, sleep lapses due to environmental change, emotional behaviors may fragment or deprive sleep. This in-turn may affect sports performance. If sleep behaviors are regularized or advocated during training or pre-participation of scheduled games, it could improve

the probabilities of winning games either at homeland or overseas. This narrative review shall explain the impact of sleep on various physiological systems of the human body during sport performance, effect of sports on sleep as well as sleep hygiene recommendations for athletic population.

2. SLEEP: STAGES AND MEASUREMENT

Sleep can be defined as the physiological process where metabolic and other regulatory functions halt for a period of time so that the body systems recover and prepare forthe next day's metabolic and other regulatory functions [1].There are two types of sleep: rapid eye movement (REM)and non-REM (normally called slow waves). Each type has2—3 stages depending on alpha, beta, theta and delta wave frequencies. During a single night's sleep, there are several sets of REM, non-REM and awake stages occur at different times throughout the night. These processes are said to be important for the metabolism of cortical centers, various bodily physiological systems and their recovery [14-17].

Biological clock or circadian rhythm is responsible for sleep wake cycles and maintenance of homeostasis of bodily physiological functions. As sleep is multifaceted, it is difficult to measure all its dimensions among sports professionals. Recall questionnaires of sleep has been proven to be less reliable[18-22]. Measurement of sleep has seen technological advancements over the past 3 decades. The gold standard for measurement of sleep is polysomno-graph. It is a multi-parametric test that is able to measure various physiological functions associated with sleep; electro encephalography (EEG), electrocardiography (ECG),electro myography (EMG) and electrooculography (EOG).This kind of testing requires expertise, as it is a cumbersome lab based procedure.

3. REASONS FOR SLEEP DEPRIVATION IN SPORTS

Timing of training sessions, competing at foreign soil, altitude and other new environmental influences, emotional instability, poor peer group relations, familial isolation during training and competitions as well as psychological inhibitions with training and competitions are few reasons responsible for sleep deprivation among sports population[23]. Further sports drinks, recurrent injury, financial status in order to meet expenses for coaching, competitions, travel, medical assistance for recurrent injuries and poor accommodation and facilities during competition can add to sleep deprivation in sports population[24-28]. Physiological rea-sons for sleep deprivation include but are not limited to pituitary hypothalamic disregulation, thyroid and growth hormone over activity, increase in oxidative and inflammatory markers after strenuous training or competition, neuro-hormonal dis-regulation, anxiety induced hyperventi-lation, hypovolemia and anemia during menstrual cycles and pregnancies [29].

4. PITUITARY HYPOTHALAMIC AXES

A bridge between sleep and sports performance. Central control of sleep and its efficiency depends upon the integration and regulation of sleep by the pituitary hypothalamic limbic system [30]. In cases of nutritional or hormonalism balance, pituitary-hypothalamus dis regulation could lead to sleep dysfunction. Further sleep deprivation and debt can lead to an impact on the pituitary-hypothalamus-limbic system which in-turn influences the function of cardiovascular,endocrine and neuromotor performance[31-33]. Sleep and various system effects in athletesSleep affects various physiological systems of the human body [34]. During sleep, the body recovers from the day's metabolic processes. Hence for systematic and efficient functioning of the physiological systems, sleep is a vital process. Athletes who have hyperactive physiological processes in order to meet the hyper metabolic demands, may requirea longer recovery period and hence longer sleep period for good performance during training or competitions [15].

CONCLUSION

Sleep quality and intensity shall be borne in mind in coaching athletes before, during and after the competitions. The sleep education should be part of coaches; psychologist and team manager's training for behavior modification and fruitful team performance. Sleep is an important component in sports arena but is usually neglected which is a growing concern. Coaches schedule practice, strength and conditioning as well as meal times for the entire day; however, they seem to neglect the next 8-9 hours of athlete during the night, thus failing to monitor their sleep hygiene. The above narrative review clearly depicts the stress of physiological systems due to sleep loss, deprivation and debt in sports population

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