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Effects Of Circadian Rhythm On Sports Performance In Different Seasons

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Abstract: Man is not as consistently predictable in performance as are other things we might choose to observe. This is unfortunate but obvious. We can borrow information from the related areas to apply it to sport, as another alternative. Whatever method is used, the so-called truths are at best loosely structured. We must then try to logically deduce the facts from empirical as it pertains to sports. Variation in the daily rhythm of the functional capacity of different systems which are synchronized to a 24-hour day, observe two peculiar aspects. One of them is the time dependent alternation in the levels of physiological process, expressed as circadian range or circadian amplitude. Athletic performances that occur several hours before or after the circadian peak "window" will be potentially subjected to less-than-optimal performance. This Paper tries to find out the effects of Circadian rhythm in different seasons.

Key words: Circadian Rhythm, Daily rhythm, Performance, Biological Clock and etc.

Introduction:

In today's techno-scientific age, the world has completely changed in all aspects due to discovery and research. In the field of games and sports also, there has been a great change with the help of scientific coaching and training. The athlete is being trained on scientific guidelines with highly sophisticated means for better achievement in their concerned sport to enable the coaches to get optimum performance with minimum expenditure of energy and time. They are being exposed to the exercise and training methods, which have got beneficial effect for achieving higher standard.

The daily light-dark cycle governs rhythmic changes in the behavior and/or physiology of most species. Studies have found that these changes are governed by a biological clock, which in mammals is located in two brain areas called the suprachiasmatic nuclei. The circadian cycles established by this clock occur throughout nature and have a period of approximately 24 hours. In addition, these circadian cycles can be synchronized to external time signals but also can persist in the absence of such signals. Studies have found that the internal clock consists of an array of genes and the protein products they encode, which regulate various physiological processes throughout the body. Disruptions of the biological rhythms can impair the health and well-being of the organism. One of the most dramatic features of the world in which we live is the cycle of day and night. Correspondingly, almost all species exhibit daily changes in their behavior and/or physiology. These daily rhythms are not simply a response to the 24-hour changes in the physical environment imposed by the earth turning on its axis but, instead, arise from a timekeeping system within the organism. This timekeeping system, or biological "clock," allows the organism to anticipate and prepare for the changes in the physical environment that are associated with day and night, thereby ensuring that the organism will "do the right thing" at the right time of the day.

The biological clock also provides internal temporal organization and ensures that internal changes take place in coordination with one another. For centuries, man has been looking at the universe and trying to unravel its mysteries and understand it's working. On the other hand, this endeavor has filled him with a sense of awe and wonder. Till today man has only decreased his ignorance rather than accumulate knowledge. In fact, man the scientist has not yet been able to understand and analyze himself.

In the first place, a vast majority of animals have to face regular changes in the environment as related to earth's rotation. Consequently, it is of adaptive significance that their physiological state is regulated in anticipation of the daily recurring variations in the external conditions such as ambient temperature, humidity or illumination. The 24-hour period of the earth's rotation sets a natural time base for the internal temporal order evident in the circadian system. Secondly, the interdependent physiological processes can best be timed in favorable temporal sequence. Thus, food consumption and water intake exhibit circadian rhythms with similar time course. In man, the daily diurnal efflux of potassium from the intercellular body compartment coincides with the increased renal elimination of potassium from extra cellular compartment. As a consequence, the potassium concentration of the body is maintained within a relatively narrow range during the day the time.
Thirdly, the performance and stability of homeostatic control systems may be improved by the introduction of oscillatory components. Experimental support for this notion is derived from the recent findings that dissociation of circadian rhythms in thermo regulation can lead to inadequate control of body temperature in response to thermal disturbances. Thus, the presence of circadian rhythms which are appropriately timed with respect to each other as well as the 24-hour alternation between day and night allows for a better regulation of the internal milieu and a more efficient response to the predictable rhythmic changes in the environment.

Research findings, not for sufficient quality and quantity but strong enough to indicate a trend, indicate that personal time rates or the perceived passage of time may be influenced by a wide variety of environmental conditions. More subtle than stressful or tranquil situations is the experimental observation that personal time rate varies in a circadian rhythm that parallels the activity rhythm. At or near mid-day, personal time rate is normally fast, and at early morning or late evening, personal time rate is normally slow. Reaction time and a variety of performance measures involving timing have been demonstrated to very systematically with time of day. A sports activity with heavy requirements for precise timing among individuals may thus be influenced by synchrony of the Physical activity cycles of the individual team members.

Since timing, metabolism, biochemical processes and rate of energy expenditure all depend to some degree on the point in time on the circadian cycle, the significant of the circadian activity cycle should not be minimized when considering training and ultimate performance of the sports participants. The degree of importance with reference to particular sports has not been researched, but reason could indicate that some form of sports activity would be more efficiently performed at some particular points on the circadian activity cycle and that other sports would be more efficiently performed at other points on the activity cycle. In general, sports requiring group coordination in strenuous physical activity with an emphasis on precision will require some control of physical activity cycles of individual participant for maximal performance. This control can be achieved by attention to the routines of sleep and wakefulness, meal times, rest and practice times of each participant.

The daily rhythm is a major source of variability in performance and the range of amplitude increases with increasing task complexity. The circadian range of performance rhythm oscillations is 10-30 percent of the daily mean. Thus, the timing of the athletic performance seems to be an important factor which needs

careful investigation. Some research findings indicate that the daily rhythmical oscillation occurs in several physiological and behavioral functions that contribute to athletic performance. These functions

include resting level of sensory motor, psycho-motor and perceptual variables. Research also points out that rhythmicity in components of athletic performance can be modulated by work load, physiological stressor, motivation, arousal level, "morning types/evening types," differences, lighting, sleep, disturbances, the "post lunch dip" phenomenon etc. Diurnal rhythms in reflex time tremor may be significant in athletic events requiring fine muscular control. Therefore, it may be observed that while some efforts have been made to study the diurnal variability with regard to certain physiological and psycho-physiological variables, very little is reported in context with the daily fluctuation occurring in psychomotor (Reaction time, speed of movement, kinesthetic perception, depth perception) and motor ability components (speed, strength, agility, flexibility, balance and coordination) which ultimately from the basis of performances in different or sports events.

Conclusions: since most of the information on circadian rhythmicity in biological variables relevant to athletic performance has been obtained from young males, the possible influence of gender difference upon circadian rhythmicity may be examined as significant differences between males and females in the normal levels of physiological function have been well established.

References:

1. **BOOKS**
2. Singer,Robert N. **Myths and Truths in Sports Psychology** (New York: Harper and Row Publishers, Inc., 1975), P. 9
3. Gross, G.a. "circadian rhythm and circadian system," cited by eds. Mendel and Van Pragg, **Biological Rhythm and Behavior**, (New York : S Karger, 1983), pp. 2-3
4. Barrow Harold M and Gee Rosemary Mc, **A practical approach to measurement in physical education** (Philadelphia : Lea and Febiger 1979) P 574
5. Thor Donald. H., **Encyclopedia of sports sciences and Medicine S.V.** "**Time of the day, Circadian,"** P. 125

   Journals and periodicals
6. Prior Abraham U," **Coupling governs entrainment range of circadian clocks."** Department of Biology, Washington University, St. Louis, Missouri 63130, USA. Abraham@biology2.wustl.edu, Journal: J Neurosci, Publication: 2005 Sep 21;25(38):8620-6.
7. **DDoane L and S Kremen W**, **"Associations between jet lag and Cortisol diurnal rhythms after domestic travel."** Health Psychology. 2010 Mar;29(2):117-23.
8. Lavoie Mongrain V,**" Circadian rhythms, athletic performance, and jet lag."** Chronobiology Laboratory, Sacré-Coeur Hospital of Montreal, Department of Neurosciences, Université de Montréal, Québec, Canada. Journal: J Biol Rhythms, Publication: 2004 Jun;19(3):248-57.
9. Waterhouse Drust B, G J, Atkinson , T Edwards B, Reilly **."**Circadian rhythms in sports performance"--an update, Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Henry Cotton Campus, Liverpool, UK. PubMed - indexed for MEDLINE, Chronobiol Int. 2005;22(1):21-44.
10. Bullock N, Martin DT, Ross A, Rosemond D, Marino FE."**Effect of long haul travel on maximal sprint performance and diurnal variations in elite skeleton athletes**.", Br J Sports Med. 2007 Sep;41(9):569-73; discussion 573. Epub 2007 May 1.