Concept of Nidra and its physiological aspect on human body

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Abstract
The Ancient Ayurvedic classics describes the main three milestones of life is Ahara, Nidra and Brahmacharya & nidra is one of them; it is very significant for human being. Nidra is very crucial factor for day to day life. If Nidra is not taken routinely can cause serious diseased condition, which will affect the physical and mental health as well. Lack of Nidra causes various pathological conditions called Anidra (Primary insomnia). After a long time it is converted into Chronic condition called Secondary insomnia or tertiary insomnia. In Classical Science, the Entire study of Nidra and its Classification is given in Samhitas. In this study, a Critical explanation, presented on “Nidra” and its physiological aspect on Human body” is explained.

Keywords: nidra, classification, sleep physiology

1. Introduction
1.1 Etymological derivation of Nidra
The word Nidra is feminine, formed by the prefix ni+dra+rak+ta.
This is a state of nature which causes encapsulation to the consciousness of a person [2].

1.2 Definition
The definitions given in ancient texts are as Follows –
a) Sleep is the mental operation having the absence of cognition for its grasp. Acharya Vyas made a statement that - “Sleep is a state of unconsciousness, but the consciousness remains about his own unconsciousness” [3].
b) Statement by “Mandukya Upanishad”, Nidra is a condition in which “Atma” does not have any dream or desire for anything and that state is called “susupti” [5].
c) Acharya Charak affirmed that when the mind (as well as soul) gets exhausted or becomes inactive and the sensory and motor organs become inactive then the individual gets sleep
[d) Acharya Susruta, described the sleep occurs when the Hridaya, the seat of chetana is covered by Tamas [6].
e) Acharya Dalhana, the commentator of Susruta states, that- Nidra is the state of combination of mind and intellectual in which the person feels happy [7].
f) According to Astanga Sangrada commentary, stated that, the manovaha Srotas become accumulated with sleshma and mind is devoid of sense organs because of fatigue, when individual fell asleep [8].

2. Material and Methods
Materials related to Nidra and Sleep physiology have been collected from Different journals, Ayurvedic text books, authentic websites (Pub Med etc.), Reputed Magazines, Authentic literatures, Manuscripts, Sanskrit Dictionary etc[9].

2.1 Significance of sleep
Ahara, Nidra and Brahmacharya are the three main pyramids of life, which play vital role for maintenance of health in human being. In the Ayurvedic Literature, three factors i.e. Ahara, Nidra and Brahmacharya are compared with the triangles are termed as the three Upastambhas or Tripods [10].
The inclusion of Nidra in the three Upastambha establishes its value. While explaining about Nidra, Acharyas stated, that delight and sorrow, growth and wasting, strength and weakness, virility and impotence, the knowledge and ignorance as well as the survival of life and its termination depend on the sleep [11].
2.2 Phenomenon of NIDRA
The different theories stated regarding the phenomena of Nidra can be summarized and classified into four groups (Fig no.1) -

1. Theories of Upanishad
2. Theories of Yoga
3. Theories of Ayurveda

1. Vascular Theory:
2. Pavlov’s Theory:
3. Chemical Theory:
4. Kleitman’s Theory:
5. Oxygen Theory:
6. Hypothalamus Theory:
7. Parasympathetic Theory (Acetylcholine Theory - Dixit):
8. Lactic Acid Theory:
9. Serotonin Theory:
10. Neuronal Centers theory

Fig 1: Nidra group wise classification.

2.3 Acharyas classification of Nidra
Classification of Nidra by different Acharyas as follows (Table no.1) –

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Acharya Charaka</th>
<th>Acharya Sushruta</th>
<th>Acharya Vrudha Vagbhata</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tamobhava</td>
<td>Vaishnavi</td>
<td>Tamobhava</td>
</tr>
<tr>
<td>2</td>
<td>Shleshmasamadhava</td>
<td>Vaikariki</td>
<td>Aamayakshedaprabhavaja</td>
</tr>
<tr>
<td>3</td>
<td>Manashtapinir samha Sambhava</td>
<td>Tamsi</td>
<td>Chittakshedaprabhavaja</td>
</tr>
<tr>
<td>4</td>
<td>Agantuki</td>
<td>Aagantuki</td>
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<tr>
<td>5</td>
<td>Vyadhanuvavaritini</td>
<td>Kaphaprabhavaja</td>
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<td>6</td>
<td>Ratrivabhavaprabhava</td>
<td>Dehakshedaprabhavaja</td>
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<tr>
<td>7</td>
<td></td>
<td>Kalasvabhavaja</td>
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</tbody>
</table>

2.4 Physiology of sleep
When Mind is fatigued then sleep occurs. According to Howell, sleep is due to cerebral ischaemia. Cerebral cortex is the seat of higher centers like pre and post central gyrus & associated area etc., which have the correlation with mental activities described in Ayurveda. So due to the reduction in cerebral blood supply Mind becomes calm that causes sleep.[17]

2.5 How sleep is regulated
During wakefulness, the brain is kept in an alert state by the interactions of two major systems of nerve cells, in the upper part of the pons and in the midbrain, which makes acetylcholine as their neurotransmitter (NT), sends inputs to the thalamus, to activate it. It in turn activates the cerebral cortex, and produces a waking Electroencephalography (EEG) pattern.

However, during Random Eye Movement (REM) sleep, the cholinergic nerve cells, thalamus & the cortex are in a condition, similar to wakefulness but the brain is in Random Eye Movement (REM) sleep. The difference is supplied by three sets of nerve cells in the upper part of the brain stem: The nerve cells that contain the neurotransmitter (Fig. no.2) –
The brain stem cell groups that control arousal are in turn regulated by two groups of nerve cells in the hypothalamus. One group of nerve cells, in the ventrolateral pre-optic nucleus, contains inhibitory NT (neurotransmitter) and GABA. The major influence on sleep cycle is the body’s circadian rhythm, the suprachiasmatic nucleus. These nerve cells in the hypothalamus contain clock genes, which go through a biochemical cycle of almost exactly 24 hours sleep, hormones and other bodily functions [18].

2.6 The depth of sleep
The depth of sleep is not constant during the sleeping period, but varies from hour to hour. In most adults sleep deepens rapidly to the end of the first hour, after which it lessens sharply for a time, and then more slowly till the time of waking. Generally, sleep taken during the daytime is lighter than that during the night [19]. The following are average figures of different periods of life (Fig. no.3).

2.7 Physiological effects of sleep
Acharya Charak explains that in the night, the Hridaya (Heart) gets contracted and the Srotasa (the channels of circulation) as well as the Koshta (Gastro-intestinal tract) are contracted, the body elements get softened [20] According to modern view, sleep causes two major types of physiological effects.
1) Effects on the Nervous System itself.
2) Effects on the other structures of the body.

2.8 Functions of sleep
Sleep at the night time makes for the Balance of the body constituents (Dhatu samaya), attentiveness, good vision, and good complexion and good digestive power [21].
Acharya Susruta described that, those who take proper sleep in proper time will not suffer from any type of disease, the mind of them will be calm & cool, they gain potency and in proper time will not suffer from any type of disease, the body will be good [22].

3. Discussion
The important observation made during the study - Sleep is directly connected with mental state. Ayurveda emphasized that Sharira and Satva both interact with one another in all sphere of life. Sleep is particularly relevant to psychiatric illness and frequently part of diagnostic criteria for specific disorders [23].
In today’s era, people are not getting plenty hours of sleep because of busy life schedules and overload, as a result, work hours have engaged the time of sleep. Tension also contributed its share in reducing the sleeping time. If a healthy person not getting proper sleep, he will become a patient. It is not a serious problem in the start. But later on stage it leads to number of health nuisance and ailments [24].
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