

EFFECT OF RAG BOWLI (EARLY MORNING RAGA) ON A CASE OF MONOSYMPTOMATIC NOCTURNAL ENURESIS ASSOCIATED WITH NOCTURNAL POLYURIA

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Music has a remarkable power to stimulate many social-emotional processes and to influence emotions in everyday life (Bernatzky et al., 2002). Music stimulation may also relieve negative cognitions such as feelings of helplessness and hopelessness and undesired stresses that many patients experience (Spintge, 1992). In recent years, a number of studies based on principles of evidence-based medicine which have proven the effectiveness of defined interventions, have suggested music as a powerful resource for the treatment of various illnesses (Hillecke et al. 2005). Music exerts effects on subcortical brain centers and has a strong influence on the psychological and physiological state of the organism (Panksepp and Bernatzky, 2002). The emotions aroused due to music stimulation are elicited either by sounds themselves, or as a result of associations in patients' memories, and these emotions can enhance self-experience and coping strategies. Here we present a case of nocturnal enuresis which responded to music therapy based on the early morning raga, Bowli.

B aged 25, came to the Music Medicine Unit of MGMC&RI with the complaints of mono-symptomatic nocturnal enuresis associated with nocturnal polyuria, for which he was treated with anxiolytics and detrusor inhibitors for the past 2 years. He was asked to continue the pharmacological treatment along with music based on the early morning raga known as Bowli. This raga was chosen because he had the habit of going early to bed when compared with others of his same age, and this raga would facilitate his awakening early in the morning, inducing arousal and feelings of refreshment, in synchrony with the morning atmosphere. He listened to the music between 7 to 8am in the mornings, continuously for a period of 1 month, twice a day, each session lasting for half an hour. After a month of continuous listening, he came back reporting that the frequency of nocturnal polyuria had decreased from 9 times to 4 times during the nights. After a gap of one month, he was given another music based on a different rag which had no specific time cycle attributed to it. After a month of continuous listening, he came back reporting that his nocturnal polyuria remained at the same frequency, i.e 4 times at night.

The above finding makes one ponder whether there could be a possible link between circadian rhythmic mechanisms present in renal and other tissues and certain types of ragas endowed with specific temporal attributes.

ABSENCE OF THE CIRCADIAN RHYTHM OF GFR LEADS TO NOCTURNAL POLYURIA :

Several studies have confirmed that the circadian timing system plays a major role in renal function (Voogel et al., 2001; Buijsen et al., 1994). The findings reveal that renal excretory rhythms are driven by circadian changes in both glomerular filtration and tubular reabsorption/secretion, due to a large number of genes essential for water and solute homeostasis following a well-marked circadian expression pattern (Zuber et al., 2009). The vast majority of them are based on self-autonomous local circadian oscillators (self-sustained intrinsic renal clock mechanism) which regulate the homeostatic mechanisms by controlling the activity of certain metabolic enzymes and transport systems, and also interact and affect the core clock mechanism located in the supra-chiasmatic nucleus of the hypothalamus.

THE CIRCADIAN RHYTHM OF GFR IN NORMAL INDIVIDUALS :

Day time- maximum of 122 ml/mt

Night time- minimum of 86 ml/mt (Koopman et al., 1989).

In healthy adults, the ratio of day time to night time urine production is usually greater than 2:1, so that only about 25% or less of daily urine output occurs during sleep (70 to 80 ml/hr during the waking period vs 30 to 40 ml/hr during sleep), these rates of urine production being linked to the day-night sleep pattern. Beyond the age of 60, there is a decline in the molecular clock oscillations due to ageing, and this causes a shift towards a greater proportion of urine production

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to the night time. In the case of B, ageing cannot be the reason for the disrupted renal circadian rhythm, since he is only 25 year old. Other factors like anxiety, stress etc. could have played a role. Finding ways to restore the lost circadian rhythm might lead to a possible therapy for biological clock damage and help in the prophylaxis of such disorders.

THE RELATIONSHIP BETWEEN THE TIME CYCLE OF RAGAS AND TISSUE-SPECIFIC FUNCTIONAL RHYTHMS:

It is well known that music influences neuronal, immunological and endocrine systems, and modulates homeostasis and vegetative functions because of its intrinsic properties (Aldridge,1989). According to Panksepp and Bernatzky (2002), music listening activates cortical and subcortical neural networks in the human brain, that are associated with endocrine systems and homeostatic responses. Recent studies have implicated that brain circuits of structural and functional relevance to the hypothalamo-pituitary axis are implicated in the emotional processing of music.

Ragas belonging to different Time Cycles have their corresponding impact on the emotionality and affect of listeners.

A raga or melodic mode creates an atmosphere which is associated with particular feelings and sentiments, making us synchronize completely with nature. The time cycle of ragas is based on the presence or absence of flat notes (komal swaras in Hindustani terminology), particularly Re, Dha, and Ga (rishabh, dhaivat and gandhar respectively). The fourth note Ma is rendered as sharp note (teevra swar) when singing the twilight ragas after sunset, to define the change in mood between the two hours before sunrise and sunset. In Indian music the entire mood of the raga changes with the subtle change in one note :

Ma1(Ma flat)	→	Ma2(Ma sharp)
Sunrise period	→	Sunset period

These twilight melodies convey a certain pathos or a feeling of yearning.

BIOLOGICAL BASIS OF THE DIFFERENCES IN AFFECT PRODUCED BY CHANGES IN RENDITION OF THE SAME NOTE FROM FLAT TO SHARP AND VICE VERSA :

Our emotional behavior and motivational drives are controlled by the limbic system, which decides the affective nature of the sensations, i.e. whether they are pleasant or unpleasant. Brain imaging studies have revealed that intensely pleasurable music activates numerous brain areas including ventral striatum, amygdalae, and anterior cingulate cortices (Blood and Zatorre,2001), known as reward or satisfaction areas. In contrast, when other nearby areas in the same circuitry are stimulated electrically, terror, pain, fear and other unpleasant sensations are felt, and these are labeled as punishment centers(Ganong,2005). Only a narrow margin separates the pleasure and pain centers, similar to the narrow margin separating the flat and sharp Ma (madhyam), which evoke just the opposite feelings, sharp Ma conveying a feeling of pathos in contrast to flat Ma which induces a pleasant feeling.

THE AFFECTIVE COMPONENTS OF INDIAN MUSIC INCLUDE TWO MAIN FEATURES:

1) *Bhava* or emotional expression, and 2) *Rasa* or aesthetic essence which that *bhava* engenders in the listener. Eight 'emotive stereotypes' or 'permanent emotions' known as *sthayibhavas* have been elucidated, each of which evokes a corresponding *rasa* or aesthetic essence (Rowell,1992).

All musicologists agree that the *bhava* or the essence of raga is knowable only through direct experience (performance or listening), and is not the result of its inherent scale type, transilience, tessitura, characteristic motion etc. The affective responses like emotional expression and its aesthetic essence are no doubt induced by a raga, but are also tinged by the listeners' temporal experience, since they believe that it denotes a specific meaning, due a prior conditioning as a result of the knowledge of association between performance and context. In short, musical meaning is coloured by the listeners' conditioning through generations dating millennia back.

At this juncture, we can hypothesize that listening to music that is synchronized with the sympathetic overtones of the time and hour of the day harmonizes the individual with the natural environment, and regulates his moods. Early morning ragas create a very tender, calming and refreshing mood that helps us to step out of sleep into a harmonious waking state. This waking state is associated with a steady increase in the levels of stress hormones like cortisol, which show a specific and well-defined day- night rhythm. The attunement to a refreshing state in the mornings may be enhanced by the synergistic effect created by listening to such early morning ragas, which are synchronized with the sympathetic overtones of the morning hours, inducing appropriate changes in the affect of the listeners, by acting on

the brain circuits of structural and functional relevance to the hypothalamo-pituitary axis implicated in the emotional processing of music. Such an influence may be exerted on the set of circadian genes driven by systemic humoral or neuronal circadian signals, which are connected with the core oscillators.

An interesting finding which emerged from treating the above case is that, the disease process even though partly rectified, remains at the same level of improvement even after cessation of music-listening, unlike pharmacologic treatments which need to be continued indefinitely to prevent the recurrence of symptoms in cases of such chronic duration. One can readily surmise that music has acted at some deep, inner level connected with endogenous rhythms, reaching out to physiological homeostatic mechanisms via affective channels, and once the disorder is set right, it attains a state of permanent stability.

More exploration is needed regarding the connection between the time-cycles designated to different ragas and tissue- specific functional rhythms which interact with and affect the core clock mechanism.

About RagBowli – (Early morning raga.)

Arohan- S R1 G3 P D1 S

Avarohan- S N3 D1 P G3 R1 S

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