



A Note on Possible Healing Effects of Conch Shell Frequencies

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ABSTRACT

The conch shell as a music tool with its innumerable uses has occupied a singular place in almost all ancient traditions and cultures across the globe. It could be considered as the sole musical instrument designed by Nature herself into a fascinating piece of art. However, studies aimed at understanding the acoustical attributes of a conch shell received very less attention in modern times. None of the previous studies on conch shell aimed at looking into a few aspects for which it is usually adored and considered sacred. In general, the sound radiated from a conch shell is believed to hold a healing aspect, and that is the underlying reason why different cultures used it during ritual practices, special ceremonies and at acoustically designed sacred sites. The present concept seminate from the observation that we have an additional ultrasonic component in the sound spectrum of a conch shell along with other harmonic frequencies. Since the low-range ultrasonic frequencies are known for their beneficial and healing effects, it's obvious to relate them to such component existing in the conch shell spectrum. In this respect, the present note serves as a starting step in analyzing the fundamental grounds for its healing aspect.

Key Words: Conch Shell, Ultrasonic, Spectral Analysis, Sound Healing, Frequency

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Introduction

The shell by definition implies a hard external covering; such an outer layer with a unique spiraling structure developed by a long sea snail (mollusk) for its protective purpose is Conch shell. It has a cavity growing spiral in both axial and transverse directions about a central pillar known as columella. Due to its unique structure geometry, conch shell supports a resonating sound field, making it a musical instrument of its kind. (Bhat, 1992; Prasad *et al.*, 1994; Rath and Naik, 2005; Prasad and Rajavel, 2010). It is delightful to see that Nature again designed the amazing curves and spiraling structures of various conch shells based on the Fibonacci pattern following the golden/sacred ratio (approx. 1.61803)(Rath and Naik, 2005; Livio, 2006;

Pouraghdam and Bhat, 2015). Even though the mystery behind Nature's blueprint still remains unclear to the present day science, it is mesmerizing to see such a piece of art. Since naturally available conch shell in its original form can't be played because of its closed pointed tip or apex, one has to cut it off to create a mouthpiece for blowing. When the natural frequency of shell cavity matches the frequency of vibrating lips it produces a resonating and unique sound. Aside from adoring it as a melodic tool, many ancient civilizations used it in countless ways; to communicate (as a tool for conveying information about natural disasters/hazards), to warn or alarm (as an indication of war or celebration of victory), and in religious rituals and ceremonies etc.

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There have been very few studies aimed at understanding the geometrical and acoustical details of a conch shell; which is perhaps the only musical instrument designed and devised by Nature herself. It is little surprising that we have numerous studies and bulk literature available on other music instruments (designed by humans) associated with dissimilar customs and traditions, but not on the one that fills a singular spot in nearly all ancient cultures of the globe. Previous studies on a conch shell (mainly *Turbinella Pyrum* or Indian Sankha) have reported the spectrum captured from the sound radiated from it when blown, and tried to examine its amazing spiraling geometric structure and acoustics (Bhat, 1985, 1992; Prasad *et al.*, 1994; Rath and Naik, 2009, 2010; Prasad and Rajavel, 2010). It is evident from X-ray tomographic pictures that inner cavity grows in spiral both in longitudinal (or axial) and transverse directions. The spectral analysis of a conch sound reveals the presence of peaks at integral multiples of the fundamental frequency. Providing conch shell with its characteristic sound, five such harmonics or partials can be discovered that form smoothly decreasing spectral envelopes (Prasad *et al.*, 1994; Prasad and Rajavel, 2010). It is interesting to see they are the only possible music instrument to have an Omnidirectional property (Pouraghdam and Bhat, 2015) i.e., the distribution of sound radiated in different directions or the directional pattern of radiation is uniform. This explains why various cultures would have used conch sound for alarming and for communication over long distances. In addition to this, other studies aimed at tracing the material and mechanical properties associated with its fabric revealed conch shell to be a true treasure gifted by Nature. Many traditional medical systems in the orient like Indian Ayurveda, ancient Chinese and Buddhist literature propound the use of ashes (from conch shell material) for healing various ailments, and hence adore it for its high medicinal value. Few scientific studies even approve and endorse the use of conch shell ashes for medicinal purposes in alternative and natural therapies (Kodlady and Patgiri, 2012). Even though conch shell is really well known for such objective properties, it is usually thought to be sacred and revered by a few cultures for several other grounds. None of the previous studies aimed at looking into such aspects for which it is usually adored and considered. The sound radiated from a conch shell is in general believed to hold a healing aspect, and that is the reason why different cultures used it as

a music instrument during rituals and religious practices, special ceremonies, and at acoustically designed sacred sites/chambers etc (Rick *et al.*, 2002; Cook *et al.*, 2008; Gaona *et al.*, 2010; Cook *et al.*, 2010). In this context, the present note gives an idea of the possible estimates for such a healing force and helps as a starting step to where to look for along those lines.

Ultrasonic frequencies and Biological systems

Ultrasonic frequency waves (>20 kilohertz) are mostly known as acoustic sound waves with a spectrum of frequencies higher than the human hearing (or audible) range (from 20Hz to 20 KHz). In addition, behavioral and neuropsychological studies on various animal species indicate that acoustic waves in this frequency range are produced and utilized by them for communication and gathering information from the environment. There is a considerable body of research and bulk literature available concerned with the interaction of ultrasonic waves with biological systems. The volume and extent of possible effects caused by such frequencies on biological systems depend on which portion of the ultrasonic spectrum we are looking at (for example; low-range or high-range etc.). Even though not all frequencies in the ultrasonic spectrum are beneficial (for say, frequencies starting from the mid-range are supposed to be potentially harmful), only the ones that descend in the low-range category; i.e., frequencies near to the lower limit of the ultrasonic spectrum, are found to have various healing elements. Consequently, several studies in the context of therapeutic and healing applications have identified and categorized these effects based on the nature of mechanisms they trigger; thermal or non-thermal (mechanical; O'Brien, 2007).

For the present purpose, we confine our attention to understanding possible effects caused by only low-range ultrasonic frequencies to trigger various mental and emotional states, and to make changes in the physiological functioning of a human system (Thompson and Andrews, 2000; Bennet and Bennet, 2009). Recent evidence indicates that cell types other than auditory hair cells (i.e. non-auditory cells) would likewise react to certain audible sounds/frequencies (Lestard *et al.*, 2013). Consequently, they seem to alter various morpho-functional parameters such as cell size, activity rate, granularity and also cell cycle mechanisms of these cells. Few frequencies are also known to alter and promote the release of different hormones and cytokines usually



observed with well-being in humans (Conrad *et al.*, 2007; Bernardi *et al.*, 2009; Lin, 2011).

In reinforcement of sound healing and music therapy, a routine of studies indicate the use of different sorts of music (that plays in low to moderate ultrasonic range) for improving mood, alleviating stress and nociception in patients with cancer and high degree burns, as well as for those undergoing surgeries (Rauscher *et al.*, 1995; Hung *et al.*, 2010; Nguyen, 2010). They are also known to help in treating Alzheimer's, TBI, and other disorders etc (Lemmer, 2008; Lin, 2011; Akiyama and Sutoo, 2011). Such applications may even benefit autistic subjects; where these acoustic frequencies trigger remapping of brain neuronal circuits. At the ground level, these frequencies are known to alter neuronal migration and thereby accelerate cell growth, which is in general mediated by microtubules that regulate neuronal axons and dendrite extensions (Ang *et al.*, 2006; Bennet and Bennet, 2009; Bernardi *et al.*, 2009; Tufail *et al.*, 2011; Raman *et al.*, 2013). It is worth noting that the response to these frequencies (mainly in humans) seems to be uniform and independent of the subject; for example, similar cardiovascular responses are reported in different subjects regardless of personal taste and musical training (Lemmer, 2008; Bernardi *et al.*, 2009; Akiyama and Sutoo, 2011). Through careful observation, one may see that most of the frequencies or music reported to show healing effects surprisingly turns out to be in the low-mid range ultrasonic spectrum. Here is the connection these low-range ultrasonic frequencies could possibly have with the healing aspect associated with conch shell sound.

Ultrasonic component of a Conch shell spectrum

The present concept seminate from the observation that we have an additional ultrasonic component in the sound spectrum of a conch shell along with other harmonic frequencies (Rath and Naik, 2010). This portion of the spectral component is usually overlooked or neglected considering it to be a probable higher overtone or a higher multiple of fundamental frequencies. Hence, former studies that reported the sound spectrum of a conch shell haven't accounted for this component (Bhat, 1985, 1992; Prasad *et al.*, 1994, 2010; Rath and Naik, 2009, 2010; Pouraghdam and Bhat, 2015). But, the detailed linearized spectral analysis (or normal-mode analysis) of equations governing the propagation of sound associated with the conch shell geometry

reports the presence of such component, and hence should be taken into account (Rath and Naik, 2010). Having known the effects and benefits of spectrum of frequencies in the ultrasonic range on various biological systems, it's obvious to relate such component frequencies existing in the conch shell spectrum with beneficial and healing elements (Cook *et al.*, 2008; Hill *et al.*, 2010; Cook *et al.*, 2010; Tufail *et al.*, 2011; Gaona *et al.*, 2014). For an in-depth understanding of the effects of such frequencies on biological systems, we need to examine how they trigger a change in various biophysical, biochemical and neurophysiological properties in connection to neuroacoustics and psychoacoustics.

Conclusion

In this respect, the present report is only an attempt to suggest that the bearing of the ultrasonic component in the frequency spectrum of a conch shell sound could be the reason why a conch shell is considered sacred and revered in nearly all ancient civilizations and cultures. It would be an interesting attempt to give it a try and investigate the effects of such frequencies (spectrum of ultrasonic components) radiated by Nature's healing tool on cancer/tumor cells. This, in turn, adds to support sound healing and music therapy. To appreciate any possible healing effects of conch shell frequencies, an in-depth analysis of various biological, physiological and neural mechanisms is needed.

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