



KARNANADA AND KARNA BHADIRYA WSR NOISE CANCELLATION TECHNOLOGY

¹ Dr.Jayvant Vasant Kharat , ² Dr.Manjiri Pritam kesar,

¹ PhD scholar, ² Head of Department
Department of Shalakyatantra
Parul Institute of Ayurveda Parul University Vadodara Gujarat, India

Abstract : Huge technological advancements are being made because of the human race's superior intellect. Major industries, such as the media in particular, climate action, and healthcare, have seen significant upheaval in recent years as a result of technology. The development of Noise Cancellation technology (ANC) is in high demand today in the modern media headphone industrial sector. Earbuds with noise cancellation are an incredible innovation that has grabbed attention and is widely used. The frequent and intense utilization of these cutting-edge earbud features has culminated in a number of ear incidents, including tinnitus and deafness. In the global discipline of Ayurveda, it has been stated that Asatmayindriyarth Prayoga in Heenayoga, Mithyayoga, and Atiyoga is one of the primary motivating factors for the occurrence of any Vyadhi. The widespread adoption of noise-cancelling headphones in Mithyayoga and Atiyoga forms is responsible for the rising popularity of Karnanada and Karnabhadriya Vikara in recent years. Given that this is a pressing issue in the recent era, the present article intends to understand the connection between Asatmayindriyarth Prayoga (Mithyayoga and Atiyoga) of active noise cancellation technology earphones leading to Karnanada and Karnabhadriya

Key words – noise cancellation earphones, *Karnanada*, *Karnabhadriya*, tinnitus, and deafness

INTRODUCTION

Technology has advanced dramatically during the past few years. Noise-cancellation earphones are a fantastic advancement in the contemporary media headphone industries that have garnered popularity and are extensively utilized. Numerous ear difficulties including tinnitus and deafness, have been brought on by the frequent and intense use of these advanced earbud functions. According to Ayurveda, *Indriyas* are *Panchabhautika*, despite this based on their *Artha*, all *Indriyas* have a predominance of a specific *Mahabhoota*¹. Because *Akasa Mahabhuta* predominates in both, *Srotrendriya* serves as a lens through which *Shabda* is observed. *Karna* is *Adhishtana* of *Srotrendriya*, and *Shrotrobuddhi* performs the act of interpretation. *Dukha* (Roga) is mostly caused by *Heenayoga*, *Atiyoga*, and *Mithyayoga* of *Indriya*². Given this, the increased popularity of *Karnanada* and *Karnabhadriya Vikara* in recent years is due to the widespread use of active noise-cancelling headphones in *Mithyayoga* and *Atiyoga* forms. This aims to comprehend the relationship between *Asatmayindriyarth Prayoga* of noise cancellation technology earphones leading to *Karnanada* and *Karnabhadriya* (*Mithyayoga* and *Atiyoga*).

Concept of Karnanada and Karnabhadriya and Noise Cancellation Technique:

Shabda, Sparsha, Rupa, Rasa, and Gandha are perceived by the *Indriyas*; hence they are also called *Buddhi Indriyas*^{3,4}. It is said that the root cause of *Indriyartharoga* occurs due to the *Heenayoga, Mithyayoga, and Atiyoga* of *Indriya*. Among the *Indriyarthas*, *Shabda*, which is perceived by *Shravanendriya* and is predominately *Akashamahabhuta*, is deemed first among *Indriyas*. *Karna* is the *Adhithana* of *Shravanendriya*. The *Heenayoga, Mithyayoga, and Atiyoga* of *Shravandriyendriya* are the main cause of the *Karna Roga*. Acharya Sushruta, Vagbhata, and Charaka have mentioned different types of *Karna Roga* which include *Karnanada* and *Karnabhadhira*.

Karnanada is a *Vyadhi* composed of the terms "*Karna*" and "*Nada*," where "*Nada*" stands for "sound" or "ringing in the ears"⁵. *Karnabhadhira* is a *Vikara* where the word "*Badhira*" denotes obstruction. According to Acharya Sushruta, vitiated *Vata* and *Kapha Dosha*, when residing in *Shabdavaha Sira*, cause *Badhira*⁶. However, according to Vagbhata, *Badhira* is caused by *Vata* or *Kapha Anubandha Vata*, which obstructs *Shabdavaha strotas* or by failing to treat *Karna Nada*⁷. The specific *Nidana* of each *Karnaroga* are not mentioned in Ayurvedic classics but *Samanya Nidana* have been explained by Acharya Yogaratnakara⁸ such as *Avashyaya* (excessive exposure to the mist and snow), *Jalakrida* (includes underwater swimming, diving, bathing in river, sea, and fountain or sprinkling water) *Karna kanduyana* (itching in the ear), etc. The *Mithyayogenashabdasya* and *Atiyoga* of *Shabda* is the most frequently seen among them. The wrong and excessive utilization of *Uccha Shabda* is an aetiological component of the cause of *Karnanada* and *Badhira*. It is believed to be the lodgement of vitiated *Vayu* in *Shabdavaha Srotas* by *Sevana* of *Vata Prakopaka Nidana*. As a result, proper perception, or the transporting of sound waves inside *Shabdavaha Srotas*, is hindered, making it unable to sense sound waves and resulting in *Karnanada* and *Badhira*. In rare circumstances, vitiated *Kapha* obstructs the *Vata Dosha* route, causing *Vata* to be unable to conduct sound waves⁸.

One of the notable developments in the media sector nowadays that is widely used is noise-cancelling technology. There are primarily two forms of it: The term "passive noise control" (PNC) technology is a technique for blocking unwanted sound waves by physically isolating your ears with items like earbuds or headphones. The advantages of PNC technology include low power costs and a wide effective frequency range. However, experts have acknowledged that PNC technology has considerable limits due to its massive weight and lack of flexibility in compared to small devices. This brings up the contrary: Active Noise Cancellation (ANC) techniques. It uses an electro-acoustic technology to muffle the noise that was once previously in there. By introducing a noise-reduction signal with the same antiphase and amplitude, it achieves it. The Least Mean Square (LMS) method and the Normalised Least Mean Square (NLMS) algorithm are the two main algorithms used in noise cancellation⁹.

PNC headphones, especially the circumaural or over-ear kind, function by physically soundproofing the ears with a set of materials. PNC headphones include ear cups that form an airtight seal over the ear, prohibiting sound from escaping or entering, and memory foam, a high-density material, further muffles outside noise. With ANC, the ambient noise in your surroundings is first sampled using a tiny microphone. The battery-operated noise-cancelling device in the headphones is then fed the sampled audio via the microphone. Following that, the system reverses it, creating a signal that is exactly the opposite of the original. Finally, this opposing signal is played back by the headphones' speakers. Destructive interference takes place when two frequencies or signals are completely at odds with one another.

Relation of noise cancellation and Karnaada and Karna Bhadriya :

Long-time exposure to sound with these varieties of noise cancellation technology has been reported to cause many ear problems such as tinnitus and deafness. WHO has listed the gradings of hearing loss¹⁰ from which we can infer that when there is excessive use of sound i.e. more than 41db-81db for a longer period of time using headphones or earbuds has lead to ear problems such as tinnitus and deafness It occurs due to working principle of this technology as it ceases spaces in the auditory canal and creates a pressure which leads to tinnitus and overtime leads to deafness.

This indicates that when there is *Mithyayoga* or *Atiyoga* of *Shabdha* is either lead to *Upaghata* and *Upatapa* causing *Indriya Pradoshaja Vikara*, a concept has been explained in *Sutrasthana* by Acharya Charaka. In *Shravendriya, Nidana* of the *Karnada & Bhadriya* is due to *Mithya* and *Atiyoga* of *Shravendriya* which causes *Vata* and *Kapha Prakopa* hampering the *Vayu* and affects and causes the disease. Thus, exposure to earbuds with excessive noise and longer duration can cause *Upaghata* and *Upatapa* in the form of ear deafness and tinnitus.

Conclusion:

Innovations in the modern day, like noise-cancelling headphones, have both benefits and drawbacks for society. These incredible new developments in the media headphone market have gained widespread use and are becoming more and more popular. However, the frequent and heavy use of these advanced earbud features is causing several health risks, including tinnitus and deafness. As a result, both *Mityayoga* and *Atiyoga* practices constantly expose our *Indriya* (sensory organs), which over time leads to a myriad of diseases linked with them. Therefore, one must avoid its *Nidana*, including the moderate use of contemporary technology like noise-cancelling earbuds, to avoid diseases like *Karnaada* and *Karna Bhadriya*.

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