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Protecting Hearing in the Dental Workplace: Understanding the Risks and Solutions

KaVo had the chance to interview the Postdoctoral Researcher Sreeram Kaithali Narayanan.

Sreeram Kaithali Narayanan
Postdoctoral Researcher

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of Denmark and University of
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KaVo: What is your field of research?

Mr. Narayanan: My research focuses on understanding the effects of hearing loss and the effectiveness of hearing aid rehabilitation. I also study behavioral changes, such as head and gaze movements, due to hearing loss and the use of specific hearing aid features, especially in challenging multi-talker environments.

KaVo: Can you briefly explain what the term hearing impairment can refer to? For example, tinnitus or hearing loss.

Mr. Narayanan: Hearing impairment can be categorized into three main types:

- 1. Conductive Hearing Loss:** Issues in the outer or middle ear that prevent sound from being effectively transmitted to the inner ear.
- 2. Sensorineural Hearing Loss:** Damage to the inner ear or the auditory nerve that transmits sound signals to the brain. This includes:
 - Presbycusis (age-related hearing loss)
 - Noise-induced hearing loss
 - Ototoxicity (due to ototoxic drugs)
 - Acoustic neuroma (a noncancerous tumor affecting hearing and balance)
- 3. Congenital Hearing Loss:** Hearing impairment present at birth, which can be genetic or non-genetic.

Tinnitus, or ringing in the ears, can, among other things, be a precursor to hearing loss.

KaVo: What factors can affect hearing impairment?

Mr. Narayanan: Key factors contributing to hearing impairment include aging, noise exposure, middle-ear infections, ototoxic medication, genetics, earwax buildup, and tumors or other health conditions.

KaVo: Can you explain decibels in regard to their effect on hearing impairment? Is it a good way to measure noise?

Mr. Narayanan: Decibels (dB) measure the intensity of sound. The decibel scale is logarithmic, so every 3 dB increase results in a doubling of sound intensity. Decibels are useful for representing the wide dynamic range of human hearing, from whispers to jet engines. However, understanding noise exposure also requires considering the duration of exposure and the frequency spectrum of the noise.

KaVo: Can you explain the effect of noise exposure on hearing impairment?

Mr. Narayanan: Exposure to loud noise can have various impacts on hearing. Immediate effects include temporary threshold shifts, where hearing sensitivity is reduced temporarily. Prolonged and repeated exposure can cause permanent damage and hearing loss. High-intensity noise exposure can also lead to tinnitus. Excessive noise exposure can damage hair cells in the inner ear (cochlea) and disrupt the synaptic connection between hair cells and the auditory nerve, affecting sound transmission to the brain.

KaVo: In a dental clinic, there are several high sounds, such as drills. What effect can that have on hearing?

Mr. Narayanan: Prolonged exposure to high-intensity noise in dental clinics can significantly impact the hearing health of dental professionals. Research shows that tinnitus is common among dental professionals, and prolonged noise exposure is correlated with years of experience in the clinic.

KaVo: What are the first signs or symptoms of hearing impairment that a dental worker should be aware of? What do you recommend they do if they experience symptoms?

Mr. Narayanan: According to the American Speech-Language-Hearing Association (ASHA), common signs and symptoms of hearing loss include:

1. Tinnitus (ringing in the ears)
2. Avoidance of social settings and reduced participation in activities
3. Consistent requests for repetition
4. Difficulty understanding speech, especially in a noisy environment, from high-pitched speakers, or on the telephone
5. Hearing others' speech as „mumbled“
6. Increasing the volume on the television and other devices

7. Listening fatigue
8. Perception of „muffled“ hearing
9. Trouble hearing consonants
10. Speaking too loudly or too softly

If you experience any of these symptoms, consult a hearing care professional for a hearing check. Early intervention is key to minimizing the effects of hearing loss.

KaVo: What are the consequences if someone doesn't seek help early on?

Mr. Narayanan: Unaddressed hearing loss can lead to challenges in communication, cognitive decline, social isolation, loneliness, and work-related performance limitations. It is also a significant modifiable risk factor for dementia. On an individual level, it can cause irritability, stress, and fatigue, impacting personal life and general quality of life.

KaVo: What can a dental worker do to protect their hearing?

Mr. Narayanan: Dental professionals can use hearing protection, such as custom-made earplugs with noise cancellation, to reduce exposure. Regular hearing checks and being mindful of symptoms are essential for early intervention. Awareness of daily exposure limits and taking breaks can also help mitigate long-term exposure risks.

KaVo: What do you recommend a manager or employer do to improve the working environment regarding noise?

Mr. Narayanan: Managers and employers should educate staff about the risks of noise exposure and the importance of hearing protection. Reducing noise at the source by choosing better quality equipment that is quieter, maintaining equipment correctly, providing hearing protection, and regular checks on environmental noise levels are all crucial. Employers should also plan shifts to ensure enough breaks are taken, and provide quieter break areas for proper ear rest.

KaVo: Can hearing loss or impairment be reversed or healed?

Mr. Narayanan: In most cases, it is permanent. Any hearing loss caused by the deterioration of hair cells or nerve fibers in the inner ear typically cannot be reversed.

KaVo: Are there studies available for dental workers to reference?

Mr. Narayanan: There are studies from the US and abroad, but there is a lack of studies from Scandinavia. More research is needed to understand the difficulties dental workers face regarding hearing, such as annoyance and fatigue, and to develop solutions for protecting hearing while maintaining communication with patients and colleagues.