Unilateral Transitory Sensorineural Hearing Loss following a Dental Procedure

An article in this issue of JAAA reports the case of a bilateral sudden onset idiopathic sensorineural hearing loss that was associated with the extraction of four wisdom teeth (Wilson et al, this issue). That hearing loss, which was followed from August 2007 for 19 months, was characterized by a 45 dB notch in the air- and bone-conduction pure-tone thresholds in the vicinity of 2000 Hz. Interestingly, a second case of sensorineural hearing loss related to a dental procedure occurred within our small audiology and speech-language pathology “family” at Mountain Home. This case, which is substantially different from the original case, involves a 64-year-old male who as a speech-language pathologist is a skilled observer and intimately familiar with the speech and hearing mechanisms. In this case the unilateral, sensorineural hearing loss was transitory over less than 12 hours and was accompanied by tinnitus and dizziness. First, the dental procedure is described. Second, the events associated with the hearing loss, tinnitus, and dizziness are recounted from the point of view of the patient. Finally, the audiologic data before, during, and after the hearing loss are reported.

The dental procedure involved the replacement of a large, cracked filling on the lower left second molar (#18) with a crown. An inferior alveolar nerve block numbed the left side by injecting a bolus of Lidocaine through a 27 gauge needle. Subsequently, two 1.8 ml carpules of 2% Lidocaine with 1:100 K epinephrine were injected into the same site. Access to the tooth required a wide opening that was aided with a Styrofoam prop. The cracked filling then was removed and the tooth prepared for the crown. An impression of the crown was made, and a bis-acryl temporary crown was cemented on the tooth. The estimated chair time was two hours. The following three paragraphs are the patient’s account of the dental procedure and the associated hearing loss, tinnitus, and dizziness.

At 8:00 a.m. on the morning of August 4, 2008, I was seen by a dentist for placement of a temporary crown on a lower left molar. A numbing injection to the left cheek was tolerably painful. The left face up to the temple, the left mandible a few millimeters past midline, left gum, and left tongue were numb in ten minutes. My body was positioned in a reclined position in the dental chair with my head slightly lower than my feet. A block was placed between the right upper and lower teeth to help keep the mouth in a fully open position. This felt uncomfortable, but not painful. The drilling noise around the affected molar was of a disturbing moderately high pitch and loudness, but tolerable. Drilling and other unknown procedures took about 45 minutes with the mouth fully open during that time, with slight right mandibular pain experienced during the last few minutes. After this initial procedure was completed, I was given a five minute break during which time I walked around and felt somewhat light-headed and slightly dizzy. These sensations resolved when I sat back down in the dental chair with the upper body partly reclined. The dentist and dental assistant then proceeded to take an impression of the molar for the temporary crown. After placement of a sticky impression material over the molar, I closed my mouth as instructed. In a few minutes the impression material was removed. The most uncomfortable and mildly painful part of this procedure was opening of the mouth since the material stuck to the upper teeth creating a substantial resistance. Extra mandibular force was required to open my mouth to remove the impression material. The dentist was not satisfied with the impression, which resulted in more drilling and a second impression. Again, after several minutes the impression material was removed with discomfort and mild pain of the mandible. The dentist examined the new impression that again showed a slight imperfection that required another impression. The procedure was again repeated with some refinement of the lower and possibly the upper molar immediately prior to the insertion of impression material. The same response to removal of the impression material was experienced as previously described. My left cheek and mandible still felt fully numb at this point, but about this time I heard a slight ringing in the left ear that I attributed to perhaps a noise in the environment. Also, of no concern was mild right mandibular discomfort.

Following the successful impression, a temporary crown was inserted by the dental assistant using surprisingly excessive pressure against the mandible without any lower support. I was asked to “tap-tap” and laterally to move the mandible with my mouth closed. The temporary crown was broken during this procedure and another temporary crown was made and inserted with force against the mandible followed by the same oral movements. The temporary crown was removed two or three times for modification and reinserted, each time with force while the mouth was fully open. The final placement resulted in what felt like normal articulation between the upper and lower teeth. At the end of this procedure, I noticed increased ringing in the left ear and some hearing loss in that ear. I felt slightly light-headed and dizzy when I walked to
the checkout counter at approximately 10:40 a.m. By the time I got to my car, I experienced a significant increase in the tinnitus and hearing loss in the left ear. I turned on the radio to a talk station and noticed that speech was somewhat distorted. I occluded my right ear and noticed that speech loudness in the left ear was greatly reduced and at the same time distorted. When I arrived at work a few minutes later there was no change in the intensity of the tinnitus and no improvement in hearing in the left ear. As I walked toward a tunnel connecting the hospital with another building I felt mildly light-headed with slight vertigo. It felt that if I made a sudden move, I could lose my balance. Near the entrance of the tunnel to the hospital, there is a steam pipe that consistently makes a loud “hissing” noise. As I walked toward this area, the noise progressively became more irritating. When I got near this area, I occluded my left ear due to a very uncomfortably distorted noise from the steam pipe. When I entered my office and sat down the tinnitus and hearing loss appeared to have increased. I also noted some return of sensation in the left tongue and mandible. As expected, however, my speech sounded slightly slurred during a self-test. My speech improved to normal or near normal by the time I saw my first patient around 12:30 p.m. I still felt slightly light-headed with some vertigo as I walked to the patient ward. These sensations were not noticed when standing and talking to a patient and staff. I continued to experience the tinnitus and hearing loss with no significant change since my arrival at the hospital. While speaking, it felt as if my left ear were occluded. While typing a patient report I played a classical instrumental music CD through my computer. The music sounded distorted, and when I occluded my right ear, I noticed that I could barely hear the music with my left ear and that the musical tones were significantly distorted. After I completed the report, I went to the Audiology Clinic where I spoke to an audiologist regarding my hearing loss, tinnitus, and sound distortion. Pure-tone testing was conducted and showed a 50 to 55 dB hearing loss on most frequencies in my left ear. With similar bone conduction thresholds, a sensorineural hearing loss was suspected. After the testing, I returned to my office and made a telephone call to a ward physician. I had a difficult time understanding the physician with the handset placed over the left ear. His voice was very soft, and speech was very distorted. There was no difficulty understanding speech with the handset over the right year.

By around 5:00 p.m., the numbness on the left face and mandible was almost completely gone. I continued to experience some left tongue pain and was unable to open my mouth fully. Although I still had a hearing loss, the tinnitus seemed significantly reduced, and I was listening to music with less left ear sound distortion. When I walked to my car at 5:45 pm, I did not experience any light-headedness or vertigo. The music and speech on the car radio on the way home sounded much less distorted than it did when driving from the dental clinic earlier in the day, and the tinnitus in the left ear was noticeably lessened. While eating supper around 6:30 p.m., I was listening to a newscast on television, and it sounded normal. Occlusion of the right ear with my hand resulted in no speech distortion in the left ear and no apparent hearing loss. Very mild bilateral mandibular pain was experienced while chewing, and fully opening my mouth was difficult. I do not recall having any tinnitus during or after supper. I slept well that night. After awakening the next day, my hearing appeared to be back to normal without any tinnitus. Pure-tone testing that morning showed dramatic improvement in the hearing in my left ear and no significant change in my hearing from a baseline hearing test conducted in 2004.

A pure-tone audiogram was obtained on the patient the afternoon of August 4, 2008. At that time the air- and bone-conduction thresholds in the left ear were essentially the same as the left ear audiogram of 2004. For all audiograms, the pure-tone thresholds in the right ear were essentially the same as the left ear audiogram of 2004.

![Figure 1. Pure-tone audiograms (see American National Standards Institute, 2004) for the left ear of the patient before (2004), during (August 4, 2008), and after (August 5, 2008) the dental procedure that is associated with the hearing loss. For all audiograms, the pure-tone thresholds in the right ear were essentially the same as the left ear audiogram of 2004. For the August 4, 2008, audiogram, effective masking was used for air- and bone-conduction.](image)
established from a 2004 hearing test (see Fig. 1). His hearing sensitivity in his right ear was unchanged from the thresholds obtained in 2004. For both ears, 226 Hz admittance tympanograms were normal, ipsilateral and contralateral acoustic reflexes were present, word recognition in quiet with recorded monosyllabic words was 92% or better at 60 and 84 dB HL, and distortion product otoacoustic emissions were consistent with mild high-frequency hearing losses. Finally, performance on a words-in-noise test indicated essentially normal function on the materials presented to either ear.

The brief dizziness described as light-headedness was first noticed after rising from a supine position with the head slightly lowered for 45 minutes of drilling and other procedures. Because the symptoms of dizziness resolved quickly, it seems likely that the cause was orthostatic. Although almost the exact time of the sudden onset hearing loss is known, the cause remains unknown. The patient recalled that the tinnitus and hearing loss in the left ear was first apparent just after several attempts to seat the temporary crown through a procedure that was described as exerting extreme downward pressure on the unsupported mandible. He experienced dizziness again, but this time it was associated with imbalance and vertigo. In the timeline, hearing loss was noticed an hour after any drilling, which seemingly would rule out noise exposure either via air or bone conduction as the culprit, and over two hours following the injection of Lidocaine and epinephrine, which seemingly would rule out an anesthetic-caused hearing loss. The most likely etiology in this case is a momentary reduction in the blood supply to the labyrinth caused by the extreme pressure placed on the mandible in the open position that in turn restricted the arterial or venous flow to or from the labyrinth altering cochlear and vestibular function. Tan et al (2007) suggest that widely opening the jaw during a dental procedure could result in stretching and/or crushing of the vertebral artery that released microemboli that impacted the cochlea or caused a reduction of the blood supply to the cochlea. These and other possibilities are discussed in the Wilson et al (this issue) article.

This second case of dental-related sudden onset sensorineural hearing loss reinforces our belief that the hearing loss side effect of dental procedures is more common than has been reported previously. Audiologists are encouraged to report these types of cases.

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Richard H. Wilson
richard.wilson2@va.gov

Robert King

Faith W. Akin

VA Medical Center, Mountain Home, Tennessee, and Departments of Communicative Disorders and Surgery, East Tennessee State University, Johnson City