Canadian Audiologist

The Official Publication of the Canadian Academy of Audiology

Readers' Choice 2013: Whisper Test of Hearing

Published February 25th, 2014

It is Amazing What One Can Find About Hearing Aids when Looking for Something Else

In her recent post on the HHTM blog, Gael Hannan commented on the "whisper game" that hearing-impaired individuals are not particularly good at, and provided an accurate and entertaining commentary as to why this is. She reported that some family physicians use the whispered voice test to detect possible hearing loss in their patients, but also use it to test the effectiveness of hearing aid fittings. She asked her fellow HHTM bloggers who are audiologists what we thought of the whisper test for this use, and that is when a hoped-for simple answer became complicated.

To be honest, I don't think many of us had really given it much thought, other than to remember that it had been used as part of a battery of crude tests before the introduction of audiometers to determine if a person had a hearing loss. Most likely we had given little thought to its use with hearing aids. For my part, I don't recall reading or hearing anything positive about it from any source. Still, the question bothered me, primarily because I was wondering why people were talking about it again – or, had the talk never ended?

Historical Events Related to the Whisper Test

The use of speech to determine hearing levels has most likely been performed since times immemorial, even if not conducted specifically for that purpose (but for basic communication between a physician and patient). Pfingsten (1802) [1] was apparently the first to attempt a scientific study of the hearing acuity for speech. He divided speech sounds into three classes: (1) vowels; (2) voiced consonants; (3) voiceless ("noisy") consonants. He distinguished three degrees of hearing disorders, depending upon which of these three classes of speech sounds were still understood by his patients. He obviously knew already that the intelligibility of vowels is usually better than that of consonants.

Schmalz (1846) [2] advocated a classification of hearing losses for speech into four categories. The rank ordering was based upon the distance at which speech could be understood, as well as various kinds of clocks and pocket watches. He differentiated between speech at moderate levels and at normal levels. He paid attention to the difference in audibility between vowels and consonants and quoted Pfingsten and Itard in this respect. Whispered speech was not widely used in the middle of the 19th century, because it was not mentioned, and nothing was said about test words or test sentences.

A few years after Schmalz, Frank (1949)[3] and then later von Tröltsch (1962)[4] reported there was not always a simple relation between the distance at which watches and other sound sources could be heard and that at which speech could be understood. These statements touched upon problems

that are still being discussed today.

The Whisper Test Explained to the Uninformed (one of the methods used)

- The examiner stands arm's length (0.6 m or other distance) behind the seated patient (to prevent lipreading) and whispers a combination of numbers and letters (for example, 4-K-2) and then asks the patient to repeat the sequence.
- Variation: Ask the patient to repeat a set of three different random numbers (e.g., 6,1,9) presented to the tested ear at four decreasing levels of loudness: conversational voice at 6 inches and at 2 feet from the ear, and whispered voice at 6 inches and at 2 feet from the ear. Exhale completely prior to testing with whispered voice.
- The examiner should quietly exhale before whispering to ensure as quiet a voice as possible.
- If the patient responds correctly, hearing is considered normal; if the patient responds incorrectly, the test is repeated using a different number/letter combination.
- The patient is considered to have passed the screening test if they repeat at least three out of a possible six numbers or letters correctly. Patients with no cerumen occlusion of the ear canal and who fail this test are considered to have a hearing loss that correlates with a 30-dB hearing loss.
- Variation: A passing score is given if the patient can repeat all three numbers correctly at each level of loudness or achieve greater than 50% success over three successive triplet sets. Failure to hear a whisper at 2 feet indicates hearing loss and may be the most discriminating test of the set[5].
- Each ear is tested individually, starting with the ear with better hearing, and during testing, the non-test ear is masked by gently occluding the auditory canal with a finger and rubbing the tragus in a circular motion (by patient or examiner) to ensure occlusion.
- The other ear is assessed similarly with a different combination of numbers and letters[6].

In addition to whispering having an advantage over conversational voice in that it is relatively easy to standardize (at the end of expiration), the whisper represents at fairly even intensity the range of frequencies needed for good understanding of speech. The intensity with which the whisper is varied as the tester comes closer and closer to the subject must be understood because the intensity of sound varies inversely as the square of the distance it travels. In practice, this rule almost always breaks down badly because of reverberations from the walls of the room.

What is the Status of the Whisper Test Today?

Today's professionals involved in hearing threshold evaluation know the history of the "Whisper Test" and would be hard pressed to qualify any "results" due to the myriad lack of controls and rationale. The Whisper Test, along with the Conversational Voice, Coin Click, and Watch Tick tests, are considered crude tests of hearing sensitivity.[7] Each of these simple tests was intended to solve, in different ways, the issues as to which frequencies were being tested. The whisper test had an advantage over conversational voice in that loudness standardization of the whisper was easier (especially if at the end of an expiration) than vocalization. However, an important feature of any hearing sensitivity test is an interest not merely in knowing that someone can hear and/or repeat whispered stimuli at a certain distance, but how the results compare with fellow men.

Hearing professionals might be surprised that the whisper test is still used today. For example, in the United Kingdom, general practitioners have been obliged to screen the elderly for hearing loss since the 1990 National Health Service contract. While its diagnostic value continues to be debated, the Royal College of General Practitioners has chosen the whispered voice as the first test for hearing loss.[8]

In the United States, the U.S. Department of Transportation, Federal Motor Carrier Safety Administration, provides “Physical Qualifications for Drivers,” via regulations current to August 30, 2012. In the Current Medical Fitness Standards and Guidelines for CMV (Commercial Motor Vehicle) drivers in the United States[9] (49 CFR 391.41(b)(11)), the following is stated relative to physical qualifications for drivers:

First perceives a forced whispered voice in the better ear at not less than 5 feet with or without the use of a hearing aid, or, if tested by use of an audiometric device, does not have an average hearing loss in the better ear greater than 40 decibels at 500 Hz, 1,000 Hz, and 2,000 Hz with or without a hearing aid when the audiometric device is calibrated to American National Standard (formerly ASA Standard) Z24.5-1941.

The document further states that “Either test may be administered first,” and “..the second test may be omitted when the test results of the initial test meet the hearing requirement for that test.” The document goes on to say in (b)(5), “Hearing shall not be less than 10/20 in the better ear, for conversational tones, without a hearing aid.” In the forced whisper test a hearing aid may be worn while testing. When a hearing aid is used to qualify, the hearing aid must be worn while driving. The test area should be free from noise that could interfere with a valid test. Measure and mark the five-foot passing distance. When a driver who wears a hearing aid is unable to pass a forced whisper test, referral to an audiologist, otolaryngologist, or hearing aid center is required.

I didn’t look further into the use of the Whisper Test by other U.S. Government entities, but my gut instinct tells me that if it shows up on one place, it may take on the characteristics of a bad penny.

Reliability and Validity of the Whisper Test

Because of a lack of standardization (materials, speaker, ambient noise levels, presentation levels, etc.), it is difficult to imagine that the whisper test could be used in a systematically controlled way. A review of studies related to the whisper test was conducted by Pirozzo, etc. al. (2003).[10] The purpose was to determine the accuracy of the whispered test in detecting hearing impairment in adults and children. This study gathered information on essentially any topic that included the words “whisper test,” and identified that a reference test (audiometry) had been performed on at least 80% of the participants. Four studies involving adults were found that met these requirements, but with different whisper test techniques used.

As to reproducibility of the whisper tests in the studies analyzed, the authors stated there was considerable room for improvement in standardizing the technique of conducting the test and in setting the threshold for hearing impairment. The study concluded that the whisper test is an accurate and simple test of hearing impairment that could be used by general practitioners, even though it has not been adequately evaluated in primary care settings; differences in accuracy among published studies could be explained by differences in conducting the test; and that the technique for conducting the test needs to be standardized to optimize sensitivity of the test. None of these concerns, along with a number of others, are surprising comments, and continue to be unresolved.

Whisper Test to Determine the Effectiveness of Hearing Aids

Now that the whisper test and how it is being used have been described, it’s time to get back to one of Gael’s initial questions : How good is the whisper test for determining if a hearing aid is performing as expected, with reference to Dr. Gil’s Whisper Test as described below?

Dr. Gil’s Whisper Hearing Test

This is a simple test suggested for home use to determine the effectiveness of worn hearing aids.

1. Start by having the user adjust the hearing aid to their normal listening setting.
2. In a quiet room, ask a friend or spouse to sit about 5 feet away from the hearing aid wearer. Have them whisper a question or sentence to be repeated by the wearer – listening with eyes closed to not utilize visual cues.
3. The listener should easily be able to hear the question or sentence. If the whisper was not heard, the suggestion is that the hearing loss has not been corrected, meaning that the soft sounds of speech are not being amplified properly.
4. If the listener is able to hear the whisper, next test the loudness settings of the hearing aid. Ask a friend or spouse to make some very loud sounds. Have them shout, bang dishes together, clap loudly, and vigorously shake a newspaper page. It is said that today's hearing aids should easily be able to deliver whispered sound even for people with severe hearing loss. If the whisper is HEARD, but not UNDERSTOOD, the suggestion is that one needs to learn more about what the hearing aid can or cannot do, and should also contact the person from whom the aid(s) were purchased for readjustment.

Is using the whisper test in this manner useful? I suspect that it is, just as are many other approaches that utilize casual speech when asking a person how they are performing with hearing aids. And, I would guess that the most frequently-used casual speech utterance to a person wearing a hearing aid is "How does this sound to you?" As with the use of the whisper test to determine if a hearing loss is evident, the use of the whisper test for hearing aid performance use is subject to the same criticisms related to uncontrollable unknowns and lack of standardization.

Conclusion

When Gael asked HHTM fellow bloggers what we thought of the Whisper Test to determine if a hearing aid performed as it should, the response was underwhelming. It was like planning for a big steak dinner and someone changed the menu to macaroni and cheese. I had long ago relegated the whisper test to ancient history. On the other hand, it did offer an opportunity to describe its place in the historical events related to the discipline of hearing, and especially to the evaluation of hearing. What is perhaps the most interesting thing about this discussion is that it again proves the point that the wheel seems to be constantly rediscovered when it comes to hearing aids. The use of the whisper test to casually determine how a hearing aid is performing was taught in early Sonotone (and most likely other manufacturers') sales manuals (1960s).

Footnotes

1. Pfingsten, G.W. Vieljährige Beobachtungen und Erfahrungen über die Gehörfehler der Taubstummen als Winke beim Galvanisieren zu gebrauchen, nebst Beschreibung einer neuen Art von Hörrohr. Kiel, 1802?
2. Schmalz, E. Erfahrungen über die Krankheiten des Gehörs und ihre Heilung, B. G. Teubner, Leipzig, 1946?
3. Frank, M. Practische Anleitung zur Erkenntniß und Behandlung der Ohrenkrankheiten; ein Handbuch der practischen Ohrenheilkunde. F. Enke, Erlangen, 1945?
4. Tröltsch, A. Die Krankheiten des Ohres, ihre Erkenntnis und Behandlung, Stahel, Würzburg 1962, 149?
5. Macphee G, Crowther J, McAlpine C. A simple screening test for hearing impairment in elderly patients. Age Ageing. 1988;17(5):347-351?
6. Pirozzo, S. Whispered voice test for screening for hearing impairment in adults and children: systematic review. British Medical Journal, 24:327 (7421):967, October, 2003?
7. Davis, H., and Silverman R., Audiometry: pure tone and simple speech tests, Hearing and

Deafness, Chapter 7, pp. 181-182, Holt, Rinehart and Winston, New York, 1970?
8. Williams, E., Wallace, P. Health checks for people aged 75 and over [Occasional paper 59], London, Royal College of General Practitioners, 46, 473-474, 1993?
9. U.S. Department of Transportation, Federal Motor Carrier Safety Administration, Physical qualifications for drivers, (49 CFR 391.41(b)(11), Medical Fitness Standards and Guidelines for CMV drivers in the United States, August 30, 2012?
10. Pirozzo, S., Papinczak, T., and Glasziou, P. Whispered voice test for screening for hearing impairment in adults and children: systematic review, British Medical Journal, 327(7421) 967, October 25, 2003?