

## Word Recognition Scores

The purpose of word recognition testing is to determine the patient's optimum performance, obtained in such a standardized way that it can be confidently enter our findings into the patient's medical records.

There are basically four uses:

- To determine if the patient's performance agrees with his or her pure-tone hearing loss. Are the findings consistent with what one would expect for someone with a cochlear pathology?
- To identify unusual asymmetry that is not predicted by the hearing loss.
- To monitor performance over time, through sequential testing.
- To assist in making amplification decisions (e.g., if a person has a relatively symmetrical hearing loss, but highly asymmetric word recognition performance, this could influence what ear to fit for a patient who only wants to purchase one hearing aid).

One of the commonly used techniques is what is called 'fixed sensation level'. For this SRT is obtained first and word recognition presentation level is generally then 30 to 40 dB above that. The concern with this approach is that for someone with good low-frequency hearing and a downward sloping high-frequency loss, it often will not result in a high enough audibility level for the patient to hear speech sounds and reach the maximum score we are seeking with the test. In contrast, if one presents at 30-40 dB above the SRT of a patient with a severe flat hearing loss, one might exceed their loudness discomfort level (LDL).

Another approach is the loudness-comfort approach. The rationale behind this approach is that it is not of interest to know how well the patient understands when the speech signal is "comfortable," but rather, what is the best performance possible.

There are some issues with using too high a presentation level. It can be too uncomfortable, and one can degrade performance at that level. (Benjamin W.Y. Hornsby, 2013)

A landmark study by Guthrie and Mackersie (2009) asked if there was one method for selecting a speech level that's going to give us the best shot of achieving a phonetically balanced (PB) maximum. If we are only going to test at one level, which one is going to give us the best chance at maximum performance without exceeding UCL, and does that level vary depending on whether the patient has a mild loss or a more severe loss?

The study found that the best chance of getting the highest score was if the LDL-minus-5 dB method was used. The 2000 Hz SL method gave comparable scores most of the time. Although these two methods that gave the best scores, but the differences between methods varied a bit depending on the hearing loss of the participants.

Guthrie and Mackersie (2009) concluded that:

- For mild to moderate gradually sloping losses and for steeply-sloping losses, two presentation levels for supra-threshold word recognition testing resulted in the highest scores without exceeding listeners' UCLs. Both provided equivalent results.
  - One method is to set the level to 5 dB below the speech UCL

- The second method is to set the dial level above the nominal 2-kHz threshold as follows:
  - 2-kHz threshold < 50 dB HL: Use 25 dB SL re: 2-kHz
  - 2-kHz threshold 50–55 dB HL: Use 20 dB SL re: 2-kHz
  - 2-kHz threshold 60–65 dB HL: Use 15 dB SL re: 2-kHz
  - 2-kHz threshold 70–75 dB HL: Use 10 dB SL re: 2-kHz
- For listeners with moderately-severe/severe losses, UCL-5 dB resulted in the highest phoneme recognition scores. (Mackersie, 2009)

Word recognition tests assess the person's ability to understand speech when presented at a loudness that is well above their threshold. It may be expected that a correlation exists between the type and degree of hearing loss and the word recognition score (WRS), but this depends on the cause of the hearing loss. For example, a person with a moderate conductive loss might score 88% on a word recognition test, but a person with a similar moderate retrocochlear hearing loss, might only score 28%. With cochlear hearing loss, speech recognition is expected to increase up to a certain point with increasing intensity (maximum recognition point), and then to stabilise. With retrocochlear lesions speech recognition improves as intensity increases up to a point (maximum recognition point) after which recognition deteriorates at higher intensities. This phenomenon is called "roll-over" and is considered to be an indication of retrocochlear pathology. Thus pure tone audiogram may not accurately predict the WRS scores in all situations. (Zyl, 2016)

## Bibliography

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