Listening preferences of new adult hearing aid users: a registered, double-blind, randomised clinical trial of initial fit versus real-ear fit

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INTRODUCTION

Hearing aids are typically programmed using validated audiogram-based prescription methods and verified using real-ear measurements. Hearing aid software can estimate prescribed targets (initial fit). Manufacturers' initial fits are now more accurate than ever due to developments in technology and computation; thus, the benefit of routinely using real-ear measurements (REM) for new adult users is unclear (1,2).

Aims:

- Determine whether new adult hearing aid users prefer REM or the initial fit using a preference diary on a daily basis.
- Question users about the reason for their preference

METHODS

This double-blind, randomised, mixed method study was pre-registered in the Open Science Framework platform (OSF; osf.io/d2bjm) and approved by the North-West Liverpool Central Research Ethics Committee (Ref: 20/NW/0283).

Participants

- Direct referrals of adults with mild-to-moderate sensorineural hearing loss and who had no previous experience with hearing aids were asked to participate in this clinical trial.

Procedures

- All participants were fitted (in accordance with the BSA guidelines) with one or two NHS Oticon Engage behind-the-ear hearing aids.
- Each hearing aid was fitted with two programmes—the REM and initial fitting approaches—with modifications based on the user's feedback, as per the clinics normal practice.
- Both fitting approaches were saved as two hearing aid programmes (A and B). The participants and their audiologists were blinded to the order of the programmes.
- Participants were told to compare the two fitting approaches in many listening environments on a daily basis for six weeks and record their preferences.

Preference diary and follow-up questionnaire

- Each participant was provided with a diary with one page for each day of the 6-week trial. Each page contained the following:
  - Four 7-point Likert scales measuring the participant's preferences for the clarity and comfort of sounds in quiet and noisy environments; and
  - A question about the participant's overall preference.
- All participants were asked to complete the follow-up questionnaire, which contained a question about the reasons for the participant's preferences.

RESULTS

Participants

- 58 participants were deemed eligible for inclusion and were fitted with the two fitting approaches. Of these, 45 participants (aged between 27 and 89 years) completed this clinical trial.
- The pure-tone average for those who completed the study (averaged across 0.25, 0.5, 1, 2 and 4 kHz) was 34 dB HL (SD = 12). The configuration was typical of age-related hearing loss.

Adjustments to the initial settings

- 13 participants (22%) requested modifications to their initial REM and initial fit programmes.
- All adjustments were relatively small (the mean absolute difference in gain before and after adjustment was 1.7 dB).

Deviation from prescription targets

- The median mismatches from NAL-NL2 targets for the initial fit and REM programmes were generally close (see Fig. 1).
- Both fitting approaches resulted in less gain at high frequencies compared to the NAL-NL2 target, especially the initial fit.
- The difference in the root-mean-square errors (of deviations from 0.5–4 kHz) between the fitting approaches at average input levels was statistically significant (p < 0.05), with the REM values being closer to targets (3.2 vs 5.3 dB).

Aim 1: Listening preferences

Regarding the clarity and comfort of sounds in quiet and noisy environments, participants' ratings were averaged from weeks 3 to 6. Fig. 2 shows the medians and interquartile ranges for all listening conditions. Positive ratings indicated preferences for the REM programme.

Aim 2: reason for preference

Thematic analysis of participants' responses revealed that:

- The main reason for initial fit was that 'is mellow and sounds are less annoying'.
- The main reason for REM was that 'is clearer and provides access to treble sounds'.

REFERENCES

[1] Folkeard et al. JAAA 2019
[2] Narayanan et al. IJA 2022

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