PERCEPTION OF MUSIC FOR ADULT COCHLEAR IMPLANT USERS: A QUESTIONNAIRE

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Introduction
Postlingually deafened adult cochlear implant (CI) users often find music to be less pleasant and less enjoyable post-implantation, and a music training program may help to enhance their appreciation of music. However, existing studies do not provide detailed information from CI users on the factors which they feel contribute to their poorer ratings for music, nor do they investigate the approach a music training program should take. The purpose of this study was to develop and administer a questionnaire that collects unique information which would assist in the development of a training program aimed at improving CI users’ music perception and appreciation.

This questionnaire differed from previous questionnaires, as CI users’ instruments, styles, and music to which they adapt expect it to sound to a person with normal hearing. Unique rating scales were developed, and the focus of the questionnaire was on gathering detailed and specific information to assist in the future development of an effective music training program to improve implant users’ appreciation of music.

Method – The Questionnaire

- Initially, unstructured, face-to-face interviews were conducted with adult CI users to determine their views on music perception and enjoyment with a CI.
- Based on the interviews, a pilot questionnaire was developed and administered to 10 adult CI users. The respondents were also interviewed to determine the clarity, appropriateness, length & validity of the questions and the questionnaire.
- The final version contained 48 questions, covering the following topics:
  - Music Listening & Musical Background
  - Sound Quality Ratings of:
    - Piano
    - Flute
    - String Family
    - Male Singer
  - Ratings for Musical Styles:
    - Classical (orchestra) vs. Country & Western
    - Classical (orchestra) vs. Jazz
    - Pop/Rock vs. Classical
  - Music Preferences:
  - Music Recognition;
  - Factors Affecting Music Listening Enjoyment;
  - Music Training Program;
  - For instrumental sound ratings, subjects were asked to rate both the overall sound quality (Unpleasant-Pleasant; Unnatural-Natural), as well as specific qualities of the sound:
    - Empty = Full
    - Dull = Sharp
    - Rough = Smooth
    - Tone = Pitch
    - More noisy = Less noisy
  - For musical styles ratings, the following scales were used:
    - Unpleasant – Pleasant
    - Simple – Complex
    - Can never follow tune – Can always follow tune
    - Can never identify this style by listening alone – Can always identify this style by listening alone
    - Sounds nothing like I would expect it to sound to a person with NH – Sounds would be expected to sound to a person with CI

- General questions included:
  - How often they listened to music, and their overall enjoyment of music (pre-hearing loss, pre-CI, & now);
  - Musical training & involvement in musical activities (pre-CI & now);
  - If they used a HA in the contralateral ear, and if this had any impact on music listening.

- Questions about the music training program included:
  - How long each session should last;
  - How many times a week;
  - Format preferred (e.g. DVD, CD, CD-ROM etc.);
  - Skills or topics they feel are important to include;
  - Any historical instruments, styles, songs etc. they would like to hear better.

- Approximately 30 to complete (15-1/2 hr).
- Included both objective rating scales, closed-set choices, and open-ended qualitative questions.

Preliminary Results
- The questionnaire was posted to 221 adult Nucleus CI24 users, all using the ACE speech-processing strategy.
- 133 replies were received (60%). Of these:
  - 37 questionnaires were fully completed (44%);
  - 31 respondents either returned incomplete surveys, or replied to state that they were unable to complete the survey primarily due to poor health, or they did not listen to music;
  - 5 surveys were returned unopened.

So far, 50 questionnaires have been analysed:
- 29 CI-only users; 21 CI+HA users.
- Mean age: 61 yrs, 8 mths.
- Unique rating scales were developed, and the focus of the questionnaire was on gathering detailed and specific information to assist in the future development of an effective music training program to improve implant users’ appreciation of music.

How often do you listen to music?

- Did not enjoy at all
- Slightly unpleasant - Pleasant
- Unnatural-Natural

How much do you enjoy listening to music?

- Did not enjoy at all
- Slightly unpleasant - Pleasant
- Unnatural-Natural

Do you notice a difference in the sound quality (for listening to music) between ‘CI-only’ and ‘CI AND Hearing Aids’?

- Yes: 44%
- No: 13%
- Never Tried: 42% (n=45)

Sound quality ratings for different musical instruments or families:

- Classical (orchestra) vs. Country & Western
- Classical (orchestra) vs. Jazz
- Pop/Rock vs. Classical

-钢琴 vs. 木管家族
- String Family vs. Brass Family
- Male Singer vs. Female Singer

Music Training Program Preferences

3 most important skills to help music listening enjoyment:

1. Being able to recognise tunes known prior to implantation;
2. Being able to recognising commonly known tunes;
3. Being able to hear ‘or pick’ the tune when presented with harmony (accompaniment).

- 56% would be interested in a Music Training Program (n=45).
- 84% would find an accompanying written manual helpful.
- 69% would prefer the training program to introduce them to a wide range of musical styles (rather than just focusing on their preferred style).

Preferred format:

- Length of session: (mins): Mean: 29.6; Mode: 30; Range: 15-62
- Frequency (times per week): Mean: 2.7; Mode: 2; Range: 1-7

Conclusions & Recommendations

- Users of a CI = HA rated instrumental sounds as significantly more pleasant, and more natural than those who used only a CI.
- Post implantation, respondents reported lower levels of (i) participation in musical activities & training, (ii) time spent listening to music, and (iii) enjoyment for music listening.
- Key factors that can enhance music listening enjoyment: high quality speakers; quiet environment; familiar lyrics, words, and/or music; knowing the song title and/or context; having the musical score or words to follow; watching the performer; and music with a slow rhythm or beat.
- Key factors that are detrimental to music listening enjoyment: echoey rooms and live concerts.

Music Training Program Preferences

- Country & Western music was rated to be the most pleasant, easiest to identify, and the style sounding most like they would expect it to sound to a person with NH.
- Rock music was rated to be the least pleasant, hardest to identify, and the style sounding least like they would expect it to sound to a person with NH.
- Many CI users would be interested in undertaking a music training program.
- Recognising familiar tunes is regarded as the skill that would best help them to improve their music appreciation.
- Preferred format for a music training program: 30 minute sessions, 2-3 times a week, on DVD, covering a range of styles, with an accompanying manual.

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