Managing Bilingual Cochlear Implant Candidates: An Audiological Perspective

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Disclosures

Cochlear Corporation – Consultant

Med El – Past consultant

Advanced Bionics - Consultant
Facts about Hispanic Population in the US

• The Hispanic population continues to expand, reaching a record **58.6 million** in 2017.

• Hispanics account for more of the nation’s overall population growth than any other race or ethnicity. It is the **second-largest racial or ethnic group** in the U.S.

• Overall, the U.S. population increased by more than 2.2 million people between 2016 and 2017, with Hispanics accounting for 1.1 million, or **about half (51%)** of growth in the US.
Hispanic Population in the US
Language Considerations for Testing: English vs Spanish

- English has more high frequency consonant clusters
- Spanish has steeper psychometric function
- Spanish has more multisyllabic words
Case study:

Case #1:
- 82 yr old male
- HL dx approximately 30 yrs ago, with immediate HA use
- Former diver; Possible barotrauma
- Tinnitus, bilateral; R>L
- Family of HL: mother
- Spends 70-80% of day reading or communicating in English
Case study:

*Speech perception performed in Spanish*
Interpretation of results: Case study

*Hearing aids verified via Real Ear
## Case study: Results pre-op

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<thead>
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Case study: Results post-op

Test Condition

- AzBio Quiet
- Spanish HINT Quiet
- Spanish HINT OdB SNR
- CNC words
- Spanish Bisyllable words

% Correct

- Pre op
- post op
Methods: Procedures

• Retrospective chart review between 2008 and 2018
  • Bilingual patients with cochlear implants
    • Spanish is the primary language; English is secondary
• Excluded inner ear malformations and meningitis
• Primary outcomes:
  • Postop speech perception scores using English and Spanish tests
• Data Analysis:
  • Wilcoxin Signed-Rank Test with Bonferroni Correction
  • Linear Regression
Methods: Subjects

• 13 Bilingual subjects
  • 10 were unilateral implant recipients
  • 3 were bilateral implant recipients

• Gender
  • 10 female
  • 6 male

• Mean age at implantation: 57.7 year
  • Range: 38 to 82 years
Results

Box Plots for Scores by Word Tests

Test Scores (%)

Speech Tests

CNC (Quiet)  Monosyllable (Quiet)  Bisyllable (Quiet)

Symbol: Mean; Box: 25-50-75th Percentile; Whiskers: Min and Max
Wilcoxin Signed-Rank Test with Bonferroni Correction, NS not significant, *p<0.05, ** p<0.01, ***p<0.001
Results

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Linear Regression for
Word Tests by Time after Initial Stimulation

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<th>p</th>
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<tr>
<td>Spanish Bisyllable</td>
<td>0.2045</td>
<td>0.079</td>
</tr>
<tr>
<td>English CNC</td>
<td>0.2786</td>
<td>0.052</td>
</tr>
<tr>
<td>Spanish Monosyllable</td>
<td>0.1172</td>
<td>0.573</td>
</tr>
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</table>
Results

Linear Regression for Sentence Tests by Time after Initial Stimulation

- Spanish HINT (Quiet): $R^2=0.0142$, $p=0.779$
- Spanish HINT (+5dB SNR): $R^2=0.1099$, $p=0.227$
- Spanish HINT (0dB SNR): $R^2=0.0203$, $p=0.612$
- Spanish HINT (+5dB SNR): $R^2=0.1780$, $p=0.104$
- English AzBio (Quiet): $R^2=0.1290$, $p=0.172$
- English AzBio (+5dB SNR): $R^2=0.1290$, $p=0.172$

Test Scores (%)
Conclusion

- Bilingual CI patients perform better on Spanish speech tests, when compared to English
  - Testing in both languages may show performance in different aspects of real life
- Spanish HINT (+5dB SNR) and English AzBio (quiet) may be better tests to track progress over time
- These findings highlight the importance of testing bilingual patients in English and Spanish conditions.
Limitations and Future Directions

• Limitations:
  • Retrospective chart review of small sample size
  • Pre-operative testing was not analyzed
  • Different etiologies and duration of hearing loss
  • Different cochlear implants used

• Future Directions:
  • Comparing AzBio English to AzBio Spanish tests
  • Evaluating the impact of testing in English and Spanish on CI candidacy
  • Prospective studies to determine best testing algorithms for bilingual patients
Language Considerations: References


You’re Invited

7th International Conference on Bone Conduction and Related Technologies
December 11-14, 2019
www.OSSEO2019.COM
THANK

Gracias