

A Pilot Study to Identify Sensory Integrative Dysfunction in Children with Bilateral Cochlear Implants in South Africa.

Ethical consent ref nr: 87/2018

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Presented by Stefanie Kruger*

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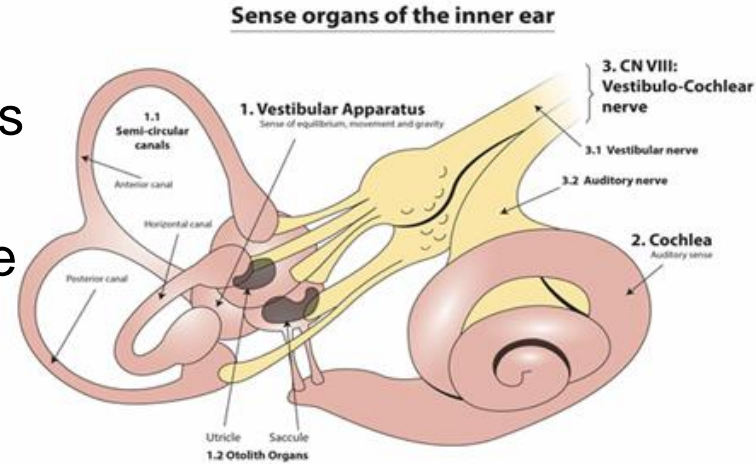
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Introduction

- CIs provide access to sound and language to hearing impaired (1)
- Vestibular deficits and impact of CI surgery is well documented (2)
- Show vulnerability in motor skills i.e. balance and coordination (3)
- Vestibular receptors most sensitive, constant pull of gravity (4)
- However, therapeutic intervention in children with CIs focuses on audition and speech (3, 5)



Background

- Vestibular **bilateral integration deficits** were identified in children with CIs from the USA (Koester et al, 2014). (1)
- An additional study in Iran recommended that **vestibular evaluations and interventions should be prioritised** for children with CIs (Ebhraimi et al, 2016). (6)
- OTs not typically considered part of the CI team
- **1060 children across SA** received CIs since 1988 (SACIG Annual Reports 2016)
- Two-folded problem: (i) lack of evidence in literature in context of OT and sensory perception in SA, (ii) role of OT is underestimated in cochlear team

Aim

- To determine the pattern of sensory integrative dysfunction in children with bilateral cochlear implants in South Africa. (2,8,9)

Methods

- Quantitative study: descriptive, comparative design
- Population: SA children aged 5 yrs – 8 yrs with bilateral CIs, without other known diagnoses
- Measurement tool: Sensory Integration and Praxis Tests (SIPT)
- Numerical data was gathered from deidentified SIPT reports
- Sample: 9 SIPT reports from Gauteng province
- Descriptive statistics was used to analyse SIPT data from SA
- Inferential statistics was used to compare SA results to USA results



Results: SA Scores associated with Bilateral Integration and Sequencing (BIS) pattern

Adapted to SA norms (Van Jaarsveld et al, 2012) ⁽⁸⁾

| SIPT scores associated with BIS pattern | SA Means |
|---|----------|
| Standing and Walking Balance | -2,28 |
| Oral Praxis (imitating mouth movements) | -1,21 |
| Kinesthesia | -0,95 |
| Sequencing Praxis | -0,94 |
| Postrotary Nystagmus | -0,86 |
| Bilateral Motor Coordination | -0,82 |
| Motor Accuracy | -0,73 |
| Graphesthesia | -0,70 |
| Manual Form Perception | -0,27 |

} Problematic

} At risk

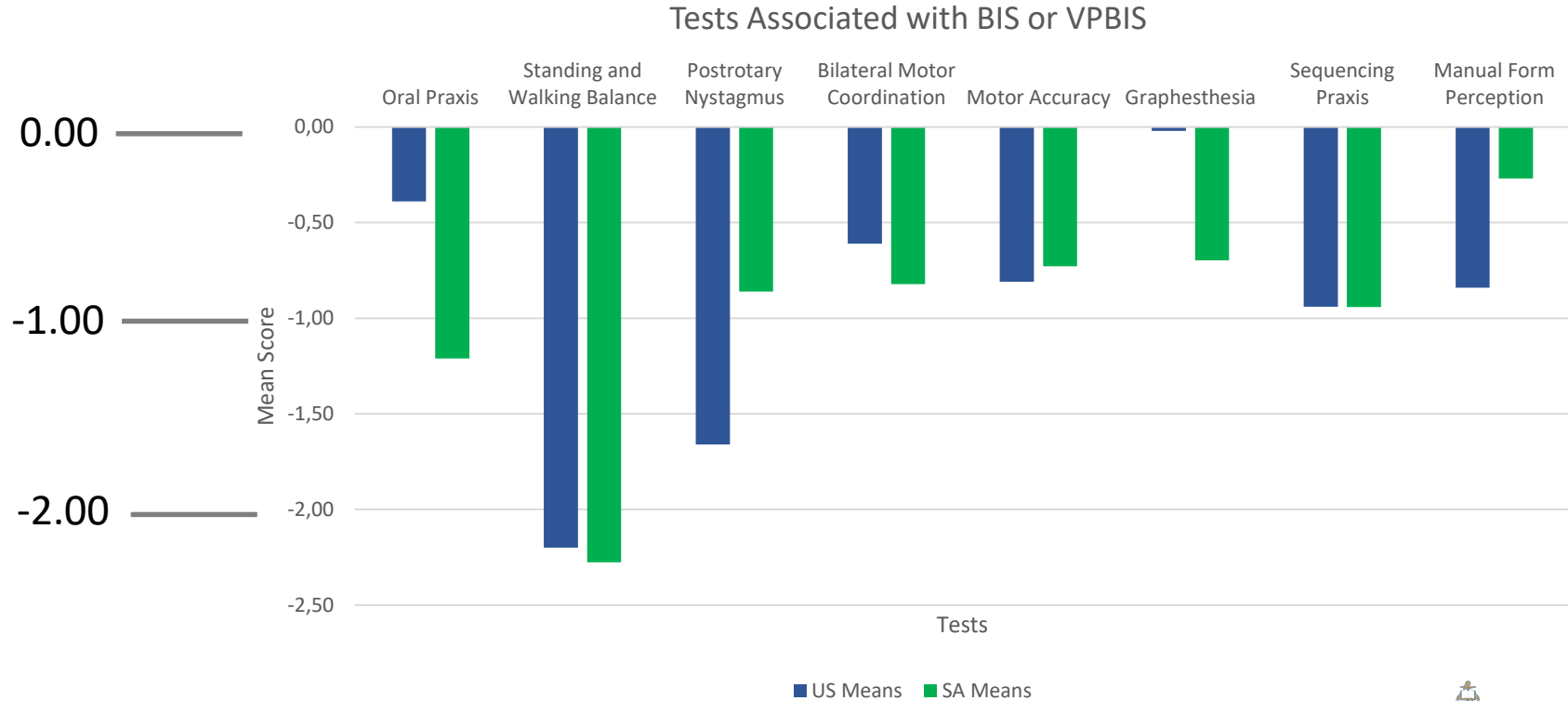
Results: SA scores not associated with BIS

Adapted to SA norms (Van Jaarsveld et al, 2012) ⁽⁸⁾

| SIPT scores Not associated with BIS or VPBIS | SA Means |
|---|-------------|
| Constructional Praxis (copying 3D structures) | 0,33 |
| Postural Praxis (imitating postures) | -0,07 |
| Design Copying | -0,77 |
| Finger Identification | -0,38 |
| Localization of Tactile Stimuli | -0,44 |
| Space visualisation (perception of 3D space) | -0,82 |
| Figure ground perception | -0.09 |

NOTE:
All 9 children
scored **SD -3.00**
for **Praxis on**
Verbal
command

Results: Comparison SA vs US (Koester et al, 2014)



Summary of findings

- Children in SA with bilateral CIs present with the BIS pattern of Sensory Integrative Dysfunction (2,8,9)
- No significant statistical differences between results from SA vs USA: BIS pattern present in both groups

Limitations & Suggestions for future research

- Small sample size (9 SIPT reports) from one province in SA
- Follow-up study to increase sample size:
 - include children with hearing aids and unilateral cochlear implants
 - other provinces
 - obtain information regarding emotions, behaviour and sensory regulation

Recommendations for practice

- OTs have a crucial role to play within the CI team:
- **Assessments:** Creating awareness for holistic assessments that include a thorough evaluation of sensory perception and motor performance, including vestibular related function
- **Intervention:** Findings contribute to the body of knowledge to inform and empower OTs to design effective intervention plans for children with CIs, particularly with attention to vestibular-related sensory integrative deficits
Poster: Data Driven Intervention Guidelines for OTs working with your children with CIs
- **Outcomes:** To facilitate optimal performance and participation in occupations, optimally benefit from CIs, enjoy life to their fullest.



Conclusion and Acknowledgements

- Special thanks to co-authors:
 - Ms Maretha Bekker (Occupational Therapy Department, UP)
 - Dr Susanne Smith Roley (CLASI)



References

1. Yawn R, Hunter JB, Sweeney AD, Bennett ML. Cochlear implantation: A biomechanical prosthesis for hearing loss. F1000Prime Reports. 2015; 7.
2. Koester AC, Mailloux Z, Coleman GG, Mori AB, Paul SM, Blanche E, et al. Sensory integration functions of children with cochlear implants. The American journal of occupational therapy : official publication of the American Occupational Therapy Association. 2014; 68(5):562-9.
3. Gheysen F, Loots G, Van Waelvelde H. Motor development of deaf children with and without cochlear implants. Journal of Deaf Studies and Deaf Education. 2008; 13(2):215-24.
4. Ayres AJ, Robbins J. Sensory integration and the child: Understanding hidden sensory challenges: Western Psychological Services; 2005.
5. Le Roux T, Vinck B, Butler I, Cass N, Louw L, Nauta L, et al. Predictors of pediatric cochlear implantation outcomes in South Africa. Int. J. Pediatr. Otorhinolaryngol. 2016; 84:61-70.
6. Ebrahimi AA, Movallali G, Jamshidi AA, Haghgoo HA, Rahgozar M. Balance performance of deaf children with and without cochlear implants. Acta Med. Iran. 2016; 54(11):737-42.
7. Ayres AJ. Sensory integration and praxis tests (sipt). Los Angeles: Western Psychological Services. 1989.
8. Mailloux Z, Mulligan S, Roley SS, Blanche E, Cermak S, Coleman GG, et al. Verification and clarification of patterns of sensory integrative dysfunction. The American journal of occupational therapy : official publication of the American Occupational Therapy Association. 2011; 65(2):143-51.
9. Van Jaarsveld A, Mailloux Z, Herzberg DS. The use of the sensory integration and praxis tests with South African children. South African Journal of Occupational Therapy. 2012; 42(3):12-8.



Thank You



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