REFERENCES


Ching, T., Dillon, H., & Katsch, R. (2001). Do children require more high frequency audibility than adults with similar hearing losses? In R. Seewald, & J. Gravel (Eds.), *A sound foundation through amplification: proceedings of the second international conference* (pp. 141-152). Stäfa Switzerland: Phonak AG.


Moore, B. (2001). Dead regions in the cochlea: implications for the choice of high-frequency amplification. In R. Seewald, & J. Gravel (Eds.), *A sound foundation through amplification: proceedings of the second international conference* (pp. 153-166). Stäfa: Phonak AG.


APPENDIX A

Audiogram
APPENDIX B

Speech audiometry record sheet
### WORD INTELLIGIBILITY BY PICTURE IDENTIFICATION TEST
**Assessments with previous generation digital signal processing hearing aids**

Child: ___________________________________ Date: _________________________________________

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## WORD INTELLIGIBILITY BY PICTURE IDENTIFICATION TEST

**Assessments with integrated signal processing hearing aids**

| Child: ___________________________ | Date: ___________________________ |

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August 2007

Dear (Parent/Legal guardian of child with hearing loss)

RESEARCH PROJECT: PERMISSION TO CONDUCT RESEARCH INVOLVING YOUR CHILD

As qualified audiologists and speech-language therapists we are currently studying towards a Master’s degree in Communication Pathology at the University of Pretoria. We would like to conduct a research project that will include two smaller research studies, involving children with hearing loss at the Carel du Toit Centre. The titles of the individual studies will be as follows:

- **Linear Frequency transposition and word recognition abilities of children with moderate-to-severe sensorineural hearing loss** *(conducted by Annerina Verschoor)*

- **Linear frequency transposition and rapid word-learning in young children with a moderate-to-severe sensorineural hearing loss** *(conducted by Surida Booyzen)*

The purpose of these studies is to determine if a new type of hearing aid will help children with a hearing loss to hear high frequency sounds better, and if this will have an effect on their ability to recognize spoken words and to learn new words. Frequency transposition hearing aids process high sounds differently from conventional hearing aids and may affect the way children perceive speech and learn new words. The results obtained from this project will provide valuable information about whether this new hearing aid technology is suitable for children and about the word-learning abilities of hearing-impaired children and normal hearing children.

We would like to invite you and your child to participate in this project and request permission to use the information in your child’s school file. Should the information in the file indicate that your child is not deemed a suitable participant, you would be informed. Your child will receive two of these frequency transposition hearing aids which he/she will have to use for a 5-week period. During this
period, your child will be assessed five times. The assessments for the project may take up to 1½ hours each, and will include the following procedures which are normally used for biannual assessments at the school:

- Otoscopy to inspect the child’s ear canal and ear drum
- Tympanometry to assess the child’s middle ear functioning
- Pure-tone audiometry to evaluate hearing thresholds with and without his/her current hearing aids as well as the new hearing aids
- Speech perception tests to assess how the child can understand speech with the current and new hearing aids.

As part of these procedures, your child will also be expected to listen to a story and then demonstrate if he or she can remember the correct picture associated with the new words learned as part of the story. In total your child will be out of the classroom for a period of 7½ hours (divided into 5 assessments) during the 5-week period. Appropriate steps will be taken to make sure that he/she will not fall behind the rest of the class due to participation in this project. At the end of the 5-week period, we will evaluate the results and determine whether frequency transposition or conventional amplification is most beneficial for your child. Should the new type of hearing aid prove to be the best for your child, he or she will be allowed to keep it. Your child will also receive a reading book as a prize after all the results had been obtained.

Assessments will take place at the Carel du Toit Centre in the mornings. There are no financial obligations related to participation in this project. There are also no medical risks associated with this project, but your child might experience some adjustment to the new hearing aids. As with all the routine biannual assessments performed at the Carel du Toit Centre, we will inform you immediately as soon as anything out of the ordinary is detected during the assessments that may raise concern, and the necessary steps will be taken in order to manage it according to best practice guidelines.

Your child’s participation in this project will be much appreciated. Participation is strictly voluntary and you may decide to withdraw your child at any time without any negative consequences. Information regarding the project or you and your child’s right as participant will be provided upon request at any time during the study. All information and test results will be treated with confidentiality and the information will be destroyed should you wish to withdraw from the project. According to international and U.P. regulations, a copy of the raw data will be stored in electronic format for 15 years before it will be destroyed. The stored data may be used in future research projects, but should this happen, your permission in this regard, will be requested. The information and results gathered will be available in the format of a thesis at the Academic Information Centre (AIC) of the University of Pretoria as well as in a possible journal publication. All participants will have access to the data obtained in this project.

You are kindly requested to complete the attached document should you decide to take part in the study, and return it to your child’s class teacher as soon as possible.
You are most welcome to contact us at any stage if you require more information, or want to discuss your child’s participation in this project.

Kind regards,

Surida Booyzen  
Student researcher  
Carel du Toit Centre  
021-938 4884 / 021-930 3136  
021-930 3144  

e  Annerina Verschoor  
Student researcher  
Carel du Toit Centre  
021-938 4884 / 021-930 3136  
021-930 3144

Mrs. Emily Groenewald  
Supervisor

Dr. Catherine van Dijk  
Supervisor

Prof. Brenda Louw  
HEAD: DEPT COMMUNICATION PATHOLOGY

Dear Surida and Annerina,

**RESEARCH PROJECT: PERMISSION TO CONDUCT RESEARCH INVOLVING YOUR CHILD**

I hereby give permission for my child to participate in this project. I also grant permission for you to access his/her school file in order to obtain audiological information. The identity of my child will not be revealed and all information will be treated in the strictest of confidence. I can withdraw my consent at any particular time without penalty or fear of implication for my child.

-------------------------------------------------------------

Child’s name

-------------------------------------------------------------

Parent/Guardian  Date

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APPENDIX D

Informed assent letter
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<tr>
<td><strong>1.</strong> My name is ________________________________</td>
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<tr>
<td><strong>2.</strong> My ears will listen with the new hearing aids.</td>
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<tr>
<td><strong>3.</strong> I will listen to Surida’s stories and Annerina’s words.</td>
<td></td>
</tr>
<tr>
<td><strong>4.</strong> Surida and Annerina will not tell anybody if I struggle.</td>
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<td><strong>5.</strong> I will try my best.</td>
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<tr>
<td><strong>6.</strong> If I don’t want to listen to the words and stories I can tell teacher and then I can stop.</td>
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<td><strong>7.</strong> I can help choose which hearing aids are the best!</td>
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APPENDIX E

Ethical clearance: Research Proposal and Ethics Committee
11 Oktober 2007

Me A Verschoor
Postbus 15727
PANORAMA
7508

Geeste Verschoor

TITEL: REGISTRASIE: STUDIERIGTING – MKOMMUNIKASIEPATOLOGIE

Met genoëë deel ek u mee dat die volgende goedgekeur is:

ONDERWERP: Linear frequency transposition and word recognition abilities of children with moderate-to-severe sensorineural hearing loss

LIEFER: Dr C van Dijk

MEDE-LIEFER: Me E Groenewald

U aandag word in besonder op die volgende gevestig:

1. TERMYN VAN REGISTRASIE
   (a) U moet vir minstens een akademiese jaar as student vir die magistergraad geregistrer wees voordat die graad toegeliet kan word.
   (b) U registrasie moet jaarliks voor April van elke akademiese jaar herne word totdat u aan al die vereistes vir die magistergraad voldoen het. Geen herregistrasie sal na 31 Maart aanvaar word nie. U sal stegs geregistreer wees op die leiding van u leier indien u jaarliks bewys van registrasie aan hom voerid.

2. GOEDKEURING VIR INDIENING
   Vir eksamendoeleindes moet u voldoende eksemplare vir elke eksaminator indien, tesame met ’n skriflikke verklaring van u leier dat hy/sy die indiening van die verhandeling goedgekeur sowel as ’n verklaring deur u, wat vir ’n Kommissaris van Ede geteken word, wat by Studente-administrasie ingehandig word.

3. KENNISGEWING VOOR INDIENING
   Dit is ’n vereiste dat u my ten minste drie maande voor die tyd in kennis stel van u voornome om ’n verhandeling/aksripsie in te dien.

4. VOORSKRIFTE IN VERBAND MET DIE VOORBEREIDING VAN DIE VERHANDELING/ASKRIPSIE ASOOK DIE SAMEVATTING IS OP DIE KEERSEY VAN HIERDIE BRIEF UITEENGESIT.

Die uwe

[Ons verw: Me P Woest / 90095697
Tel: 012 420 2736
Fax: 012 420 2698
E-pos: petru.woest@up.ac.za]

Fakulteit Geesteswetenskappe

nms DEKAAN: FAKULTEIT GEEESTESWETENSKAPPE

GW-005A
APPENDIX F

Letter requesting permission to the centre for hearing-impaired children
August 2007

Dear Mrs. du Preez

RESEARCH PROJECT: PERMISSION TO CONDUCT RESEARCH INVOLVING CHILDREN WITH HEARING LOSS

As qualified audiologists and speech-language therapists we are currently studying towards a postgraduate Master’s degree in Communication Pathology at the University of Pretoria. We would like to conduct a research project by dividing it into two research studies involving children with moderate-to-severe sensorineural hearing loss at the Carel du Toit Centre. The titles of the individual studies will be as follows:

- Linear frequency transposition and word recognition abilities of children with moderate-to-severe sensorineural hearing loss (conducted by Annarina Verschoor)

- Linear frequency transposition and rapid word-learning in young children with a moderate-to-severe sensorineural hearing loss (conducted by Surida Booysen)

The purpose of these studies is to determine if a new type of hearing aid will help children with a hearing loss to hear high frequency sounds better, and if this will have an effect on their ability to recognize spoken words and to learn new words. Frequency transposition hearing aids process high sounds differently from conventional hearing aids and may affect the way children perceive speech and learn new words. The results obtained from this project will provide valuable information about whether this new hearing aid technology is suitable for children and about the word-learning abilities of hearing-impaired children and normal hearing children.

We would like to invite you and the children at your school to participate in this project and request permission to access the personal information in the children’s school file as well as the audiological facilities at the school. Parents of the children between the ages of 5.0 and 7.11 years will receive letters of informed consent. After the parents have given permission for the children to take part in the study, information in the school files will need to be analysed to determine suitable candidacy. Each child will also undergo a receptive vocabulary assessment that will take approximately 20 minutes.
Should the information in the file or the results of the vocabulary assessment indicate that the child is not deemed a suitable participant, you and the parents will be informed. During a 5-week period, the children will be assessed five times. Initial assessment will occur with the children’s own hearing aids. Thereafter each child (at most 10 children) will receive two of these frequency transposition hearing aids, which they will have to use for a 4-week period. The assessments for the project may take up to 1½ hours each, and will include the following procedures which are normally used for biannual assessments at the school:

- Otoscopy to inspect the child’s ear canal and ear drum
- Tympanometry to assess the child’s middle ear functioning
- Pure-tone audiometry to evaluate hearing thresholds with and without his/her current hearing aids as well as the new hearing aids
- Speech perception tests to assess how the child can understand speech with the current and new hearing aids.

As part of these procedures, the children will also be expected to listen to a story and then demonstrate if they can remember the correct picture associated with the new words learned as part of the story. In total, each child will be out of the classroom for a period of 7½ hours (divided into 5 assessments) during the 5-week period.

Appropriate steps will be taken to make sure that the children will not fall behind the rest of the class due to participation in this project by liaising with each class teacher, Mrs. Kritzinger and Mrs. Swartz, regarding suitable times to extract individual children from the educational environment. At the end of the 5-week period, we will evaluate the results and determine whether frequency transposition or conventional amplification is most beneficial for children with a hearing loss. Since the hearing aids under investigation had been donated to the centre, the children will be able to keep the hearing aids should they prove to be most beneficial. Each child will also receive a reading book as prize after all the results has been obtained.

Assessments will take place at the Carel du Toit Centre in the mornings. There are no financial obligations related to participation in this project to either you or the parents of the children selected. There are also no medical risks associated with this project, but the children might experience some adjustment to the new hearing aids. As with all the routine biannual assessments performed at the Carel du Toit Centre, we will inform you immediately as soon as anything out of the ordinary is detected during the assessments that may raise concern, and the necessary steps will be taken in order to manage it according to best practice guidelines.

Your school’s participation in this project will be much appreciated. Participation is strictly voluntary and you may decide to withdraw your consent at any time without any negative consequences. Information regarding the project or the school and children’s right as participants will be provided upon request at any time during the study. All information and test results will be treated with confidentiality and the information will be destroyed should you wish to withdraw from the project. According to international and U.P regulations, a copy of the raw data will be stored in electronic format for 15 years before it will be destroyed. The stored data may be used in future research
projects, but should this happen, your permission in this regard, will be requested. The information and results gathered will be available in the format of a thesis at the Academic Information Centre (AIC) of the University of Pretoria as well as in a possible journal publication. All participants will have access to all data obtained in this project.

You are kindly requested to complete the attached form should you decide to take part in the study, and return it to us as soon as possible.

You are most welcome to contact us at any stage if you require more information, or want to discuss your school’s participation in this project.

Kind regards,

Surida Booyse
Student researcher
Carel du Toit Centre
☎ 021-938 4884 / 021-930 3136
✉ 021-930 3144

Annelina Verschoor
Student researcher
Carel du Toit Centre
☎ 021-938 4884 / 021-930 3136
✉ 021-930 3144

Mrs. Emily Groenewald
Supervisor

Dr. Catherine van Dijk
Supervisor

Prof. Brenda Louw

HEAD: DEPT COMMUNICATION PATHOLOGY
Dear Surida and Annerina,

RESEARCH PROJECT: PERMISSION TO CONDUCT RESEARCH INVOLVING CHILDREN WITH HEARING LOSS

I hereby give permission for you to conduct this project at our school. I also grant permission for you to access the necessary school files in order to obtain audiological information and to use our audiological facilities. The identity of our school and children will not be revealed and all information will be treated in the strictest of confidence. I can withdraw my consent at any particular time without penalty or fear of implication for the children.

[Signatures]

Principal

Date

Class Teacher

Date

Class Teacher

Date
APPENDIX G

Ethical clearance: Committee for Human Research
5 October 2007

Ms A Verschoor
Carel du Toit Centre
PO Box 19130
TYGERBERG
7505

Dear Ms Verschoor,

RESEARCH PROJECT: "THE EFFECT OF FREQUENCY TRANSPORTATION ON THE SPEECH PERCEPTION ABILITIES OF CHILDREN WITH MODERATE-TO-SEVERE HEARING LOSS"

The primary evaluator and the chairperson appraised your response dated 14 September 2007 to the problems that the Committee for Human Research identified in the original submission of the project. The corrections/additional information has been provided satisfactorily, but it was requested that the statistician should be consulted before the study starts to determine if the sample size is adequate.

On receipt of the additional information/corrected document(s) the application will be reconsidered. Please mark all the corrections/amendments clearly in order to allow rapid scrutiny and appraisal.

Yours faithfully,

[Signature]

CJ VAN TONDER
RESEARCH DEVELOPMENT AND SUPPORT (TYGERBERG)
Tel: +27 21 938 9207 / E-mail: cjvtsun.ac.za

CJVT/pm