Trends in Pediatric Hearing Care – 7 PM

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CAA Webinar

Trends in Pediatric Hearing Care

Keynote Speaker - Andrea Pittman

Industry Sponsor Presentation – Oticon Canada

Q&A 20 questions - Dave Gordey and Marlene Bagatto

Contributed Research Papers

Moderator - Dave Gordey

Sept. 21, 2021

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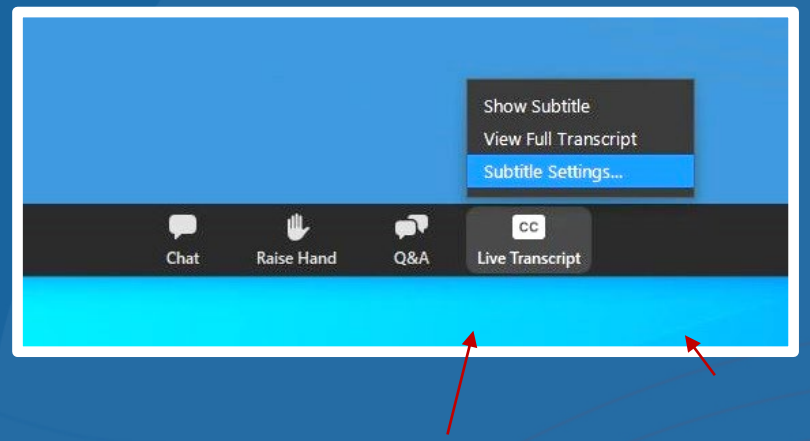

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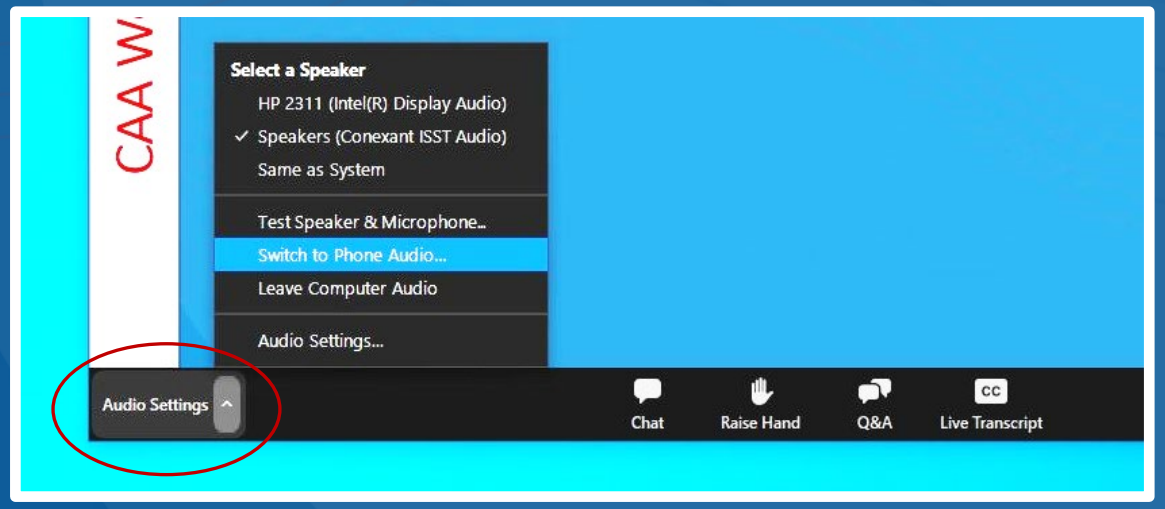

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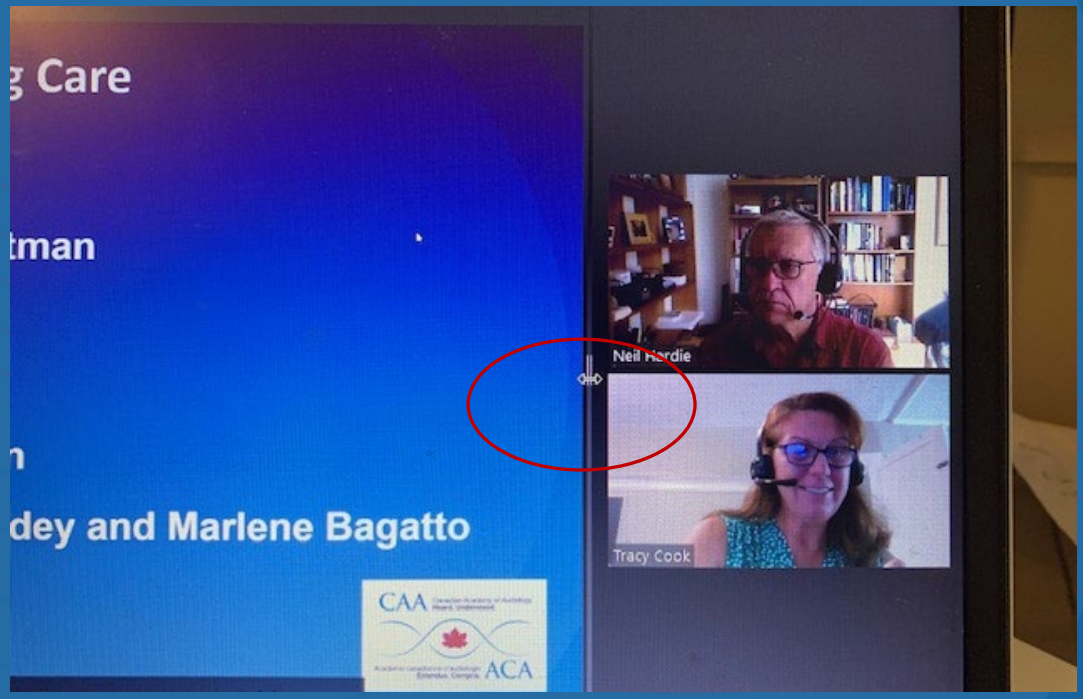

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Moderator – Dave Gordey

Dave Gordey has been a pediatric audiologist for twenty-four years. He previously worked in a pediatric clinical practice in Victoria and Vancouver, British Columbia. Dave is currently the director of clinical research and professional relations for Oticon A/S.

He is an adjunct professor at the University of British Columbia where he teaches classroom amplification. Dave is a Ph.D. candidate at York University in Toronto and his interests include amplification, implantable devices, auditory processing disorders, counseling and the social and emotional development of children with hearing loss.

Agenda

- 7 pm Welcome and Introduction
- 7:05 Keynote Speaker - Andrea Pittman- Understanding Children and their Hearing Aids
  Hearing Aids for Infants and Children
- 8:00 BREAK (5 min)
- 8:05 Dave Gordey presents the Honours of the Academy Award to Elizabeth Fitzpatrick
- 8:10 Contributed Research Paper - Shaghayegh Omidvar, University of Ottawa
- 8:15 Contributed Research paper - Zohreh Ahmadi,University of Ottawa
- 8:20 Featured Sponsor Presentation - Rebecca Angel, Remote Microphones &
  Digital Modulation
- 8:35 20 questions - Challenges and Opportunities of Working with Children who have Unilateral Hearing Loss
  Dave Gordey / Marlene Bagatto
- 8:55 Thanks and Wrap - Dave Gordey
- 9:00 End

Keynote Speaker: Andrea Pittman

PhD CCC-A, Arizona State University - Associate Professor, Director, Pediatric Amplification and Auditory Prosthesis Laboratories

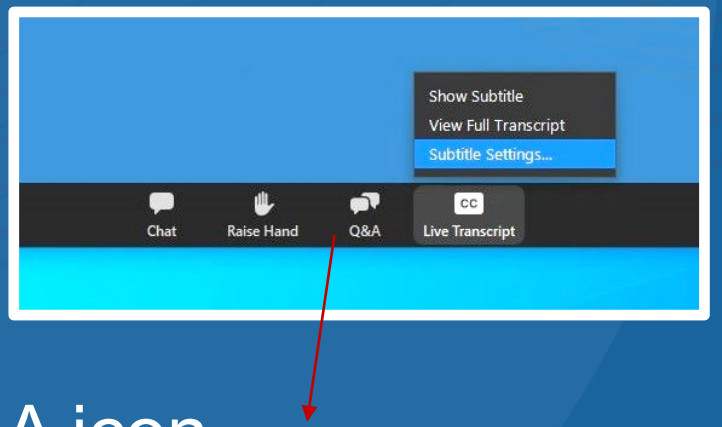
Dr. Pittman is an Associate Professor in the Speech and Hearing Science program at Arizona State University. She is the Director of the Pediatric Amplification and the Auditory Prosthesis Laboratories.

Her research focuses on the effects of hearing loss and amplification features on listening, learning, and recall of new information across the lifespan. Her work has been funded by grants from federal, foundation, and industry sponsors.

Questions

Keynote Speaker: Andrea Pittman, PhD CCC-A

Moderator: Dave Gordey



A reminder to please type your questions into the Q & A icon.

Short Break – 5 minutes

Award Presentation

Dave Gordey presents the Honours of the Academy Award to Elizabeth Fitzpatrick:

The Honours of the Academy Award is awarded for outstanding contribution to audiology or a related field; such as the development of a significant clinical program, test procedure or protocol, an outstanding research project, teaching or mentoring, excellence in management of an audiology or related program, contribution to the field through advocacy or outstanding public relations efforts.

Contributed Research Paper: Shaghayegh Omidvar, PhD student, University of Ottawa

Auditory brainstem responses in children with or at risk of central processing disorder: a scoping review.

3 key learning points:

- In spite of the diversity in the results of click ABR, most studies indicated increase in the wave latencies and/or decrease in the wave amplitudes of click ABR in children with/ at-risk of CAPDs.
- The results of speech ABR assessments were more consistent and prolongation of the transient components of speech ABR was observed in these children, while sustained components remained unchanged.
- It seems that speech ABR assessments yield more reliable findings than click ABR in children with CAPDs.

Auditory brainstem responses in children with or at risk of central auditory processing disorder: A scoping review

Authors: **Shaghayegh Omidvar, Victoria Duda, Amineh Koravand**

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Background

- CAPDs is clinically identified using behavioral tests.
- Auditory electrophysiological tests, such as ABR, is independent from confounding cognitive factors.

Objective

- To review the possibility of using ABR to click and/or speech stimuli to identify children with or at risk of CAPDs.

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Methods

PubMed | Web of Science | Medline | Embase | CINAHL | Gray literature

16 papers

sABR: 5 | cABR: 11

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Results

Click ABR in children with CAPDs

Latency
Amplitude

Author(s)	Results					
	I	II	III	IV	V	BIC
Roush & Tait (1984)			NC		NC	
Gopal & Pierel (1999)					↓	↓
Gopal & Kowalski (1999)	↓				↓	
Jirsa (2001)	NC		NC		NC	
Purdy et al. (2002)			←		←	
Gopal et al. (2002)		→	↓		→/↓	
Hurley (2004)	↓		↓		↓	NC
Allen & Allan (2014)	→/-				→/↓	
Strauss et al. (2016)						NC, NC
Morlet et al (2019)	NC, NC		NC, NC		NC, NC	
Ankmnal-Veeranna et al (2019)	→	→	→	→	→	

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Results

Speech ABR in children with CAPDs

Latency
Amplitude

Authors	Results						
	V	A	C	D	E	F	O
Filippini et al (2012)	Pre-treatment						
	→/↓	→/↓	→	→	→	NC	→
	Post-treatment						
	←		←	←	←		
Koravand et al (2019)	Pre-treatment						
	-	-					
	Post-treatment						
	↑	↑					
Rocha-Muniz et al (2012)	→	→	→	→	→	→	→
Rocha-Muniz et al (2014)	→	→	→	NC	NC	NC	→
Kumar and Singh (2015)	→/↓	→/↓					

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Conclusion

- Speech ABR assessments yield more reliable findings than click ABR in Children with CAPDs.
- The findings should be interpreted with caution.
- Well-designed studies on children with confirmed CAPDs using standard diagnostic and assessment protocols are recommended.

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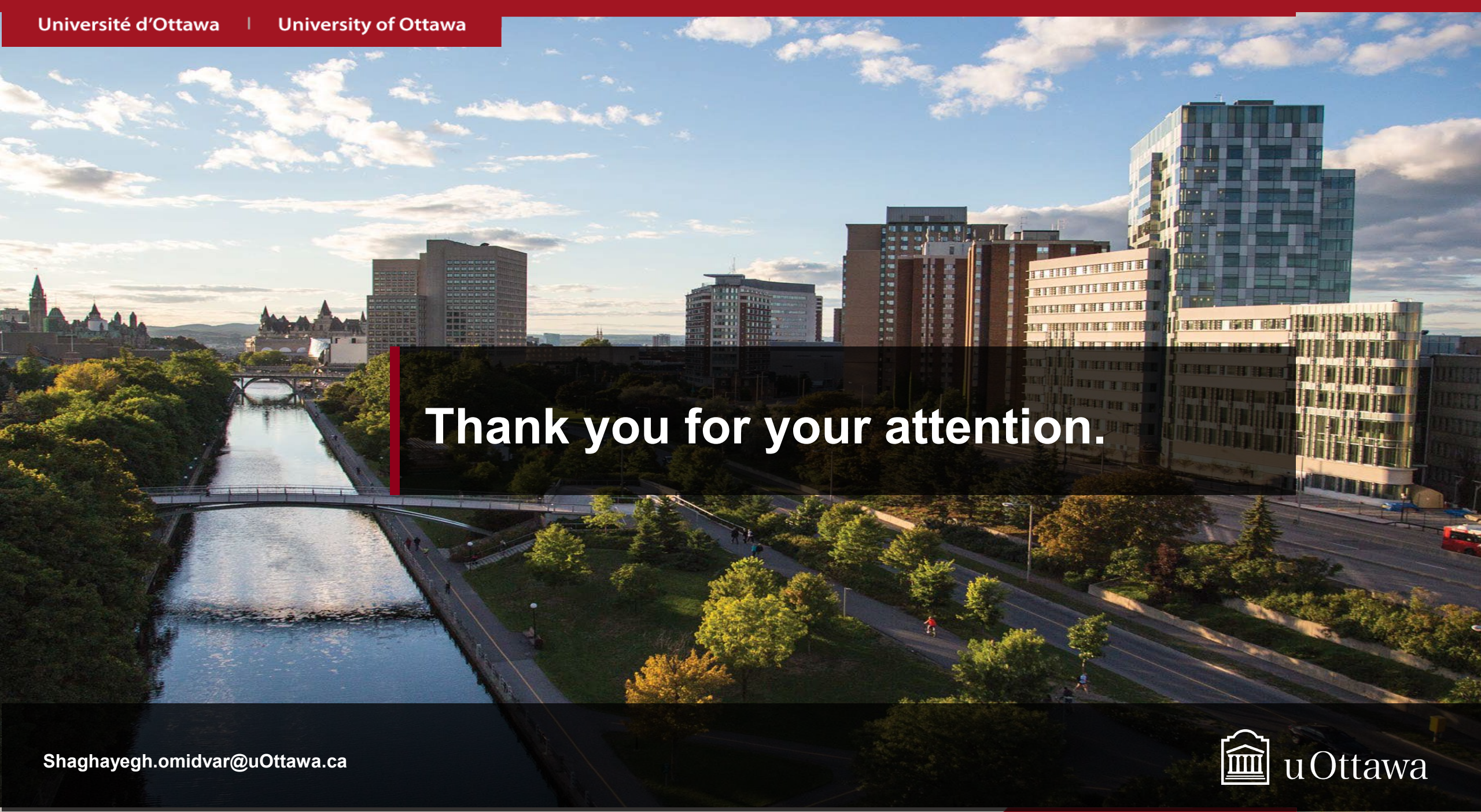

Thank you for your attention.

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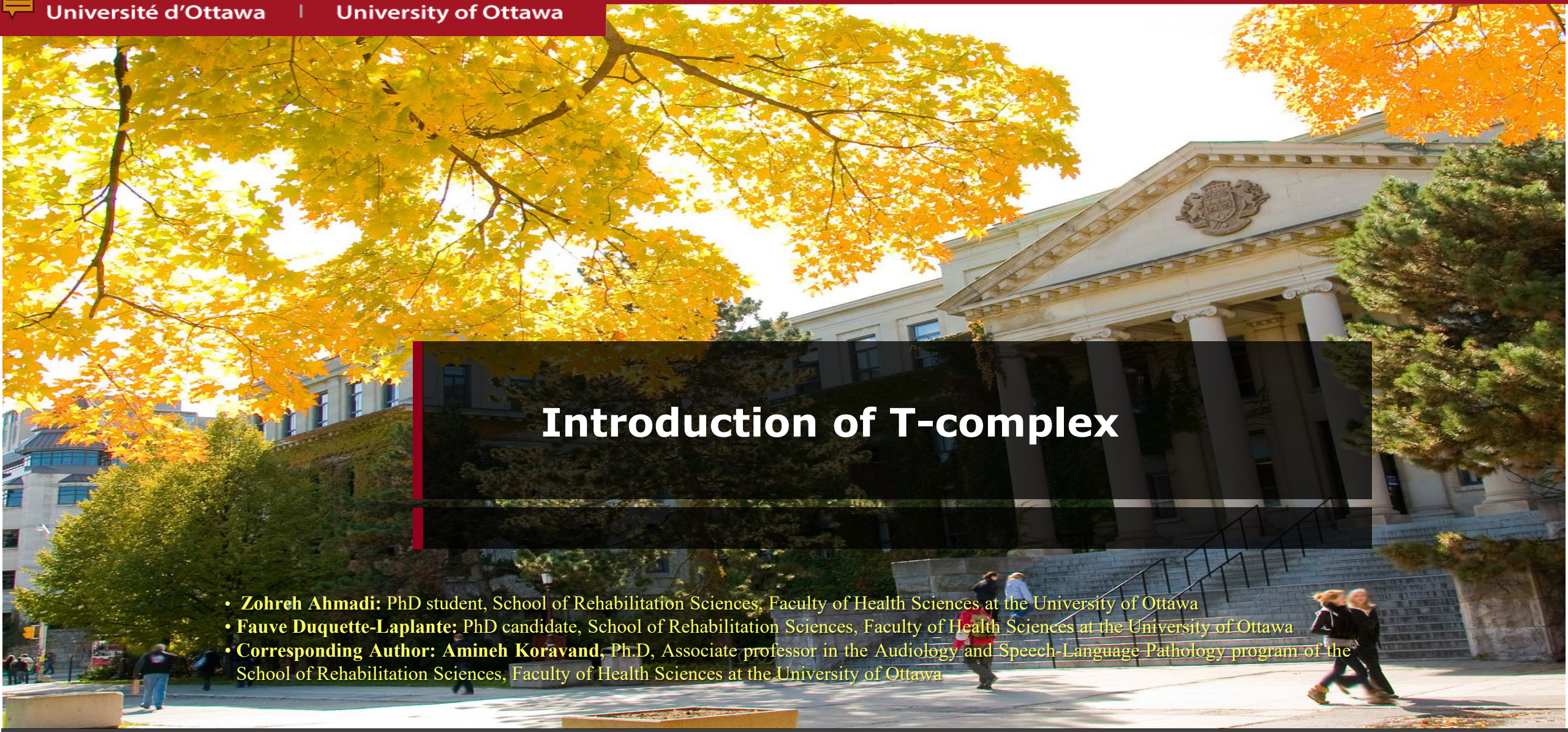
Contributed Research Paper: Zohreh Ahmadi, PhD student, University of Ottawa

Introduction of T-complex

3 key learning points:

- Components and origins of T-complex
- Lateralization and maturation of T-complex
- Influencing parameters on T-complex



Introduction of T-complex

- **Zohreh Ahmadi:** PhD student, School of Rehabilitation Sciences, Faculty of Health Sciences at the University of Ottawa
- **Fauve Duquette-Laplante:** PhD candidate, School of Rehabilitation Sciences, Faculty of Health Sciences at the University of Ottawa
- **Corresponding Author: Amineh Koravand,** Ph.D, Associate professor in the Audiology and Speech-Language Pathology program of the School of Rehabilitation Sciences, Faculty of Health Sciences at the University of Ottawa

Introduction and aim

- T-complex is an auditory event-related potential (AERP) obtained from the lateral surface of the temporal lobe(Wolpaw and Penry 1975).
- Composed of both a positive (Ta) and a negative (Tb) deflection(Wolpaw and Penry 1975).
- Multiple studies show the advantages of using T-complex to investigate the central auditory processing (Wagner, Roychoudhury et al. 2016; Wang, Yang et al. 2018; Wagner, Lee et al. 2017).
- The use of T-complex in the hearing research is still rare (Bishop, Anderson et al. 2011; Shafer, Schwartz et al. 2011).
- No review article regarding the parameters and features of T-complex was found.
- This study aimed to collect T-complex-related studies and summarize T-complex's most consistence features, parameters and applications.

Objectives

- The objectives of this study were two-fold:

  (1) to investigate the features, characteristics and assessment-related factors of T-complex;

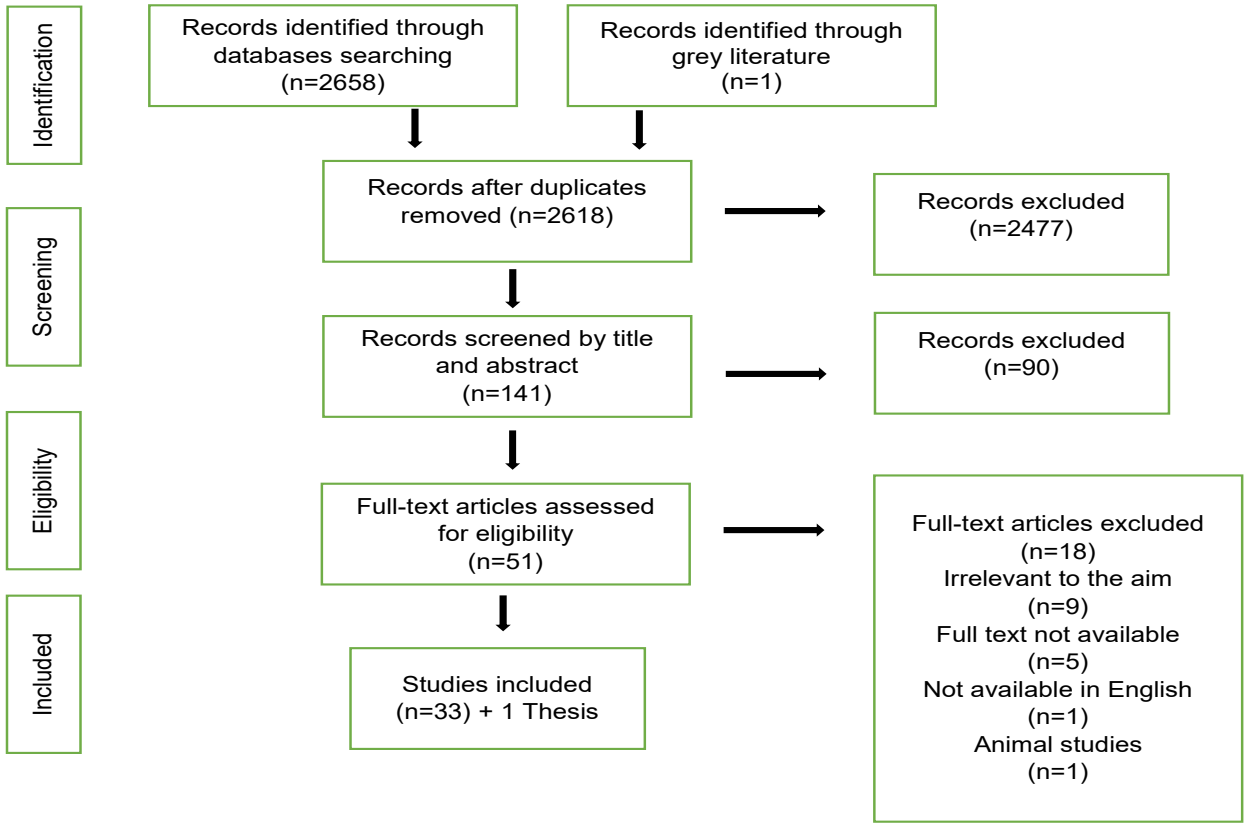
  (2) to show the most appropriate techniques leading to preferable morphology (amplitude and latency) of T-complex's waves

Methods and results

- Electronic databases (PubMed, Web of science, Scopus, and Ovid) were searched for T-complex related studies published in the last 70 years (up to May 2020). The review included all articles related to T-complex with typically developing participants from all ages (youngest: 3 months old, and the oldest:60 years old)

Methods and results

Figure 1. The flow-chart for the scoping review process



From 2658 articles → ended up to 33 articles and one thesis

Discussion

- 2 parts
  - Features of the T-complex
  - Influencing Factors on T-complex

Discussion
Features of the T-complex (origin, maturation)

1. Sequence: Na-Ta-Tb found in 80-150 ms of auditory-event related potentials (Wolpaw and Penry 1975).
2. Generation: Na and Ta from primary Auditory areas and Tb from secondary auditory areas that have a high potential to probe auditory processing disorder at high-level brain (Wagner, Shafer et al. 2017).
3. Maturation :T-complex is adult-like at about 5-6 years old and is found later (longer latency) and larger (higher amplitude) in children rather than adult (Pang and Taylor 2000; Tonnquist-Uhlen, Ponton et al. 2003; Bishop, Anderson et al. 2011; Bruneau, Bidet-Caulet et al. 2015).

Discussion

➢ Suggestion about Influencing Factors on T-complex(Parameters):

1. Use complex stimulation such as speech rather than a simple tone(Groen, Alku et al. 2008)
2. Use higher ISI (inter-stimulus interval)(Cacace, Dowman et al. 1988,Clunies-Ross, Campbell et al. 2018)
3. Use shorter RT (rising time)(Hämäläinen, Fosker et al. 2011)
4. Use longer SOA (stimulus onset asynchrony) (Bruneau, Bidet-Caulet et al. 2015)
5. Present stimuli through headphones rather than speakers(Mahajan and McArthur 2013)
6. Use binaural stimulation rather than monaural stimulation(Matsuda, Igarashi et al. 2019)
7. Use dipole modeling rather than other techniques such as subtraction method(Albrecht, Suchodoletz et al. 2000)(Tonnquist-Uhlen, Ponton et al. 2003)
8. Use a balanced non-cephalic electrode (BNE) (Hoonhorst, Serniclaes et al. 2009,Deng, Du et al. 2019)

Conclusion

- Limited literature
  - There are only about 51 articles related to T-complex in general
  - In hearing research, Click-ABR, Speech-ABR, MMN, or P300 have been more often used than T-Complex
  - No specific article using T-complex in the auditory processing disorder (APD) population has been found
    - One of the potential reasons may be related to the lack of familiarity and inadequate knowledge
- The results of this scoping review can encourage scientists and clinicians to use T-complex in research or clinical setting

- Many Thanks for your attention

- Greatest thanks to Dr. Amineh Koravand and Fauve Duquette-Laplante

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Featured Sponsor Presentation

Remote Microphones and Digital Modulation -

Rebecca Angel, M.Sc., Aud (C), RAUD, Business Development Manager, Oticon Canada

Abstract:

In this presentation we will discuss the differences between FM, DM, and Bluetooth, with a focus on Oticon's newest DM classroom transmitter, EduMic.

21 September 2021

Remote Microphone Systems and Digital Modulation

Oticon EduMic

Rebecca Angel, M.Sc., Aud (C) RAUD
Business Development Manager, Oticon Canada

oticon
life-changing technology

What is Digital Modulation?

- Digital modulation or DM is everywhere. It is a generic name for processes that use discrete signals to modulate a carrier wave (such as 2.4 GHz).

- Step 1 – digital modulation - A voice is picked up by a transmitter, sampled at some specific rate and then compressed and turned into a bit stream – a set of digital packages – and this is turned into a signal, then superimposed on the carrier wave.

- Step 2 – protocol - The protocol is looking at how these digital bits are packaged. Protocols include data packet size, boosts for latency time, strategies to avoid interference – essentially things to make the data signal more robust.

Thompson et al., 2006; Frenzel, 2018; Galal et al., 2012

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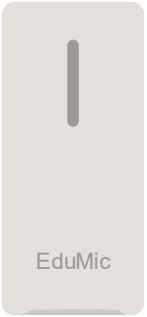
How does EduMic work?

Transmission of the Sound



- EduMic uses a proprietary low-energy protocol to share information between the transmitter and the receivers (**using 2.4 GHz low-energy audio system**)
- EduMic uses **dual frequency transmission** where signals are sent on different carrier frequencies to avoid interference
- Advanced signal processing to prioritize speech and remove background noise (open sound navigator)
- The 2.4 GHz receivers are built into hearing aids on the Velox and Velox S Platform (Opn Play, Xceed Play)
- 150 Hz – 10,000 Hz Bandwidth

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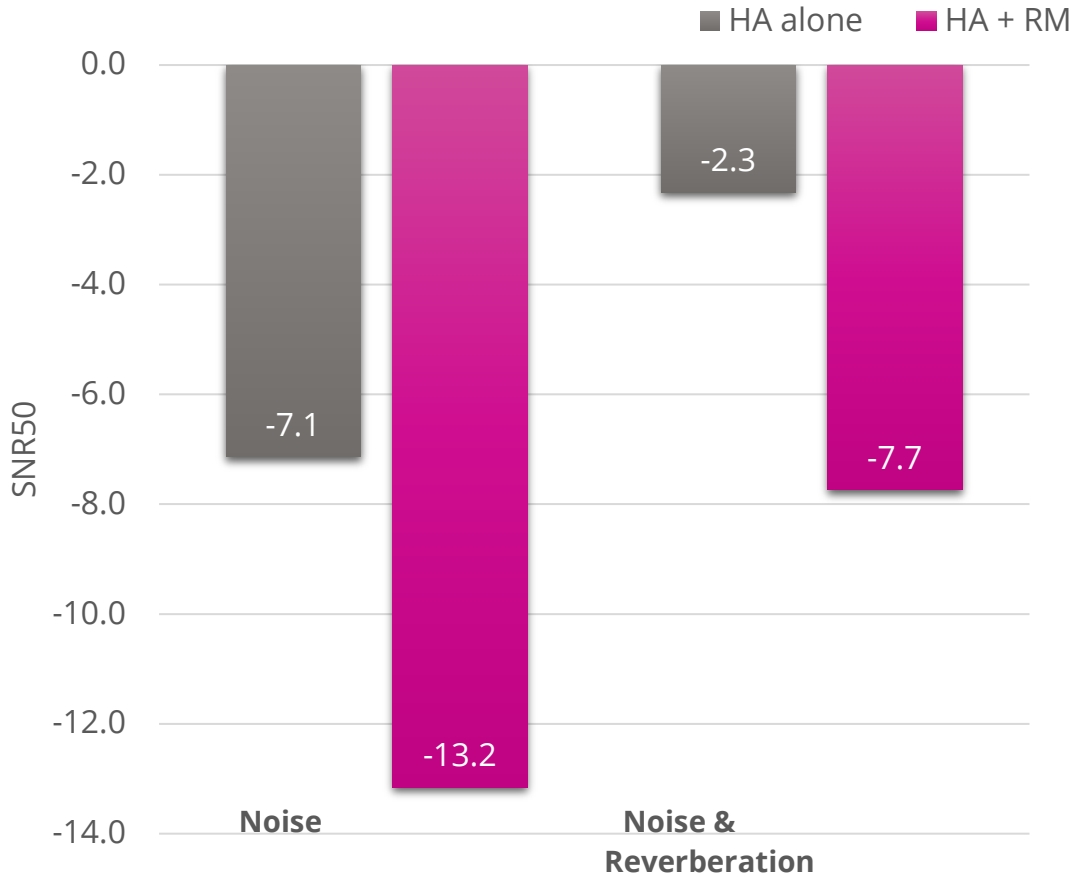
What are the benefits of RMS?

- Helps with the speech understanding in noise, reverberation, and at a distance
- Typically used in educational settings but have benefits in various scenarios
  - In the car
  - Extracurricular activities
  - Social settings
- In both reverberation and noise, EduMic significantly improved speech understanding in noise compared to hearing aid alone



Gordey & Rumley, 2019
Lewis, Spratford, Stecker & McCreery, in preparation

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What can EduMic do?

Microphone mode
(20 m range)

Jack mode
(20 m range)

FM mode
(3 m range)

Telecoil mode
(3 m range)

2.4 GHz

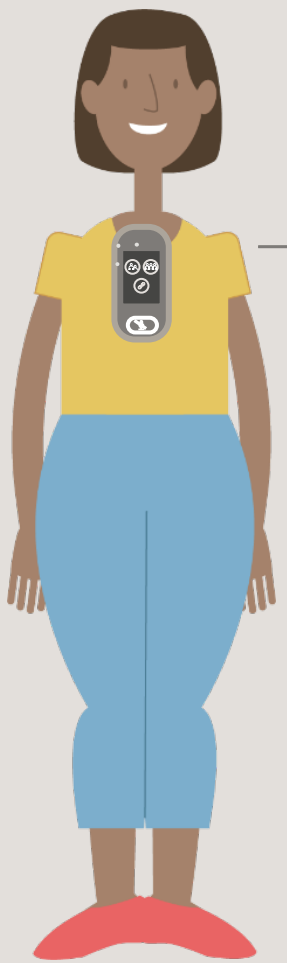
Remote Microphone Mode

Direct voice transmission to hearing aids

- Edumic transmits directly to the hearing instruments (up to 20 m or 60 ft)
- Provides clear and consistent access to the teachers voice
- Manages the effect of noise, reverberation, and distance
- Outside the classroom (in the car, extra curricular activities)

“FM” Mode - Compatibility with classroom systems

Phonak Roger TouchScreen



Phonak Hearing Aid

OTICON | **Xceed Play**

OTICON | **Opn Play**

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Phonak Roger school use cases

Main use


Transmits directly to Phonak HI

Phonak

Option A


Cannot transmit directly to Oticon HI

Oticon BTE

Ear-level Roger X receiver

Option B



Direct transmission to both HI brands

Phonak

Oticon

Ponto 4

Teacher uses 2 transmitters

Option C


Cannot transmit directly to Oticon 2.4GHz HI

Oticon

Roger MyLink neck loop receiver

Works for all Oticon hearing instruments with a T-coil

Option D



EduMic with Roger X is used as a gateway

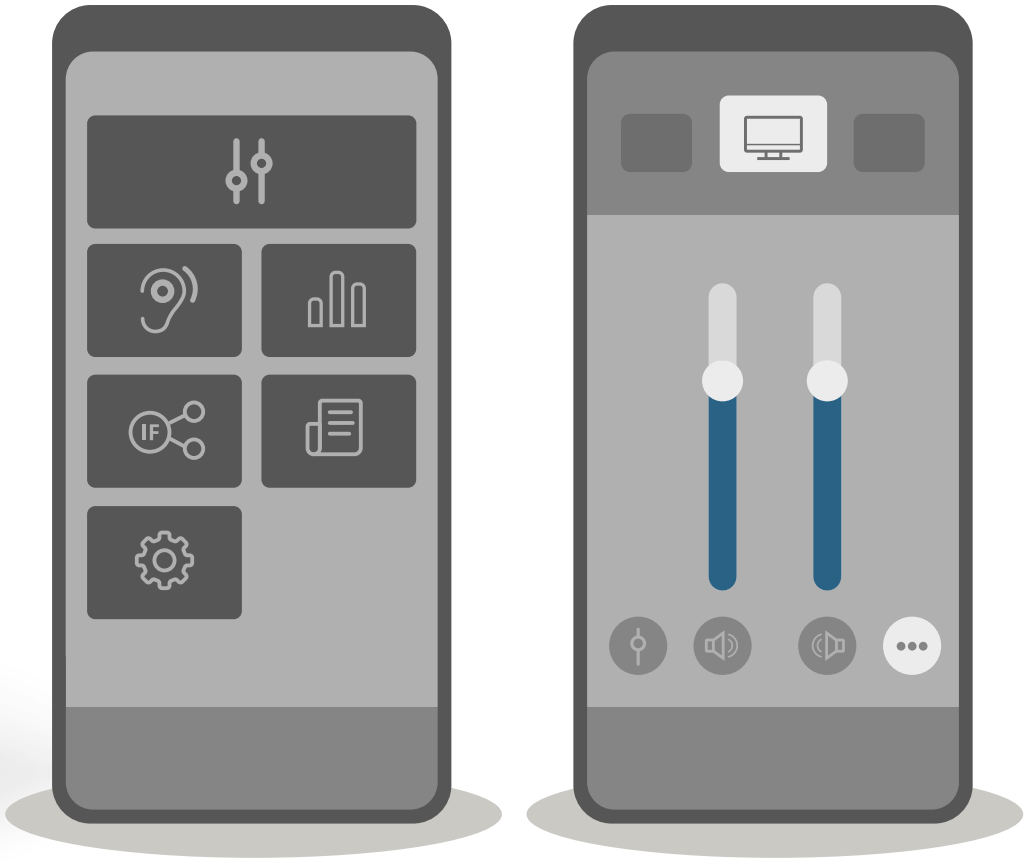
Oticon

Ponto 4

Works for all Oticon 2.4 GHz HI styles

EduMic + Oticon ON App

Streaming and environmental control



Download on the App Store

GET IT ON Google Play

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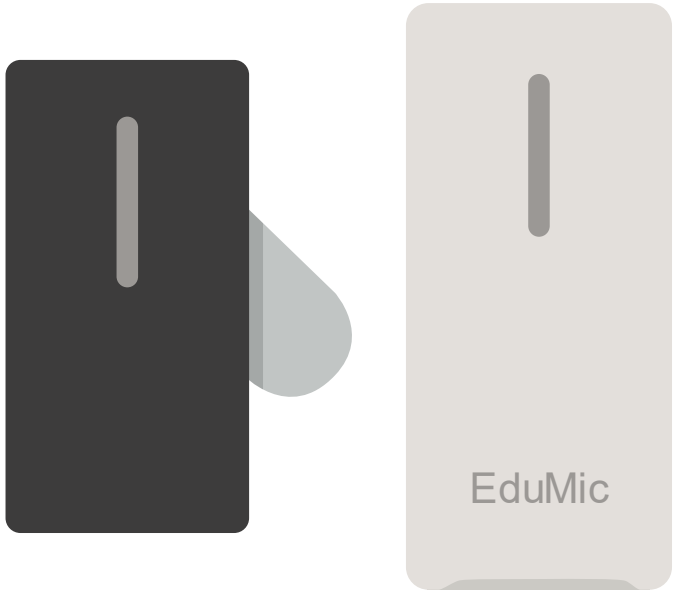
How is EduMic different from Connect Clip?

	EduMic	ConnectClip
Size	Larger	Smaller
Battery Life	10 hours	8 hours
Chip Technology	Velox S	Velox
Multiple Sets of Hearing Aids	Unlimited	No
Mute function	Yes	No
Audio input	Yes	No
FM connectivity	Yes	No
User Interface	Ease of use focused	Multi-function focused
Bluetooth®	Proprietary 2.4GHz Dual Frequency Transmission	Standard 2.4 GHz Transmission
Hearing Aid Remote Control	No	Yes
Telecoil	Yes	No
On App Controls	Yes	Yes

Ideal client	• For users who want an easy remote mic solution
	• For users with non-telecoil hearing aids to have access to teleloop systems
	• For children or adults in need of a solution for an educational setting
	• For users who want to share the remote microphone transmission
		• For users who want to stream music from any device featuring Bluetooth wireless technology
		• For users who want to make hands-free calls from their smartphones
		• For users that want connectivity at work or home
		• ConnectClip is for users who want a versatile product:
		  ◦ Remote microphone
		  ◦ Remote control
		  ◦ Hands-free calling
		  ◦ Music streaming



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Summary

- EduMic uses digital modulation and proprietary dual-frequency transmission protocol
- Open Sound Navigator
- Teachers rated EduMic highly on ease of use, design, comfort
- You can pair an unlimited number of Velox hearing aids to one Edumic
- Easy Verification Protocol
- There are several modes for the Edumic (including compatibility with other RMS)
- Number of current and ongoing research studies

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20 questions: Challenges and Opportunities of Working with Children who have Unilateral Hearing Loss

with Marlene Bagatto

Marlene Bagatto is an Assistant Professor in the School of Communication Sciences and Disorders and the National Centre for Audiology at Western University in London, Ontario. The research in her Pediatric Audiology Strategies and Systems Laboratory focusses on policy and practice integration for infant and child hearing.

Dr. Bagatto is Past President of the Canadian Academy of Audiology and Chair of the Canadian Infant Hearing Task Force.

20 questions: Challenges and Opportunities of Working with Children who have Unilateral Hearing Loss with Marlene Bagatto and hosted by Dave Gordey

A discussion about the challenges and opportunities encountered by those who work with children who have unilateral hearing loss will occur in this interactive session. Hosted by Dr. Dave Gordey with special guest Dr. Marlene Bagatto, a variety of topics related to the assessment and management of unilateral hearing loss in children will be addressed. Participants will be encouraged to ask questions during the session to facilitate a meaningful learning experience.

Learning Objectives:

- Describe common clinical challenges when working with children who have UHL
- Explain research opportunities for managing children who have UHL
- Be able to discuss the impact on parents when learning about UHL in children

Upcoming CAA Events

Wednesday October 6, 2021, 7-9PM ET - Supporting Adults with Hearing Loss

Moderator – Sarah Mason with Keynote speaker Dr. Esther Oh, Johns Hopkins University

Q&A on **Adult Hearing Screening** with Sarah Mason and Lorienne Jenstad

Saturday November 13 , 2021, 11AM-1PM ET - Implantable Hearing Technologies

Moderator – Justyn Pisa with Keynote speaker Dr. Griet Mertens, University of Antwerp

Q&A on **Bone Conduction** with Justyn Pisa and Bill Hodgetts

Saturday December 4 , 2021, 11AM-1PM ET - Industry Roundtable

The Future of Hearing Aid Technology

Moderator – Steve Aiken - featuring international speakers from 5 industry leading companies

Contact Us

Contact

- CanadianAudiology.ca
- Contact@CanadianAudiology.ca

- Webinar recording, and PDF will be posted to the CAA website within a few business days.
- For those attending this session live you will receive a thank you for attending email. That is your record of attendance and CEU.

Thank You For Attending

CAA webinars count towards CEUs. Please keep your ‘thank you for attending email” for your record. More information on website: https://canadianaudiology.ca/virtual-conference-modules-fall-of-2021/

Thank you