# کاربرد فناوری در توانبخشی گفتار زبان و بلع

دکترزهرا سادات قریشی
عضو هیات علمی گروه گفتاردرمانی
سرپرست واحد استعداد درخشان دانشگاه

# Speech therapy domain

- Speech
- Language
- Communication
- Swallowing

In

Children and adults

# Common communication disorder in children

- Developmental language disorders
- hearing loss
- Intellectual disability
- Cerebral palsy
- Stuttering
- Cleft lip and palate
- Autism
- ADHD
- Learning disability
- Articulation disorders
- Voice disorders
- Feeding disorder

# Common communication disorder in adults

- Stroke (aphasia, dysarthria, dysphagia, dysphonia, apraxia)
- Dementia(cognitive communication disorder)
- Voice disorder
- Stuttering

# USING IPADS AND OTHER TABLETS TO ENHANCE SPEECH THERAPY

- With the increasing number of high-tech gadgets that our kids are exposed to these days, it is essential for therapists and parents to learn how to use iPads and Android-based tablets as tools to enhance the therapy process.
- While there are seemingly unlimited educational apps available to download, a few types of apps stand out, including articulation, language, and AAC apps


USING A
TABLET
FOR
Speech Therapy?
?
www.littlebeespeech.com

# Language learning


Articulation Games

# Using technologies for Augmentative and alternative communication (AAC)

- Augmentative and alternative communication (AAC) is the use of symbols, aids, strategies, and techniques to enhance the communication process. This includes sign language, various communication boards, and both manual and electronic devices help those who have trouble with communication.
- 1. **Low-tech AAC** - Any type of aid that does not require batteries or electricity. This includes things like a simple pen and paper to write messages on, as well as pictures boards, that can be carried to aid communication. On picture boards, users can point to images, words, pictures, drawings, or letters in order to communicate their message. The pointing might be done with the user's hands, other body parts, eye gaze, or a pointer held in the hands or mouth.
- 2. **High-tech AAC** - Any aid that requires electricity or batters. This includes specialized devices, software, smartphone applications, electronic communication boards, and keyboards. Many high-tech AAC devices are Speech Generating Devices, which means they can produce digitized speech when the user either types a message or presses on images, words, or letters.

# E- Stim for Dysphagia Treatment

- Neuromuscular electrical stimulation (NMES or e-stim) has been added to exercise during rehabilitation by allied health professionals for decades (Hainaut & Duchateau, 1992). In e-stim treatment, clinicians deliver electrical current through externally placed electrodes to stimulate the peripheral nerves that innervate a muscle. In sufficient intensity, this stimulation creates an action potential that travels through the motor neuron and evokes a muscle contraction.


eSWALLOW™ USA
flying
The healing hands of a caring SLP
Advanced NMES for dysphagia
The Total Package
- Stimulation Unit
- Training/Certification
- Advanced Electrodes
- Industry Leading Support

Glenys suffered a brain injury following a fall at home which resulted in weakness on the left side of the body

# Ultrasound visual feedback for articulation therapy

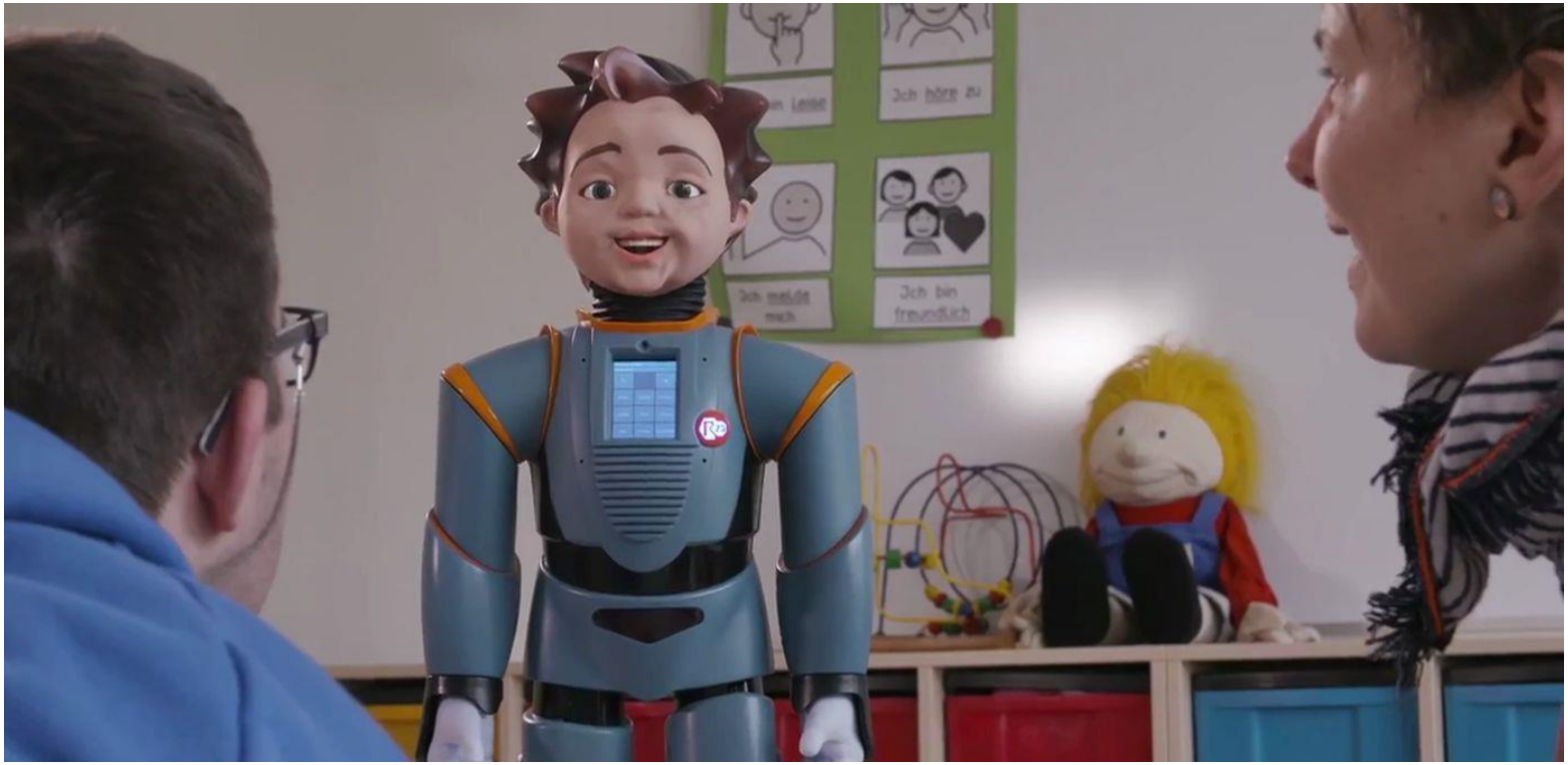
- Ultrasound treatment techniques have been developed for English lingual stops, vowels, sibilants, and liquids.
- These techniques come from a series of small n studies with adolescents and adults with severe hearing impairment, residual speech impairment or accented speech at the Interdisciplinary Speech Research Laboratory at the University of British Columbia.
- Ultrasound allows excellent visualization of tongue shape features, which is especially useful for feedback during speech (re)habilitation


Ultrasound biofeedback

# Interactive robots in autism therapy

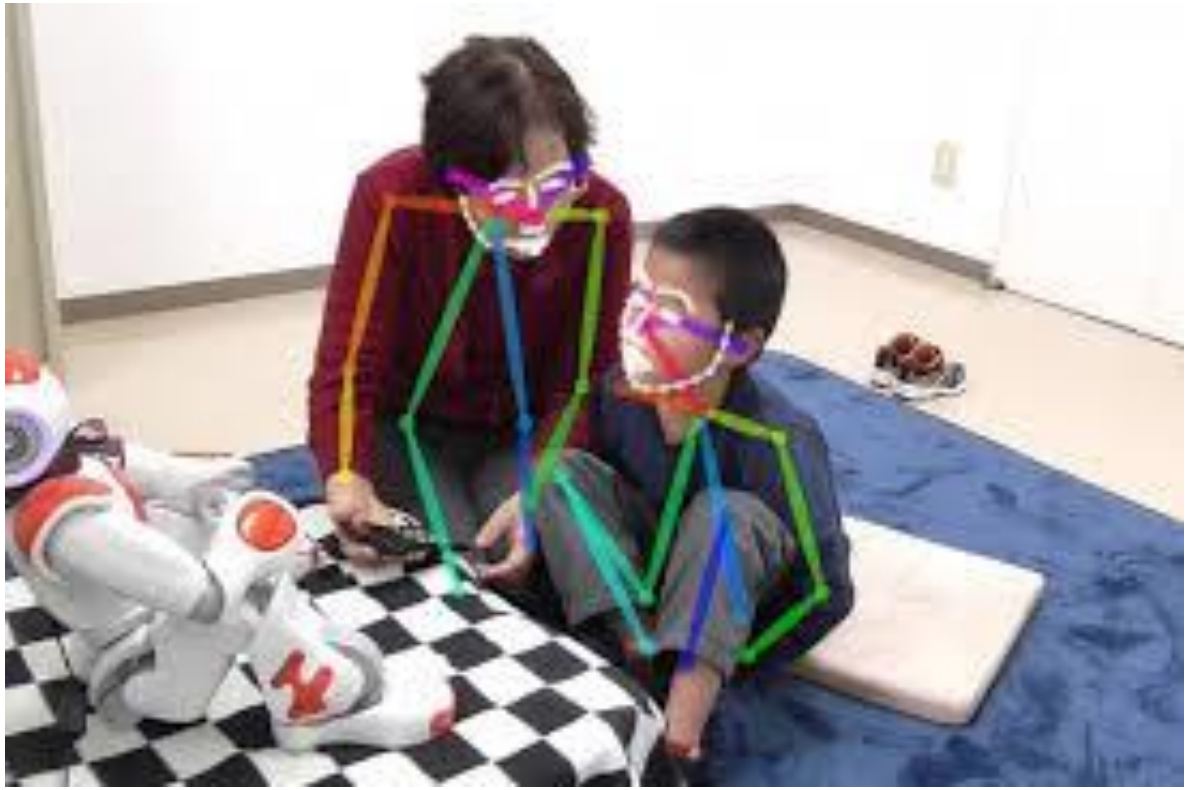
- Studies are organized into four broad categories: (a) the response of individuals with ASD to robots or robot-like behavior in comparison to human behavior,
- (b) the use of robots to elicit behaviors,
- (c) the use of robots to model, teach, and/or practice a skill
- (d) the use of robots to provide feedback on performance

# Developing a robot-assisted intervention programme for emotion teaching, powered by artificial intelligence



- Autistic children frequently have difficulties in understanding and using social and emotional cues, and researchers agree that targeting these developmental “building blocks” can have broad, long-term benefits.
- Existing research has shown promise in using robot-assisted interventions for teaching social and academic skills to autistic children, including emotion recognition. Most of this work has focused on older children in mainstream settings, and has not addressed young children or wider range of cognitive and language abilities.
- Given claims that robot-assisted interventions could present lower, less complex social demands than human-led interventions, it is particularly important to investigate their feasibility for children whose social, daily life, or language skills may present barriers to participation in “traditional” interventions


Yale
Robotics



# Treatment of Dysarthria: improving Respiratory/ articulatory/ phonatory/ resonatory systems

- applying pressure or vibration to various body parts such as the diaphragm or ribs;
- applying ice to the diaphragm;
- and electrical stimulation.


Inhale slowly for 3-5 seconds, then slowly release

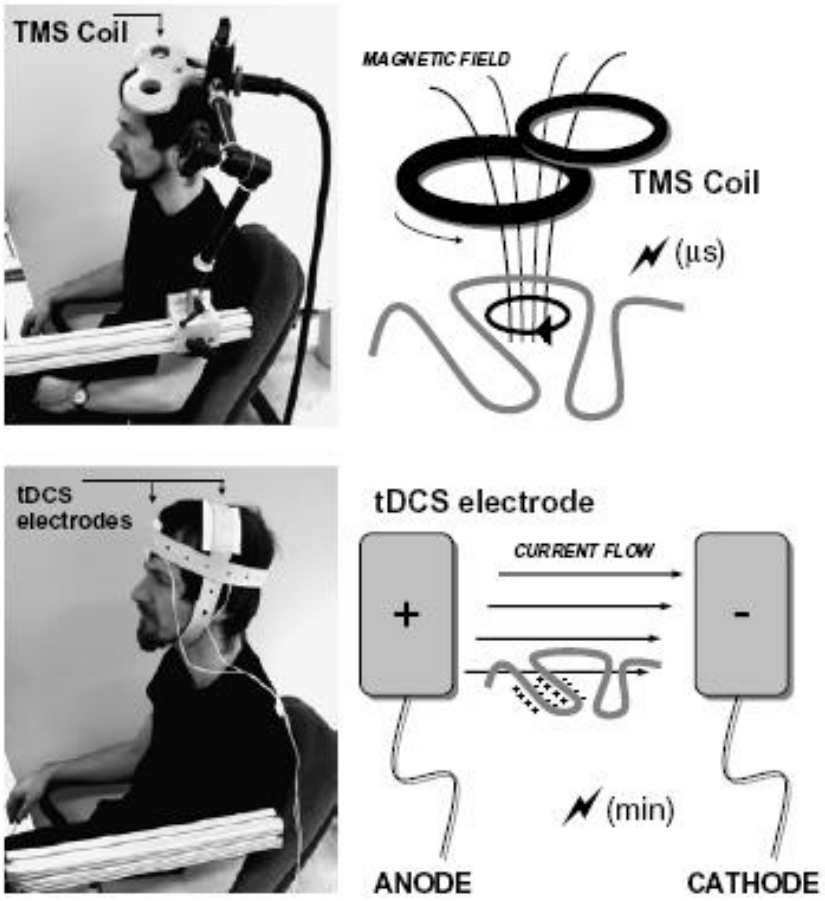
# tDCS applications

Stroke ( language stimulation/ sensory-motor)

Neurodegenerative disease

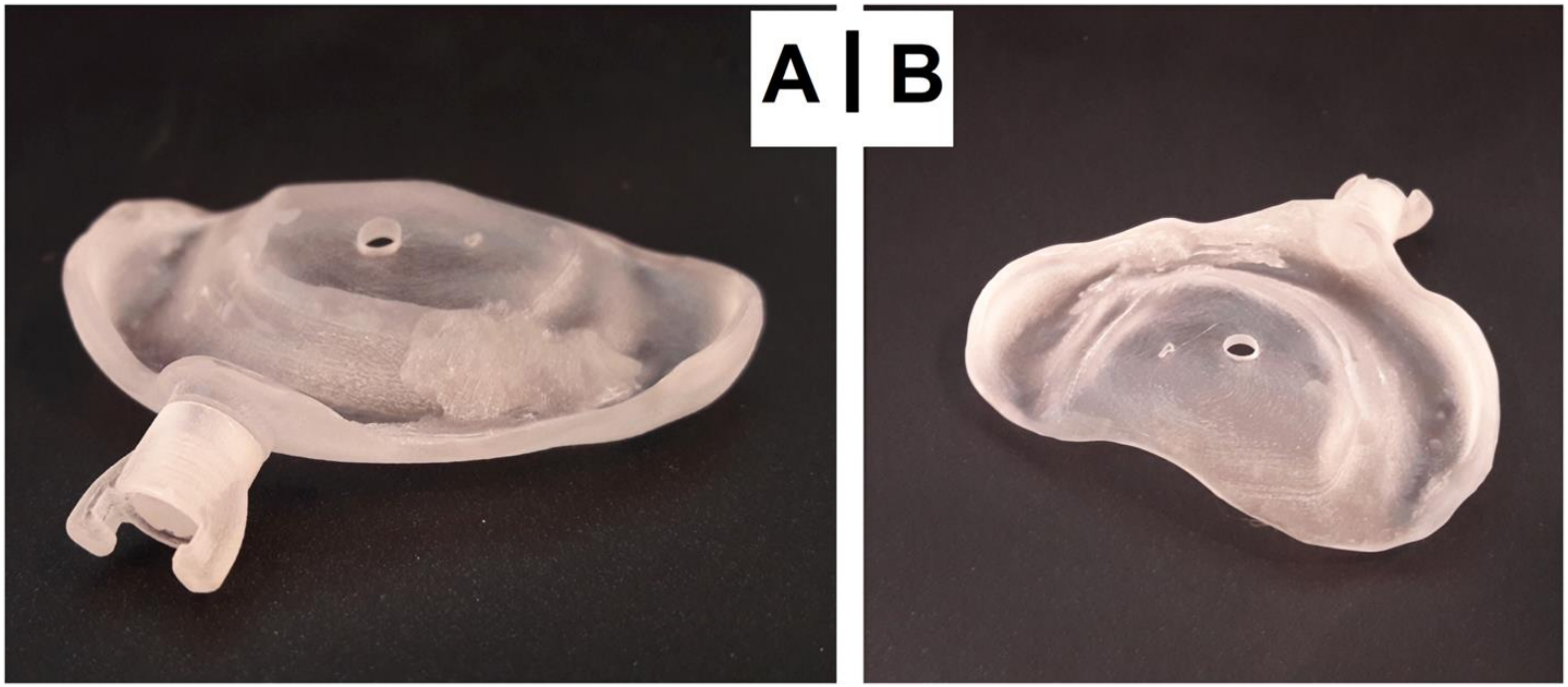
Cognitive enhancement

# TMS and tDCS


TMS Coil
MAGNETIC FIELD
TMS Coil
(µs)
tDCS
electrodes
tDCS electrode
CURRENT FLOW
+
-
(min)
ANODE
CATHODE

# USING THECHNOLOGIES IN CLEFT PALATE

- **APPLY 3D PRINTING TO TREAT CLEFT LIPS AND PALATES**
- by translating MRI scan data into a 3D printed model.


A
B

# Using DAF in stuttering

- Delayed auditory feedback (DAF) can be used two, very different ways. The delay can be set between 50 and 70 milliseconds to reduce stuttering about 70% at a normal speaking rate, without training, mental effort, or abnormal-sounding speech.
- DAF can also be used to support the fluency shaping target of slow speech with stretched vowels. For this purpose the delay is usually set at 200 milliseconds and then reduced to shorter delays (as short as 75 milliseconds) over the course of the therapy program.

# Using daf in stuttering

# Implantation of an Artificial Larynx after Total Laryngectomy

- The ability to speak and communicate with one's voice is a unique human characteristic and is fundamental to many activities of daily living, such as talking on the phone and speaking to loved ones.
- When the larynx is removed during a total laryngectomy (TL), loss of voice can lead to a devastating decrease in a patient's quality of life, and precipitate significant frustration over their inability to communicate with others effectively. Over the past 50 years there have been many advances in techniques of voice restoration after TL

# Telepractice

- Telepractice is the newest addition to the field of speech and language pathology and it has gained popularity over the past three years. It is an exciting and innovating service delivery as it helps to reach individuals in remote or rural areas where speech therapy is sometimes not an option.

# Basic Equipment for Conducting Telepractice or Online Speech Therapy

- **Hardware:**
- Computer
- Web camera with 15 FPS (frames per second) capture rate (built in or separate)
- Headset with attached microphone (analog or USB)
- High-speed internet connection (150 kbps minimum)
- **Video Conferencing Software for Telepractice or Online Speech Therapy**