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SSC 18 February 2016 Functional Listening & Speech Perception

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Scottish Cochlear Implant Programme

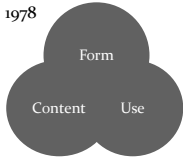
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Why is listening important for speech production?

- Good models of speech lead to good production of speech
- Auditory pathways working well
- Stimulation of speech sounds necessary to imprint target on developing brain
- Children and adults who have better phonological memory skills acquire language more rapidly than children and adults who are less able to remember novel auditory stimuli (Gathercole, 2006)

- Remember Bloom and Lahey 1978



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Pre Requisites for Optimal Auditory Development

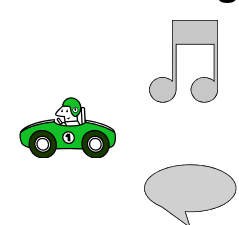
- Carers understand what is an appropriate listening environment and talk to the child
- Child is aware of sound and is able to detect it
- Enabling carers to make activities developmentally appropriate for the child's chronological and hearing age
- Child is immersed in good models of listening and speech
- Remembering rate of progress will differ depending on child's abilities prior to CI
- And their own general development
- **Take Home Message -Wearing equipment all day, every day (hearing aids, cochlear implants)**

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What is Functional Listening?

- Music
- Environmental sounds
- Speech sounds
- Words
- Phrases
- Conversation




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What is Speech Perception?

- Intonation and Stress, Rhythm and Rate
- Pitch
- Phonology
- Morphology
- Semantics
- Grammar
- Conversation?
- Telephone conversations



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An Auditory Programme

- One size doesn't fit all
- Clarify which skills you are working towards
- You may be able to work with more than one skill at a time
- Start at the beginning
- Fill the gaps
- Ensure success to maintain motivation

Take Home Message – Everyone has a role in child's language development

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So where is the beginning?

- Before switch on?
- Detection of Sound
- Discrimination of sounds
- Attaching Meanings
- Memory and Sequencing
- Advanced Listening
- After switch on?
- Detection of sound
- Discrimination of sounds
- Attaching meanings
- Memory and sequencing
- Advanced listening

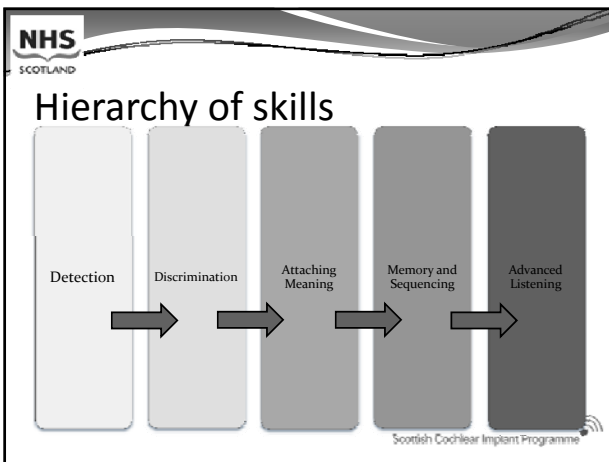
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Remember the Hierarchy

- **Detection**
- **Discrimination**
- **Identification**
- **Comprehension**

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What to Expect - Detection

- More alert
- Increasingly vocal
- Response to music – begins to sway
- Response to carer’s voices
- Environmental sounds – dogs barking, door banging
- Recognising voices – that’s my mum!
- Recognising own name
- Increased range of speech sounds used – vowels and consonants
- Response to emotion of voice

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How to measure detection

- Infant Listening Skills Assessment (ILIP) from NEAP – gives a profile of ability ranging from never observed to established skill
- Meaningful Auditory Integration Scale – Parent/Caregiver Questionnaire
- Developmental Scales – Cochlear Integrated Scales of Development, Monitoring Protocol, Pre School Language Scales

Take Home Message – Detection of sound can be subtle in young children

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Examples of Detection

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What to expect - Discrimination

- Is that mum or dad's voice? ○○○○○
- Am I going out now?
- Or is it time for food?
- Are they doing boring talking or is it dancing time?
- Ok now we're getting serious
- You want to know if it's a dog or a cat?
- A bus or an aeroplane?
- Is it my turn to talk now?

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How to measure discrimination

- Ling Sounds
- Why ah, oo, ee, sh, s, m (and no sound)?
- Dr Daniel Ling (1926-2003)
- Familiar speech sounds
- Represent the speech spectrum from low to high
- A tool for professionals and parents to know what sounds the child can hear
- 6/7 sounds as a simplified version for all ages

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Ling 6 Sound Check

- Daily check of listening (not speech in early stages)
- Needs to be done consistently to note any changes
- Information about hearing ability and CI function
- In the early stages only detection is required
- Later a child should be able to identify and discriminate between sounds
- Don't forget to use 'no sound' too!

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How to measure discrimination

- Hear Say Pack (STASS Publications) by Kathryn Gander (TOD) & Gill Close (SLT)
- Suitable from emerging language level up to a 3 word level
- Uses stereotypical pre-words
- Books and activities that are very repetitive
- Ideal for language delay as well as hearing impaired
- Programme for teaching 40 nouns, 8verbs, +12 adjectives
- Record sheets available

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How to measure discrimination

- Family Names and common objects
- Photo Albums (or phone or tablets etc)
- Mr Potato Head
- Learning to Listen sounds
- Hear Say programme
- Ling Sounds

Take Home Message – Check what child can do both with and without visual cues

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Example of discrimination

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Attaching Meanings

- Associates meaning to sounds and words
- Family names
- Common phrases
- Animals
- Body parts
- Transport
- Action words
- Describing words

POPPY'S LOVE RABBIT
PRINCE PLAY IN TODAY
LOVE NANNY

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What to use

- Routine Activities
- Family Album
- Mr Potato Head
- Toys
- Games
- Child's favourite activity

Take Home Message – Expand child's word knowledge in everyday activities

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Programmes

- Listen, Learn, Talk
- STEPS
- Small Talk
- Chit Chat
- Language Steps
- LEAPing on with Language
- Baby Beats
- Musical Journey
- Otto's World
- Hear Say
- Pic Toys
- NDCS Working Memory
- NDCS Secret of Words
- Rhodes to Language
- Snap Dragons
- Auditory Adventures

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Memory and Sequencing

Basic skills

- 1 item from 3 (from 13 months) - 'The cat says meow'
- Following one step directions - 'clap your hands'
- Moving from word representations to real words
- 2 items (from 19months) Find the dog and the sheep/
The boy is sleeping / Get a small fish
- 3 items (from 31 months) - important to include sequencing by now and encourage child to remember in order - 'Get the ball, the book, and the car'
- Nursery Rhymes are good - Humpty Dumpty sat on the _____?

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Memory and Sequencing

Advanced skills (31 months plus)

- 2 part instructions - 'get your shoes and give them to Daddy'
- 3 part instructions - 'open the box, get the dolly and put her to bed'
- Begin to include grammatical features - 'put the cow under the chair'
- Increase auditory memory to 4 then 5 items
- Use memory in daily routines - 'we need to get eggs and milk to make pancakes. What do we need to get?'

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Memory and Sequencing

Advanced skills for school readiness

- Storytelling
- Music
- Leading into Literacy
- More later

"Tell me a story....."

"Start the day with a song"

"Music and language share the neural pathways in the brain"
(Spray and Meyer, 2014)

Take Home Message - Lots of practise listening to good speech models. Speech in leads to speech out.

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Example of memory and sequencing

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Advanced Listening

- Able to learn new vocabulary through everyday activities and incidental hearing
- Can cope with recorded language
- Remembers longer instructions and can work with complex linguistic vocabulary; "If I miss the bus then I will be late for my appointment at the dentist's"
- Listens to a story and can tell it back to someone in order

Take Home Message - Allow time for oral skills to progress before expectations are high for literacy

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Example of advanced listening

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Speech Perception

Copying what is heard without a visual cue

- Suprasegmentals – oh oh
- Pre-words – moo, baaa, beep-beep
- Real words – baby, no, daddy, mum
- Speech sounds
- Phrases
- Sentences (5 word level achievable by approx 3years of age in NH children)

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Stages of Listening and Talking

Birth	Listening	Talking
	Auditory awareness Attention Localisation Discrimination Auditory feedback Monitoring of voices Sequencing Auditory processing Understanding	Crying Cooing Smiling Laughing Vocalising Babbling Imitation Jargon First words 2 word combinations Phrasing Sentences Conversation Nearly perfect grammar
6 years	Higher level understanding	

Source: Estabrooks, Warren, Cochlear Implants for Kids, 1998
Table adapted from Pollack, 1985

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Normal Development 6-12months

- Listening attentively
- Smiling at people
- Babbling
- Looking at a speaker
- Making noises to get your attention
- Understanding a few words

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Normal Development 1-2years

- Copying sounds and words
- Using 20-50 words
- Attention span increasing
- Understanding words and phrases
- Missing ends off words
- Using only some speech sounds; p, b, m, w

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Normal Development 2-3years

- Using up to 300 words
- Asking lots of questions
- Making short sentences
- Understanding longer instructions
- Expanding their range of speech sounds
- Reducing longer words like banana to nana
- Not using consonant clusters yet

Take Home Message - the earlier children progress their spoken language the better their speech production will be!

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Red Flags

- By 1 month post CI - wearing CI not established
- By 3 months post CI - no awareness of voice + no increase in child's vocalisations
- By 6 months post CI - no response to carer's voice, no babble
- By 9 months post CI - not alerting to own name, not looking at speaker, no interest in new sounds
- By 1 year post CI - not using voice to gain attention, no awareness when CI system not working
- By 2 years post CI - Less than 5 word attempts used expressively

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Assessments

• Listening Profile	• MacArthur-Bates Communicative Development Inventory
• IT-MAIS	• EarlyCaLL
• MUSS	• Common Phrases Test
• CAP ₂	• CVC Words
• SIR	• GASP
• PLS-5	• Sentence Repetition
• ISD	• Articulation & Phonology
• NAMES	

Take Home Message - Share assessment results with others involved with child's care

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Take Home Messages

- Wearing equipment all day, every day (hearing aids, cochlear implants)
- Everyone has a role in child's language development
- Detection of sound can be subtle in young children
- Check what child can do both with and without visual cues
- Expand child's word knowledge in everyday activities
- Lots of practise listening to good speech models. Speech in leads to speech out.
- Allow time for oral skills to progress before expectations are high for literacy
- The earlier children progress their spoken language the better their speech production will be!
- Share assessment results with others involved with child's care

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