

# Queen Margaret University research helps children with Down's Syndrome

*Pioneering research helps Down's syndrome children improve speech*

University researchers in speech and language sciences are taking their expertise out to schools to help children with Down's syndrome improve their communication skills.

The project involves the use of pioneering visual feedback technology to help children with Down's syndrome, between the ages of six and ten years of age, with their speech communication skills. The research project will train school learning assistants to assist children with their speech improvement whilst still attending their own school. The project builds on pioneering speech and language therapy technology developed by researchers at Queen Margaret University, Edinburgh.

Down's syndrome is the most common genetic cause of mild to moderate learning difficulties, affecting 1 in every 1000 children born. Children with Down's syndrome tend to have poor speech skills. Their difficulties with speech production can reduce their speech intelligibility which can lead to them being disadvantaged in a number of areas of life.

Dr Sara Wood, Speech and Language therapist at Queen Margaret University, explained: "Good communication is so important in modern society. If people are struggling to communicate effectively, this can affect their educational progress. Difficulties with communicating successfully will affect the formation of friendships and integration into the wider community. These speech difficulties often persist into adulthood, which may then limit life opportunities including

employment.”

She continued: “Conventional speech and language therapy relies on auditory feedback which the person with Down’s syndrome cannot always use to change their speech”.

In response to this, the research team at Queen Margaret University has been exploring how its cutting-edge speech technology, combined with speech therapy, could be used more effectively to help children with Down’s syndrome.

The University’s earlier research identified that children with Down’s syndrome responded extremely well to visual feedback. Therapists had recorded significant improvements in children’s speech when they used Electropalatography or EPG for short. This new research project sees the rolling out of this EPG therapy which will now be used in some schools in Lothian.

Professor Jim Scobbie, Director of the Clinical Audiology, Speech and Language Research Centre at Queen Margaret University, explained: “Finding out exactly what the tongue is doing inside the mouth has traditionally been very difficult. However, QMU has developed a range of technologies to view and record tongue movements.”

EPG is a technique which is not yet routinely available in NHS clinics. EPG records where and when the tongue makes contact with the roof of the mouth during speech. It can be a particularly useful means of helping some children with speech difficulties to improve their speech because it provides visual feedback to the child, which is not ordinarily available, and does not rely purely on what the child hears. The technique is proving particularly helpful to children with Down’s syndrome, as they are known to respond well to visual stimuli.

Professor Scobbie said: “It has been estimated that up to eighty percent of children with Down’s syndrome have hearing

impairment which means that they find it more difficult to correct their speech by just repeating what they hear. EPG allows the child to use visual feedback, showing in real time where their tongue is touching their palate inside their mouths, and they can learn where to place their tongue to create the pattern appropriate for a specific sound.”

EPG requires that an artificial palate, like a dental plate, be custom made for the child. The child wears the palate which contains 62 electrodes that detect the child’s tongue movement on the roof of the mouth when they speak. These can be analysed and compared to typical speech patterns to help the speech and language therapist identify more accurately errors in the child’s speech. During a session, the therapist also wears a palate that models the correct patterns to the child. The child can clearly see the images which the tongue makes on the computer screen. The child tries to copy the therapist’s tongue movements by trying to recreate the same pattern which shows on the computer screen. The child can then view their own tongue pattern and compare this to the pattern made by the therapist. This visual stimulus can be incredibly effective in helping the child achieve more normal sounding speech.

Earlier speech projects specifically for children with Down’s syndrome required them to travel to Queen Margaret University to access EPG. However, travel issues and time spent out of school prevented some children from participating in the earlier research programme.

Dr Wood explained: “This new project will give 20 children with Down’s syndrome easier access to EPG technology by taking it out of the laboratory and into schools across Lothian. Queen Margaret University will train learning assistants in schools to deliver the specific therapy which we hope will significantly improve the children’s speech production.”

Dr Wood continued: “We know that children with Down’s syndrome have problems with memory and that learning requires frequent

repetition to be effective. Children participating on the project will undergo detailed speech analysis with EPG. They will benefit from short bursts of therapy, maybe just 10 – 15 minutes at a time, but this will take place every day over a 12 week period. This means that the children will receive more intensive intervention than ever before. It will not only be tailored to their particular learning ability, but it will be integrated as part of their overall learning package at school.”

Speech and language therapists from Queen Margaret University will then follow up this therapy by going out to the schools twice a month to monitor the teaching input of the learning assistants and measure each child’s progress.

Dr Wood said: “By taking the technology out to schools and equipping learning assistants to use the technology, we are aiming to provide real solutions for children with Down’s syndrome. By targeting younger children than in our earlier study, we are hoping to correct speech problems before they become entrenched.”

Professor Scobbie concluded: “We believe that this research project could have a significant impact on the quality of life of children with Down’s syndrome by helping improve their speech communication. This could help them to access education and engage more successfully with social activities. Ultimately, we hope this work will help pave the way to a much brighter future for people with Down’s syndrome.”

The two year project, which began in April 2012, is supported with a £148k from the Nuffield Foundation.