Self-Contained In-the-Ear Device to Deliver Altered Auditory Feedback: Applications for Stuttering

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Stuttering is a problem that affects sixty million people worldwide regardless of language group, age or sex. However, the onset of stuttering usually occurs between the ages of two and four and occurs four times as often in males than females. Also, a person who stutters often has relatives that stutter.

The cause of stuttering is unknown and, until recently, it was believed that it was a psychological problem. Recent research has shown it is actually a physical problem. A person who stutters does not hear things the way everyone else does.

Previously, the methods used to treat a stuttering problem were counseling, acceptance of the problem, and traditional speech therapy. Traditions stuttering workshops consist of over 120 hours of work over a three-week period. The device researched in this paper has immediate results.

There are three ways to inhibit stuttering. They are: Delayed Auditory Feedback (DAF), Masked Auditory Feedback (MAF), and Frequency-Altered Feedback (FAF). DAF and FAF have been shown to be more effective than MAF. The development of a prosthetic device using these two techniques has been proven to be important. This device must meet two criteria: it must be acoustically invisible and it must be cosmetically appealing.

The working part of the device is the TOCCATA™ Digital processor System. It was chosen due to its flexibility to implement the DAF and FAF algorithms while maintaining low-power consumption, high fidelity and small size. The device was also constructed in both an in-the-canal model (ITC – middle) and a completely-in-the-canal model (CIC – right). While the models are similar in their methods, the ITC also includes a volume control.

This device also includes a fitting software, so it may be adapted to anyone. The software allows one to adjust the FAF, DAF, linear gain control, and independent eight band 20 dB gain controls. One may use either DAF, FAF or a combination of the two.

There are many facts that make this device appealing. First, it is cosmetically appealing to the user. Second, the effect shown in laboratory settings shows positive results. In a study, 89% of people who stuttered had positive results. The downside to this device is it may result in distraction when worn in unfamiliar settings. This less of a problem with monaural opposed to binaural fittings.

References:

Stuart, Andrew, et al. "*Self-Contained In-the-Ear Device to Deliver Altered Auditory Feedback: Applications for Stuttering*". Annals of Biomedical Engineering. Vol. 31, February 2003.
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