CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)
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Project Number
J0301

Project Title
Tongue Untwister

Abstract

Objectives/Goals
Speech disorders such as Apraxia and Dyspraxia are very common in our society. Unfortunately, they have been known to affect more than just one's ability to communicate verbally. Difficulty speaking can lower confidence and self-esteem. It can even hurt one's education. The purpose of this engineering project is to create a therapeutic device that will treat these conditions faster and more effectively than has been done to date. By using the proper tool, people who suffer from these disabilities will be able to improve on their speaking abilities. The goal of this project is to create that tool.

Methods/Materials
After the device has been inserted into the mouth, a series of different exercises are performed. These tasks emphasize pushing a lever up and down with the tongue for certain amounts of time. The tongue is fundamental in executing correct speech, so these exercises are designed to strengthen the muscles that are necessary for speaking. While following the instructions, and using the device daily, I am confident that improvement will be seen.

Results
Five different versions of the device were created, each an improvement on its predecessor. The purpose of the device is to show the user his own tongue's muscle strength and to guide him along the path of improving it. The device has the ability to send its data to Excel and put the measurements straight into easy to read scatter graphs. These charts can then be compared with previous trials to track progress. When testing a person without any speech problems, it was clear that he had no issues completing the tasks given to him. The same exercises were given to the patient with a speech disorder and proved to be much more challenging. The device does it's job very well and has room to be optimized.

Conclusions/Discussion
I have proved that a device can be created to help those with speech disorders. One of the people tested has a background of almost ten years of speech therapy. Even after the first seven days of using the device, improvement was seen in the patient. The testing hasn't been completed yet, but more and more progress can be seen every day. With continued use I am sure that the user will be able to talk as clearly and precisely as those without speech disorders.

Summary Statement
A therapeutic device was created to treat people with speech disorders and measure their improvement.

Help Received
Marlowe Fischer (Speech Therapist) provided information on modern speech therapy; Sarah Rines (Science Teacher) provided science fair advice; 5th prototype was 3D printed by Incept3D.