Feb 15th Presentation

Slide 1

* Currently there are 7 million people in US that are orthosis users.
  + 20% of them are SCI patients, the rest of them are patients of other neuromuscular diseases, such as stroke, cerebral palsy.
* Particularly in SCI, most of them are young to mid-aged adults, people who are still studying or working before they had the injury.
  + Injury completely changed their life.
  + They are all eager to regain motor control.
  + As mentioned, they are particularly eager to regain control of their upper extremities.
* So let’s take a look what is on the market right now.

Slide 2

* 5 main biotech companies in US dominating 60% of the market.
  + Main product: knee braces and wrist braces
  + Only one of them are selling dynamic orthosis for everyday usage.
* Many research done on developing better orthosis or exoskeleton
  + Harvard University developed a soft robotic glove that could produce complex, precise finger motion.
  + However, they are still having three main problems hindering them to enter the market and discouraging customers to buy them.
* Expensive
  + Using costly material
  + Require complicated manufacturing process.
  + High maintenance
* Complexity
  + sophisticated device and users have difficult time understanding and utilizing it
    - require lots of training and fitting.
  + built to maximize engineering capability instead of user experience.
* Not viable for daily activities.
  + Design for stationary movement.
  + Device is too bulky for everyday use.

Slide 4

* As mentioned, using an EMG sensor to collect signal from user’s choice of muscle.
  + It could be any skeletal muscle that user is comfortable to use
  + In this case, we are using brachioradialis
    - Strong forearm muscle used
    - Involved in many forearm motion, including grasping.
* Play Video
  + Capturing user’s EMG signal from her brachioradialis and translating it into binary control signal.
  + Indication light?

Slide 5

* To illustrate how we capture EMG signal, we downloaded some sample data
* We allowed the participants to perform control exercise with her brachioradialis
  + We set a threshold (red horizontal line) using signal mean and standard deviation, so that it will be depended on the strength of user’s signal.
* Once the signal hits the threshold, it produces an on signal and continues to stays on until the signal hits the threshold again.

Slide 6

* Currently we are focusing our design on one particular patients, Eric
* Through iterative testing, collaborating with physical therapists and other patients
* In terms of product development, continue to improve the functionality of the device.
* In terms of business development, join the business competition to seek expert opinion and further funding and potential investors of the device.
* Ultimately, we are hoping we can expand this technology to a greater population.