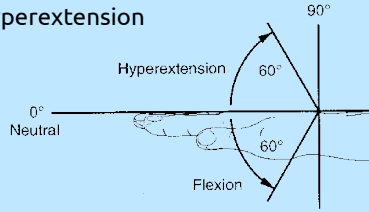


M-Brace : Monitoring Brace

Group #11 Simon Fraser University April 9th, 2018

Introduction

- Goal: prevent repetitive motion syndrome
- Performing activities that require repeated movement of the hand and wrist can result in pain and loss of strength in the hand
- Monitoring sudden wrist flexion and hyperextension



Solution

- Flexible wearable brace with sensors to monitor strain on the palm and wrist
- Phone app alerts user of poor posture or overuse of hand and wrist
- Powder test determined the ideal type of sensors and their placement

Consultants:

Dr. Andy Hoffer, Dr. Shahram Payandeh,
Dr. Bonnie Gray, Neha Chhatre, Shaun Fickling

Hardware/Firmware Design

- Force Sensing Resistor will be placed under the distal transverse arch
- Flex sensor or hall effect sensor will be placed on the wrist to measure flexion
- Real time data transmission to the computer

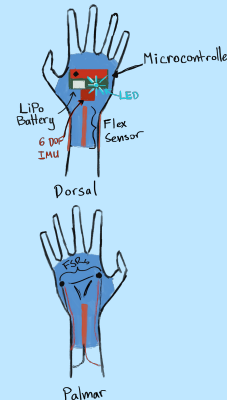
Software Design

- M-Brace app displays current data from the brace component via line graph
- TCP connection used to pass data from host computer to emulated iPhone running the app



Future Work (Prototype)

- Improving on user comfortability and design robustness by using conductive fabric
- Detecting hand position and orientation
- Using more customizable microcontroller
- Connecting hardware to phone app via Wi-Fi
- Fabricating a customized PCB design
- Transmitting real-time data directly from wearable device to companion app
- Updating data automatically
- Allowing customizable app notifications
- Improving upon visuals for displaying data



Conclusion

M-Brace is a comfortable solution to monitoring the development of repetitive strain injuries in the hand and wrist.

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References

- N. Hamilton, W. Weimar, and K. Luttgens, Joint Range of Motion. The McGraw-Hill Companies, Inc., 2012
- R. Gagne, "Repetitive Strain Injury (RSI)," Fir2WRK Clinical Education, vol 1.11, 2010.
- D. Norman, "The Design of Everyday Things," 5 November 2013. [Online].