# Do Phone Grips Really Work?

Human Factors and Ergonomics
Project 3
Team 2

## 1. Background

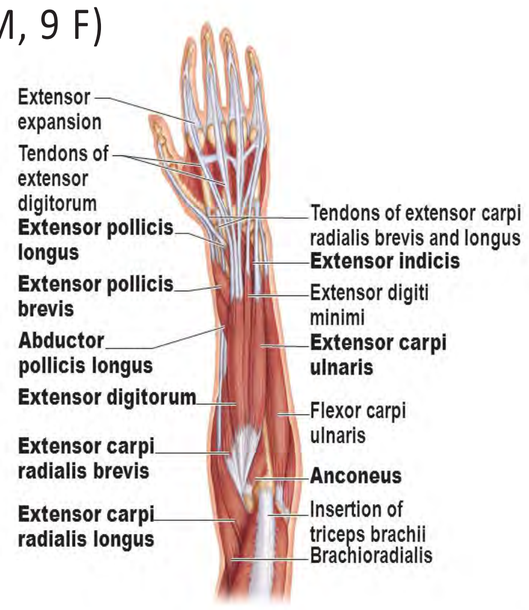
- Ever increasingly, people are spending more and more times on their phones. Such long hours on their phones can create strains onto wrists and hands. To provide more comfort and prevent arm/hand related injuries, various phone grip tools have been designed.

- We wanted to to find the relationship between phone grips and comfort/injuries through data that was measurable. We wanted to see if, by using Electromyography(EMG), we could prove that such tools provided aid and comfort for users.

***HYPOTHESIS***: 'The use of either phone grip tool will reduce the amount of strength applied from various hand and arm muscles when using smartphones.'

## 2. Experiment Method

**Location**: Ebenezer Hall (2nd, 3rd Floor)
**Subjects**: 18 HGU Students (9 M, 9 F)
**Time**: 25 minute intervals
**Tools**: - Samsung Galaxy S7
- 1 'Jelly' Case (w/o tool)
- 1 'Band' Case
- 1 'Tok' Case
- Noraxon Telemyo DTS




### *Procedure:*

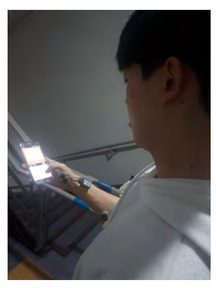
EMG sensor pads are applied to the 4 various muscles on their dominant arm.

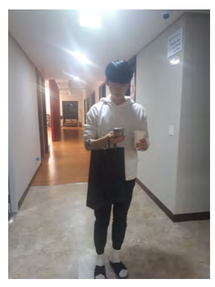
(Task 1) Standing still + Typing

(Task 2) Walking up stairs + Typing

(Task 3) Holding handful of items + Walking + Typing

(Task 4) Lying down + Watching Video

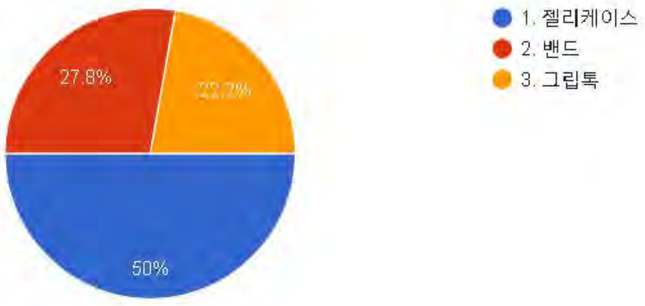




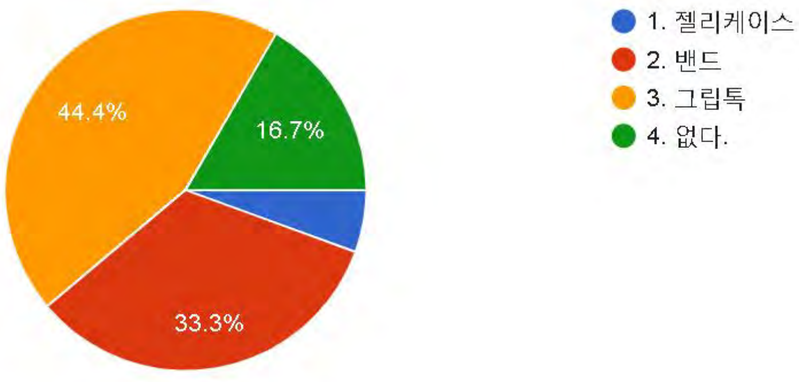
## 3. Results

### *Survey:*

(Prior to Experiment) Which case looks most comfortable?




(Post Experiment) Which case would you consider buying?




| | 'Jelly' Case | 'Tok' Case | 'Band' Case |
|---|---|---|---|
| Task 1 (Standing Still + Typing) | 3.3 | 3.3 | 3.6 |
| Task 2 (Walking Up Stairs + Typing) | 3.2 | 3.2 | 3.6 |
| Task 3 (Holding Various Objects + Walking + Typing) | 2.7 | 2.1 | 2.5 |
| Task 4 (Watching video while lying down) | 2.6 | 3.7 | 4 |

### *EMG:*

**Percent Change in Muscle Use Compared to Usage With the Regular 'Jelly' Case**

| | | T1 | T2 | T3 | T4 |
|---|---|---|---|---|---|
| 'Tok' Case | M1 | 7.0% | 2.2% | 6.5% | -27.3% |
| | M2 | -1.0% | 1.2% | 0.6% | -0.3% |
| | M3 | -1.2% | 0.8% | 1.2% | -3.9% |
| | M4 | -1.1% | 3.8% | 4.0% | 3.0% |
| 'Band' Case | M1 | 21.4% | 12.2% | 41.4% | -23.2% |
| | M2 | 3.2% | 0.1% | 5.5% | -0.6% |
| | M3 | 2.1% | 1.8% | 4.4% | -3.2% |
| | M4 | 3.8% | 3.7% | 6.2% | -1.7% |

## 4. Conclusion

**In response to the first question of which case looked most comfortable, the majority of the subjects chose the regular 'Jelly' case. We believe that this is so due to the fact that the subjects haven't been accustomed to exactly what the other gripping tools do or what benefits they might have.**

**This begs the question where if we had chosen participants who have formerly heard of and/or used certain gripping tools, would the survey responses have been different?**

**We must realize that there is a difference between what our muscles unconsciously do and how we cognitively perceive things to be. Although in reality our muscles may be working harder, our cognition may believe that the use of a certain gripping tool provides more comfort and ease. This now becomes a question of whether we find objective data to be more important than subjective data.**

**Prior to testing, we hypothesized that the various gripping tools would obviously provide more ease and less strain to the muscles of the users. However, we were surprised to see that in terms of EMG readings, the results do not necessarily support the claims of the hypothesis.**

**The significant decrease in muscle usage while performing Task 4(lying down and watching a video) infers that the gripping tools are of great aid for using the phone while lying down. However, the gripping tools while standing or moving about may not be more comfortable but instead be of a small hindrance.**