A Novel Method to Restrict Portion Sizes

Steven Dai, Isabel Mangaoang, Jena Srikanth
2015 SIMR Bioengineering Bootcamp, Stanford University

Introduction

Obesity is a serious problem prevalent in the United States where 68.5% of adults are overweight or obese. A major cause of this problem is excessive portion size; in fact, a recent study suggests that overeating is almost singlehandedly to blame for the obesity epidemic. However, despite the severity of this problem, the current methods for reducing portion sizes (namely, diets and bariatric surgery) rely on a sudden/draastic reduction of food intake for patients. This is jarring for patients, which may contribute to the fact that 80% of people who lose weight eventually gain it back within 2 years. Therefore, a method is needed that will allow patients to steadily transition into eating appropriate portion sizes.

Bariatric Surgery
- Huge Commitment
- Forces smaller portions
- High chance of complication

Crash Dieting
- Sudden drop in caloric intake
- Low rate of compliance
- Low success rate

Competitor Analysis

MUST HAVES
- encourage adults to stay within the BMI range of 5th-85th percentile
- travel friendly (<1 ft³ in volume)
- easy to understand - average adult takes <2 min. to learn
- affordable (<$30)
- increase compliance to weight loss regime by 50%
- long-term use (usable for at least a year)
- adaptable to multiple users

NICE TO HAVES
- encourage people of all ages to stay within the BMI range of 5th-85th percentile
- aesthetically pleasing to ½ of consumers (polls)
- average 10 year old kid can understand it
- affordable (<$15)
- increase compliance to weight loss regime by >90%
- travel friendly (<1 ft³ in volume)

Need Specifications

Materials
- 3D printed components (adjustment mechanism, ridges)
- nylon 42 FG
- memory foam
- 64 oz. plastic container
- plastic bag
- SolidWorks/FDM 3D printer
- Bandsaw

Method & Materials

Methods
- SolidWorks/FDM 3D printer
- Bandsaw

Concept Analysis

Initial: 3.30 cups (781.34 ml)
Final: 1.39 cups (328.40 ml)

Future Work

1. Create a support app that will provide recipes, nutritional information, and fitness logs to users.
2. Modify the dimensions of our container to accurately represent the desired portion sizes.

Acknowledgements

Thanks to the Stanford Bioengineering Department, Stanford SIMR program, Dr. Ross Venook, the Product Realization Lab, mentors (Derek Croote, Ben Kotopka, Akshay Maheshwari, Colleen Rhoades), and TAs (Courtney Gegg, James Kintzing, Allison Mateo, Elaine Ng, Heather Rogan). Thank you to the Amgen Foundation for supporting the SIMR program.

References