

# StabiliWare

An Assistive Eating Device for Individuals with Parkinson's Disease

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## **Problem Statement**

Individuals with Parkinson's disease struggle with eating because of tremors. Tremors are a common symptom of Parkinson's disease affecting around 80% of those who are diagnosed (American Parkinson's Disease Association, 2017).

# Methodology

## **Engineering Goal**

The goal is to develop a device to aid those with Parkinson's in eating without spillage. This proposes a device to mitigate the effects of the tremors by reducing spillage. This will allow those individuals diagnosed with Parkinson's to develop a sense of independence.

## Requirements

Table 1. Table of Level 1 and Level 2 Functional and Physical requirements

#### Initial Sketches

Brainstorming and rough sketches of potential designs

## CAD Design

Modeling of prototypes in 3D in OnShape

### Prototyping

Printing out of the prototypes on the 3D printer using Fusion

#### Integration of components

Integration of external components, like my spring into the spoon

#### **Testing and Iterations**

Meeting with clients to test the spoon with various foods

## Current Design

#### **Current Design: Rotational Spoon** Utilizes two bowls where the smaller inner bowl spins when a button is pressed, similar to a

Category	Level	Requirement	Swivel Spoon	Motorized Spoon	Rotational Spoon
Functional					
	1	The device shall allow the user to lift food from their plate to their mouth with minimal spillage.	Yes	Yes	Yes
	2	The device shall allow the user to hold liquid without leaking.	Yes	Yes	Yes
	2	The device shall be dishwasher safe.	Yes	Yes	Yes
	1	The device shall be safe to use.	Yes	Yes	Yes
	2	The device shall be easy for the user to grip.	Yes	Yes	Yes
Physical					
	1	The device shall be made of a food-safe material.	Yes	Yes	Yes
	2	The spoon shall be less than 8 inches in length.	Yes	Yes	Yes
	2	The device shall be able to hold at least 0.5 tablespoon of material.	Yes	Yes	Yes
	1	The device shall discreet and look like a normal spoon.	Maybe	Yes	Yes

## 3 Designs

Figure 1. CAD of swivel spoon

#### **Design #2: Spinning spoon**

Three main components: an

#### **Design #1: Swivel Spoon**

Utilizes a small bowl inside the larger bowl where the smaller bowl rotates to counteract the shaking of the tremors

Figure 2. CAD of spinning spoon

Two components: outer and

inner bowl. The outer bowl

using a motor and button.



uses a system of gears and shafts to accomplish this.

Study 3

**Differences** in

time to eat

(plate to

mouth)

trigger ice-cream scooper. It

## **Design Studies**

<u>Study 1</u>	Study 2	
Determine	Measure	14
comfortability	changes in	
to hold and	amount of	
normality	spillage	

Figure 4b. CAD of overall

spoon design

Figure 4a. CAD of gear

embedded in spoon

## Conclusion

Created a device that successfully enables users to eat with minimal spillage when experiencing tremors. This allows those with Parkinson's to be independent and have a healthier life.

inner, middle, and outer bowl. The middle bowl rotates to cover the smaller bowl using a motor and button.



Figure 3. CAD of motorized spoon with button space

## Future Work

- Comprehensive further testing
- Reduce weight
- Reduce size of the handle to ensure spoon looks more 'normal'

American Parkinson Disease Association. (2017, July 15). Tremor in Parkinson's. APDA. https://www.apdaparkinson.org/what-is-parkinsons/symptoms/tremor/