# Introduction

The Knife Guide Arthritis Aid is a handle that attached to the back of a knife that allows a user to use both hands and requires less grip strength for the same amount of control. It is designed for users with arthritis that have difficulty gripping the handles of knives.

# Research

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Image | Price | Link |
| Commercial | | | |
| Easi-Grip Arthritis Fork Knife |  | $17.95 | [Link](https://www.arthritissupplies.com/easi-grip-arthritis-fork-knife.html) |
| Swedish Serrated Knife |  | $45.95 | [Link](https://www.arthritissupplies.com/swedish-serrated-knife.html) |
| DIY | | | |
| 3D Printable Knife Guide Arthritis Aid |  | N/A | [Link](https://www.myminifactory.com/object/3d-print-knife-guide-arthritis-aid-77506) |

# Requirements

## Goals

|  |  |
| --- | --- |
| G01 | Create a handle that allows arthritis uses to use a knife |

## Functional Requirements

|  |  |
| --- | --- |
| F01 | Device must firmly hold onto the knife |
| F02 | Device must have a more natural grip position |
| F03 | Device must not block use of the knife |

## Constraints

|  |  |
| --- | --- |
| C01 | Device must be printed in one piece with no supports |

# Prototyping

**Version 1: Original Design**

* Two flat plates with a spacer between them, connected by two bolts with a handle on one plate
* When the screws are tightened, the plates angle and separate at the bottom, preventing them from gripping the blade

A picture containing diagram

Description automatically generated

**Version 2: Modified Design**

* The plates were modified so they had a taper that would keep the plates parallel after the screws are tightened
* The plates still were loose after the screws were tightened

Diagram

Description automatically generated

**Version 3: Magnet Design**

* One piece print in place design
* Pockets for magnets to be inserted on the outside
* Knife thickness is a parametric variable that can be changed
* Most force is on the downstroke, the magnets keep the handle on the knife on the upstroke, but not expected to have to bear significant force
* Covers much less of the blade, allowing it to be used on non-chef knives

Shape, rectangle

Description automatically generated

# Testing

After assembling the final magnet version, it was found to stay on the knife well, and it left a usable amount of the knife exposed. Gorilla glue was chosen as the glue, since it is food safe, as well as being less brittle to resist the shock of being dropped.

# Opportunities for Improvement

The handle could be rotated 90 degrees to be vertical, as seen on some commercial arthritis knives.