

Design Review 1

Arthritis Kitchen Assistive Device

Amanda Lee, Maya DeBolle, Omar Da'darah, Vio Ta,
and Zahir Bashir

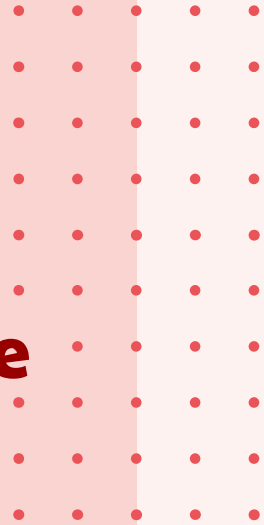
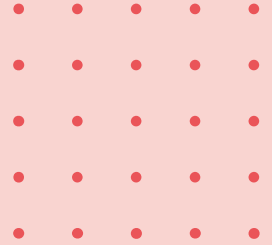


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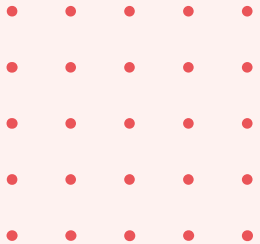
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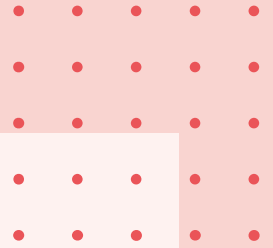
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01.

Problem Importance

Why is our problem important to address?





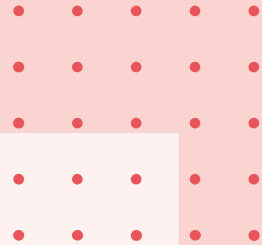
What is the problem?

Many individuals experience reduced hand strength and dexterity due to conditions like arthritis, aging, or neurological disorders, making everyday tasks such as gripping, twisting, and holding objects difficult. This loss of function impacts independence, quality of life, and the ability to perform essential daily activities.



The Everyday Struggle

- 20% of adults in the U.S. have arthritis
- Tasks like opening jars, cutting food, or holding utensils become difficult
- Causes frustration, reliance on caregivers, and a decreased quality of life
- A solution could help people regain independence in the kitchen



Needs for a Solution

- Perform kitchen tasks without assistance, maintain independence longer
- Reduce joint strain, improving comfort and safety
- Increase accessibility for people with any grip challenges
- Current tools are often bulky, expensive, or ineffective
- A simple, affordable, and effective device could be a game-changer

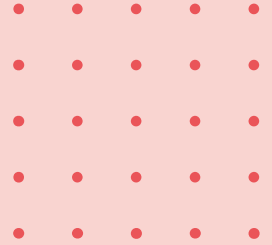
02.

User Explanation

Who are our potential users?



Potential Users



Elderly

Over half of individuals (53.9%) in the US that are 75 and older have arthritis. These people often live alone or with other elderly people.



Adults

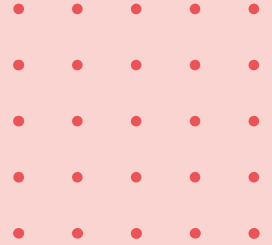
Working adults may also develop arthritis as a result of genetic predisposition and/or early onset (18.9% prevalence in the US).



Injured

Traumatic injury can lead to the development of arthritis in any age group. This is often temporary, lasting a few months.

Our Lovely User Interviewees



Elenora DeBolle
(Maya's grandmother)



Humera Bashir
(Zahir's mother)



Rama Subramanian
(Vio's housemate's mother)

(Women in the US are 5.4% more likely than men to have arthritis.)

03.

User Needs

User interviews and what people are specifically looking for



User Interviews Investigate Everyday Challenges

Users Struggle with Dexterity and Force

- Applying extensive or prolonged force using their hands, across various cases and localization of arthritis
- All three interviewees use everyday work-arounds
- Require devices that respond to users' force
 - Adjustable tightness as arthritis progresses
- Prefer devices that are lightweight, easy to carry
- Comfortable to grip and intuitive to use

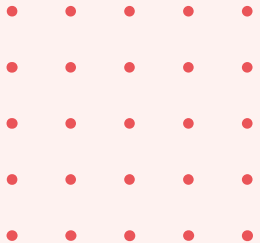
How can we design a device to help arthritis users with different conditions and needs?



Designing in Response to User Interviews

Possible Design Considerations:

- Orthopedic gloves to apply therapeutic pressures
- Soft and ergonomic handles
- Adjusts to different sized jars and lids
- Require little work from the user
- Resist shattering/breaking, prevent electrical damage



04.

Statement & Ideas

Current “Needs Statement” and what concepts we plan on pursuing that we’ve brainstormed so far



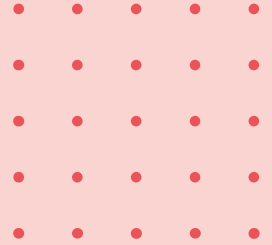


Needs Statement:

With about 20% of adults in the United States suffering from arthritis (OASH), there must be accessible options for individuals to navigate the kitchen with ease. A device capable of reducing the grip strength required for various kitchen items, such as jars or knives, would greatly improve their lives.

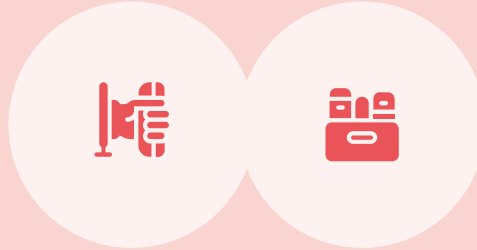


Ideas to Pursue



Manual Lid Remover

Device you can grip the lid of a jar with and apply torque to twist open. Force comes from arms or wrists as opposed to hands.

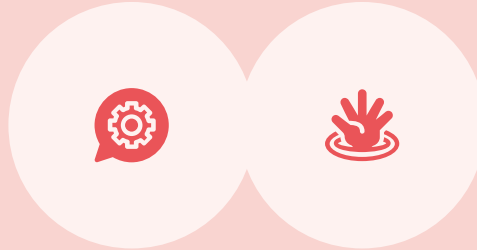


Countertop Devices

Machine that sits on counter and allows you to place the container/jar in it and holds it in place. Then, mechanically twists lid off.

Motorized Tools

Tool that sticks/suctions onto only the lid of jar and automatically twists it off using a motor of some sort.



Hand Wearable

Wearable device that goes over thumb and forefinger OR all fingers and applies force or pressure when needed.

Thank you!

For more information, please visit
our website:

<https://sites.tufts.edu/pinkteam/>

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Slidesgo , including icons by **Flaticon** , and infographics &
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Resources

Slides 4-6: Arthritis Workgroup - Healthy People 2030 | odphp.health.gov.
Health.gov.

<https://odphp.health.gov/healthypeople/about/workgroups/arthritis-workgroup>

CDC. Arthritis. Arthritis. <https://www.cdc.gov/arthritis/index.html>.

Slide 8: Post-Traumatic Arthritis: Causes, Symptoms & Treatment. Cleveland Clinic.

<https://my.clevelandclinic.org/health/diseases/14616-post-traumatic-arthritis>
(accessed 2025-02-20).

Slides 8-9: Products - Data Briefs - Number 497 - February 2024.

<https://doi.org/10.15620/cdc:145594>.

