GROUP 72

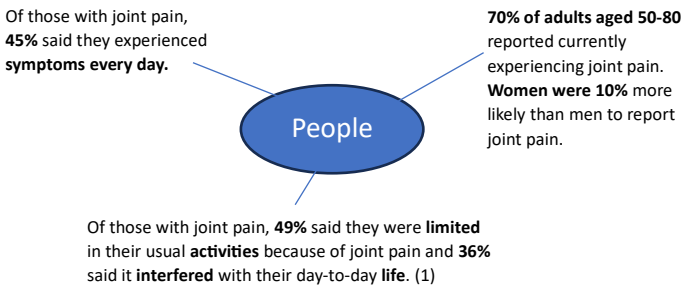
POSTER 1 – RESEARCH AND REQUIREMENTS

PROBLEM STATEMENT

Design a device that allows people with joint pain to stand for longer periods of time and move between the standing and sitting positions more comfortably while watching a sports match.

PEOPLE

TARGET MARKET:
Older people with joint pain who need assistance moving from seating to standing but don't want their day-to-day life to be restricted to their home.



EXISTING PRODUCTS

Standing Aid

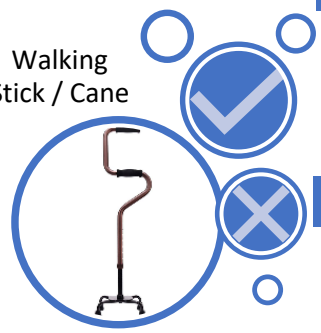
PROS

Provides support in standing up.
Adjustable.
Mechanised options.
Some models offer increased comfort.

CONS

Too big to carry around.
Heavy.
Not useful for walking.
Mostly for indoor use.
Advanced versions are very expensive.

Walking Stick / Cane



PROS

Provides support in standing and walking.
Takes pressure off legs.
Improves sensory feedback.
Useful for both short-term and long-term use.
Adjustable.
Can be used as a defensive weapon.
Lots of variety.

CONS

Cost can add up if you need to replace them frequently.
Need to replace rubber tips.
Can be heavy.
Keeps arm in use.
Stigma.

THE GAP IN THE MARKET

None of these products that assist in standing from seating positions in can be **easily transported** indicating a **gap in the market.**

The aim of our product was to meet this need and **increase the usability outdoors.** This is important as it contributes to a **reduction in isolation and loneliness** and will allow them to take **greater care of themselves outside of the house** due to **easier access to assistance.**

The global elderly and disabled **assistive devices** market size was valued at **US$ 27 billion in 2022** and is expected to hit **US$ 46.78 billion by 2032.** (2)

REQUIREMENTS

The product is an alternative to a camping chair or walking stick and should not exceed the typical weights of these products with **3 kg** being a typical weight of household items such as car seats. Typical camping chairs can support a weight of **100 kg** along with being applicable to a range of heights. (5)

The product aims to be **adjustable** for the heights of **150 to 185 cm** which accounts for **97.25% of women and 91.88% of men aged 65** in the UK. (6) For standing aids this means an adjustable height of **77 to 96 cm** according to the recommended heights of walking sticks. (7)

Maximum **storage length of 150cm** as this is the width of a boot of a small car allowing it to be **easily transported**. (8)

Operational in both rain and a temperature range of **-5 °C to 30 °C** which is a safe margin from the Met Office minimum and maximum temperatures in the UK. (9)

OTHER CONSIDERATIONS

An important consideration in the design of assistive technology is the **visibility of the disability**. **A fifth** of those with older parents who already received care said relatives were **still too embarrassed** to discuss their needs and had **hidden problems** from them. (3) Additionally, concern about racial discrimination is strong among minorities who use mobility aids. (4) The product needs to be designed in a way to makes it **suitable for everyday life** and ensure the user is **comfortable with using it in public.**

1) Arthritis and Joint Pain. University of Michigan National Poll on Healthy Aging.: https://dx.doi.org/10.7302/6410
2) Elderly and Disabled Assistive Devices Market. Precedence Research. Available at: https://www.precedenceresearch.com/elderly-and-disabled-assistive-devices-market
3) Older people embarrassed by health and care needs. https://www.independentnurse.co.uk/content/news/older-people-embarrassed-by-health-and-care-needs/
4) Perspectives on Use of Mobility Aids in a Diverse Population of Seniors: Implications for Intervention. National Library of Medicine. 2009, April 1st. Accessed 2023, November 21st. [Internet] Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2768139/
5)] Livings Cented. https://livingscented.com/how-much-does-a-camping-chair-weigh/ [Accessed 14 Dec. 2023].
6) *Height Percentile Calculator - by Gender, Age & Country*. https://www.gigacalculator.com/calculators/height-percentile-calculator.php.
7) Joe (2022). *Walking Stick Size and Fitting Guide: average sizes & types.*: https://size-charts.com/size-charts/walking-stick-size-and-fitting-guide/ [Accessed 14 Dec. 2023].
8) carwow.co.uk. (n.d.). *Fiat 500 | Specifications & Dimensions*. https://www.carwow.co.uk/fiat/500/specifications [Accessed 14 Dec. 2023].
9) Met Office. (n.d.). *Bath (Bath and North East Somerset) UK climate averages*. [online] Available at: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcnk62de6.

REQUIREMENTS LIST

D/W	Requirements	Responsible	Changes
	1. Performance		
D	• The product shall assist in standing up for extended periods of time.	bs914	21/11/2023
D	• The product shall assist in standing up from a seated position.	ol405	21/11/2023
D	• The product shall support a user of up to 100 kg.	pe328	12/12/2023
	2. Geometry		
D	• The product shall weigh less than 3kg.	pe328	12/12/2023
D	• The product shall have a maximum storage length of 150cm.	ol405	12/12/2023
W	• The product shall be suitable for users between 150 and 188cm.	ol405	12/12/2023
	3. Safety		
D	• The product shall conform to 'The Medicines and Medical Devices Act 2021'.	bs914	14/11/2023
D	• The device shall have no exposed sharp edges.	ol405	14/11/2023
	4. Material		
D	• Where the device is held, it shall use materials that are comfortable to touch.	pe328	14/11/2023
D	• The device shall be made of sturdy materials.	pe328	14/11/2023
W	• The device shall be made of recyclable materials.	bs914	14/11/2023
	5. Ergonomics		
D	• The device shall be for both left and right-handed users.	ol405	14/11/2023
D	• The device shall be adjustable.	bs914	14/11/2023
W	• The device shall be usable with one hand.	ol405	14/11/2023
W	• While standing, the device shall be used hands-free.	pe328	14/11/2023
W	• The device shall be transported by one user.	bs914	14/11/2023
	6. Production		
D	• The product shall have a production run of over 1000 units.	ol405	14/11/2023
W	• The product shall cost under £50 to produce.	pe328	14/11/2023
	7. Operation		
D	• The device shall be able to operate on concrete and grass.	pe328	21/11/2023
D	• The device shall not be complicated to operate.	bs914	14/11/2023
D	• The device shall require minimal force to operate.	bs914	14/11/2023
D	• The device shall remain operational in rain.	pe328	14/11/2023
D	• The device shall operate in a temperature range of -5° to 30°	ol405	12/12/2023
	8. Maintenance		
D	• The device shall require minimal maintenance.	bs914	14/11/2023