

P2 Project Report

A Walker for elderly people in India

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Approval Sheet

The B.Des Design Project - 2 titled “A Walker for elderly people in India” by Abhishek Chandra, Roll Number 16U130025 is approved, in partial fulfilment of the Bachelor in Design Degree at the IDC School of Design, Indian Institute of Technology Bombay.

Project Guide

Chairperson

External Examiner

Internal Examiner

Declaration

I declare that this written document represents my ideas in my own words and where others' ideas and words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

A handwritten signature in black ink, appearing to read 'Abhishek', with a horizontal line drawn underneath it.

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13 July 2020

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Finally, I would like to thank my family for all the support, my grandmother for motivating me to work during this pandemic and providing me insights for my userstudy.

Abhishek Chandra
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Introduction

This photo is captured on a bus in Singapore, I think it admirably describes a perspective of the city very well. My experience of living in a developed country has realised me the possibilities of improvement in our daily lives and the lives of elderly people.

If we look at the most aged countries in the world and how they have handled the issues, especially walking-related problems, there are some very interesting interventions. There are specialised assistive devices for specific age group and situations. By looking at these interesting products, naturally, I get into thought about implementing the same in my own country. But, even if I can, this would not make any sense without the context. Because those are two different situations, cultures, means different sets of problems.

India's population is growing at an unprecedented level and so as the Elderly. Increasing longevity and falling fertility has dramatically increased the numbers even more. According to Population Census 2011, there are nearly 104 million elderly persons (aged 60 years or above) in India. And it is expected to grow to 173 million by 2026, by another report released by the United Nations Population Fund and HelpAge India[1]. This situation becomes a problem when you see the on growing elderly abuse the country. After retirement, many elderly people are forced to live a life of humiliation, abuse and isolation[2].

One of the basic need for elderly people is to physically be able to perform their daily task and not depend on others, as this seems to look like a key problem in urban areas.

This is an attempt to understand the situation of elderly people in India and design a walking assistant that can have a major impact on their daily lives.

Initial Motivation

I have come from a family where both my grandparents are still working in the fields even if they don't have to. This is more of a lifestyle or a habit than a need to survive. As I moved from rural areas to towns to cities, I noticed, fewer elderly people were moving around as compared to small towns. If you visit any village or a hill-station, the first thing you notice is the old people around, mostly engaged in fields. This is a culture where everybody has some kind of job to do and elderly people have the important ones. That responsibility is due to the understanding of nature over time. In contrast, not many elderly people were going out in cities. It could be because of safety issues, less area to roam around or maybe other domestic or social reasons.

When I was in Singapore, I was amazed to see how elderly people were all over the city, such as grocery stores, cycling, jogging, etc. My personal experience of living with elderly people in rural and urban areas in India, combined with the experiences abroad has allowed me to see things from different perspectives.

Being able to work with real-life problems in the country has motivated me to explore my interest in interactive product design and to help elderly people in India.

Primary Research

First, the data was collected from several first-hand experiences for the user study. Observing elderly people was the first attempt to naturally seek the life of elderly people. Hospitals, Public parks, societies were the places where the observation had taken place. People were observed from a distance to understand their instinct while sitting, walking, using any kind of walking assistance, engagement with their belongings and more at public places in urban areas.

During the observational research in Mumbai, there were also some encounters with senior citizens. Some of them were very open to talking with, they have shared their life experiences, household problems and the complexities of having certain types of walking assists.

A questionnaire was prepared concerning different aspects of possible issues that a user might have faced in their daily lives. The question had been categorised to ensure the width of the spectrum.

- Getting Around(in general)
- Finding friends and activities(reaching out to people they know)
- Housing Concerns
- Safety Concerns
- Perception towards walking aids

A while after gathering some user data from a couple of people, there was a major abrupt break in the user study. The break was due to the pandemic caused by Coronavirus.



Insights

acquired from the user study in urban areas.

- The majority of elderly contacted, have **difficulty in getting up from a sitting position** and were also scared of sitting down. They do not have enough strength in their knees to hold the body weight.
- There are cases where **inconvenient posture while using crutches or a cane** had caused disbalance and falling.
- **Climbing down the staircase becomes dangerous** even if there is a walker involved. Using walker while climbing downstairs has many challenges such as adjusting the desired height, having a firm grip to the ground, placement of the legs etc.
- Many families in India follows the ritual of **not letting their elderly to do pretty much anything**, even when they trying to self-help. This may sound reasonable to some people but, this has led to other kinds of psychological problems in their daily lives.
- **Boredom** is one of the common situations where many elderly individuals have found themselves into. This has affected their mental health causing depression.
- Some people have an **unsettling fear of going out alone**. It is sometimes due to the **fear of falling sick**, and not be able to get help instantly.
- High **risk of falling** while walking downhill or uphill by a wheeled walker.
- Some people use cane for indoor and walker for outdoors.

User Study during the lockdown

The situation caused by the pandemic had transformed the direction of a user study. Instead of observing urban people in Mumbai, now the research had shifted to a rural context in Uttarakhand. Apart from being just a rural region, it is located in the Shivaliks of Himalayas. People living in the mountainous region have a drastically different lifestyle and mindset than cities.

Elderly people in mountains.

Even though the people living in the mountains are relatively strong, but it hasn't made them immune to diseases like arthritis. It's even worse to have mobility-related issues in the mountains.

There aren't much-walking aid options to choose from, usually, there are sticks or crutches. This is due to lack of existing walkers available for mountainous terrain.

Unlike in cities, the lifestyle of working relentlessly has created a strong sense of self-dependency, makes it harder to convince them for additional help.

Secondary Research



Market study

Looking at some current products available in the market would give a better understanding of the role of a walker in the society. These are some common types of assistive device used in India.

- **Single point Canes(One hand use)**

These are the most common assistive device due to its simplicity. They are used to improve safety and balance compared to no walking aid.



- **Quad Canes(One hand use)**

Larger base support than a standard cane allows for more weight to be pushed through the arms/hand.



- **Hemi-Walker(One hand use)**

This is the most stable option for users without functional use of one hand. It can keep the body stand upright.



Pros Cons

Good Stability *Single purpose*
for one hand use *Slow*
Upright posture *Bulky*
Can take more weight

- **Standard Walker**

This is the most stable assistive device available. It allows for more weight to be pushed through arms and unweighted leg. However, it has a slow walking speed.



Pros Cons

Good Stability *Single purpose*
Can take more weight *Slow*
Bulky

- **Rolling Walker**

The wheels in the front make it easier to move and relatively faster than a standard walker. Some walker has two tennis balls on the back legs to slide plain surface and user do not need to pick up from the back every time. However, with the wheels, it is less stable and can roll out from under the user.



- **Rollators(4 wheels)**

These are the fastest among the rest and has multiple functionalities such as a seat for resting breaks, storage, Brakes on handles. However, they are the least stable and do not allow for too much weight to be pushed through the arms/hand.



Pros Cons

Fast *Less stable*
Storage option *Can't take too much*
Seat to rest *weight*
Foldable *Bad posture*
Easy to use

Other Products and Concepts for Inspiration



Life Glider (Hands free Walker)



Versatile Cane



Walker Cane Hybrid



Waist Harness



Compact Walker Concept



Modular Walker



Compact Rolling walker



Gait Trainer



Walking assistive harness



Honda Assistive Devices



Ta-Da Chair Foldable Chair & Cane Stick



Beach Walker

Research Conclusion

Through primary and secondary research, the issues have been analysed and then categorised.



Stability Issues

Body and Posture

Other than ageing, these are some common factors that are responsible for unstable walking. In most cases, it differs from person to person and has a lot to do with the lifestyle of a person.

Bad postural habits in the past affect how everyday tasks are being performed. It is one of the reasons why a majority of people have difficulty while sitting or getting up during ageing.

Using existing walkers

Current walkers in the market are not addressing the importance of good posture in their products. However, there are some specialised products that improve walking and posture, i.e. gait trainer walker. Bad posture has also changed the way people use a standard walker by bending forward.

Portability

This is the most issue that a middle-class Indian person faces on a daily basis due to high population density and lack of physical space. It has effects on both indoor and outdoor situations. Hence, using a general walker in Indian situations becomes problematic through common issues such as accessing a toilet or using public vehicles.

Existing market target audience

As mentioned in the secondary research, there are multiple products that fall under different categories and each one of them has certain strengths to what and to whom they are offering. Similarly, it can be seen that there have been lots of compromises made to fulfil some specific needs.

E.g. Rollator walkers have some exceptional capabilities for the user to move around faster and the ability to take rest. However, it lacks the most basic need to maintain a good posture while walking and a stable structure.

Psychological

Sense of dependency causing restrictions in fulfilling their own daily personal needs.

Using any walking aid creates a sense of a disabled person, killing the motivation to explore.

Fear of falling sick when no one is around.

Re-Defining Brief

Designing a everyday walker for elderly.

Target audience - Middle class elderly people in Indian-urban terrain.

The aim is to make the walking/mobile experience so intuitive that the product itself becomes a part of their daily lives, just like how spectacles have become an accessory than a device for a visually impaired person. However, it isn't restricted to just walking aid rather a versatile walker for elderly people.

Ideation

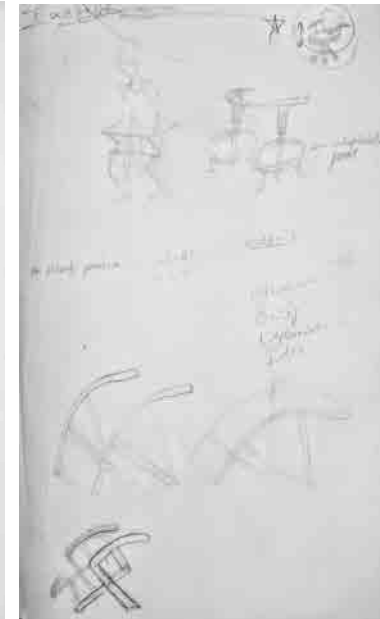
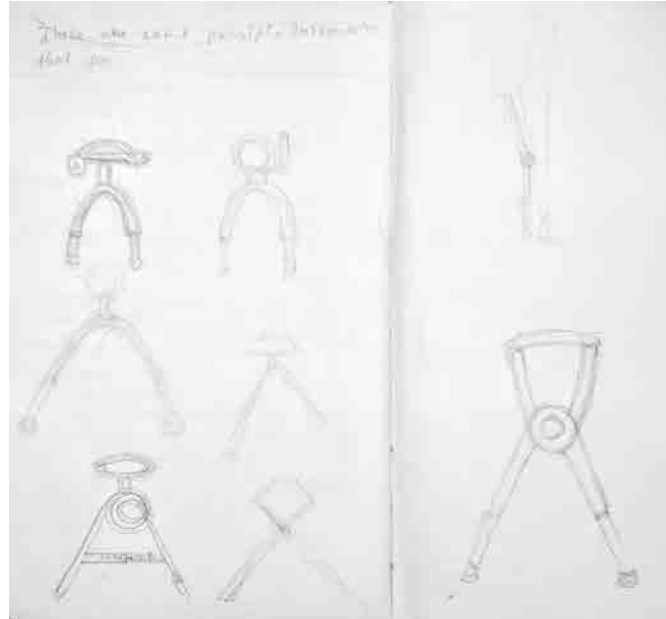
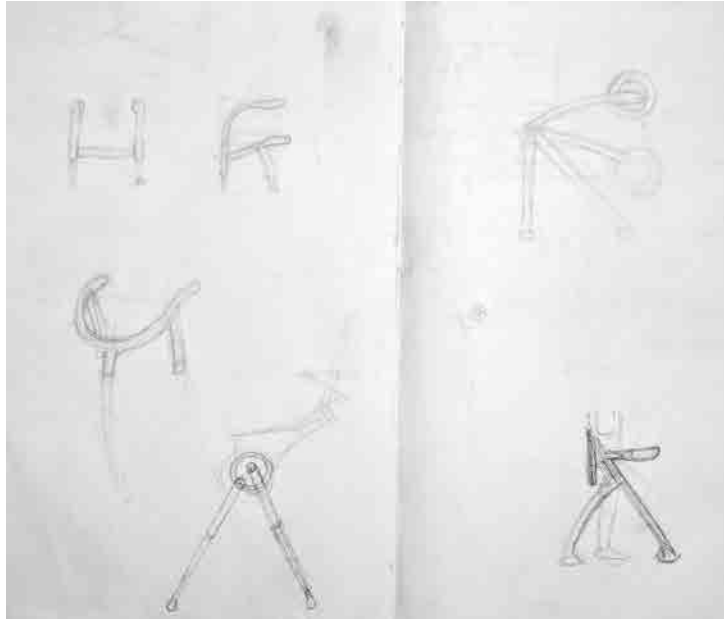
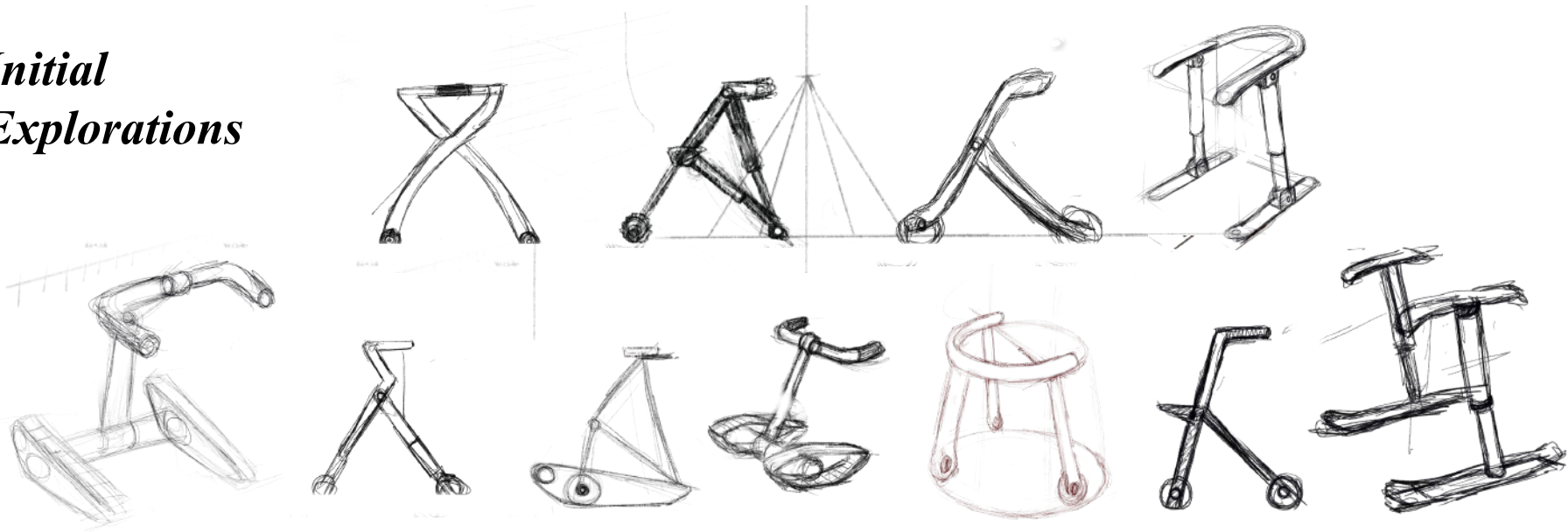


The brief has given the direction to ideate and explore the possible interventions. The aim is to provide a good amount of value and comfort without sacrificing the basic needs such as stability, safety and good posture.

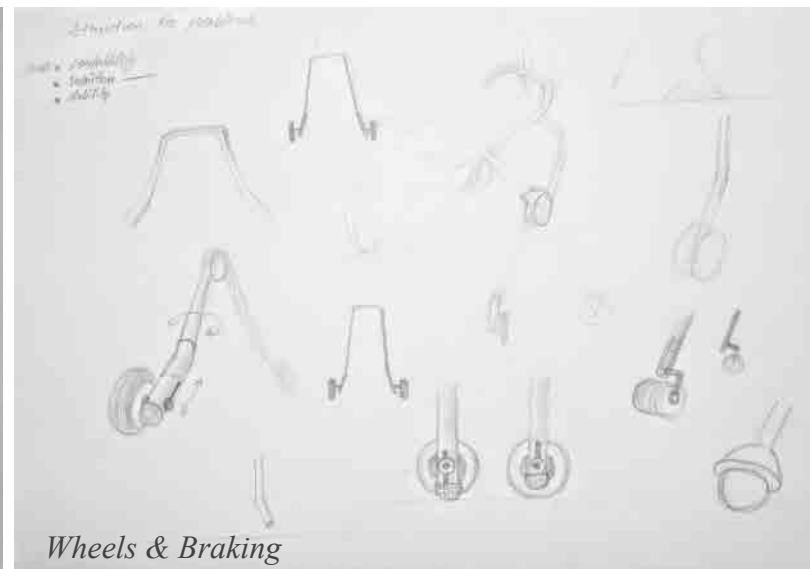
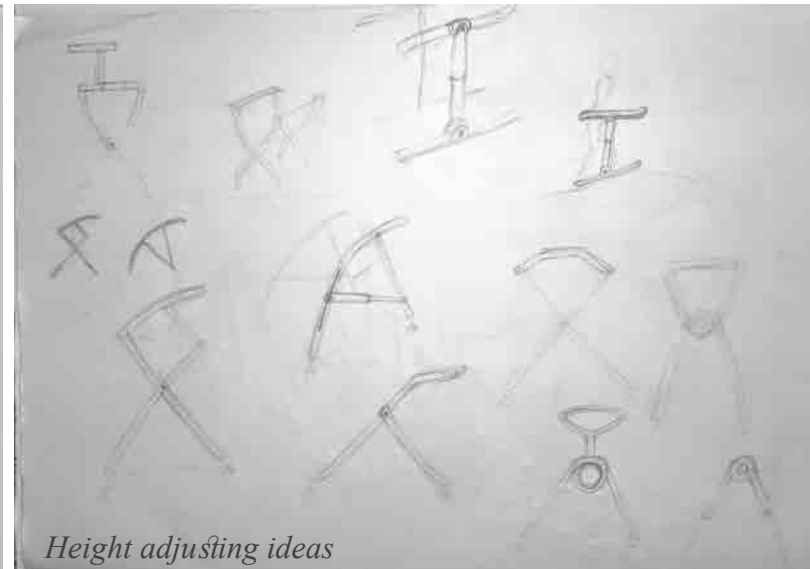
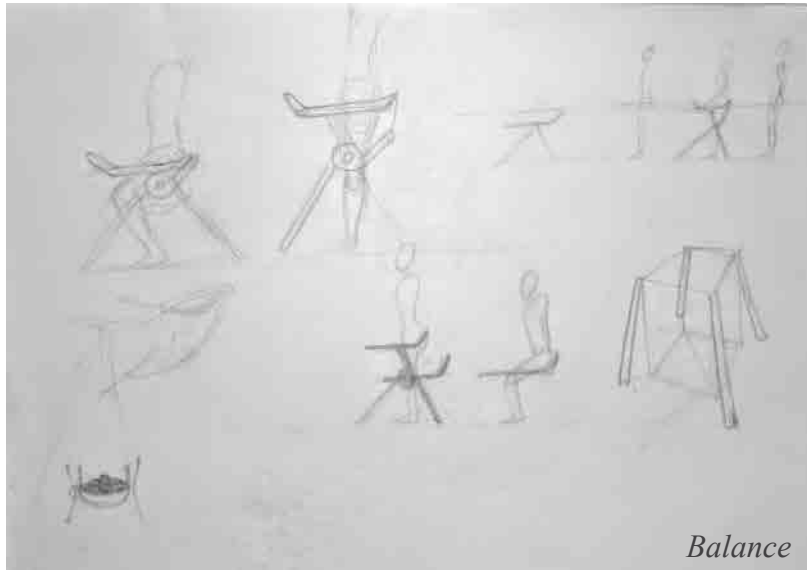
Initial Ideas-

- There can be a mechanism where the legs of the walker would step ahead automatically by pushing/dragging handle forward.
- Intuitive height adjustable walker.
- There could be a system that provides a full range of motion from a standing position to an Asian squat posture. This can not only give you full support while acting as sitting or standing but also can be used by people with different heights.
- A button/clutch that releases the tension and brings the height down slowly. (Like in a wheeled office chair)
- Brakes or a locking system to secure the walker from rolling while resting.
- Relatively larger wheels with suspension to ride over uneven surfaces.
- Instead of wheels, there could be a mechanical system that mimics human walking motion.

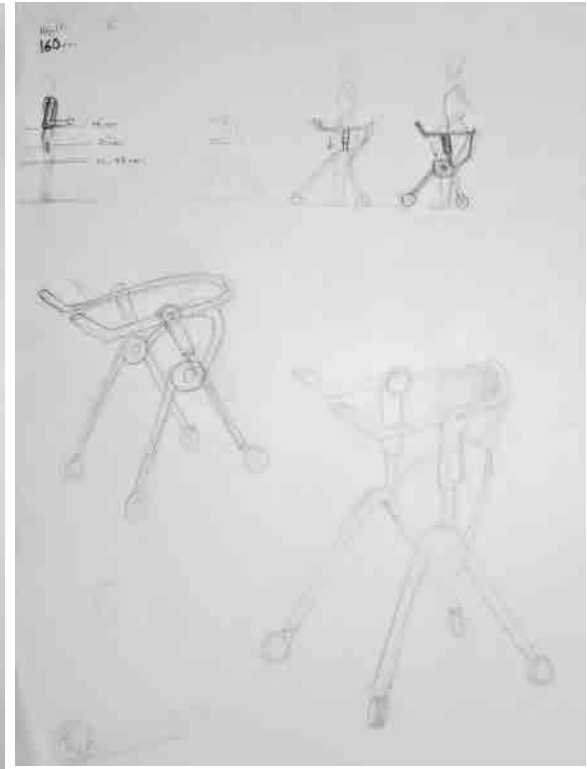
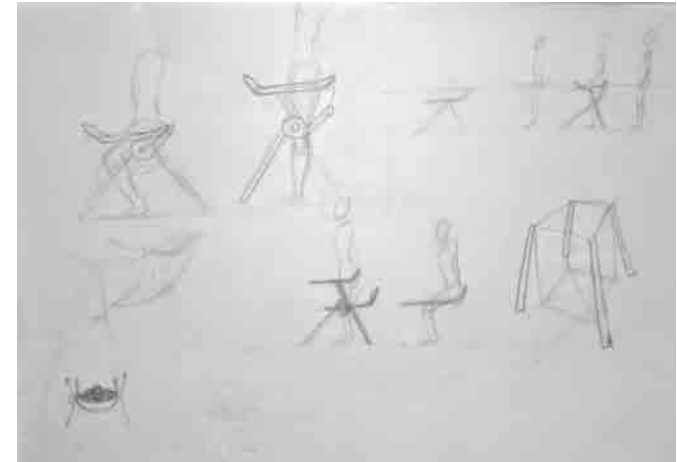
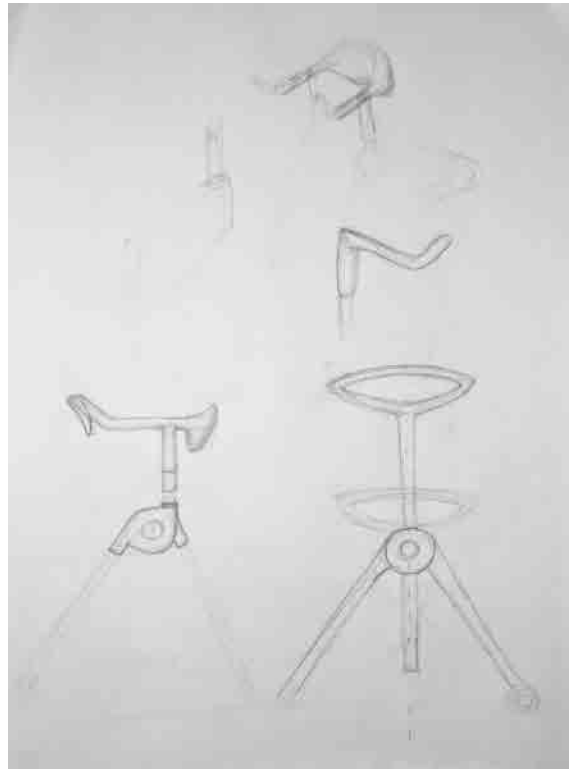
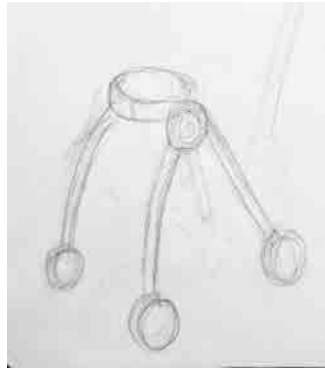
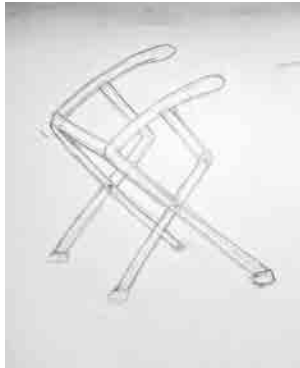
Initial Explorations



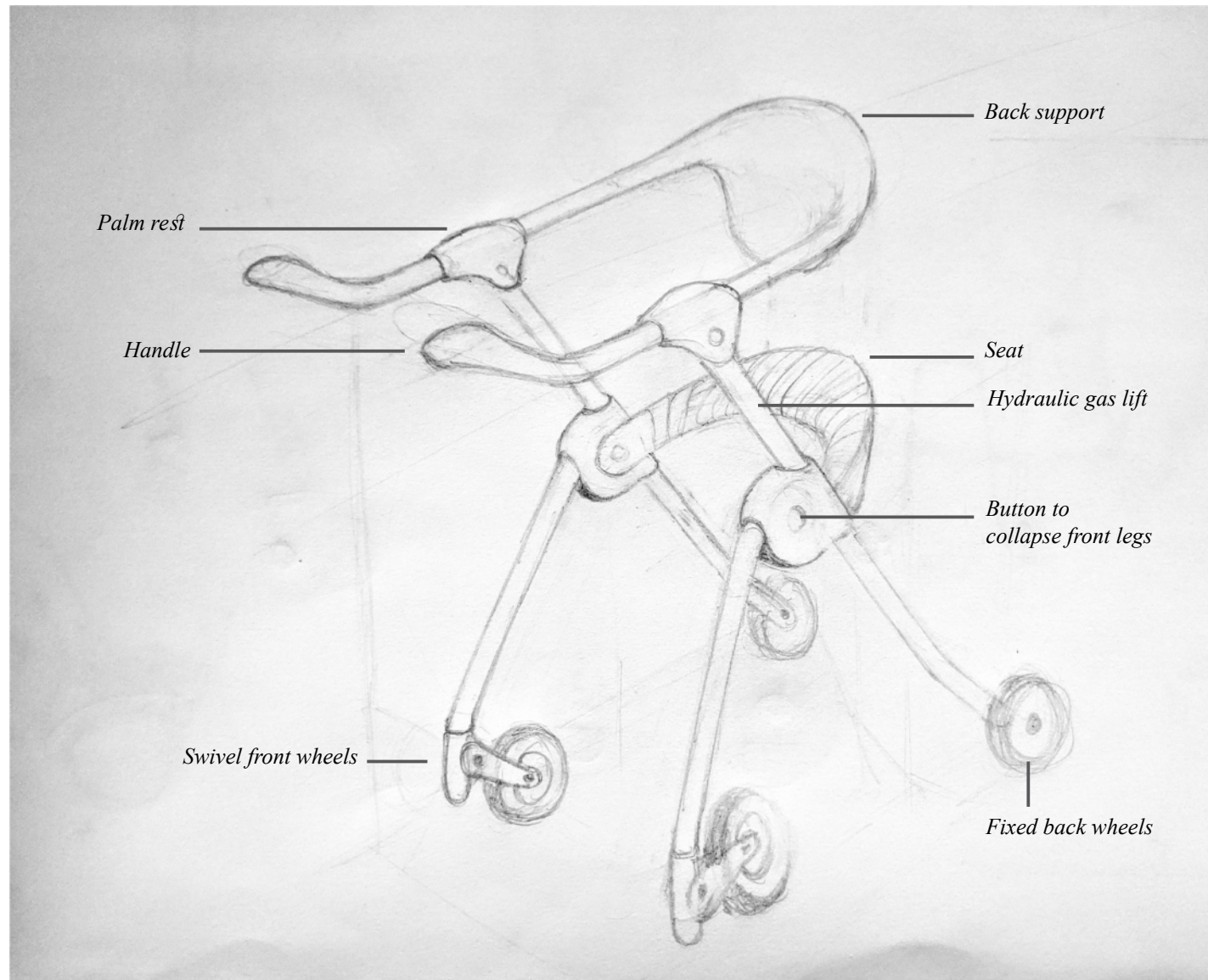
Ideation



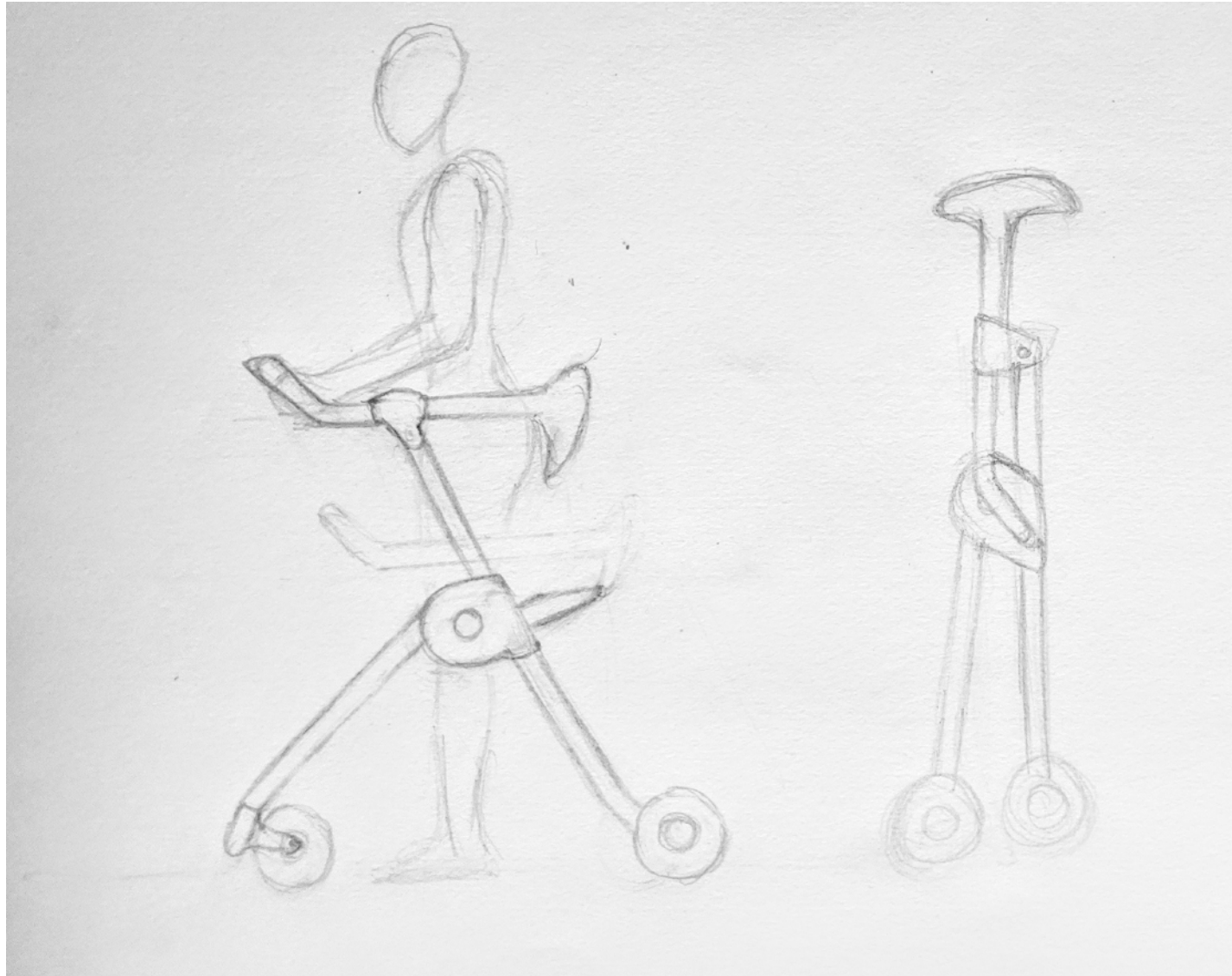
Ideation



Final Concept



Final Concept



Mockups



Human figure for reference.

Focus



Collapsible Design for portability.





Features

Height adjusting system

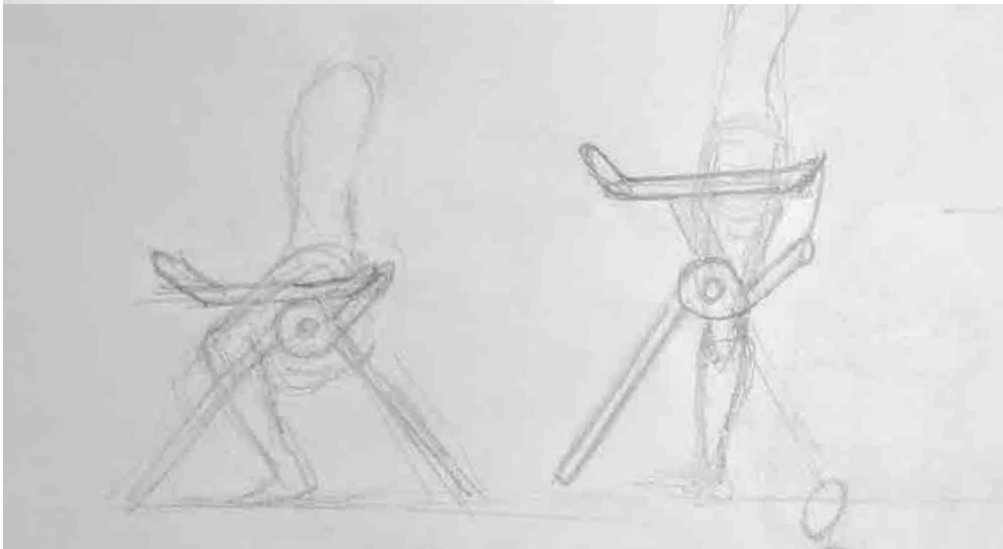
The height adjusting system of the walker consists of two main parts of the walker.

1. Handlebar

A long bar that runs behind the body with oblique handles at each end. The bar allows hold it from anywhere along the sides while the oblique handles provide a natural grip for forwarding motion. It also allows being pushed through the hands while sitting/lowering down the height.

2. Hydraulic gas lift cylinders

The bar is attached with two Hydraulic Gas lift cylinders that compresses into the two legs at back.



Legs and Wheels

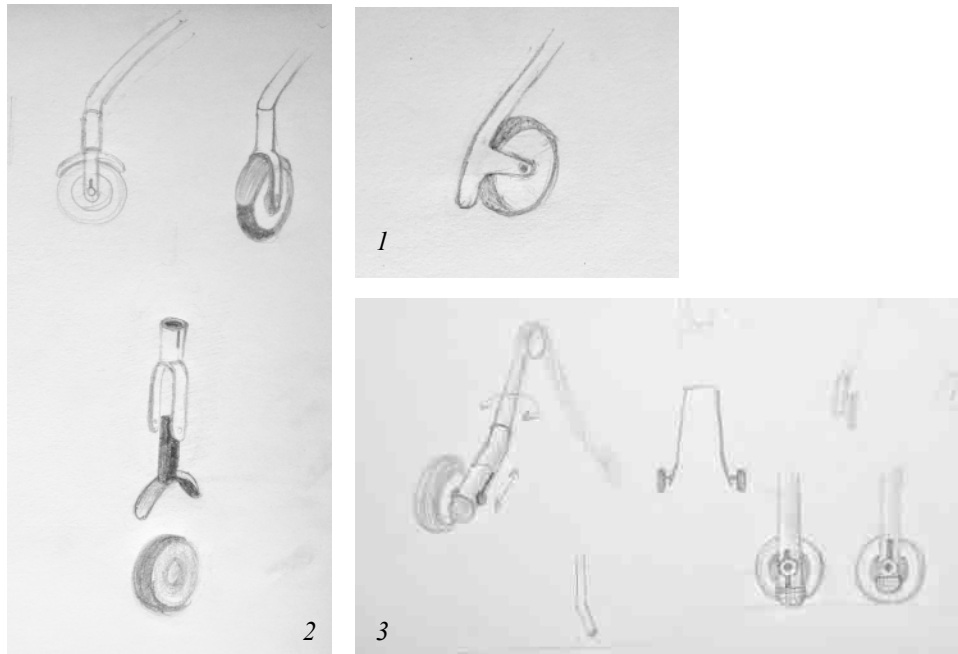
The legs/feet are placed at an angle away from the body to ensure better stability of the walker.

The front legs can fold up towards the legs at the back.

A system where the wheels can disconnect from the leg in such a way that the feet can have hard touch on the ground or lock in.

Two step Braking/locking System

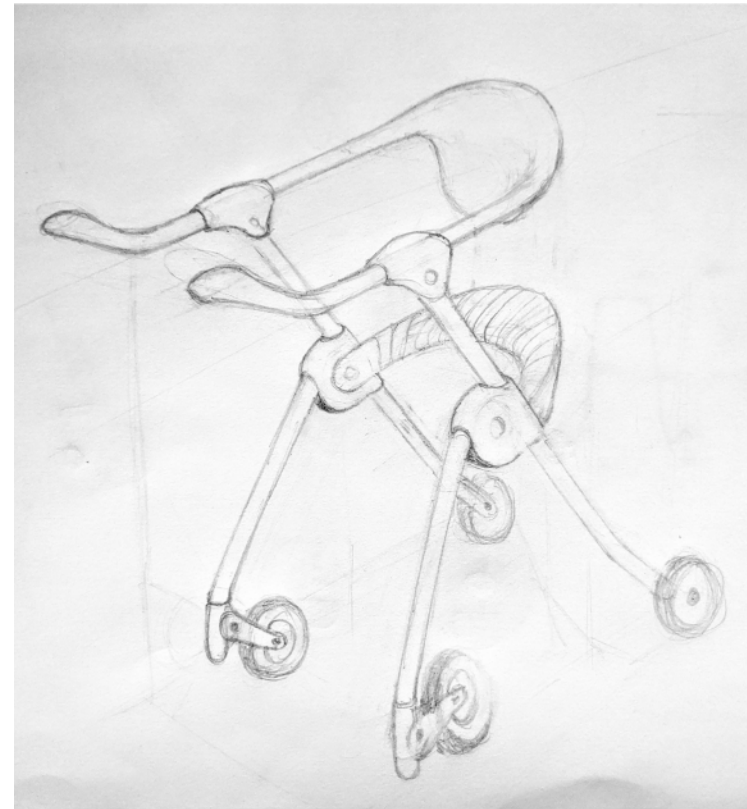
- The idea is, when the user pushes the brakes to halfway, the friction on the wheels creates a constant resistive motion. It prevents the user from unintended speeding.
- If pressed further, the wheels get locked. This secures the walker from rolling out when or while sitting. Following are some ideas how it can work.



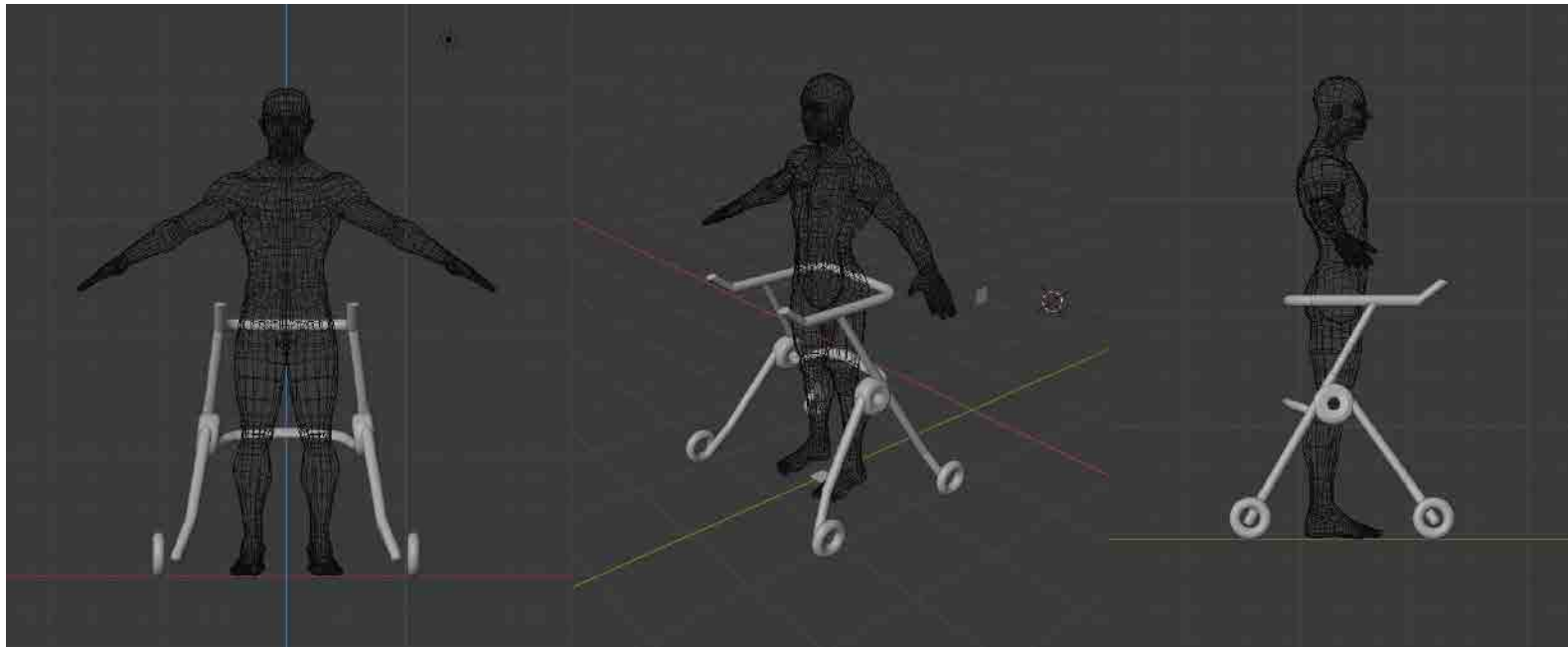
Resting

The position of the seat would be at the back of the user's body to keep the sitting action natural. The seat made up of a stretchable fibre cloth which is attached from the back of handlebar to the bar below it.

Additional feature- A detachable waist or thigh strap that can hook on to the back support, or the sides, through a thick elastic material. This can distribute all the pressure from the legs to the centre of the body. Also, it provides the ability to free the arms when needed.



Modelling



References

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2. <https://www.thehindu.com/news/cities/Delhi/The-ugly-truth-about-old-age-in-India/article14423922.ece/amp/>
3. Images from google images.

