

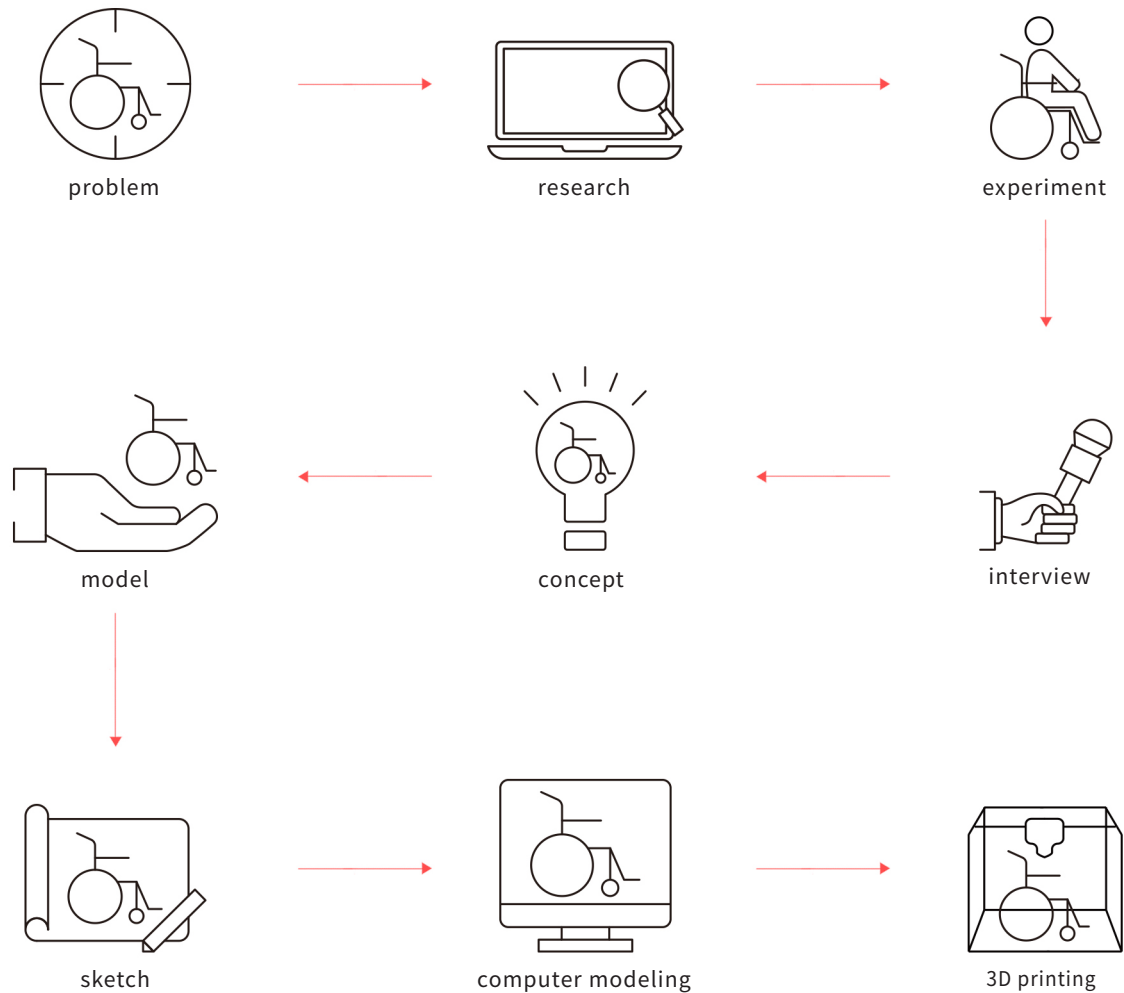


Ancer

design process

This project is a design for the medical product wheelchair. Based on the difficulties encountered by the disabled when using wheelchairs, a wheelchair with the function of pressure ulcer prevention has been developed to optimize the user experience of the wheelchair.

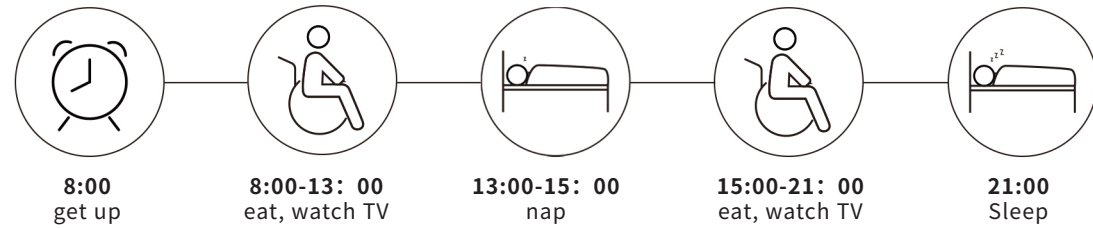
The focus of the project is the pre-stage research process: through the experimental design, the interviews with different identities and the search of the network data, the construction principles and the direction of the wheelchair with the function of pressure ulcer prevention were determined.



disabled

What does his life look like?

If mobility and perception are impaired, this continues to affect the ability of the wheelchair user to change their body position. That is why they will sit on the wheelchair for a long time.



Disabled sit on the wheelchair for an average of 10 hours every day.
(According to Chinese Disability Association statistics)

experiment

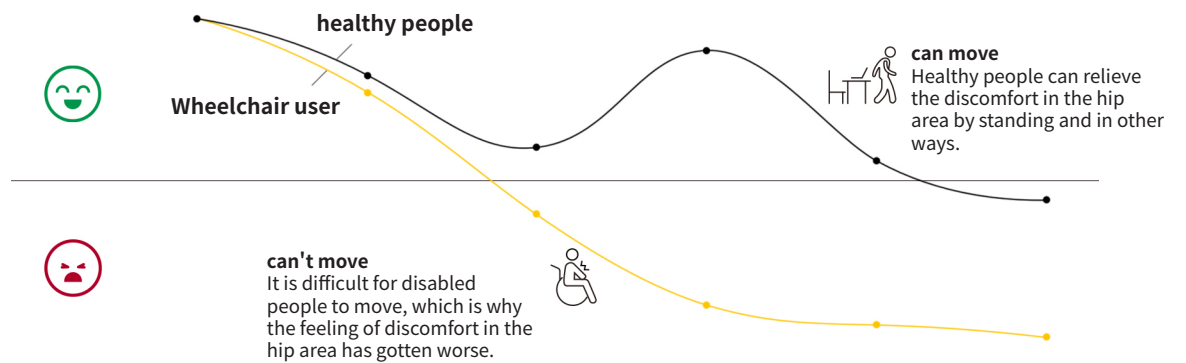
the feeling of a wheelchair user

In order to experience the feeling of long-term sitting in a wheelchair, I attached my upper limbs and legs with belts, water pipes, etc. This experiment lasted six hours, at the same time the feelings of the body were recorded.

I have found that the disabled will feel worse than healthy people if they sit for a long time. After an hour I felt very uncomfortable, after which the butt pain was the most severe.



Process of the 6 hour experiment



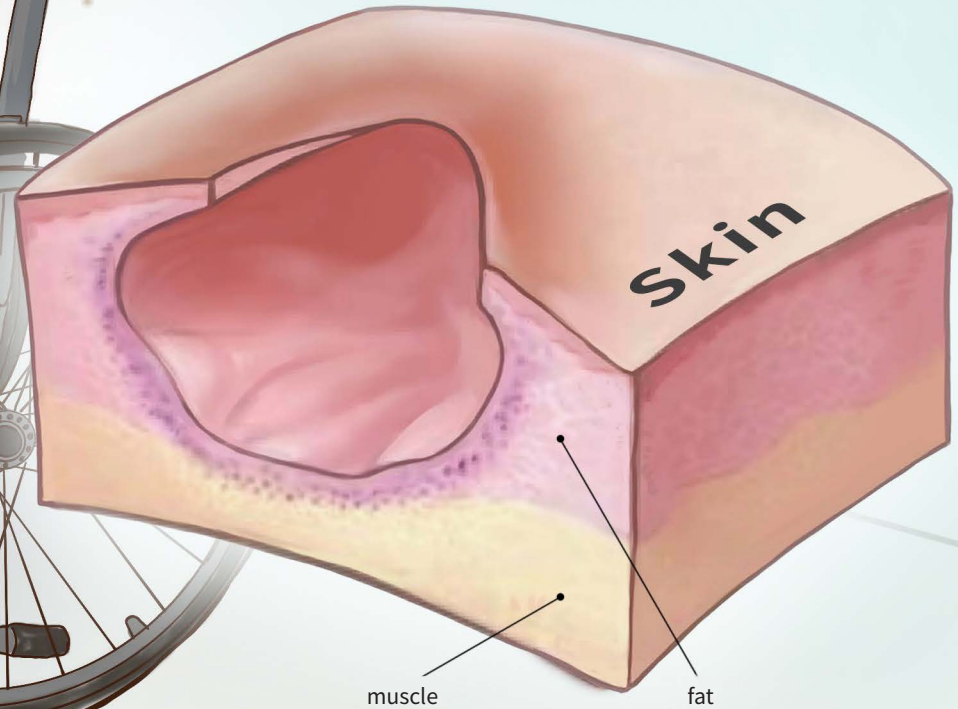
Pressure ulcer

What is pressure ulcer?

Pressure ulcers are local damage to the skin and the underlying tissue due to prolonged pressure, which disrupts the blood supply to the skin. Other names include decubitus ulcer, pressure ulcer, bedsore ulcer.



Degree 3: Loss of all layers of the skin including damage or necrosis of the subcutaneous tissue that can extend to, but not below, the underlying fascia. The pressure ulcer shows clinically as a deep, open ulcer.

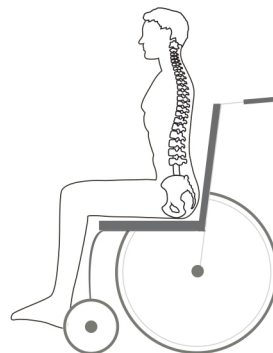


cause

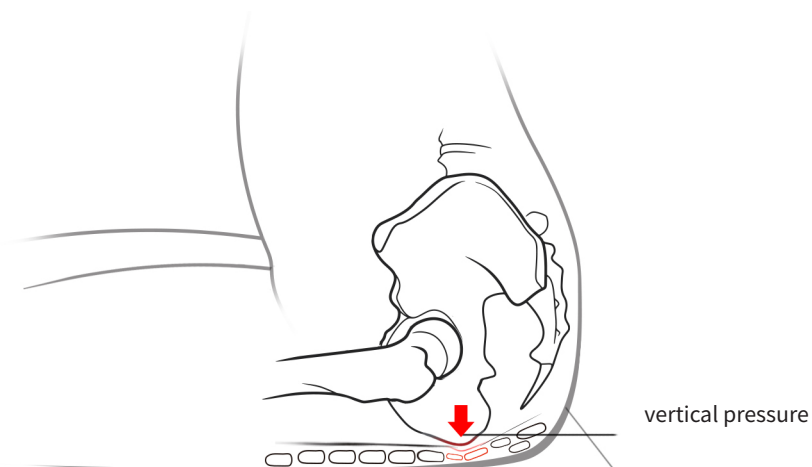
What causes pressure ulcers?

Long-term immobility is the main cause of pressure ulcers. If you sit for a long time, local parts will be subjected to constant vertical pressure and lateral or horizontal shear, especially the sciatic area. Because when you sit, the weight of the body focuses on the position of the sciatic bone.

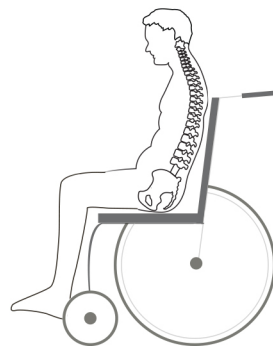
When the pressure reaches 240 mmHg, the cells will die within a quarter of an hour. When the pressure reached 100 mmHg, the time of dying cell growth was extended to more than 80 minutes. If the pressure is 68 mmHg, the time of dying cell growth will be extended to more than 120 minutes.



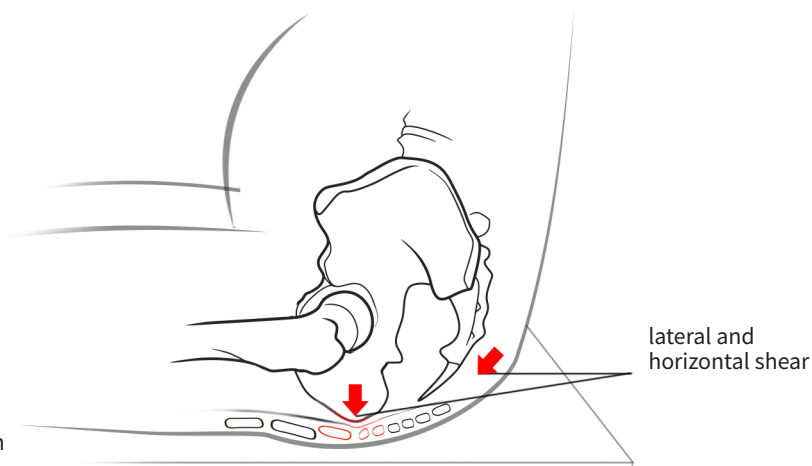
Sitting position 1: sciatic bone is pressed



vertical pressure



Sitting position 2: The body slides down



lateral and horizontal shear

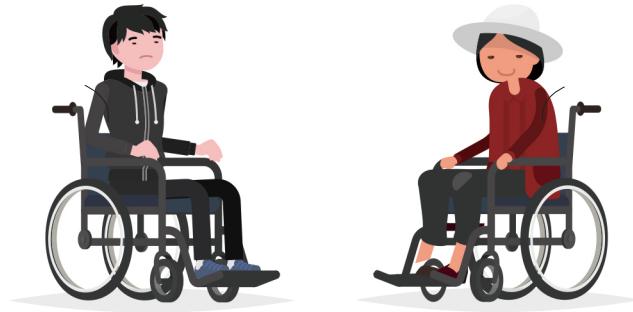
interview

interview process

During the interview, I found that wheelchair users were very reluctant to study as a research subject, and it is better if I was a wheelchair user.



Interview 1: as a student (question-answer)



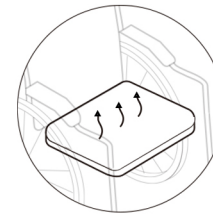
Interview 2: as a wheelchair farmer (actively sharing experience)



Insight 1:
want to move



Insight 2:
want to become independent



Insight 3:
like to use soft cushions
Some experiments have shown that the effect of soft cushions is very limited.

overview

the requirements of the anti Pressure ulcer wheelchair

1. moveable:

It is an effective way to enable the wheelchair user to change position to avoid pressure sores.

2. safety:

Safety is the most important factor in designing products for the elderly.

3. remind:

The wheelchair user's attention can be distracted by television, etc., and in this case they may forget the sciatic bone pain, increasing the likelihood of pressure sores.

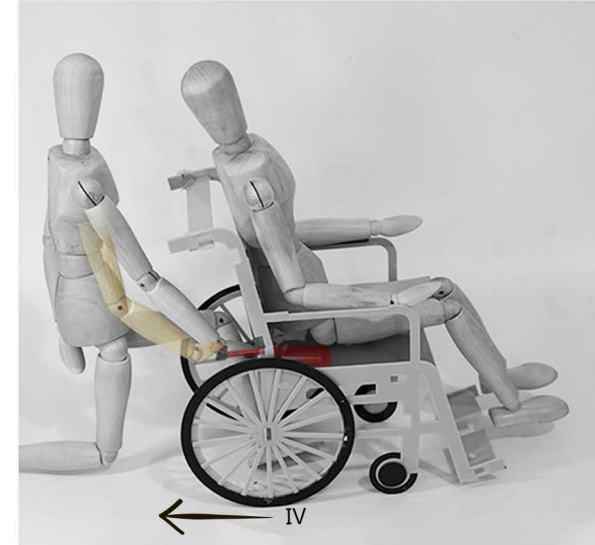
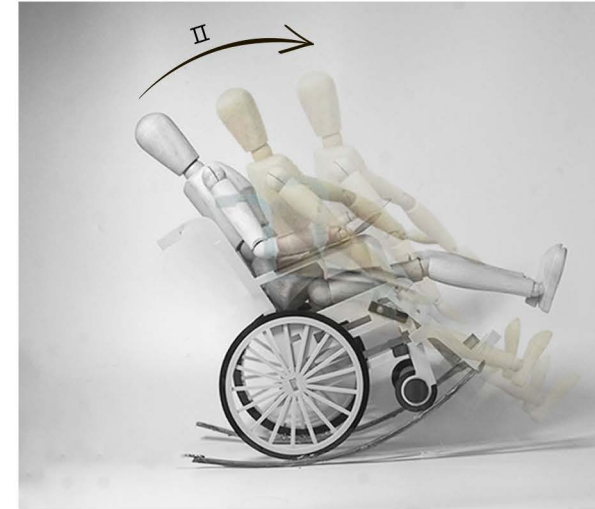
4. Easy to use

The strength of the hands of wheelchair users is very limited, so this factor must be fully taken into account when designing the wheelchair.



model

1: 4 model



model

1: 1 model

I did a 1: 1 model test to prove that the airbag can lift people's bodies, I put a balloon under a case weighing 30kg (simulating the weight of an adult's torso) and 100ml of air in the Balloon injected.

The result is that the case has tilted more than 15 degrees.

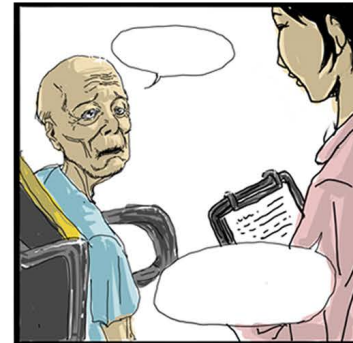
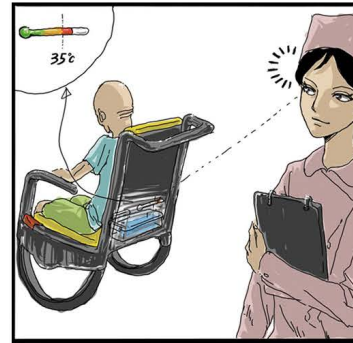


storyboard

when using

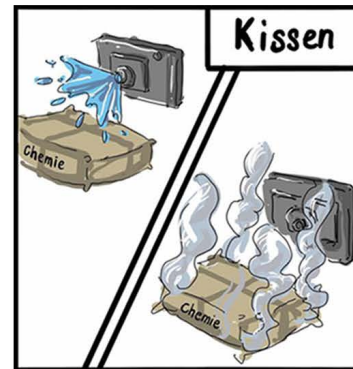
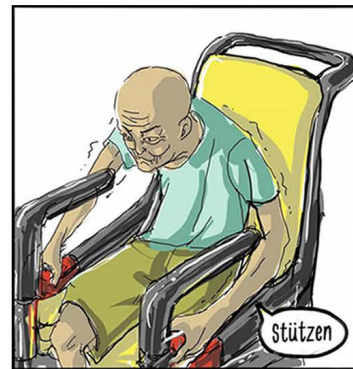
remind:

When the temperature of the senior citizen's sciatic bone exceeds 36 degrees, the seat vibrates to remind the elderly with disabilities of the risk of pressure ulcers.



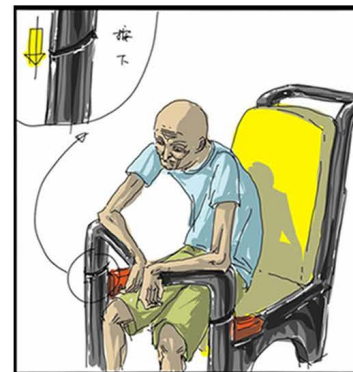
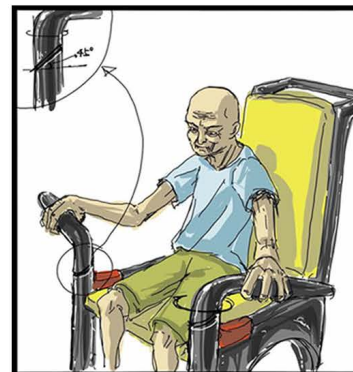
Seating position change 1:

If the seniors feel that the body is sliding forward, they can press the switch, then the air cushion on the sciatic bone is inflated, which will rotate the armrest backwards, while the seniors' bodies are raised, so that the seniors move the position of the Body can change.

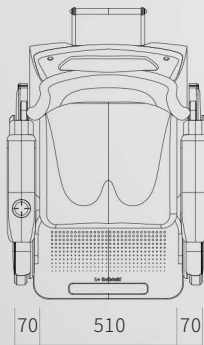
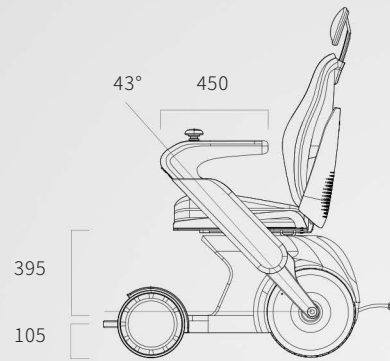
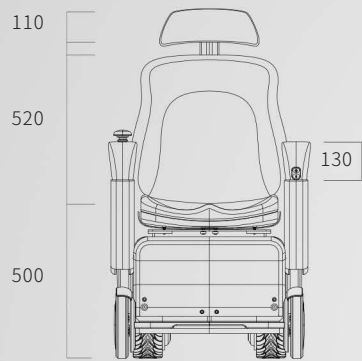


Seating position change 2:

If the wheelchair user wants to relieve the pressure on the buttocks, they can turn the armrest forward so that the elderly can lean on it more easily, at the same time the airbag is arched and an incline is created to help the elderly get up.



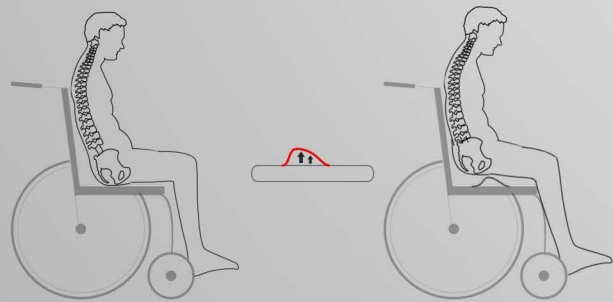




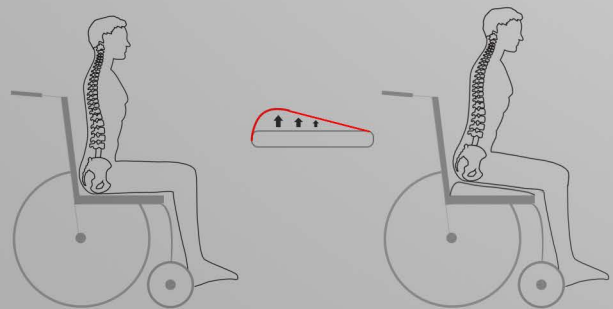
Ancer

the dimension (Einheit:mm)

cushion design



Seating position change 1



Seating position change 2



cushion

airbag

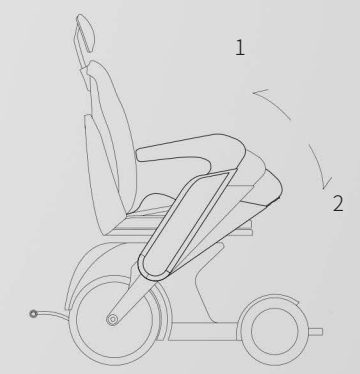
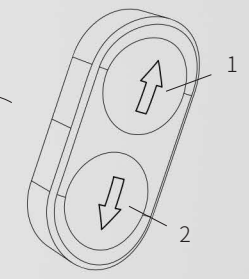
sensor

schell

research

development

design





USB

lock

brake