

DEPUTY

Redesign of phone holder for bedridden people



PROBLEM STATEMENT

Background

Some of patients in hospital beds cannot move because a part of their body was injured, so they need to stay in bed for a period of time. They usually face not only physical ailments, but also psychological trials.

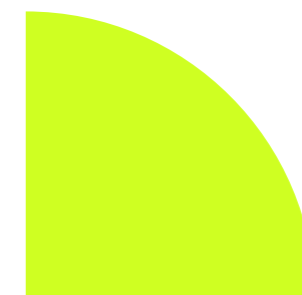
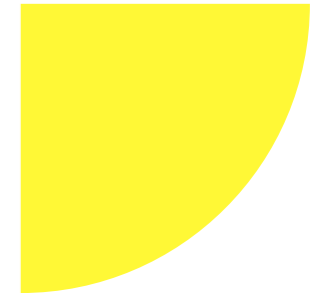
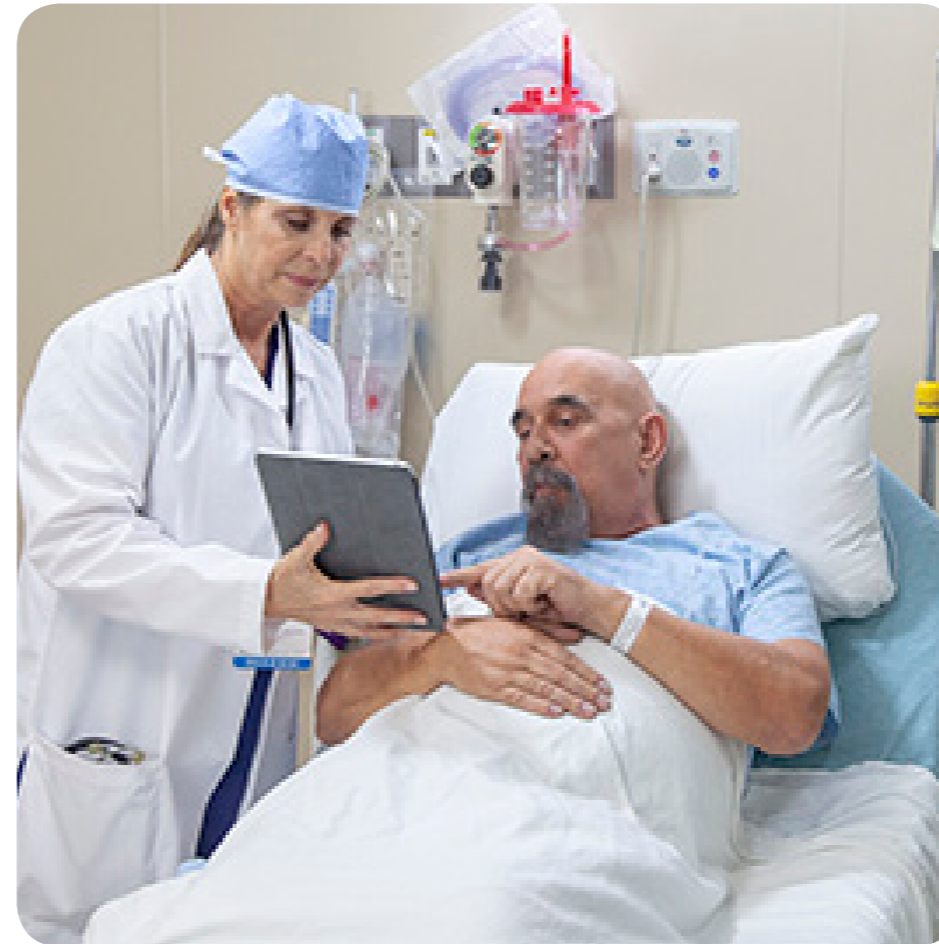
The inability to move one part of their body limits their freedom of movement, preventing them from performing many activities that would be easy for normal people. Almost all patients will have different levels of mental anxiety and negative emotions in the face of this kind of physical infreedom.

Lying for long periods of time and playing with your mobile phone may cause degeneration of the cervical spine. When people lie down and play with their phones, the cervical spine is in a state of nonphysiological curvature. This non-physiological condition can cause excessive traction of muscles and ligaments in the back side of the cervical spine, which can cause local inflammation and pain.

Design Goal

From the spiritual aspect, provide more psychological support for bedridden people.

Provide more recreational life for bedridden patients without affecting physical rehabilitation. Design a new series of relaxation mode. Relieves a range of physical health problems caused by spending long periods of time in bed using digital devices. Try to avoid the use of entertainment equipment on the body health damage.



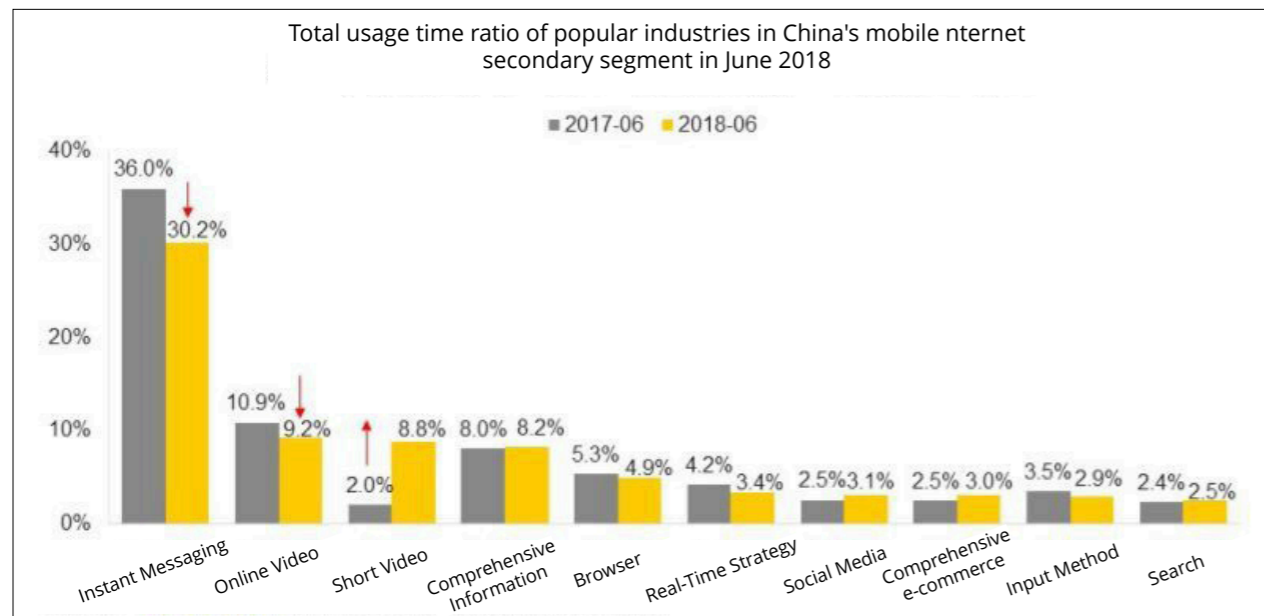
RESEARCH

Psychological Nursing of Inpatients

Nightingale, the pioneer of nursing, said more than a hundred years ago: "The object of nursing is not cold stone, wood and paper, but human beings with blood and life." With the transformation of medical model to bio-psychological social medical model, clinical nursing is bound to change from simple biological nursing to complete psychosomatic nursing.

For the patient, disease is a kind of heavy mental pressure, which may give rise to some pessimistic tendencies. Medical staff should pay close attention to the psychological problems of patients. The nursing service of medical staff plays a very important role in the recovery process of patients. Nurses should do well in psychological intervention for patients to promote the recovery of health.

Average Daily Usage of Phones



According to the "China Mobile Internet 2018 semi-annual report" released by Quest Mobile in June, Mobile Internet users in China are increasingly dependent on the Internet, spending 289.7 minutes (nearly 5 hours) per person per day.

Inpatient Observation

This images are a week-long observation of one of my research subjects. This is my Grandpa, who was briefly hospitalized for a week for minor surgery. I asked my mother, who was with me at my bedside, to take pictures of me often, and to observe and record them on video with me sometimes.



DAY 1- The patient is hardly allowed to get up and move. Need to lie down in bed. During the first day after surgery, the patient's head was not able to be raised or rotated frequently due to anesthesia and other medications. But through my observation, under the effect of the drug my grandpa appeared in the symptoms of anxiety, the whole person is very irritable. Unable to move his upper body and head, he resorted to shaking his legs to ease the discomfort.

DAY 2- He can have some simple activities, such as putting his upper body up to perform activities such as sitting up and chatting with clinical patients and family members.

DAY 3- He was able to move almost as freely as normal. Other parts of his body are free to move, except for a stayed needle in his arm, which will limit some of his movement. In these images, he can be seen trying to use the phone in different positions. Relieves body soreness from prolonged single postures. He said that if you don't use your cell phone for some entertainment, watching such scenes for a week can make normal people abnormal.

Interview



MIKE
72 YEARS OLD
1 WEEK

"My own hospitalization but also trouble children, they usually work has been very busy. And take time out to take care of me. I didn't want my daughter to come to see me when I was in the hospital."

"It was so boring during the hospital stay, the only activity every day was playing on my phone and talking to my buddies in the next bed. I don't know much about cell phones either."



DAVID
35 YEARS OLD
8 DAYS

"I hurt my leg playing football a few years ago and was hospitalized for about a week."

"The daily life of a patient with a leg injury like me is extremely boring. For the first two days I always had friends visiting me in the hospital, but then it was basically a long hospital stay. For the last three days, I felt like I was still, lying there every day without wanting to do anything, sitting in a wheelchair."



FIONA
47 YEARS OLD
48 HOURS

"During my stay in hospital, my eldest sister in the next bed had the same illness as me. Talking to her every day on her condition feels like two days pass quickly."

"I don't need to stay in bed when I'm in the hospital. I just need injections every day. So apart from my husband coming to the hospital to look after me, I didn't tell anyone."



KRYSTAL
23 YEARS OLD
5 DAYS

"I had a appendicitis surgery. I was young, so after the surgery I can walk on the ground 10h later. But then he spent five days in the hospital. The first day and the second day because of fear of intestinal adhesion so must go down to walk more."

"But lying in bed when the abdomen is not very dare to move. So can not hold the phone for a long time, arms and neck will be very sour."



SARA
32 YEARS OLD
6 MONTHS

"I am a single mother. All the stuff in the hospital. was finished by myself. I always tell myself that I must take care of my emotional problems. Believing that I can do it."

"When I was hospitalized, their always have doctors ask me where my family was. I always answer: I'm alone. I always feel sadness when I saw that people in other beds had relatives and friends visiting."



JESSICA
28 YEARS OLD
2 WEEKS

"I was once in a car accident in my senior year, when I couldn't move half my body and I had to lie on my side in one direction for four days."

"For those four days my head was clear, but my body was immobile. With a drain in his nose. Also not very able to speak, very painful."

Summary

- Inpatients spend the majority of their time lying in bed, and they need something other than electronic devices to help them pass the time.

- Medical environment has an important influence on patients' psychology. Simple and pleasing furnishings reduce anxiety and depression rather than exposing patients to complex medical instruments.

- Psychological conditions can influence mental symptoms. For example, irritability, insomnia, depression, anxiety, tension, loss of self-control and so on. Its disease is the cause, mental symptoms caused by psychological problems is the result.

- Some patients do not want to have their families or friends come to the ward to accompany them, for fear of troubling others. But at the same time they indeed want someone to accompany them.

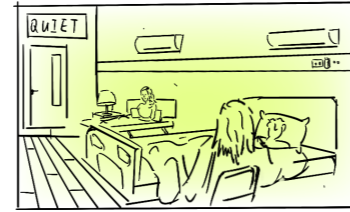
STORY BOARD



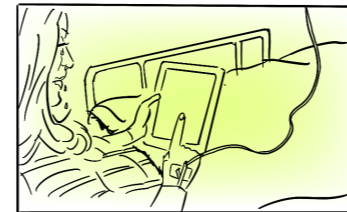
Sara, a single mother, goes to the hospital alone.



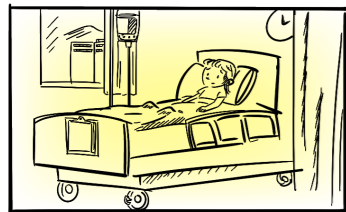
Register, line up and go through the admission procedures by herself.



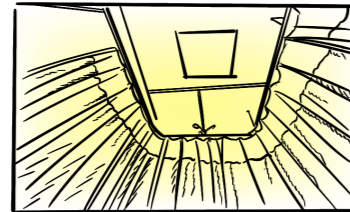
Patients in other beds were accompanied by family members.



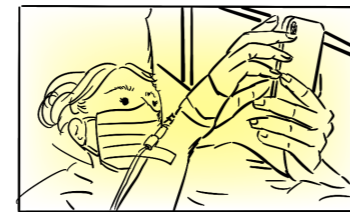
And she had to deal with her emotions alone.



Ya ya, because of acute appendicitis in the hospital surgery.



After operation she spent most of the day staring at the ceiling.

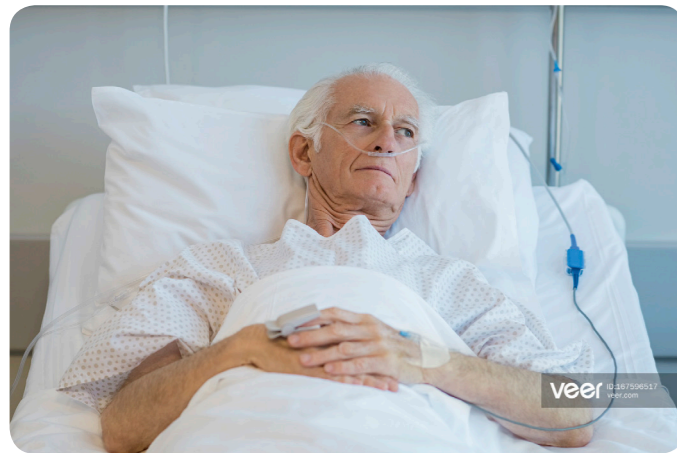


When she was bored, she would play with her phone, but her arms would get sore.



She stood in the hallway window looking out, hoping to be discharged soon.

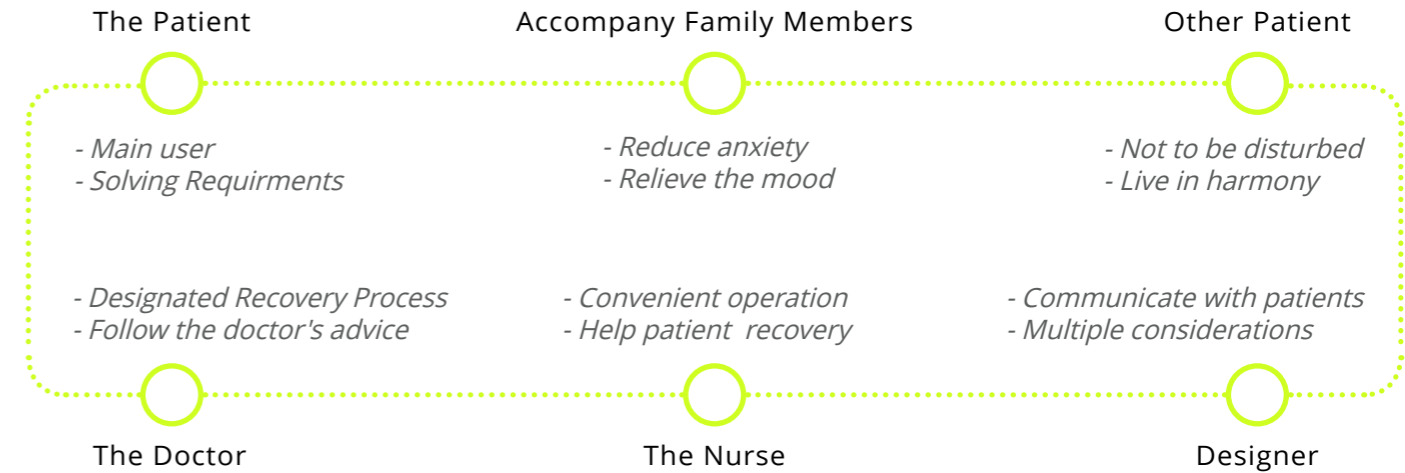
User & Environment



The user is not just the patient. The patient is not an individual in recovery. If the user is only the patient himself, it will appear lonely, may not have a positive effect, but will aggravate the patient's negative emotions.

So, a ward of patients, medical staff, family members and so on can have a connection and even a certain resonance with the patients themselves. Positive communication with others, such as encouragement from fellow patients, the company of family members and even the care of strangers, can make the patient's mood easier. This will help the patient recover.

STAKEHOLDERS



Design Opportunity

What if...

What if the design of a product, can let health care workers better understand the psychological quality and characteristics of patients, give emotional and psychological support. Help patients to build up optimistic attitude and confidence in treatment, improve patients' courage to overcome disease. The humanitarian aspect of care is highly critical. Health care workers are the people who have the most direct contact with patients. If they can treat patients like their own relatives to give a variety of care and help, can make patients to a certain extent to eliminate the fear of treatment and negative emotions.

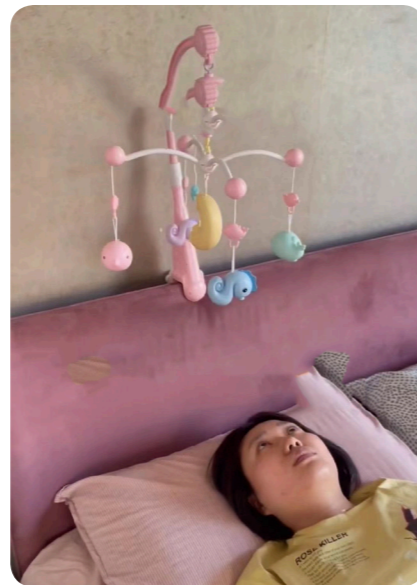
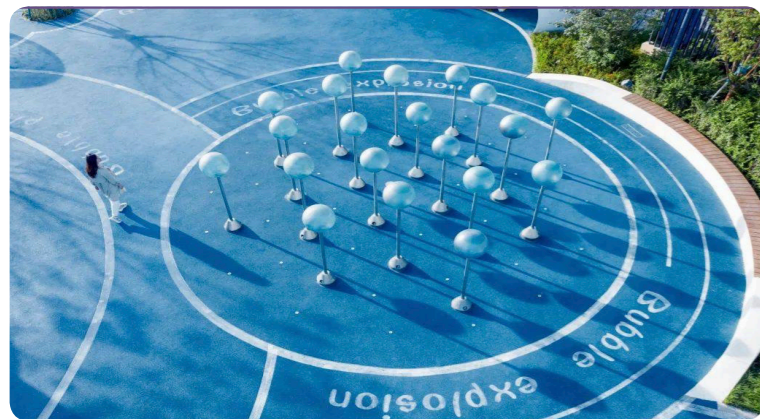
What if...

What if an interactive installations are designed in public areas of hospitals. So that patients' families and medical staff can also participate. Provide psychological support to patients who visit hospitals on their own. Can also carry on some relaxation training to the patient, help the patient learn self-care method, control the mood, exercise will, eliminate social psychological tension. Thereby improving the patient's recovery experience.

CONCEPT 1

First concept is emotional design, which is to design kind of installation can interact with people, and emotional delivery of products, give inpatients emotional and psychological support.

These public devices allow patients to interact with health care workers and family—provide a sense of encouragement and accompany. Or I can reconstruction the ward internal space to provide a relaxed atmosphere for patients.



EVALUATION: DESIGN CONSTRAINTS

After that I did some research about the requirements for design of hospital related products. Including design requirements of hospital wards, hospital ward rules and regulations. Sums up some design needs and constraints. I gradually stopped the concept 1.

Hospital environment is divided into four categories, all kinds of general wards and rooms belong to three categories of wards. General wards need to keep the wards tidy, comfortable, **safe** and **quiet**.

Unified ward furnishings, indoor goods and beds to be placed in order, fixed position, precision and valuable instruments are required to use and personal custody, not to change. Emergency passage does not pile up debris, ensure the passage is smooth.

Items for use by the patient should be **properly placed** for easy access.

Reception complaints staff should be **patient and careful**, carefully explain the work, avoid causing new conflicts.

Beds should be arranged parallel to the wall of the lighting window. Single row should not be more than 3 beds, double row not more than 6 beds.

Both sides of the ward walkway wall should be equipped with wall **handrails** and anti-collision facilities.

The inpatient department shall be a **separate area**, shall be set up with separate or shared access and shall be located in a quiet hospital environment and convenient transportation, It should have convenient contact with the medical technology department, the operation department and the emergency department, and should be close to the hospital energy source center, nutrition kitchen, laundry and other auxiliary facilities.

The nursing unit should meet the following requirements: There should be room, rescue, patient and medical staff toilet, toilet, bathroom, nurse station, doctor's office, disposal, treatment, changing duty, catering, storeroom, sewage washing and other rooms. Can be set up patients dining, activities, dressing, patients family talk, visiting, teaching and other rooms.

Please follow the prescribed schedule. Please **use earphones to listen** to radio and VCR. Not to use external power supply and electrical appliances.

The nursing department **set up a special person** to receive **nursing complaints**, listen carefully to complaints, so that patients will tell their own views, patiently appease complaints, and do a good record of complaints.

CONCEPT 2

After a series of understanding about ward product design standards and regulations. I repositioned my product design direction. Decided to embark on a redesign of the hospital bed related products.

In order to alleviate the patient's bad mood during hospitalization, hospitals now also provide many feasible solutions.

So I revisited the habits of people who use mobile phones in bed. Try to find new design opportunities and key insights that can differentiate from existing designs.

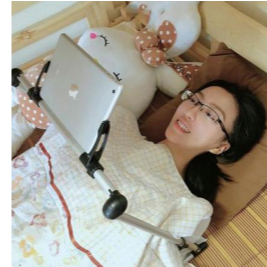
KEY FINDING

MARKET RESEARCH

There are many solutions among previous study, which can be broadly divided into the following categories. But according to market research, the existing design does not allow for the privacy of patient information in a multi-patient room. According to previous research, people spend most of their time swiping the phone with their fingers. Existing products do not offer a solution to this problem. It doesn't fundamentally free the user hands.

01

Support



02

Facilities



03

Robotic



04

Environment



When a person is lying on bad, if his arm is not lifted, his eyes and neck will look down toward the phone.



If he raises his arm to look at his phone, holding it for a long time can cause muscle strain in his wrist, elbow, and neck.

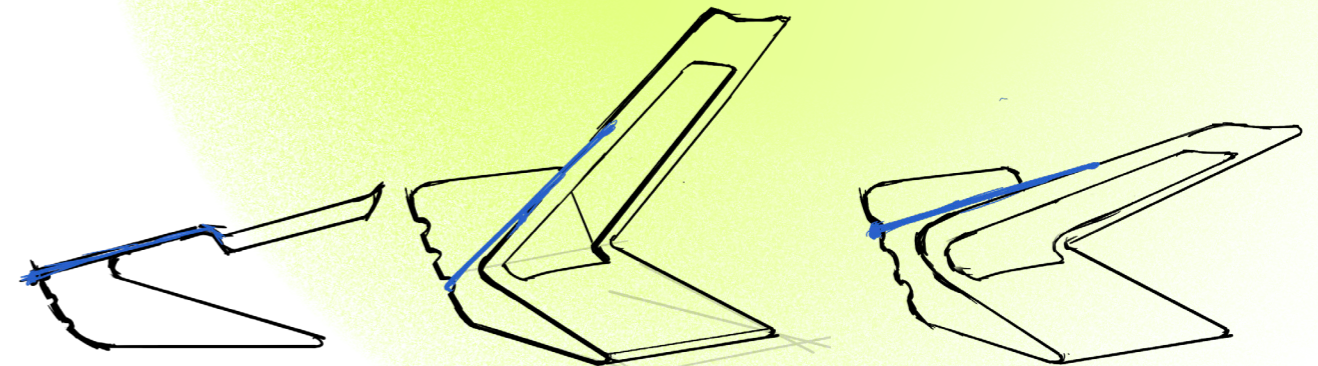
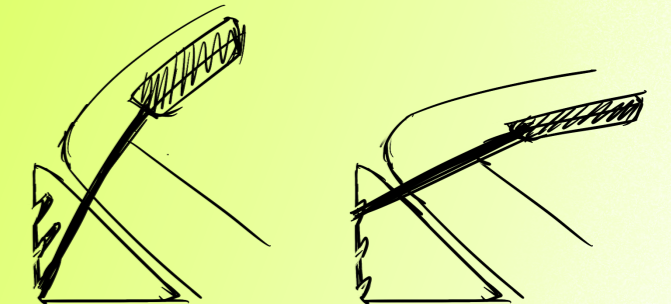
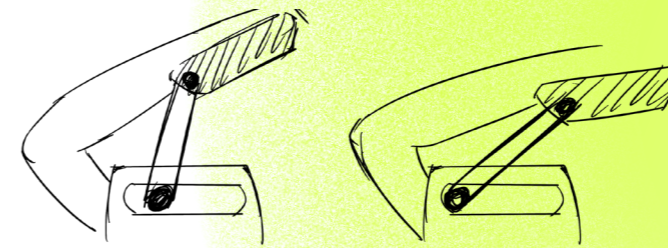
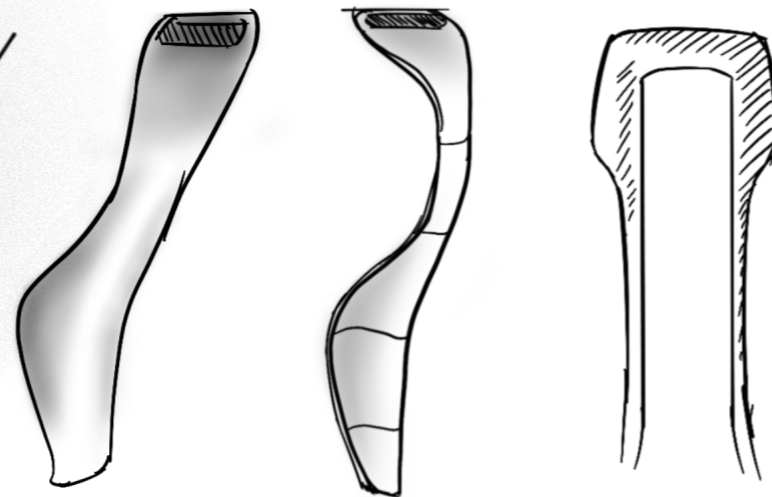
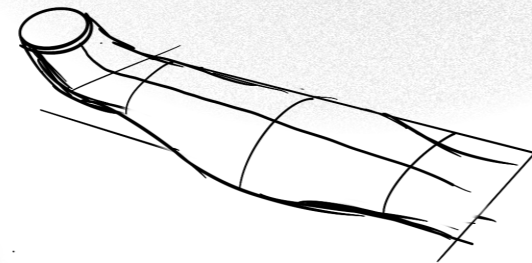
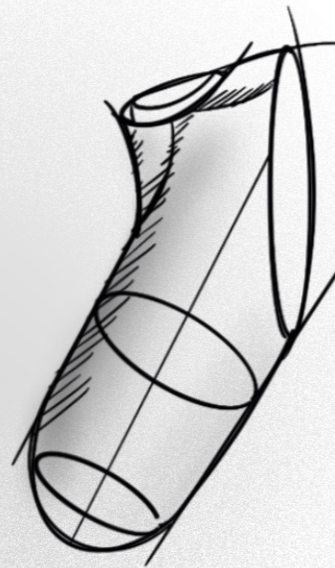
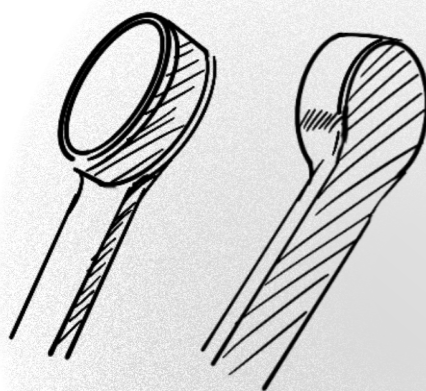
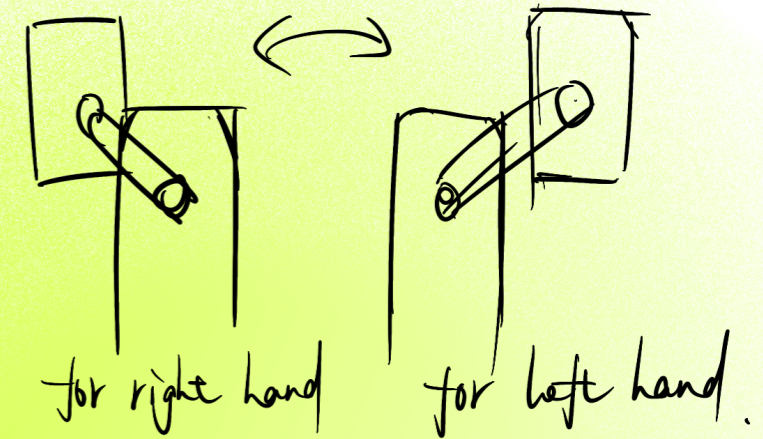
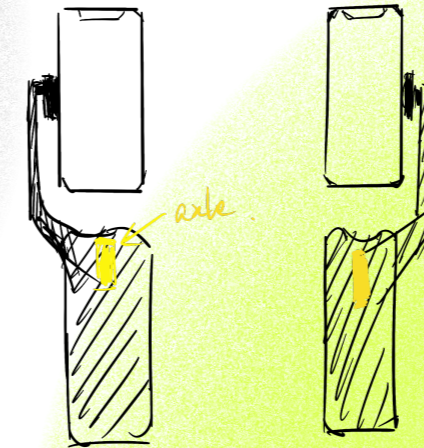
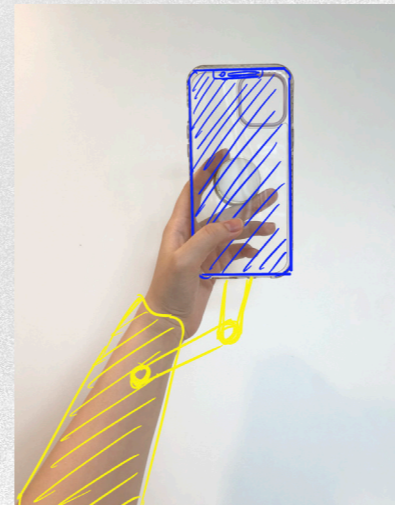
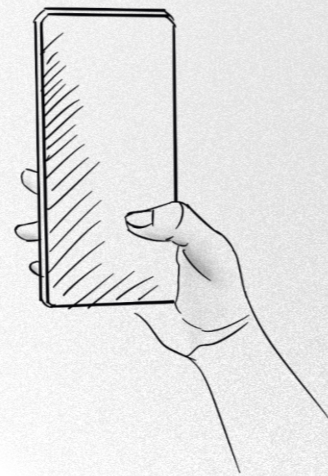
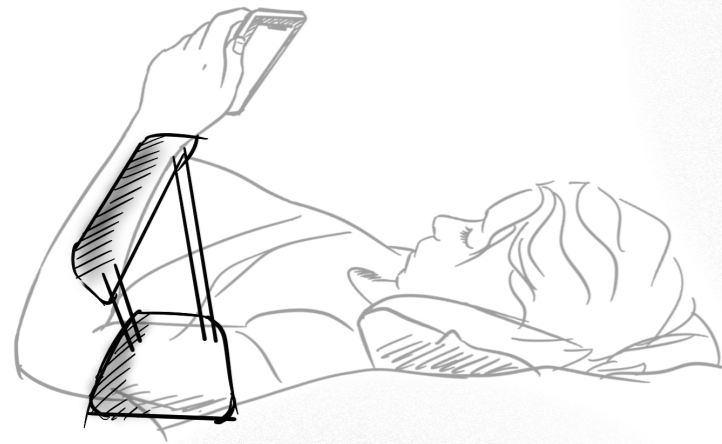
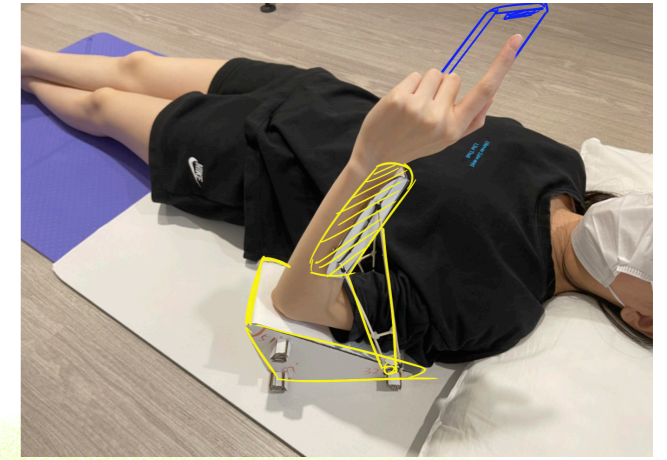
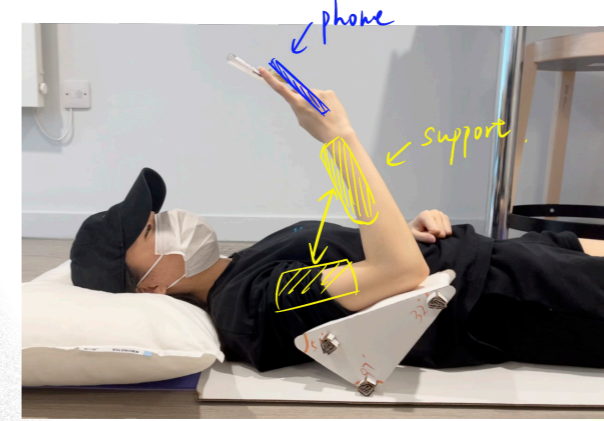
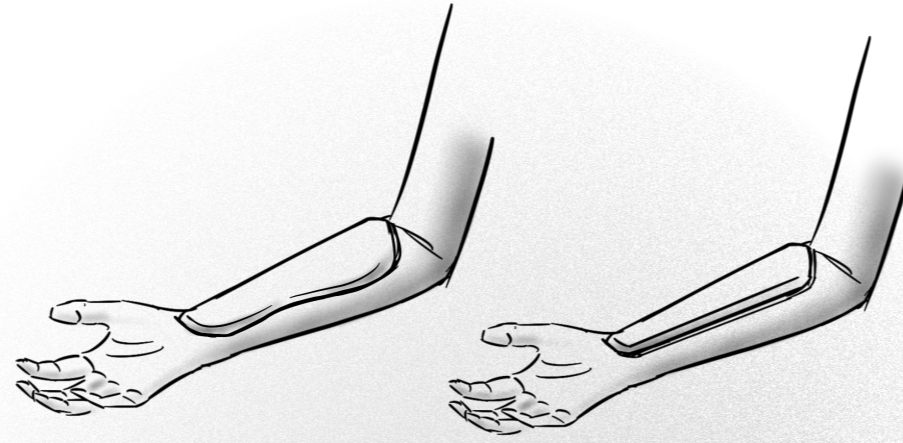


Holding phone for a long time will make the thoracic spine and cervical spine misaligned, muscle cramps.

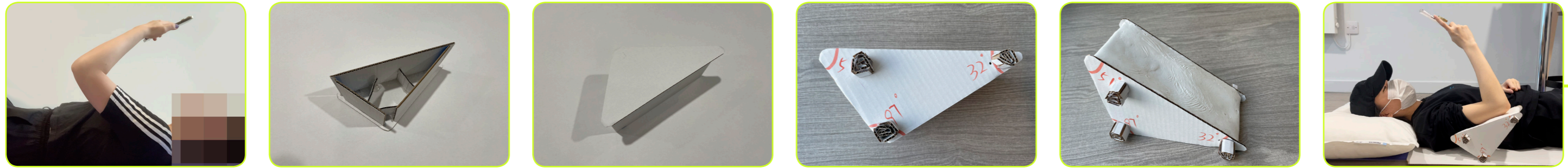
!!! He likes to tuck the quilt on the inside of his arm when he plays with his phone. He said the quilt can give the hand a support, can reduce the body discomfort to some extent.



DEVELOPMENT



PROTOTYPE & USER TEST



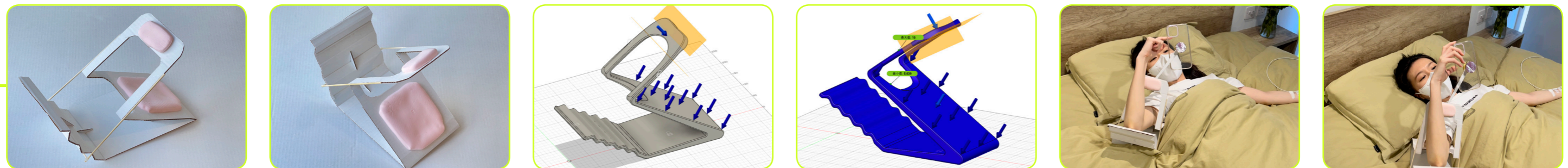
First I measured the angle of the arm in neutral position while lying on the phone. The more appropriate angles are 32 degrees and 51 degrees respectively.



There is a layer of cushion inside part of the arm, which can better fit the human body. But the first 'pull type' of force is not reasonable. The piece holding the arm will fall down and get stuck on the arm.

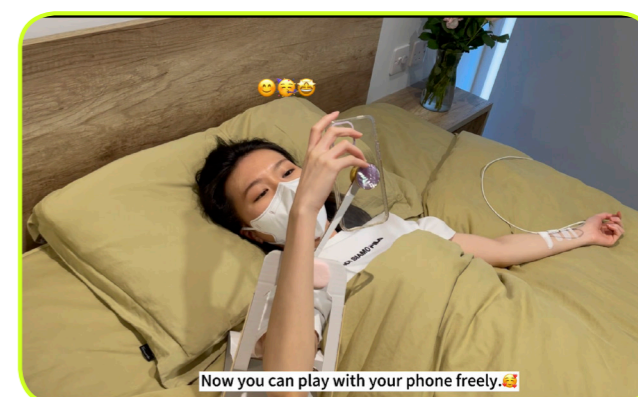
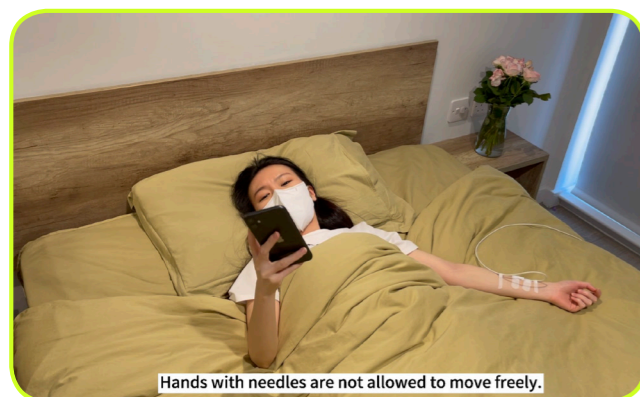
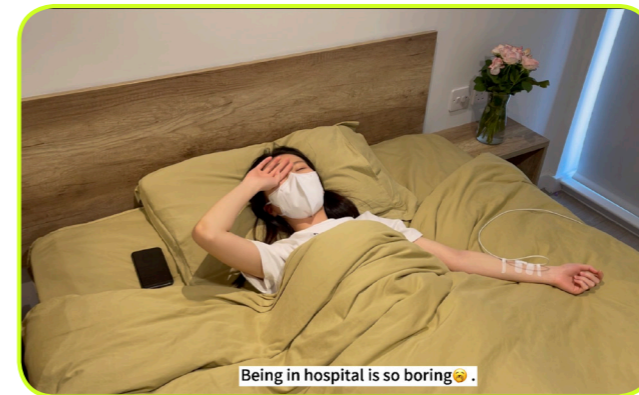


Then I did another kind of 'push type' to hold my arm. It seems reasonable. On the basis of this way I have carried on the scheme optimization.



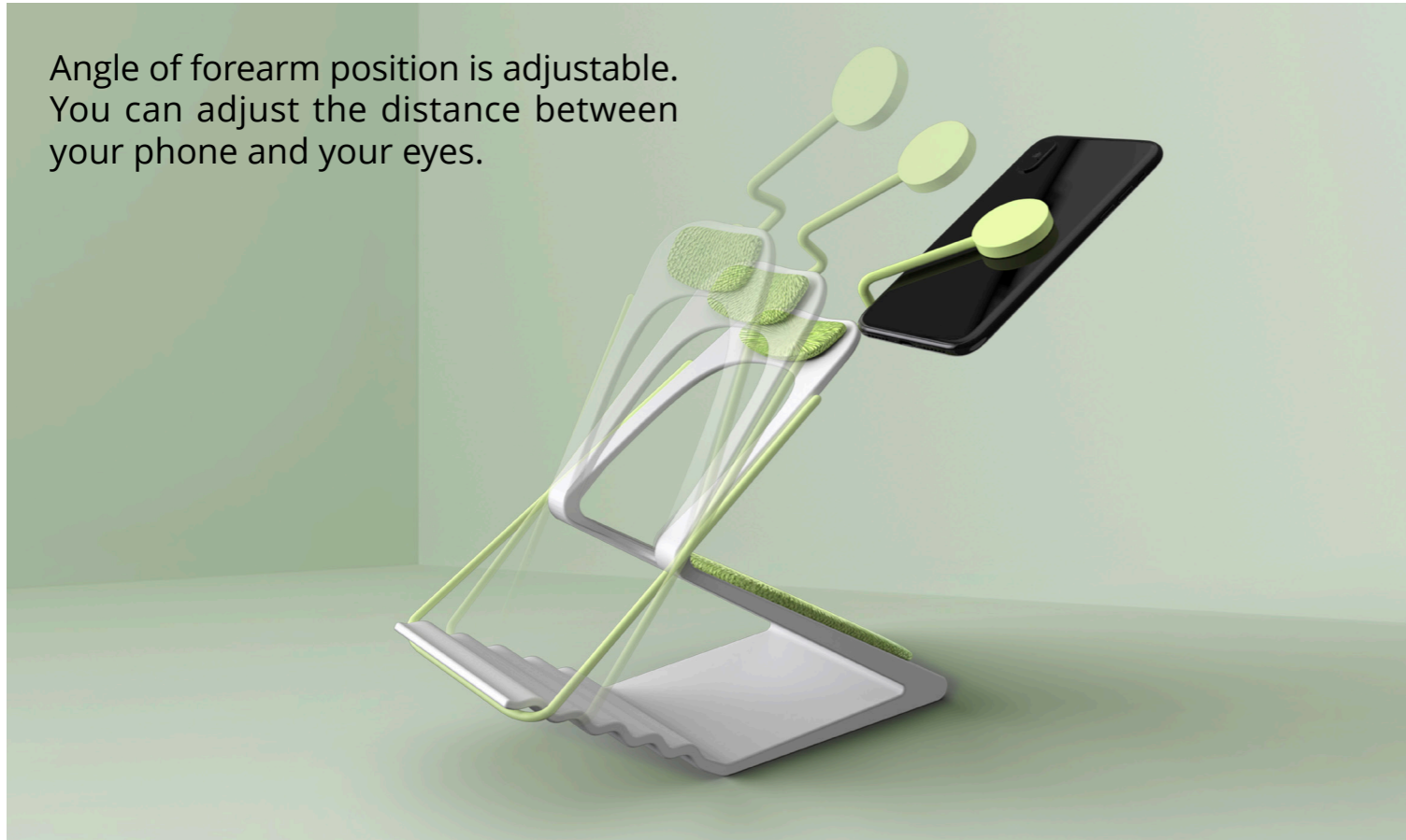
After considering the usability and manufacturing process and cost, I have made the final optimization design. In accordance with the function of the basis, the use of integrated molding technology to make the design.

USER JOURNEY

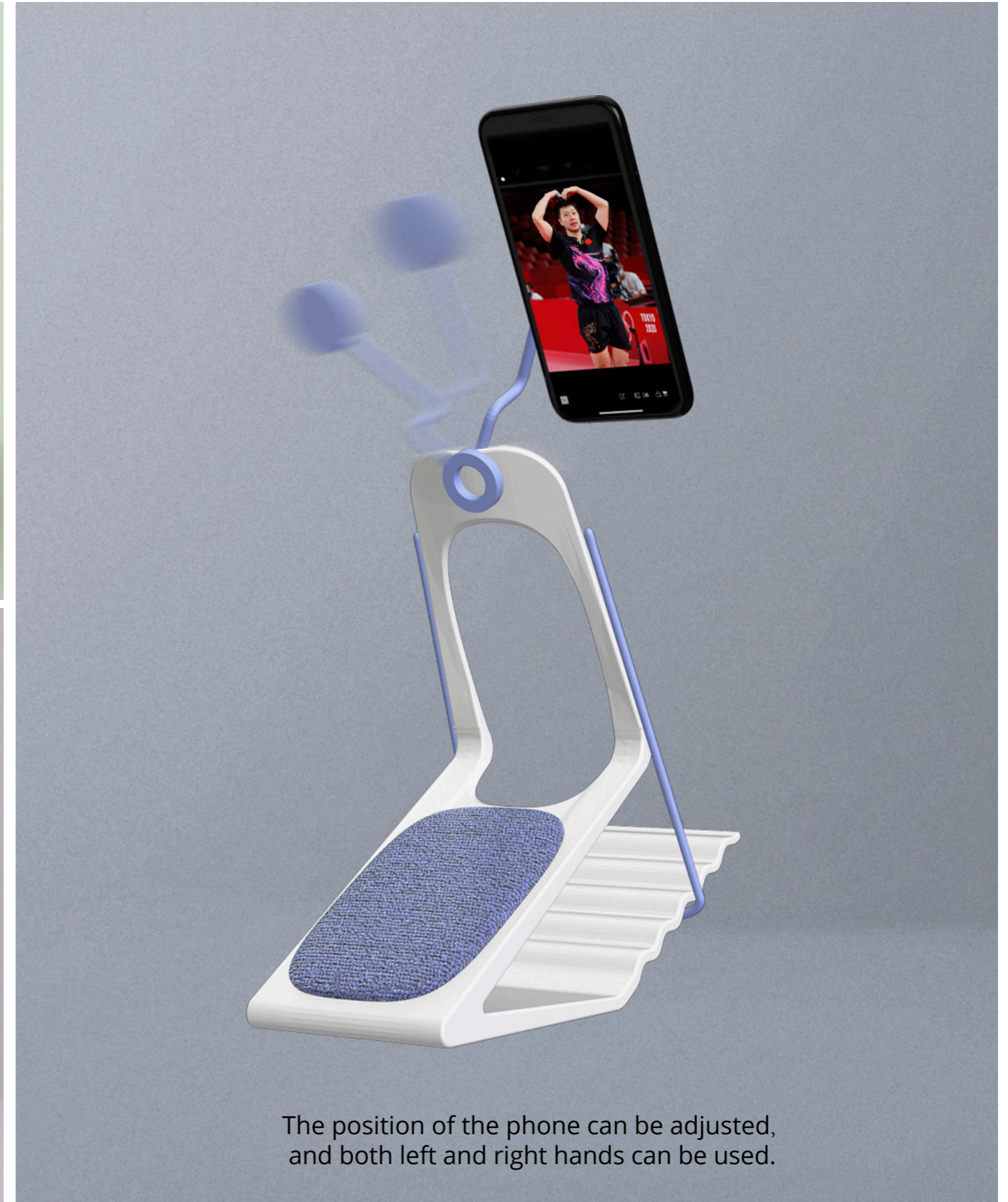


DESIGN DETAILS

Angle of forearm position is adjustable. You can adjust the distance between your phone and your eyes.



Magnetic phone holder can hold the phone firmly.



The position of the phone can be adjusted, and both left and right hands can be used.

MANUFACTURE

Rod's parts are mainly made from high quality solid stainless steel and are machined into the desired shape by bending machines and cutting machines. Then it can be painted to achieve the desired effect.



Rod



Magnetic Base Phone Holder



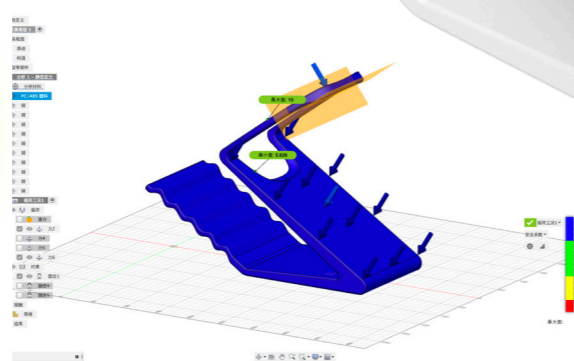
Neodymium magnet inside the suction head, through the high intensity magnetic field suction, firmly absorb the mobile phone does not fall.

Limit Damping Shaft

In order to allow both left and right hands to use this product, a limit damping rotary shaft is designed on one end of the bending bar connected to the mobile phone.



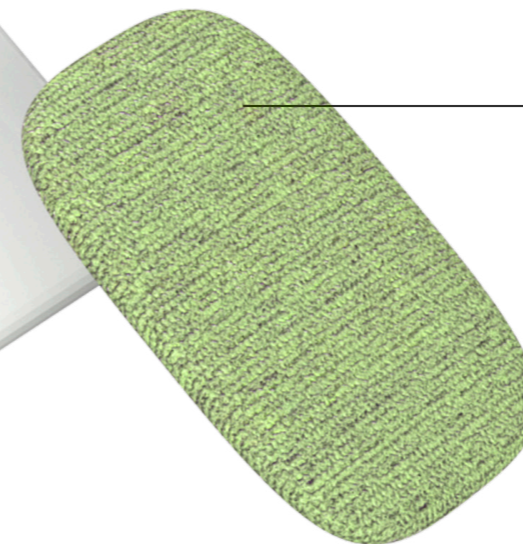
Main Body



After material research and FEA, the main body of this product is made of TPU. The soft and hard characteristics of TPU between rubber and plastic. Different hardness products can be obtained by changing the proportion of each reaction component of TPU.

Mat

This part of the surface material using polypropylene fireproof woven cloth technology. This product has superior breathability, durability, fire resistance and water resistance. The products used in hospitals require a high degree of hygiene, which can be easily sterilized and cleaned.



USAGE SCENARIO



REFLECTION

This project starts from the experience of short-term inpatient, and deeply digs into the psychological behavior of this user group. The reason of some patients' psychological problems was found. Through a series of user research methods to obtain the psychological needs of this minority special group. These findings suggest that the hospitalization experience and psychological problems experienced after hospitalization have a significant association with the recovery of patients. At the same time, this project provides a direction for improving the mental transformation of inpatients during the recovery period.

This article investigates past scholars' solutions to this problem and finds knowledge gap in the field of study and made up for the blank here. Through continuous design iterations, user testing, define the main functional architecture of the product. And from the aesthetic point of view to design services for the product function of the overall shape. Finally, the process and assembly of each part of the product are discussed, and the design scheme is given.

The generalizability of these results is subject to certain limitations. For instance, the flexibility of this product is not very high. At present, it is only possible to adjust the distance between the phone and the eye, and the angle between the upper arm and the bed is fixed at 32 degrees. There is a lot of room for improvement in the way people interact with products. More changes could also be made in terms of integration with the ward's existing products.

FUTURE WORK

This research has thrown up many questions in need of further investigation. Such as a cost budget for each component. More broadly, research is also needed to determine Precise product sizes as well as very specific product ingredients. It is suggested that the association of these factors is investigated in future studies.

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