

ANTE SVÄRD NILSSON

BACHELOR

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LUND
UNIVERSITY

PAIN HELP

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2020

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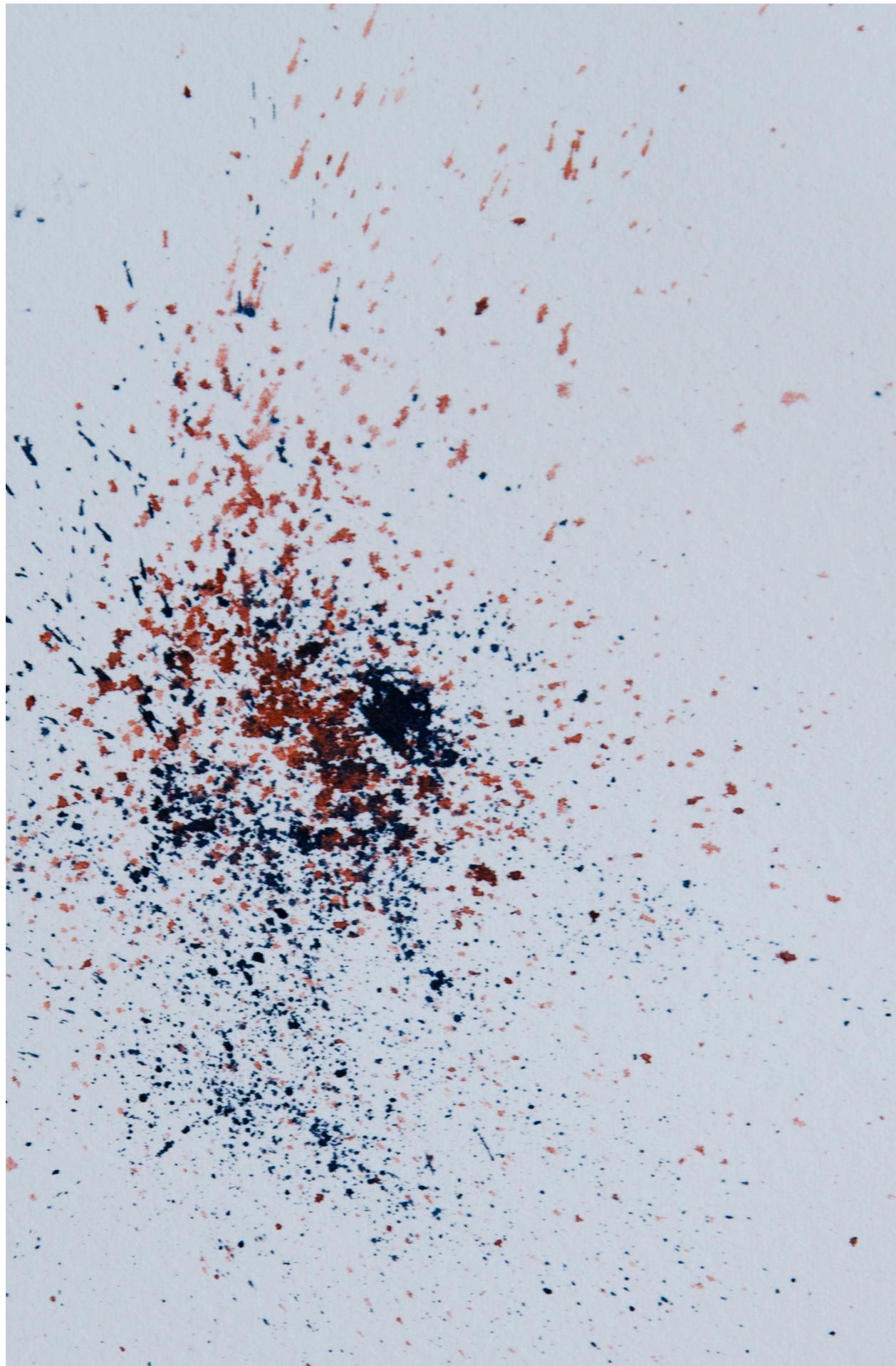
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Contents

Abstract	1
Initial Brief	5
Research	7
The Story	31
Ideation	39
Final Product	47
Discussion	87
Recognitions	88
References	89



ABSTRACT

Who hasn't had a close one who suffered from pain, who hasn't suffered from pain themselves? It might have been chronic pain, it might have been acute pain or something else. For many of us describing pain can be close to impossible. You might not know the right words to use and try to use metaphors to express the pain you are in, to a doctor. Despite being such a common sensation, pain can be surprisingly hard to explain.

The aim of my bachelor project is to fill this gap and make it easier for patients to understand and explain their pain. I used research and interviews to gain a deeper understanding of what pain is and how the perception of pain changes from individuals. Using my interviews as a base, I developed graphical representations of the most common pain types, as a way to make it easier for patients to understand their pain.

"Pain hinders me in my life. It prevents me from doing things I want to do, it forces me to use aid to get out of the apartment and move around. It hinders me from living the life I want to live."

-Anonymous interviewee

This is the story of how I got the idea for my bachelor project, lovingly called Pain Help (PH for short).

It was a late and rainy night, I was sitting on a train on my way home to Lund from a visit to my hometown Karlskrona. Suddenly I noticed pain coming from one of my knees, earlier that year I had been at a healthcare center with the same problem. My experience there was short, stressed, fairly unpleasant and I couldn't find the right word to explain the pain I was in. I got a referral to a physiotherapist, I went there a few times to get going with my training program and eventually started doing it by myself.

On this night it had been a few months since I last had the opportunity/remembered to train my knee, so I was not surprised when it started hurting again. This got me thinking about how it would have been if I knew how to explain the pain I felt. Would I have

got a different treatment? Would my experience at the healthcare center been better? I started talking to my friends and family about my experience at the healthcare center and how they explain pain to others. Here I noticed that people often lack the vocabulary to accurately explain pain to others often falling back on metaphors to express it.

It was from this experience and talking to my friends and family about their experience of pain, I developed my brief.

Here I made a decision that would lead my thought process throughout the project, focus on the patients rather than the nurses and doctors. This resulted in my essential goal of this project, to develop some sort of system to make it easier for patients to explain their pain to healthcare professionals, and for patients to get a better understanding of their own pain.

INITIAL BRIEF

How to visualize pain



RESEARCH

What is pain?

From a combination of research and talking to people about what pain actually is, I came to the following conclusion. Pain one of the most fundamental feelings that humans and animals can feel. It can be annoying, traumatic, irritating, shocking, and some might even find it pleasurable. But what exactly is pain?

Pain is a defense mechanism, it exists so that we can prevent further tissue damage to our body. Pain is felt when the pain receptors detect tissue damage and transmit the signal to the

brain through the spinal cord. Every person experience pain in different ways there is as well different ways to explain it and feel it. ANd this is one of the reasons why it can be difficult to explain pain to others.

There are different main categories of pain. These categories range from somatic pain to acute pain and a few more. To gain a better understanding of what pain is and how it is categorized, I did research on the different pain categories.

Acute-pain is short-term pain that comes on suddenly and has a specific cause, usually tissue injury. Generally, it lasts for less than six months and goes away once the underlying cause is treated.



Visceral-pain is the result of injuries or damage to the internal organs, this pain is usually felt in the trunk part of the body. It is often hard to give the visceral pain an exact location for where it is.

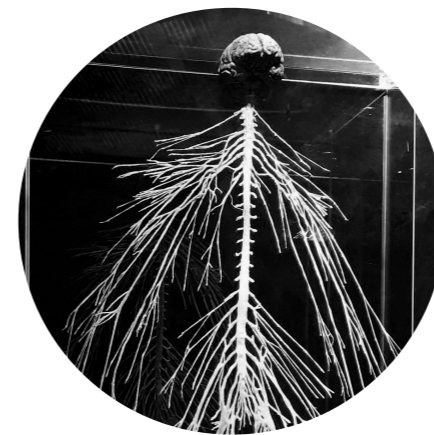
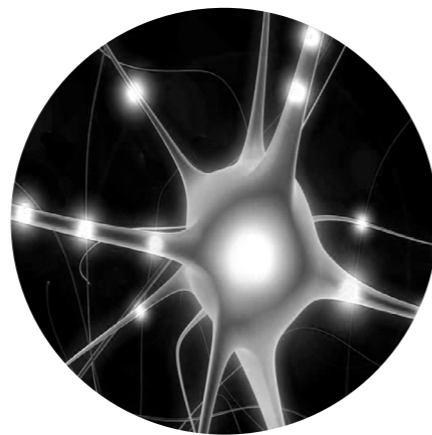


Chronic-pain is pain that lasts for more than 6 months after the original injury has healed. It can last for years and can range from mild to severe on any given day. Chronic pain is a common problem in today's stagnant society. Without proper management, it can start to impact one's quality of life.

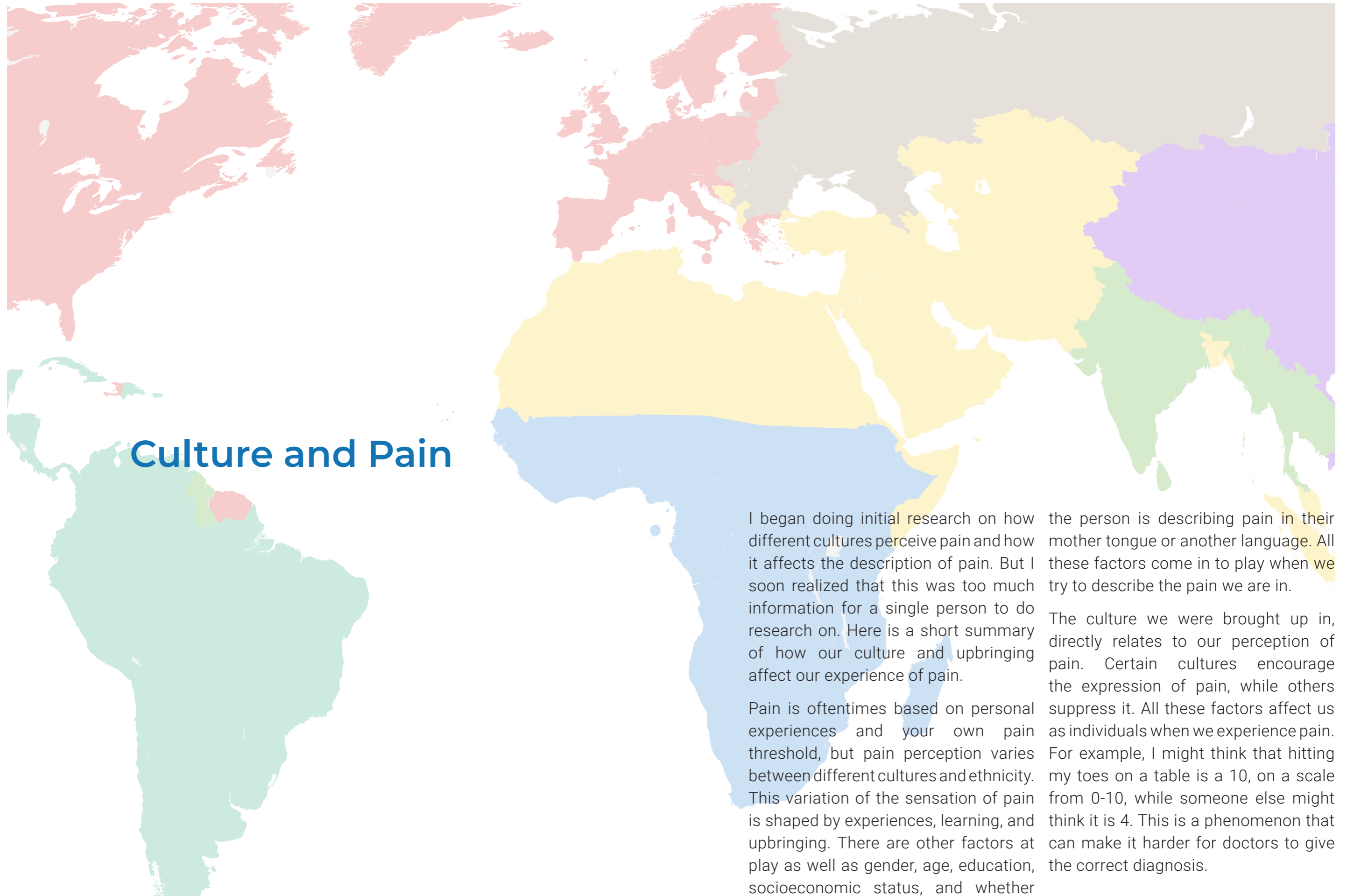
Somatic-pain is caused by the stimulation of the pain receptors in the tissue. This includes the skin, muscles joints, connective tissue, and bones. Compared to visceral pain somatic pain is easier to pinpoint where the location of the pain is.



Nociceptive-pain is the most common pain type that exists. This is caused by the stimulation of the pain receptors in tissue. The nociceptors exist through the body, especially in the skin and internal organs. They are usually activated through tissue injury like cuts or blunt-force trauma.



Neuropathic-pain is damaged or the dysfunction of the nervous system. It comes when the damaged or dysfunctioning nerves misfire, the pain seems to come out of nowhere.



Culture and Pain

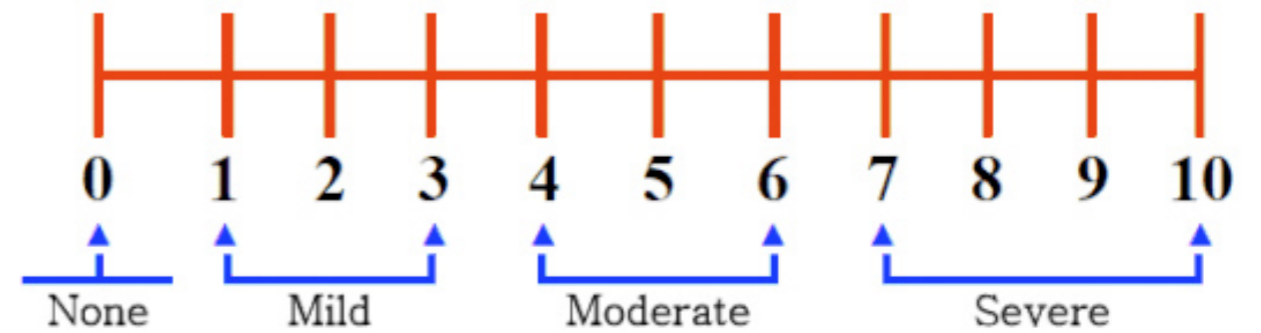
I began doing initial research on how different cultures perceive pain and how it affects the description of pain. But I soon realized that this was too much information for a single person to do research on. Here is a short summary of how our culture and upbringing affect our experience of pain.

Pain is oftentimes based on personal experiences and your own pain threshold, but pain perception varies between different cultures and ethnicity. This variation of the sensation of pain is shaped by experiences, learning, and upbringing. There are other factors at play as well as gender, age, education, socioeconomic status, and whether

the person is describing pain in their mother tongue or another language. All these factors come in to play when we try to describe the pain we are in.

The culture we were brought up in, directly relates to our perception of pain. Certain cultures encourage the expression of pain, while others suppress it. All these factors affect us as individuals when we experience pain. For example, I might think that hitting my toes on a table is a 10, on a scale from 0-10, while someone else might think it is 4. This is a phenomenon that can make it harder for doctors to give the correct diagnosis.

What kind of pain scales do hospitals use today?



Numerical Rating Pain Scale

One of the most common pain scales in health care. As the name suggests it is based around a number system where 0 is no pain and 10 is the most severe pain imaginable by the patient.

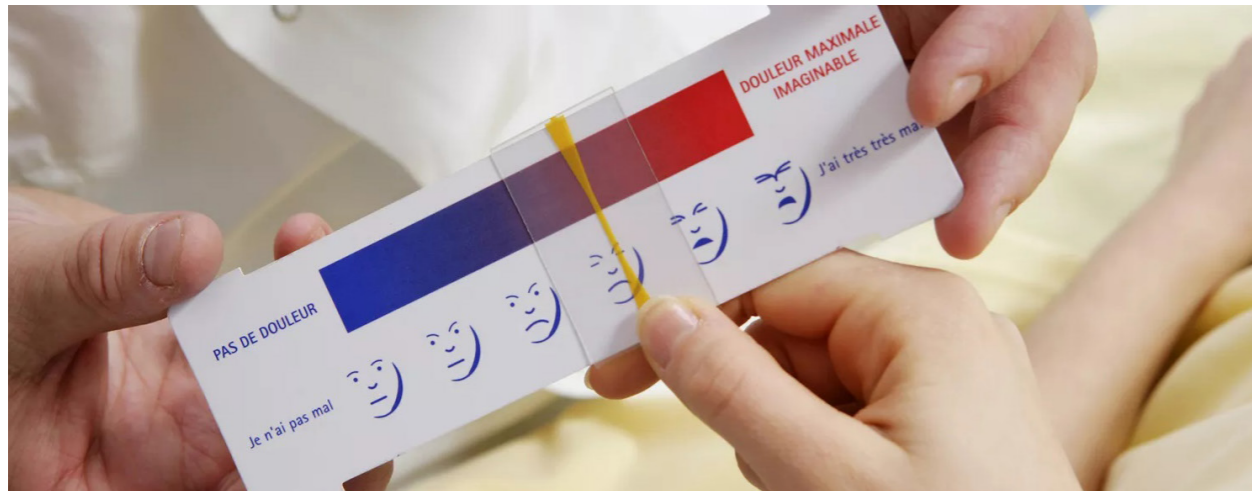
Wong-Baker FACES Pain Rating Scale



From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: Wong's Essentials of Pediatric Nursing, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

Wong-Baker Faces Pain Scale

This scale combines pictures and numbers for pain ratings. It is designed with children in mind.



Color Analog Scale

The color analog scale works similarly to the Numeric Rating Pain Scale, with red representing severe pain, blue representing comfort, and the gradient representing moderate pain and blue representing comfort.

Numeric Pain Intensity Scale
The typical numeric scale to gauge pain is from 0 to 10, with 0 being no pain, and 10 being very severe, intolerable level of pain. The scale below explains the numbers.

Mankoski Pain Scale	
0 Pain Free	No medication needed
1 Very minor annoyance-occasional minor twinges	No medication needed
2 Minor annoyance-occasional strong twinges	No medication needed
3 Annoying enough to be distracting	Mild painkillers are effective. (Aspirin, Ibuprofen)
4 Can be ignored if you are really involved in your work, but still distracting	Mild painkillers relieve pain for 3 to 4 hours
5 Can't be ignored for more than 30 minutes	Mild painkillers reduce pain for 3 to 4 hours
6 Can't be ignored for any length of time, but you can still go to work and participate in social activities	Stronger painkillers (Codeine, Vicodin) reduce pain for 3 to 4 hours
7 Makes it difficult to concentrate, interferes with sleep. You can still function with effort.	Stronger painkillers are only partially effective. Strongest painkillers relieve pain (Oxycontin, Morphine)
8 Physical activity severely limited. You can read and converse with effort. Nausea and dizziness set in as factors of pain.	Stronger painkillers are minimally effective. Strongest painkillers reduce pain for 3 to 4 hours.
9 Unable to speak. Crying out or moaning uncontrollably - near delirium.	Strongest painkillers are only partially effective
10 Unconscious. Pain makes you pass out.	Strongest painkillers are only partially effective.

Source: www.wells.com/and/pain/scale

Mankoski Pain Scale

The Mankoski pain scale uses numbers and corresponding descriptions of pain so you can be sure that you and your healthcare provider understand each other.

Date: ___/___/___ Time: _____
Name: Last First Middle initial

1) Throughout our lives, most of us have had pain from time to time (such as minor headaches, sprains, and toothaches). Have you had pain other than these everyday kinds of pain today?
1. Yes 2. No

2) On the diagram, shade in the areas where you feel pain. Put an X on the area that hurts the most.

3) Please rate your pain by circling the one number that best describes your pain at its **worst** in the past 24 hours.
0 1 2 3 4 5 6 7 8 9 10
No Pain as bad as you can imagine

4) Please rate your pain by circling the one number that best describes your pain at its **least** in the past 24 hours.
0 1 2 3 4 5 6 7 8 9 10
No Pain as bad as you can imagine

5) Please rate your pain by circling the one number that best describes your pain on **average**.
0 1 2 3 4 5 6 7 8 9 10
No Pain as bad as you can imagine

6) Please rate your pain by circling the one number that tells how much pain you have **right now**.
0 1 2 3 4 5 6 7 8 9 10
No Pain as bad as you can imagine

7) What treatments or medications are you receiving for your pain? _____

8) In the past 24 hours, how much **relief** have pain treatments or medications provided? Please circle the one percentage that most shows how much relief you have received.
0% 10 20 30 40 50 60 70 80 90 100%
No Complete relief

9) Circle the one number that describes how, during the past 24 hours, pain has **interfered** with your:

A. General activity
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

B. Mood
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

C. Walking ability
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

D. Normal work (includes both work outside the home and housework)
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

E. Relations with other people
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

F. Sleep
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

G. Enjoyment of life
0 1 2 3 4 5 6 7 8 9 10
Does not interfere Completely interferes

Brief Pain Inventory Scale

BPI uses a worksheet with 15 questions that where you rate the effect of your pain on categories such as how you relate with other people, walking and sleep over the last 24 hours.

	DATE/TIME				
Face					
0 - No particular expression or smile					
1 - Occasional grimace or frown, withdrawn, disinterested					
2 - Frequent to constant quivering chin, clenched jaw					
Legs					
0 - Normal position or relaxed					
1 - Uneasy, restless, tense					
2 - Kicking, or legs drawn up					
Activity					
0 - Lying quietly, normal position, moves easily					
1 - Squirming, shifting back and forth, tense					
2 - Arched, rigid or jerking					
Cry					
0 - No cry (awake or asleep)					
1 - Moans or whimpers; occasional complaint					
2 - Crying steadily, screams or sobs, frequent complaints					
Consolability					
0 - Content, relaxed					
1 - Reassured by occasional touching, hugging or being talked to, distractible					
2 - Difficult to console or comfort					
TOTAL SCORE					

FLACC Scale (Face, legs, activity, crying and consolability)

This is a system that was developed to help medical observers asses the pain level in children. By recording the FLACC score periodically, healthcare providers can gain some sense of whether someone's pain is increasing, decreasing, or stable.

CRIES Scale (Crying, oxygenation, vital signs, facial expressions and sleeplessness)

CRIES has often used to asses the pain level in infants 6 months old and younger and it is also widely used in the neonatal intensive care setting.

	DATE/TIME				
Crying - Characteristic cry of pain is high pitched.					
0 - No cry or cry that is not high-pitched					
1 - Cry high pitched but baby is easily consolable					
2 - Cry high pitched but baby is inconsolable					
Requires O₂ for SaO₂ < 95% - Babies experiencing pain manifest decreased oxygenation. Consider other causes of hypoxemia, e.g., over sedation, atelectasis, pneumothorax)					
0 - No oxygen required					
1 - < 30% oxygen required					
2 - > 30% oxygen required					
Increased vital signs (BP* and HR*) - Take BP last as this may awaken child making other assessments difficult					
0 - Both HR and BP unchanged or less than baseline					
1 - HR or BP increased but increase in < 20% of baseline					
2 - HR or BP is increased > 20% over baseline.					
Expression - The facial expression most often associated with pain is a grimace. A grimace may be characterized by brow lowering, eyes squeezed shut, deepening naso-labial furrow, or open lips and mouth.					
0 - No grimace present					
1 - Grimace alone is present					
2 - Grimace and non-cry vocalization grunt is present					
Sleepless - Scored based upon the infant's state during the hour preceding this recorded score.					
0 - Child has been continuously asleep					
1 - Child has awakened at frequent intervals					
2 - Child has been awake constantly					
TOTAL SCORE					

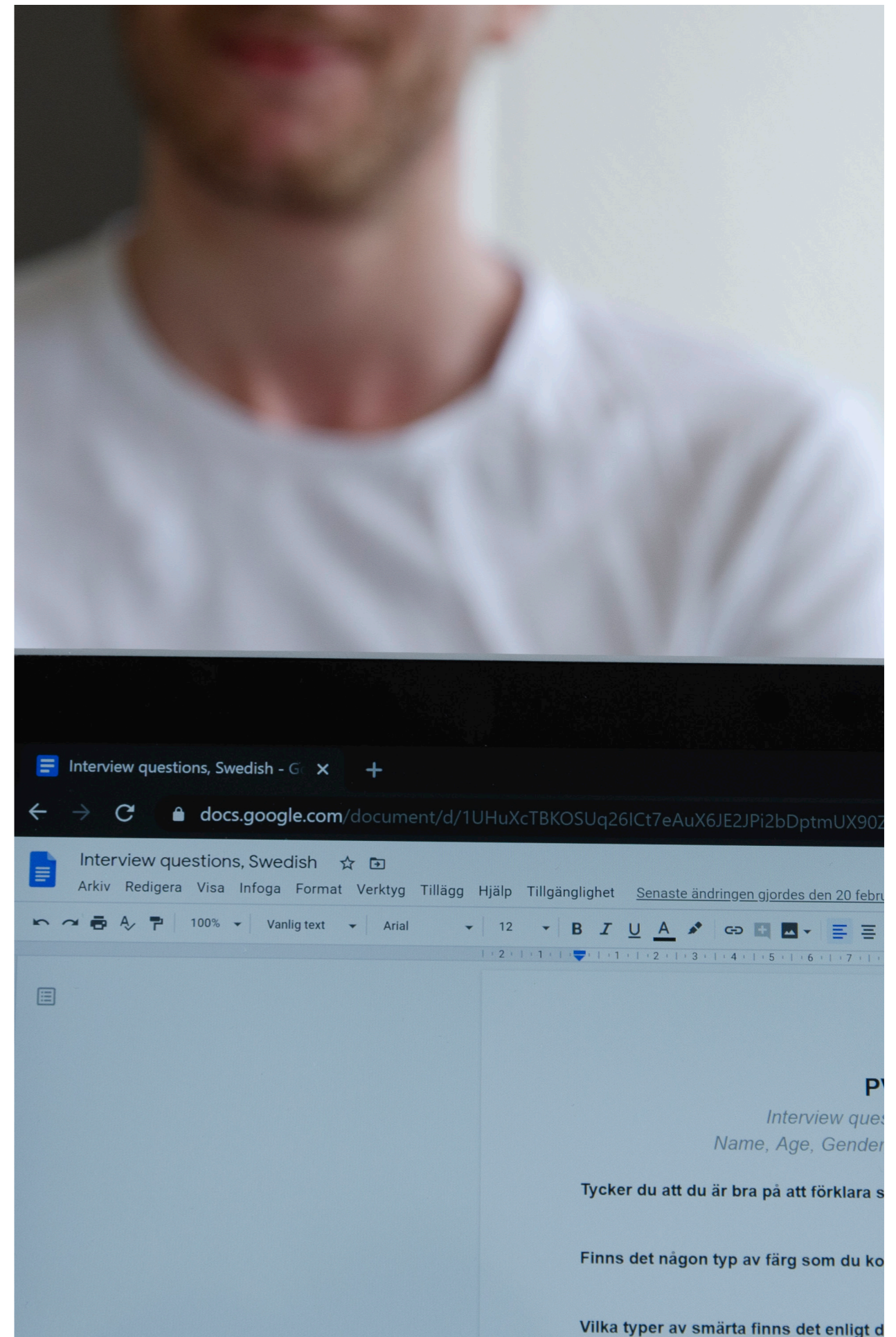
Conclusion

A lot of these pain scales rely on the patient's own experience of pain and how high their own pain threshold is. But it also relies on a certain empathy from the healthcare provider so that they won't dismiss the patient's perception of their pain. This is also the biggest problem with these systems, that the experience of pain is so personal from patient to patient that you can't get a concrete answer.

Of all these systems, the only one I as a potential patient can relate to is the Mankoski Pain Scale because it is created for the patient to healthcare

worker interaction. In other words, it makes it easier for the healthcare worker to empathize with the patient and it creates a deeper understanding between them.

Interviews



The main reason I choose to conduct interviews was that I wanted to gain a deeper insight into how different people perceive pain. This has been one of the most fundamental parts of my research, I wanted to put the users in focus when I developed this solution for this very common problem. The interviews have been a very fundamental part of my research process. I gained a lot of insights into how people's perception of pain can change depending on how old they were, what they did for a living, and to a certain extent how their upbringing shaped their notion of pain.

Summary of interviews

The goal of this study was to find out how people relate to pain. I also want to note that the participants in this study were a very culturally homogenous group, this has led to the product being developed for the Scandinavian market. If it was to be introduced in another market, for example, southeast Asia, there would be a need for a similar study so the product can be adapted to their culture.

The participant's ages ranged from 22 to 80 years old.

Interview summary

Do you think you are good at explaining pain? Scale 1-10

The average value before the interview was complete was 6, but after finishing the interview the question was asked once again.

After the interview was done the average value is 4, it should also be noted that the usual trend in the study indicates that people usually feel very comfortable in explaining pain until they have to do it. There was only one instance where an interviewee actually raised their number after the interview.

Are there any kinds of color that you associate with pain?

Participants could choose more than one color. The numbers after the colors represent how often the colors were chosen.

Red: 8

White: 4

Purple: 2

Puke green: 1

No: 1

Not surprising the most commonly chosen color was red, this might be due to our cultural heritage, comics, cartoons and so on.

What different kinds of pain exist according to you?

The results from here are possible to see in the pain glossary. But there were a few different trends. The most notable thing was what different age groups focused on, the younger participants often included psychosomatic pain when the older ones often didn't take it into consideration.

What is pain for you?

To summerise this part, pain is something that is uncomfortable, takes focus away from your normal life, it can be long-lasting and painful. Psychosomatic pain is generally worse than physical pain in the long term.

I also got a very good quote from a person who has had pain in his back for over 39 years. I won't translate it into English because I personally believe that it won't do the quote justice.

"Som regel går jag med smärta ständigt och försämra min livssituation, jag kan inte göra det jag vill göra. Både mitt självförtroende sänks av det och mitt humör, jag blir inte den människan jag vill vara.

Det är en lång pina."

What causes pain and discomfort according to you?

Here there were no differences between the different age groups. It was usually focused around physical pain rather than psychosomatic pain. You can find the answers in the glossary.

You have hit a toe in a table. Describe the pain and how it makes you feel

In general, the older you were the better you were at explaining how the pain felt to you. It was often described as something quick and intensive, and it would numb off after a while.

Can you explain these words?

In this section, there is hard to find similar explanations for the same word. It often depended on what the individual had experienced earlier in their life. But there were two words that the majority couldn't explain, it was "Molande" and "Ilande". But other words were very obvious what they meant like "Burning".

It should also be noted that these words are 1177 official words in Swedish to explain pain to healthcare workers.

How often do you feel pain?

The answers here ranged from every day to just a few times a month.

Do you have pain right now? If not when was the last time you felt pain?

This question is hard to summarise

Can you describe it with our own words?

They could usually describe it in some kind of way, in general, the older the interviewees were the better they were at it..

How does it make you feel?

It usually made them feel unfocused, irritated, the anxiety about what is wrong, angry and tired. The answers varied on how often the interviewee had pain.

The interviews have been a fundamental part of my research process. I gained a lot of insights into how people's perception of pain can change depending on how old they were, what they did for a living, and to a certain extent how their upbringing shaped their notion of pain.

One of the most interesting trends from the interviews was on the question "Do you think you are good at explaining

pain? Scale from 1-10". This question was repeated twice, at the start of the interview and at the end of the interview. There was only one person of the interviewees that actually raised his/her number on the scale at the end of the interview. This shows that people generally are overconfident in their abilities to explain their own experience of pain and what they think they know doesn't always reflect reality.

Glossary of pain

The main portion of the glossary is based on what the interviewees thought about what pain is. There is also apart from the Macmillan dictionary which is an English dictionary, here the words are described in an accurate way.

Causes of pain according to interviewees

Abstinence	Eye pain
Arthritis	Eczema
Anxiety	Fall injuries
Allergic reaction	Food can cause pain
Alienation	Get hurt
Accidents	Hangover
Attrition	Headache
Bone fractures	Hunger
Being overweight	Hitting
Blisters	Hit your thumb
Brain going on constant overdrive	Herniated
Bad memory/memories	Itching
Cuts	Imagined pain
Cold	Inflammation
Cramps	Injuries
Cutting pain/cutting yourself	Ingrown nails
Car accidents	Loneliness
Cavity	Muscle strain or overuse
Chafed feet	Muscle spasms
Cerebral pares	Not being good enough
Coughing	Natural pain, giving birth
Disease	
Dislocating	
Depression	
Empathy, hearing about someone's pain	
Emotional pain	

Obsessions	Stomach ache
Overstrain	Sick
Period pain	Sudden pain without explanation
Pricking	Shingles
Psychosomatic pain	Toothache
Panic attacks	Torticollis
Rheumatism	Thinking about things too much
Stress	Turn injuries
Soreness	Tension headache
Splinter	Touch
Screaming pain	Unrequited love
Se others hit themselves	Worn out joints
Sleep strangely	Wound

Kinds of pain according to the interviewees

Anxiety	Nagging pain
Ache	Nausea
Burning	Nerve pain
Burns	Osteoarthritis
Cramping	Pulsating
Cutting pain	Prickle
Depression	Persistent pain
Dull pain	Psychosomatic pain
Feel bad	Swollen pain
Flashing pain	Suffocation
Heartbreak	Stabbing pain
Infections	Static pain
Numbness	Stitch

Throbbing pain | Toothache

This is the synonyms of pain according to the Macmillan dictionary

Achy	Dull
If a part of your body feels achy, you feel a pain there that is continuous but not very strong	dull pain is not very strong but continues for a long time
Acute	Excruciating
Used for describing pain that is very strong and sharp	causing extreme physical pain
Agonizing	Gnawing
very painful	continuously causing you pain or worrying you
Angry	Gripping
an angry wound (=cut in your skin) is very red and painful	a gripping pain is a sharp and sudden pain in your stomach
Bad	Heavy
used about a part of your body that is causing you pain or is not working well	if a part of your body feels heavy, it is not comfortable and you cannot move it easily
Burning	Inflamed
painful, and feeling as if a part of your body is touching something hot	a part of your body that is inflamed is swollen, red, and painful because of an infection or injury
Chapped	Irritated
chapped skin or lips are dry and painful, especially because of cold weather	painful, red, or swollen
Chronic	Itchy
a chronic illness or chronic pain is serious and lasts for a long time. A serious illness or pain that lasts only for a short time is described as acute	if you feel itchy, you have an unpleasant feeling on your skin that makes you want to scratch it (=rub it with your nails)
Crippling	
causing a lot of pain or other health problems	

Painful	Tender
if part of your body is painful, you feel pain there	if a part of your body is tender, it has been injured and is painful when you touch it
Painful	Thumping
making you feel physical pain	a thumping headache (=pain in your head) is very severe
Painfully	Tight
in a painful way	if your chest or another part of your body feels tight, it feels as if it is being squeezed
Raging	Torturous
very serious, painful, or strong	causing extreme physical pain
Raw	Unendurable
if your skin is raw, it is very sore	too unpleasant or painful to bear
Severe	Vice-like
a severe pain, injury, or illness is serious and unpleasant	holding or squeezing you very tightly in a painful way
Sharp	Violent
a sharp pain is sudden and severe	painful and difficult to control
Sore	Where it hurts
painful and uncomfortable, usually as a result of an injury, infection, or too much exercise	in a way that causes most pain or problems
Stabbing	
stabbing pain is a sudden, very strong pain	
Stiff	
if you are stiff, or if a part of your body is stiff, you feel pain in your muscles and cannot move easily	
Stinging	
hitting you hard	



THE STORY

From my interviews, I developed a few personas as well as a story. Essentially I based my entire project on this story, as I believe it makes it easier to create a product that can be related to how users would interact with it.



Anthony

Age: 23

Work: Student, Cartoon

Family: Singel, but lives in a collective

Character: Social, sort of lazy

Bio

Anthony hasn't had a lot of pain in his life, except for growing pains and soreness he haven't really experienced a broad range of pain. He thinks that he can describe pain in an efficient way for health care workers even though he never had to do it before.



Bob

Age: 65

Work: Retired mechanic

Family: Married and Father of 2

Character: Silent, man of few words

Bio

35 years ago Bob was in an accident that injured his back. Since then he's had pain in his back, he has tried many different methods to help him learn how he is supposed to deal with it. In recent years he has developed rheumatism in his joints which only increases his pain. His pain makes him feel insecure with himself and he has lost the ability to do what he wants to do.

Janett

Age: 43

Work: Office

Family: Mother of 1 and lives with her partner

Character: Outgoing, likes to move around,



Bio

A few years ago Jannett noticed that she has developed problems with her back. She admits that she perhaps waited too long to go and see a doctor, and the problems worsened. When she went to the doctor and told them about the back problems she felt that she lacked the proper vocabulary to in a precise way to explain her pain.



Anthony lives a normal pain-free life and is now in his 20s. Recently he has started to experience a diffuse pain in his left knee, that he doesn't really know what it is. From the start, it doesn't bother him that much, that he has pain in his knee after all the pain usually goes away after a while.



He eventually goes to see a doctor and faces the question, can you describe the pain? After trying to find a word that explains the pain he gives up and says "It is sort of a pulsating, hot and diffuse feeling." The doctor sends him to a physiotherapist to build up his muscles around the knee.



But the pain persisted for several months and he still hasn't gotten a better idea of how the pain feels, his best explanation of the pain is sort of a pulsating, hot and diffuse feeling.



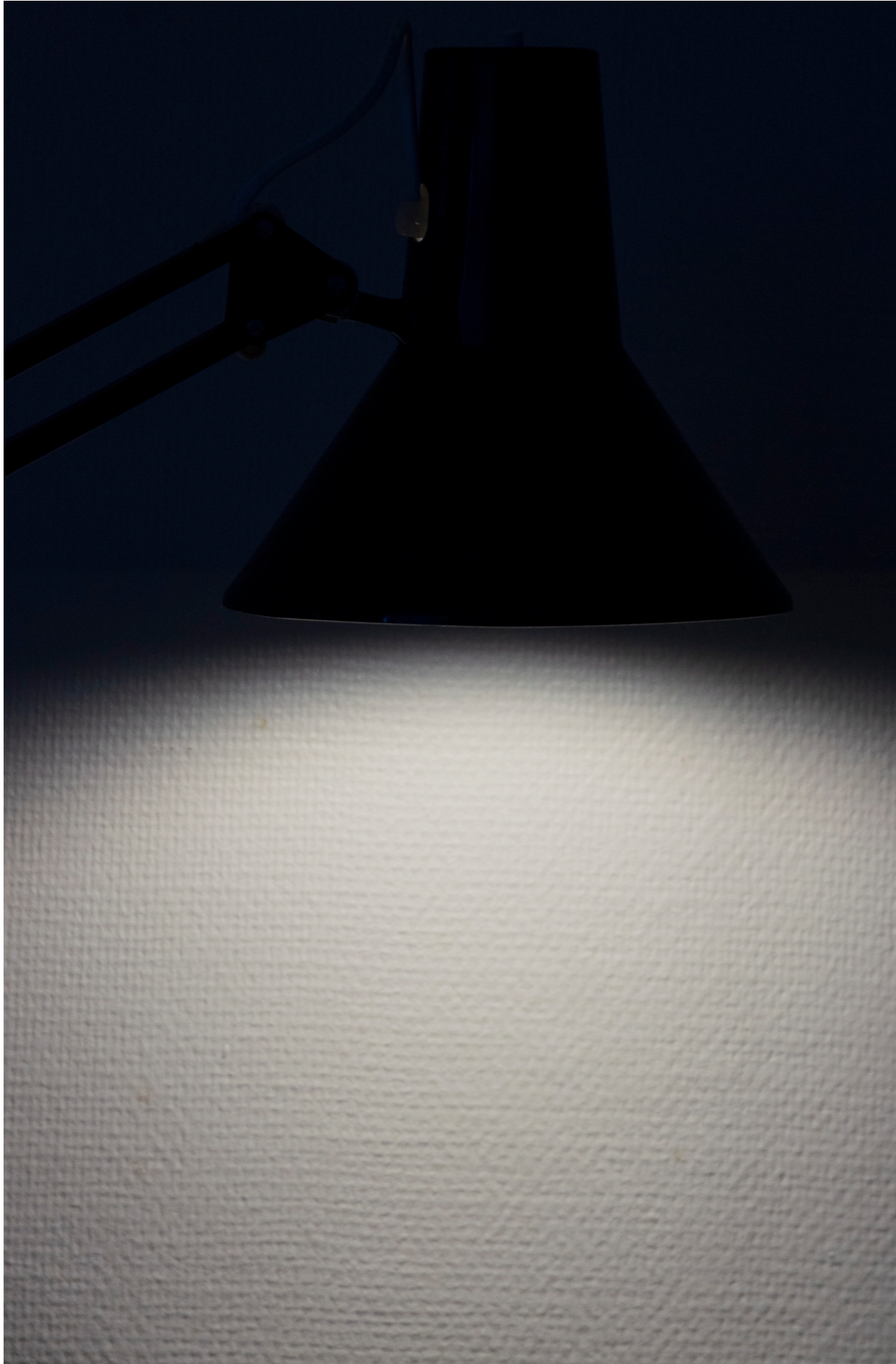
After the appointment, he is still wondering why he has pain in the knee and feels that he quite didn't get through to the doctor how exactly he is in pain. He felt that he got a standard answer that the doctor says when they don't really understand the patient.

Analyzing the story

Based on this story, the interviews, and my own experiences of healthcare, I have conducted I analyzed the situation and found these problems.

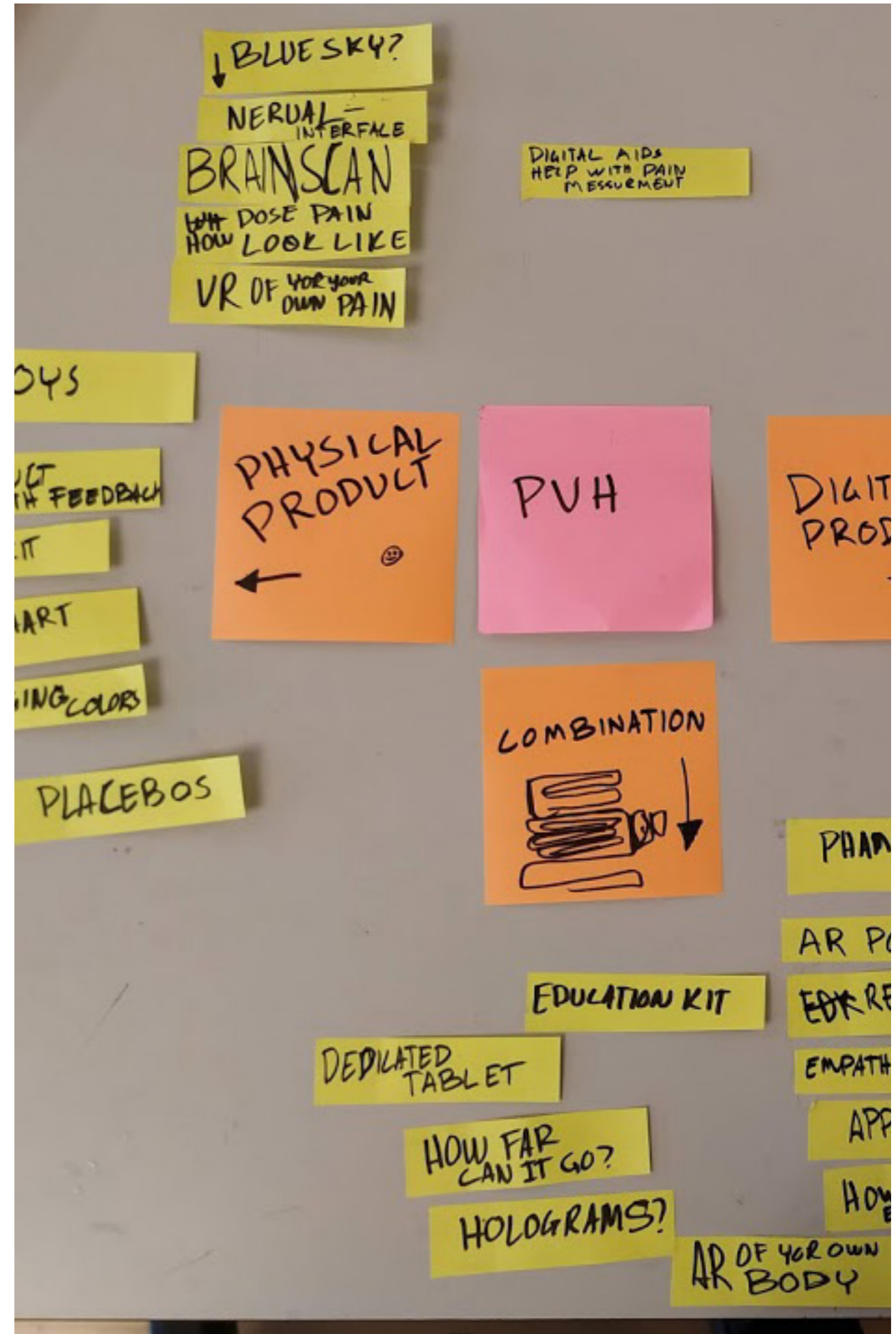
- The stress of being in a hospital
- Overworked and stressed doctors
- Not enough patient time
- **Miscommunication**
- Rushed through a system

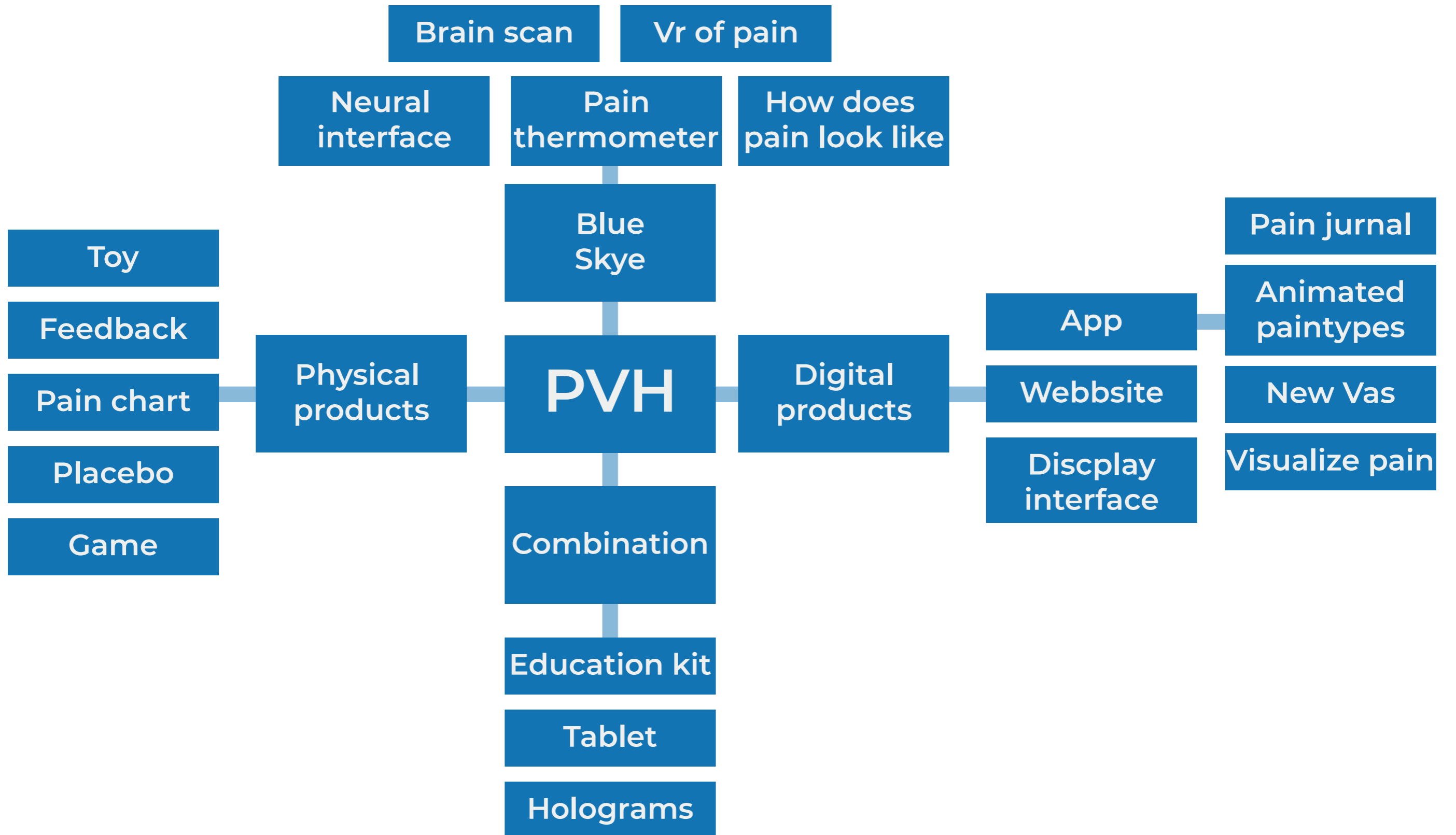
The one that stood out to me the most was the miscommunication aspect of the scenario. This is one stood out to me because it is something that is fundamental in healthcare if you can't communicate your pain it is almost impossible to get the right treatment.



IDEATION

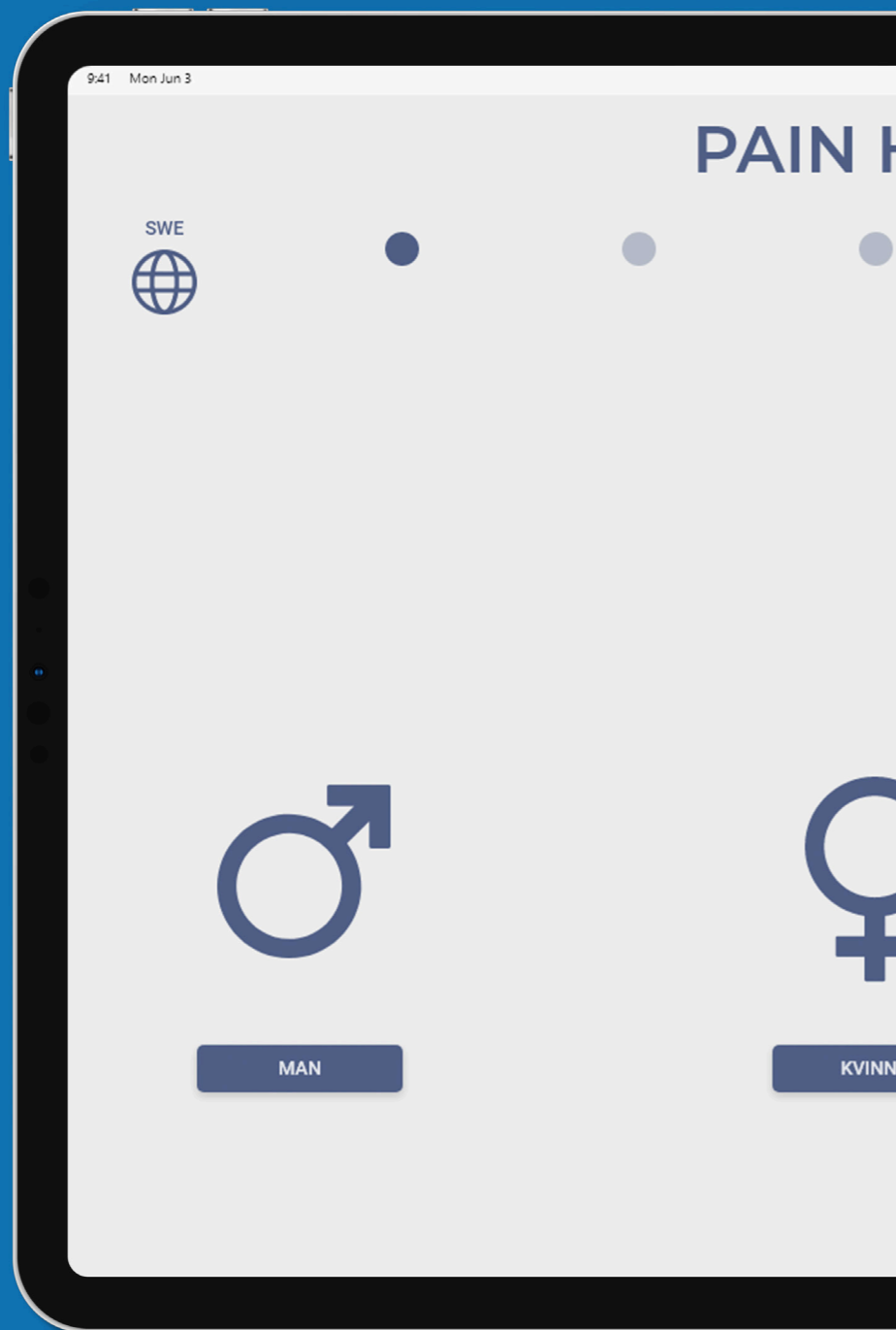
Brainstorming





Concepts





FINAL PRODUCT

Functions Analysis

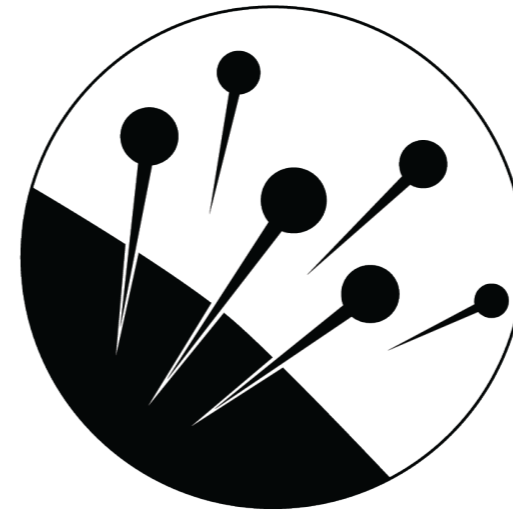
Main Function	MF
Wish	W
Need	N
Unnecessary	U

Functions	Class
Visualization of Pain	MF
Human representation	MF
Work for Color Blind	MF
Black and white	N
Color version	W
Animation of pain	MF
Explanations of pain	W
Home Page	W
Big buttons	W
Easy to use	N
Language meny	W
Zoom function	W

Brief

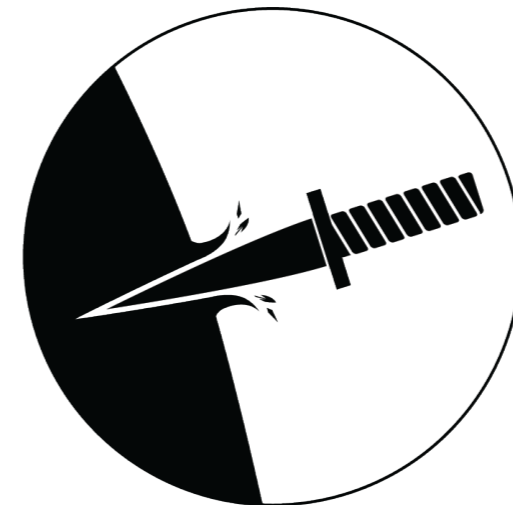
Create a way to make it easier to explain pain

Graphic representations of pain



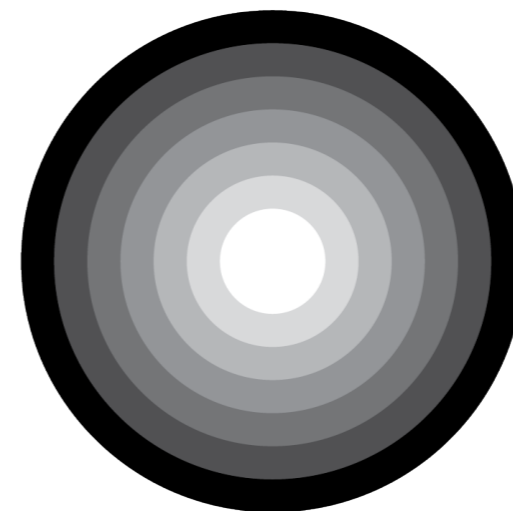
Prickling

Pins and needles going through the skin.



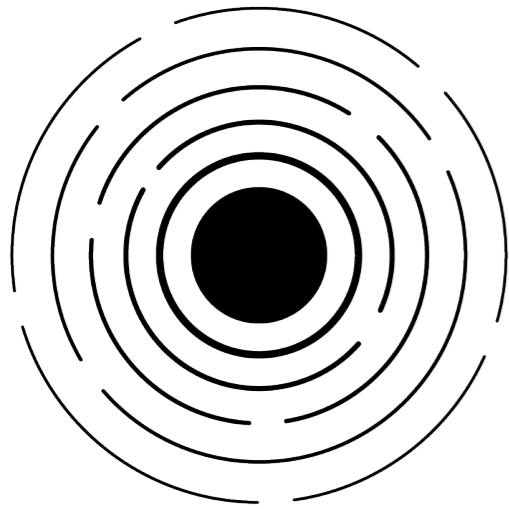
Stabbing

Sudden, intense, momentary, cutting, shooting



Dull

Aching pain, but on a lower level, lasts for long periods of time.



Pulsating

Consistent radiating pain



Electric

Sharp, shooting



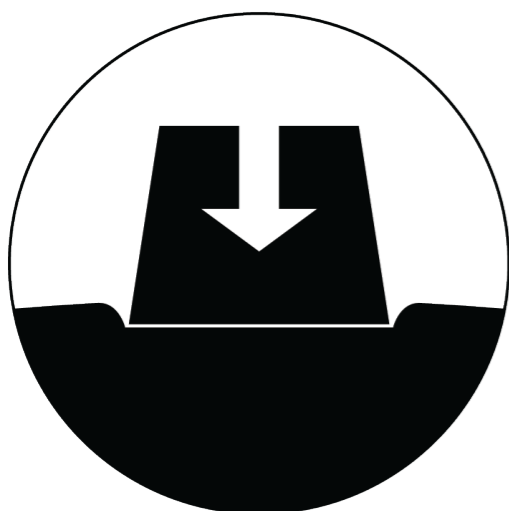
Burning

Warm, hot, and intense



Throbbing

Recurring achy pain, but also pounding, beating, and pulsing pain.



Pressing

Chest or another part of the body feels tight, it feels as it is being squeezed

I choose the different pain types based on the recurrence of them during my interviews. The pain types said multiple times got made into graphics.

The goal of using Graphical representations is to make it easier for patients to understand their pain, instead of having to rely on their own vocabulary to explain it. This will hopefully make it easier for patients to explain pain, gain a better understanding of it, and also make it easier for healthcare workers to gain insight into it.

There where a study conducted at the University of Pittsburgh in 2018, that explored the possibility of using animations as a novel tool to help patients to express their pain. The result of this study indicated that this was a useful way of describing pain. 130 of the 170 participants agreed or strongly agreed that the novel tool developed for the study was useful for them and that they would use it to communicate with their healthcare provider. This study is the reason I chose to work with pain icons.



User testing

When I started this project I had the goal of using as much user testing as possible to be able to make informed decisions as possible in my designs. But due to Covid-19, it has been difficult to conduct proper user testing. The testing of the graphical representations has been conducted through a mix of meeting up with friends and using services like Discord and Skype.

After completing the graphical representations I started testing them to figure out how if they work at all. I was glad to see that the majority of the test subjects understood the pain icons. The more abstract icons were often times harder for the test subjects to understand, but after a while, the majority got them right.



Primary:
#e6e6e6

#516188

#ffffff

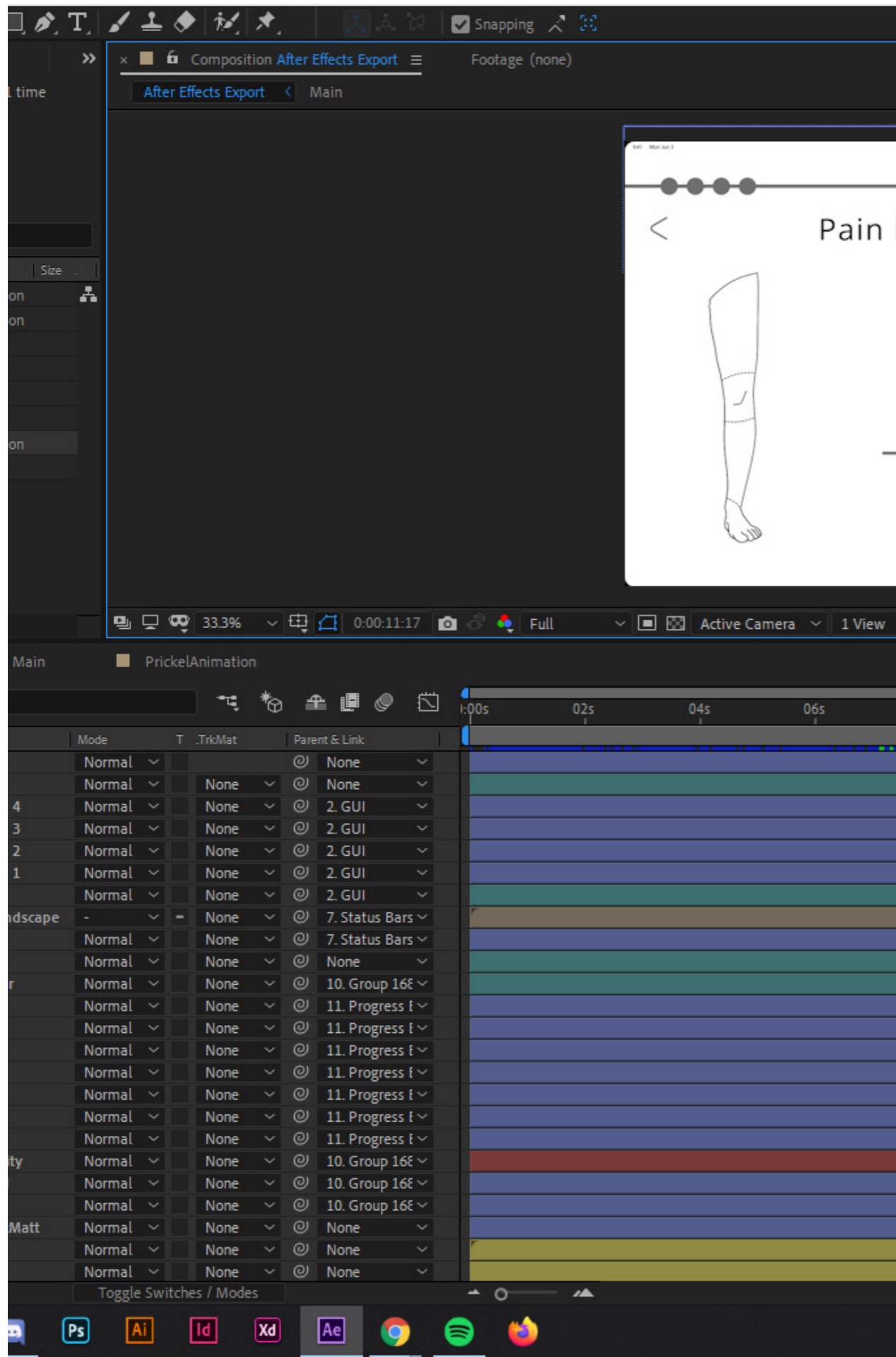
#000000

Color

The color scheme for the pain icons is black and white, the reason for this is to make them easily readable and work for the colorblind.

Inside the software, the color choices are simple, yet again with the colorblind mind. To make the application easy on the eyes, a light grey was used as a background and a dark blue was used

as a secondary color. The only part of the software that doesn't use these colors is the pain graphics, and the reason for this is to make them stand out from the rest.



Animation

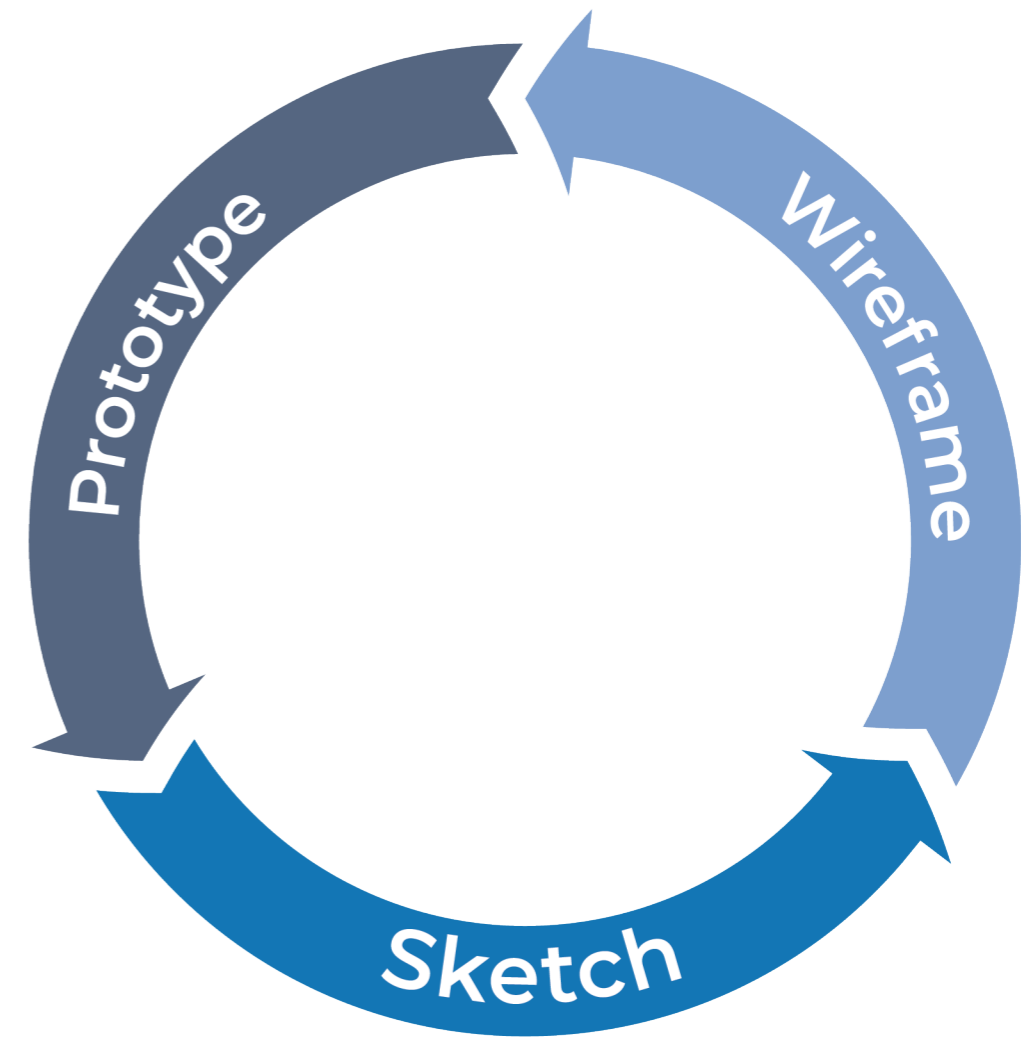
Something that I think is a 10, someone else might think is a 4.

Hitting your toe in a table edge is a pain that we all can relate to, but our perception of the pain might not be the same. I might think it is a 10, on a scale from 0-10, while you might think it is a 3 on the same scale.

Rather than using a traditional numerical rating system, I opted for using animations for visualizing the pain

the patient is in. The reasoning behind this is that a lot of numerical based pain scales rely on the patient's own as well as the health care workers' experiences of pain. With the help of animations and graphical representations, I hope that both patients and healthcare workers can make it easier to discuss the pain rather than just putting a number on it.

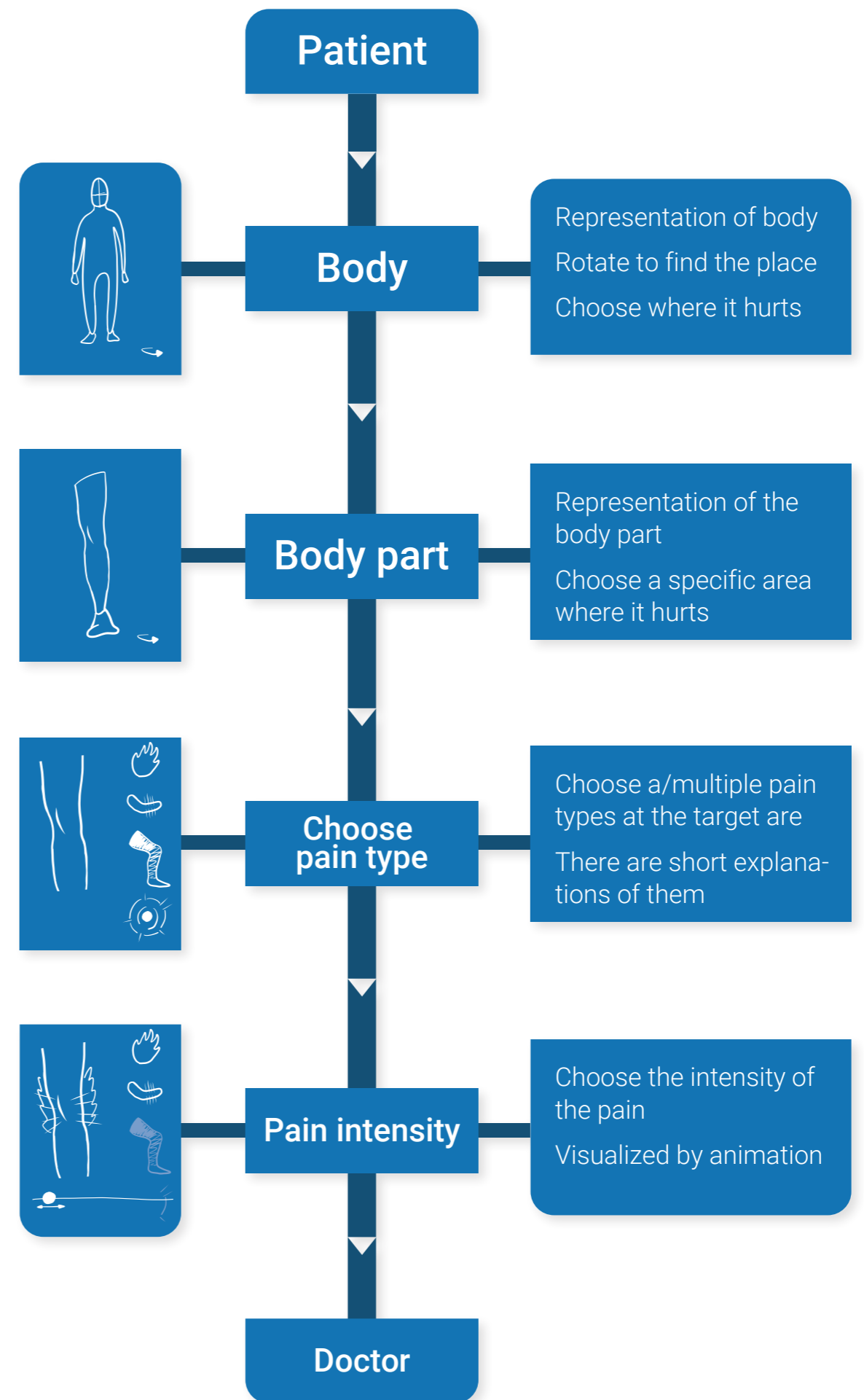
Process



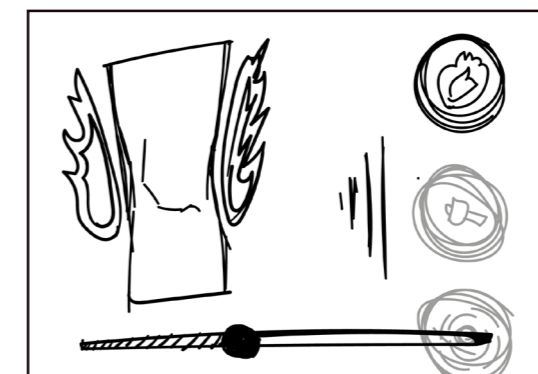
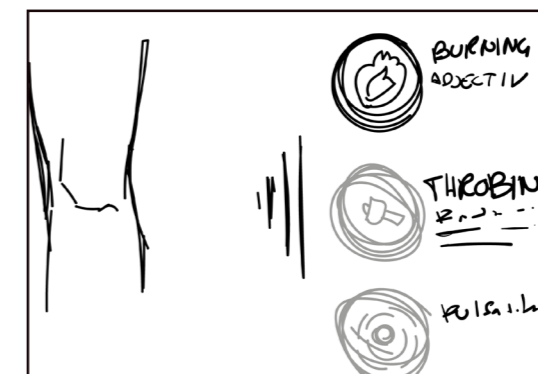
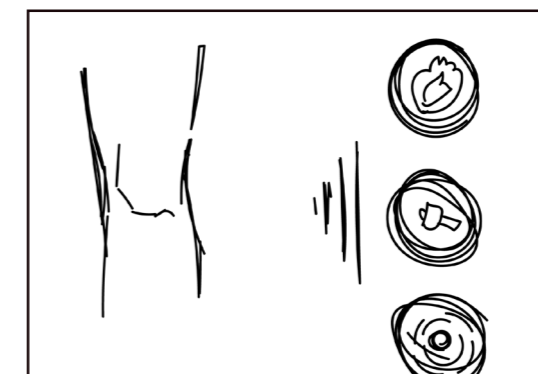
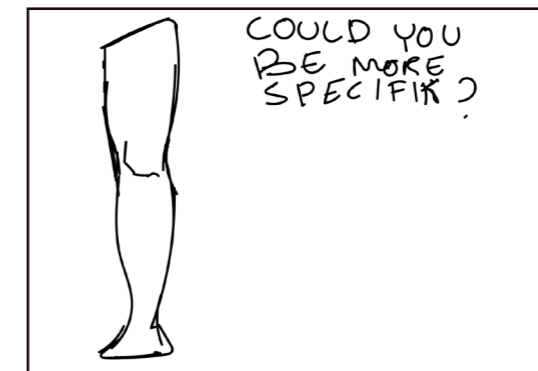
After my research, pain icons, and the animation were finished I started the process of creating the application. This has been a process of several iterations.

This process started with a very general flow chart just to get a better understanding of what the different pages should contain. Then during the iteration process, the application took many different forms until the finalized version was achieved.

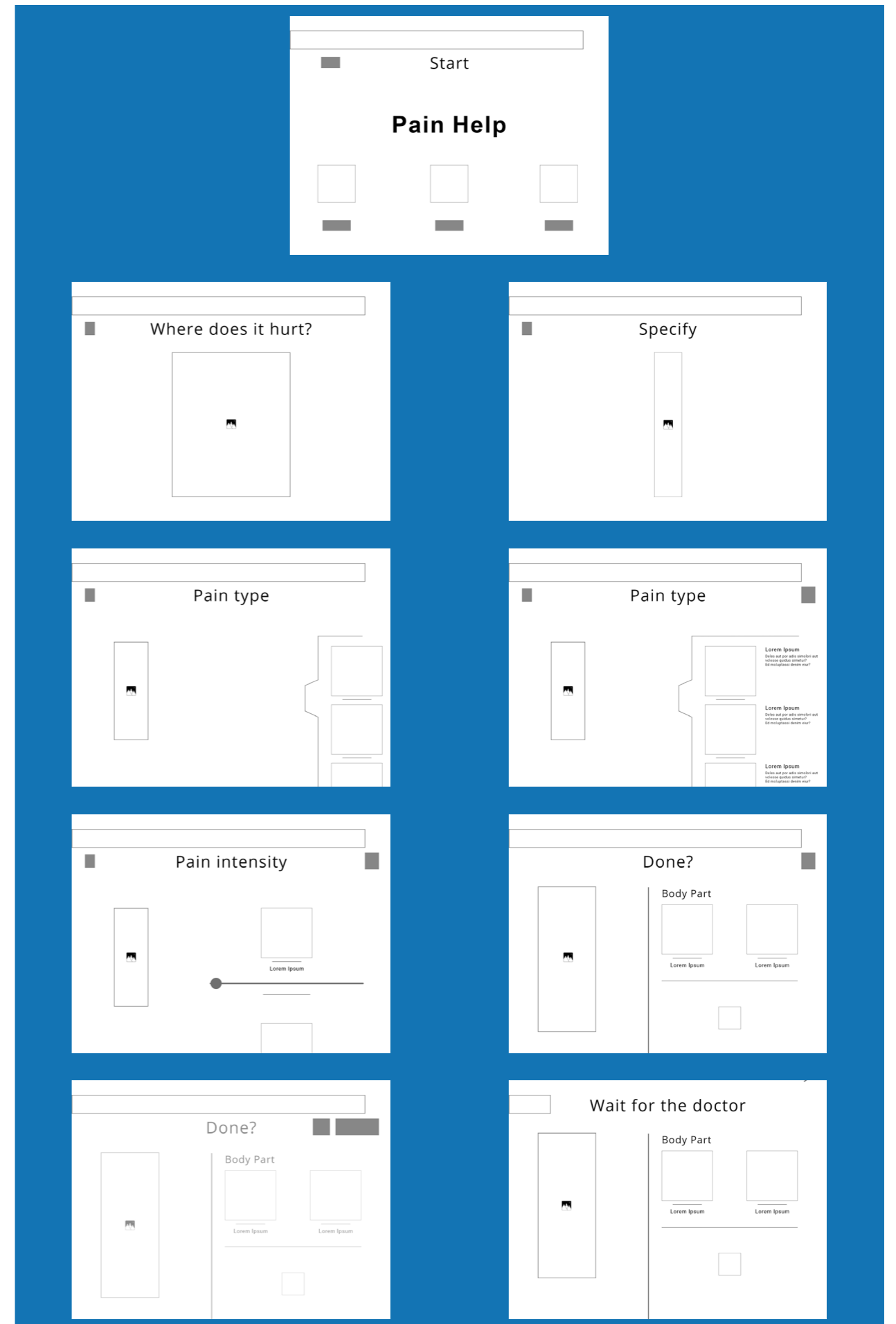
Flow chart



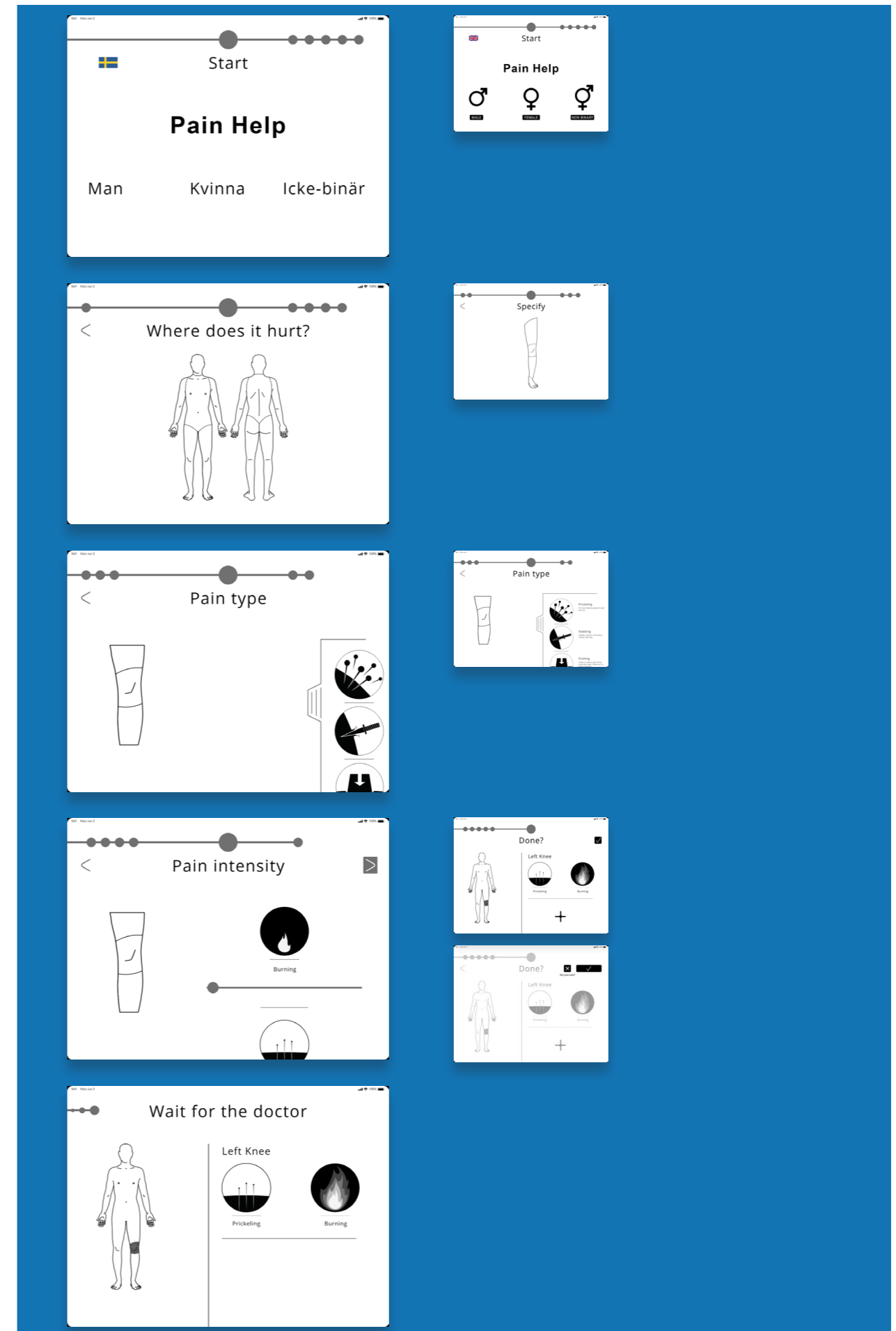
Version 1: Sketch



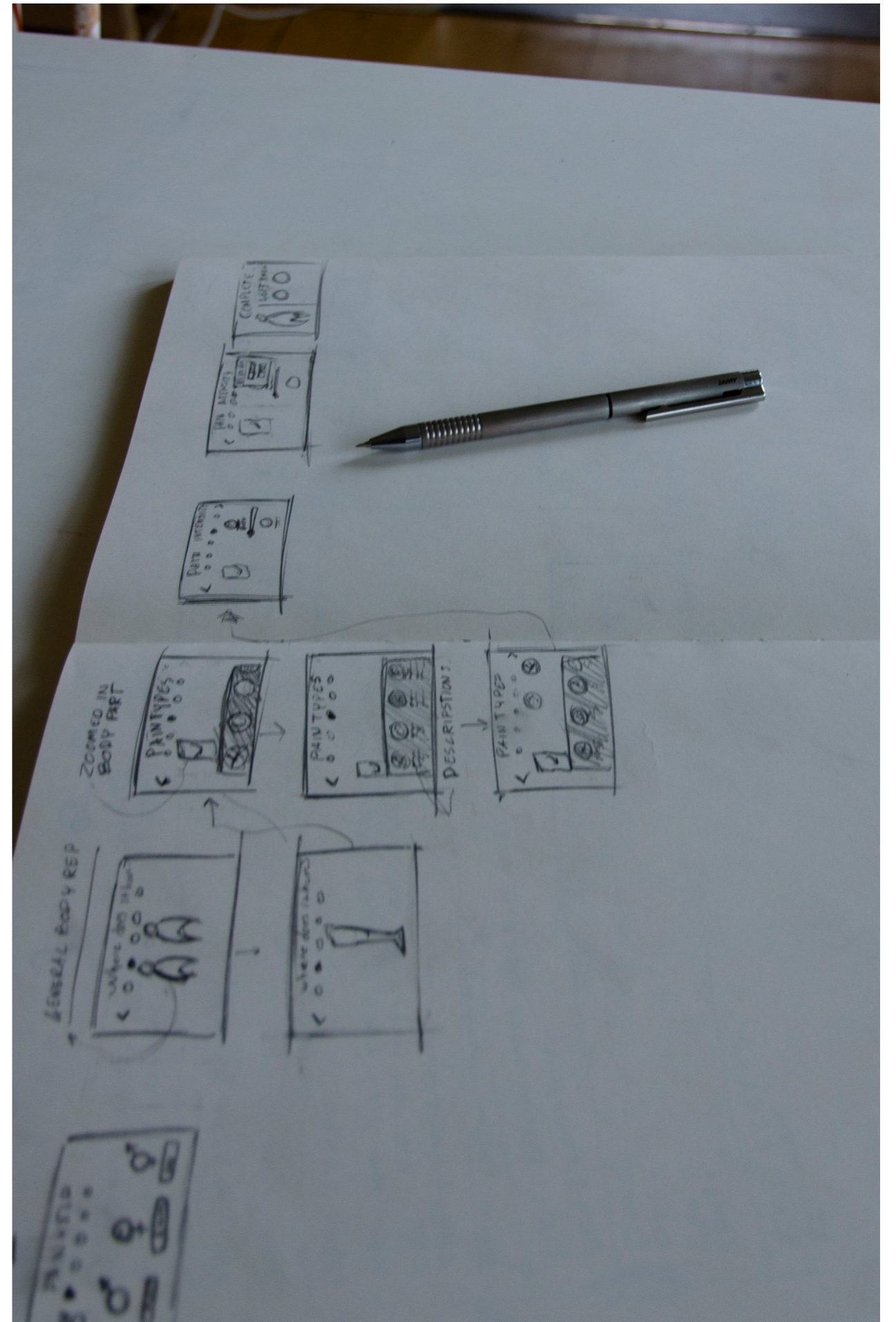
Version 1: Wireframe



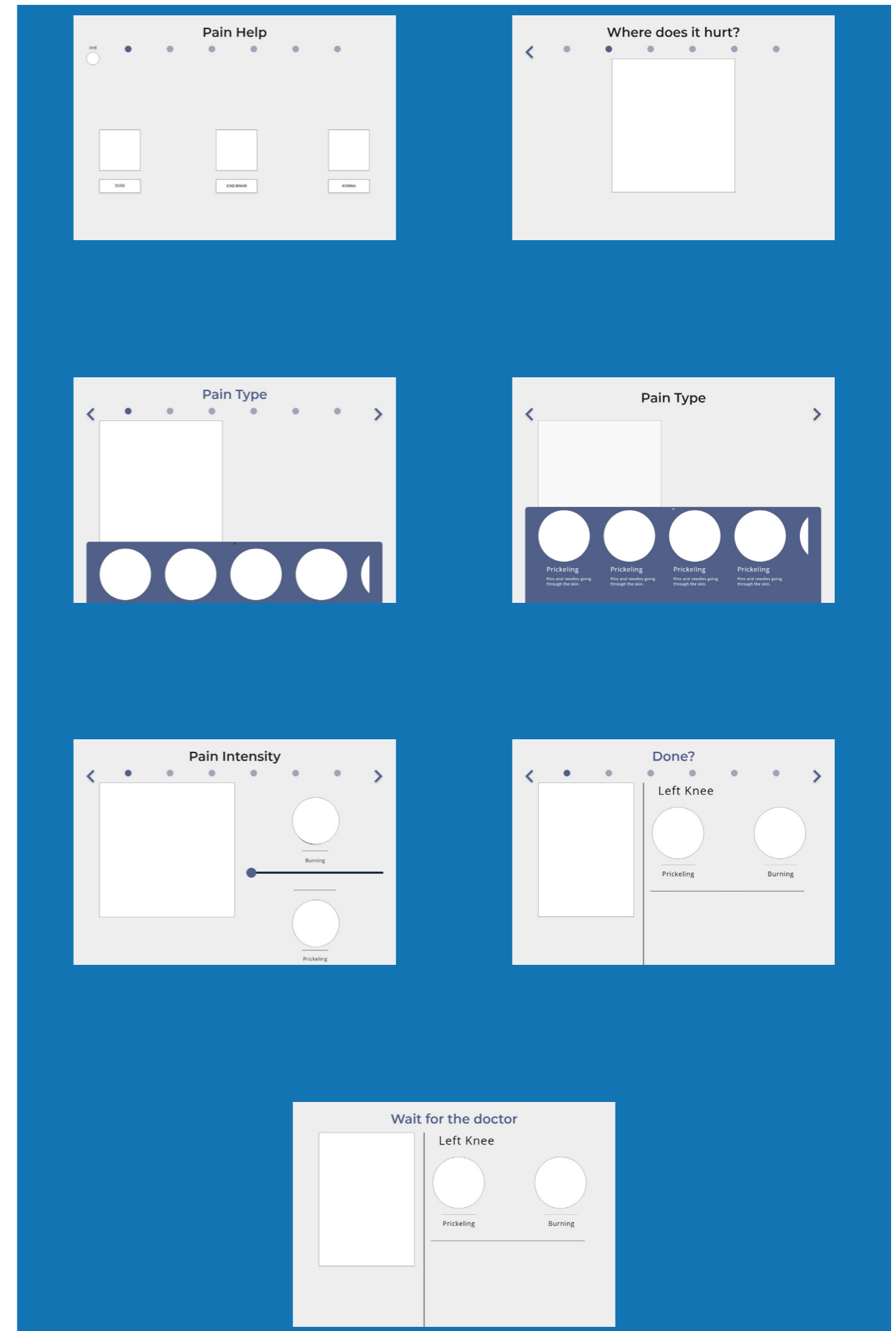
Version 1: Product



Version 2: Sketch



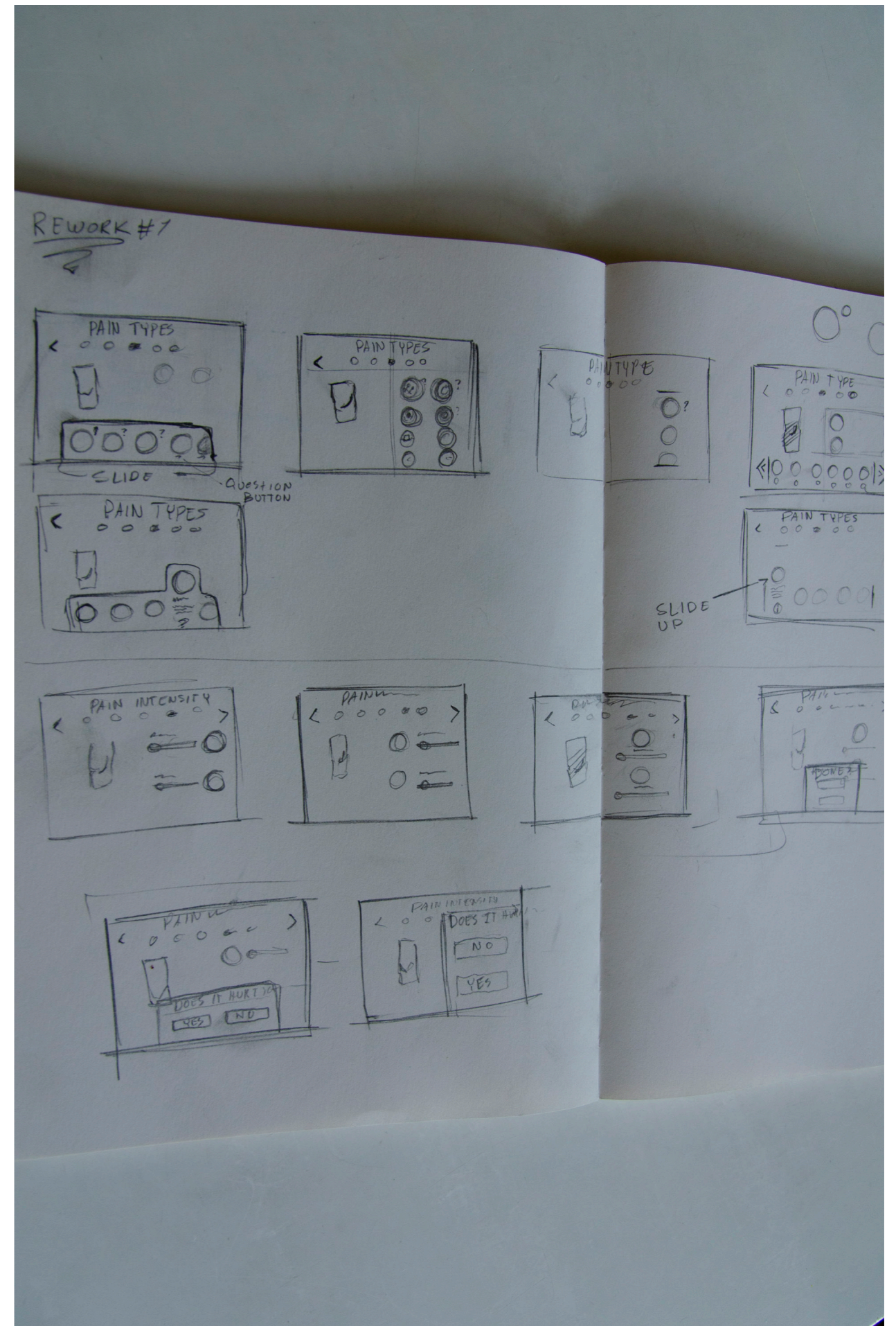
Version 2: Wireframe



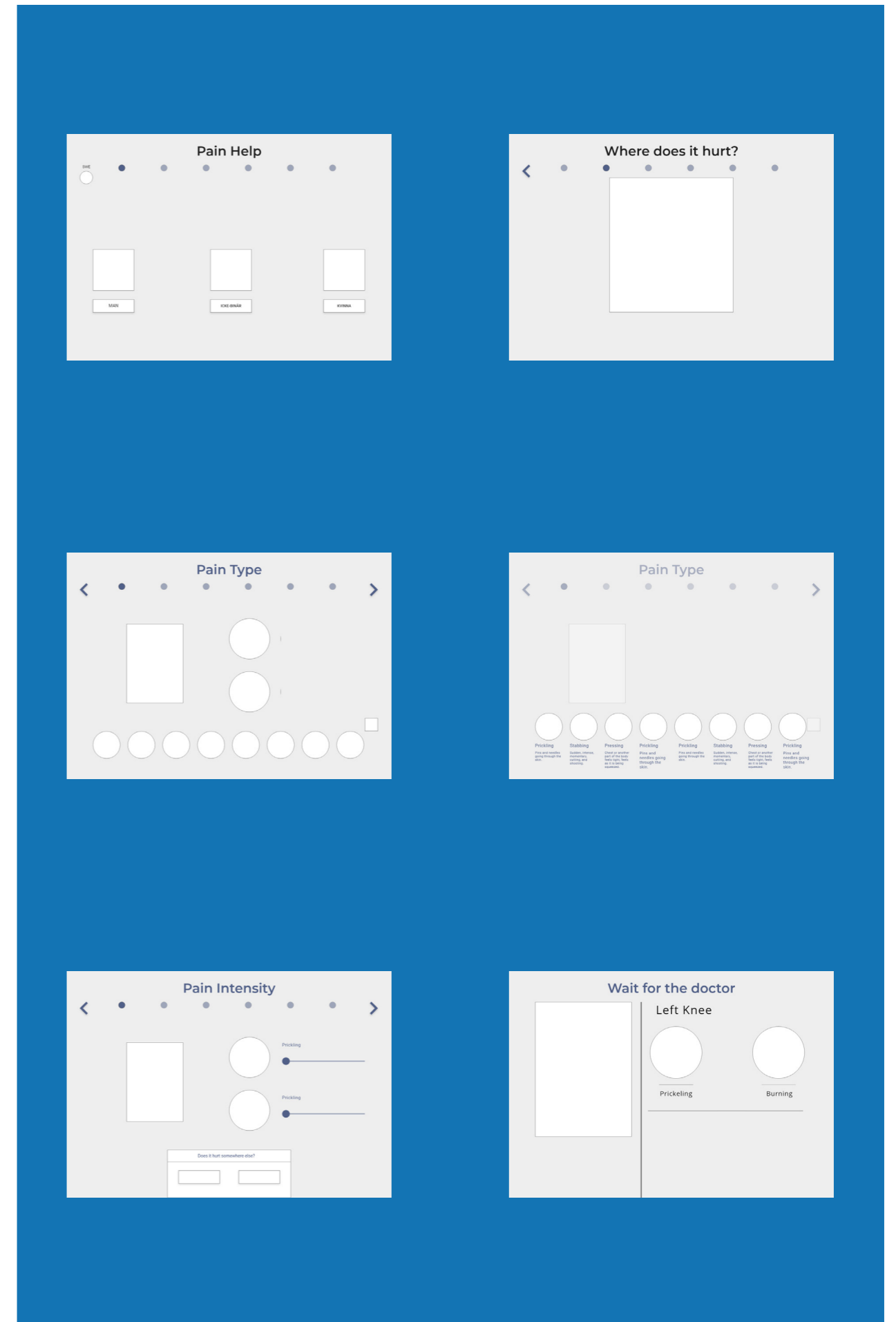
Version 2: Product

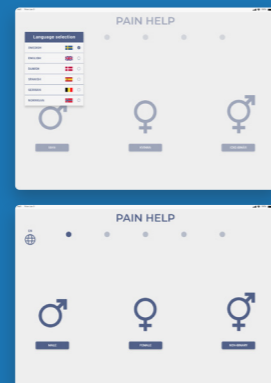


Final Version: Sketch



Final Version: Wireframe





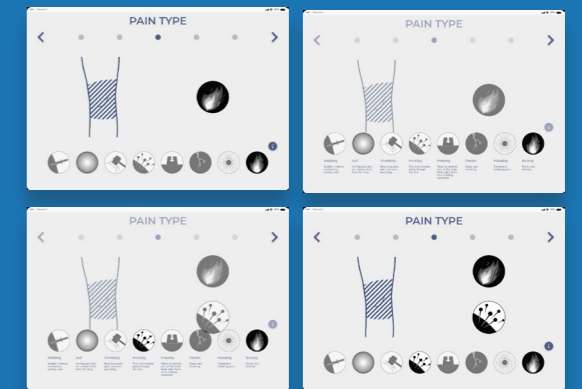
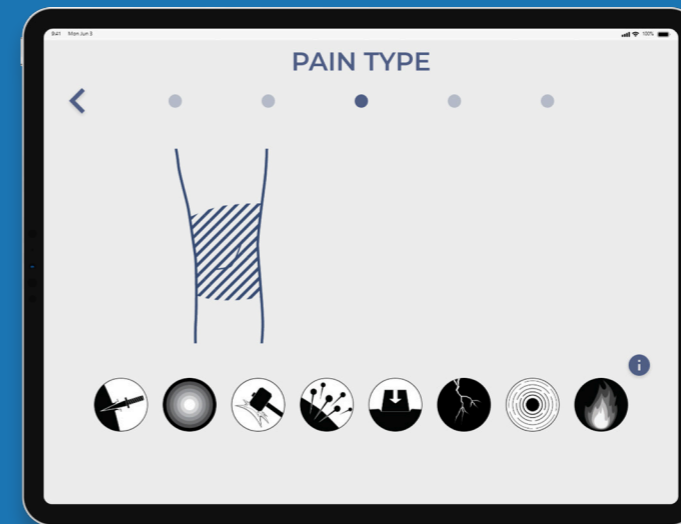
Start

Gender choice and language selection.



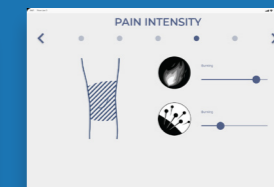
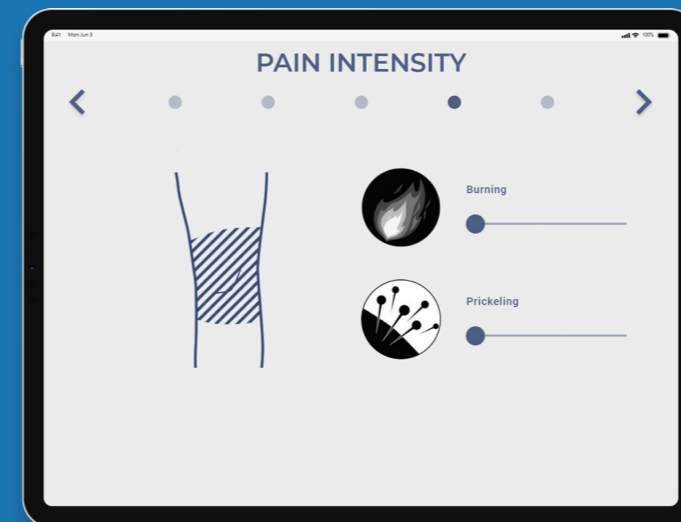
Where does it hurt

Chose where it hurts.



Pain Type

Chose type of pain with the icons. Written descriptions available.



Pain intensity

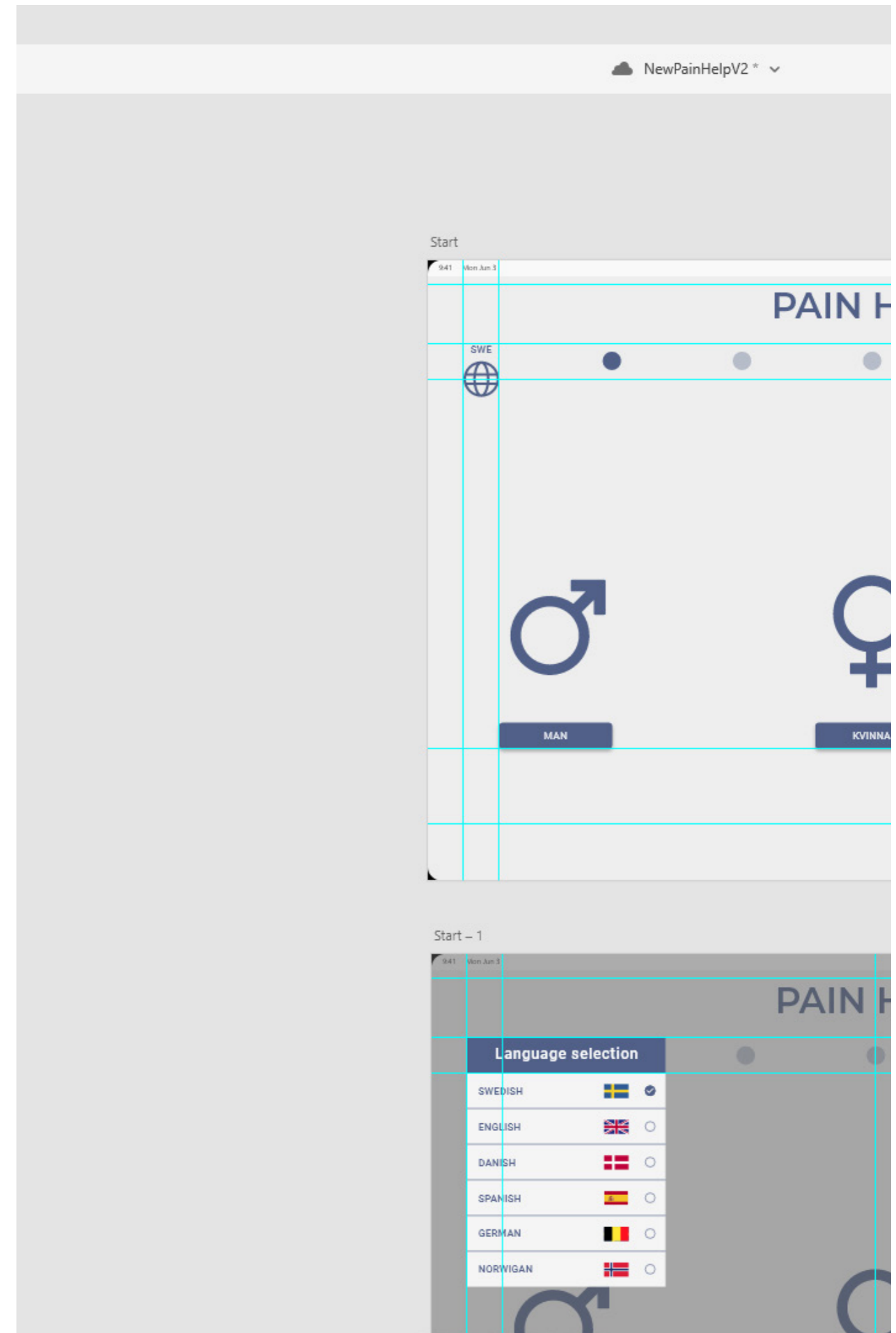
Chose the pain intensity with the help of animations.



Wait

Wait for the doctor, there are no options to go back.

Design Specifications



Fonts

Header

Montserrat

48pt

Sub header

Roboto Medium

14pt

Button

ROBOTO MEDIUM

14pt

Body

Roboto Regular

11pt

Color

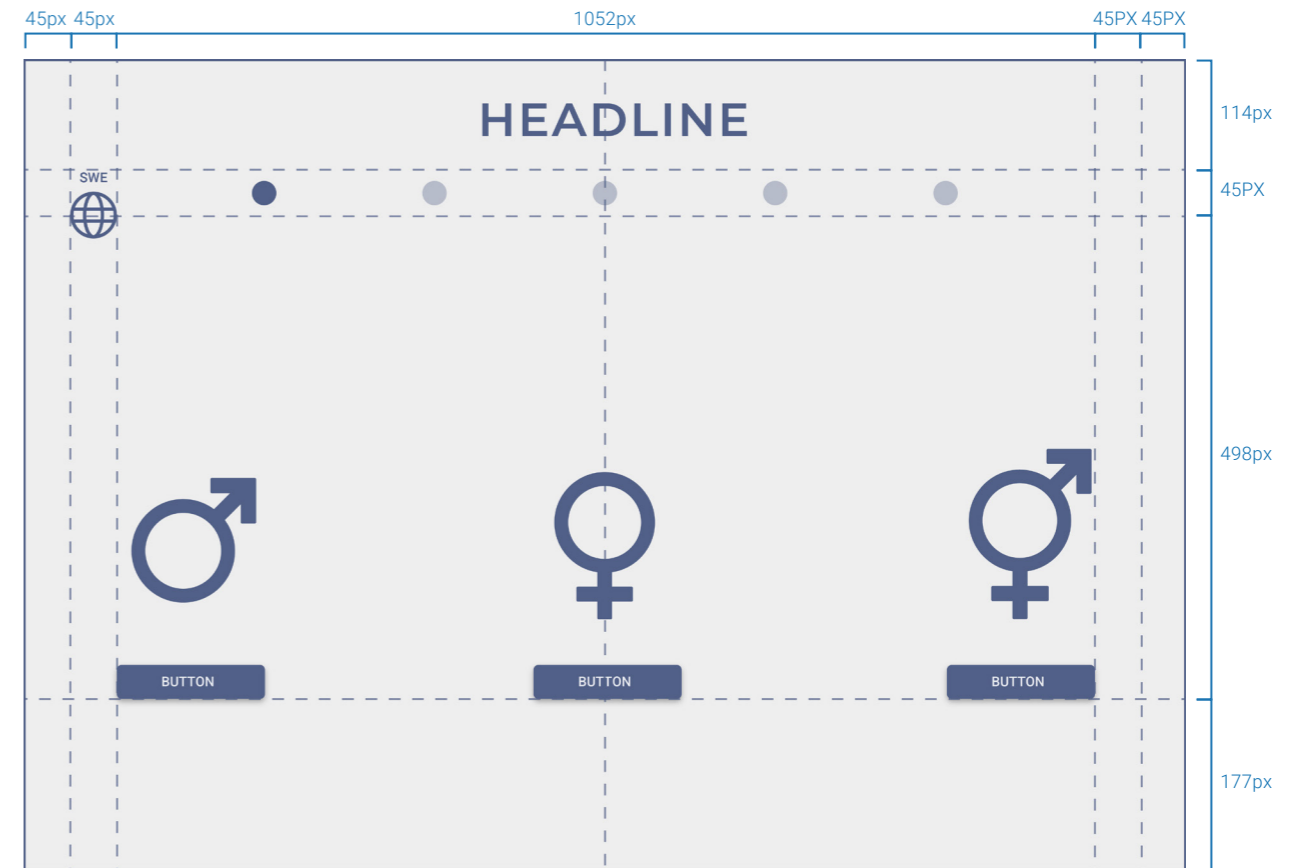
Primary:
#eeeeee

#516188

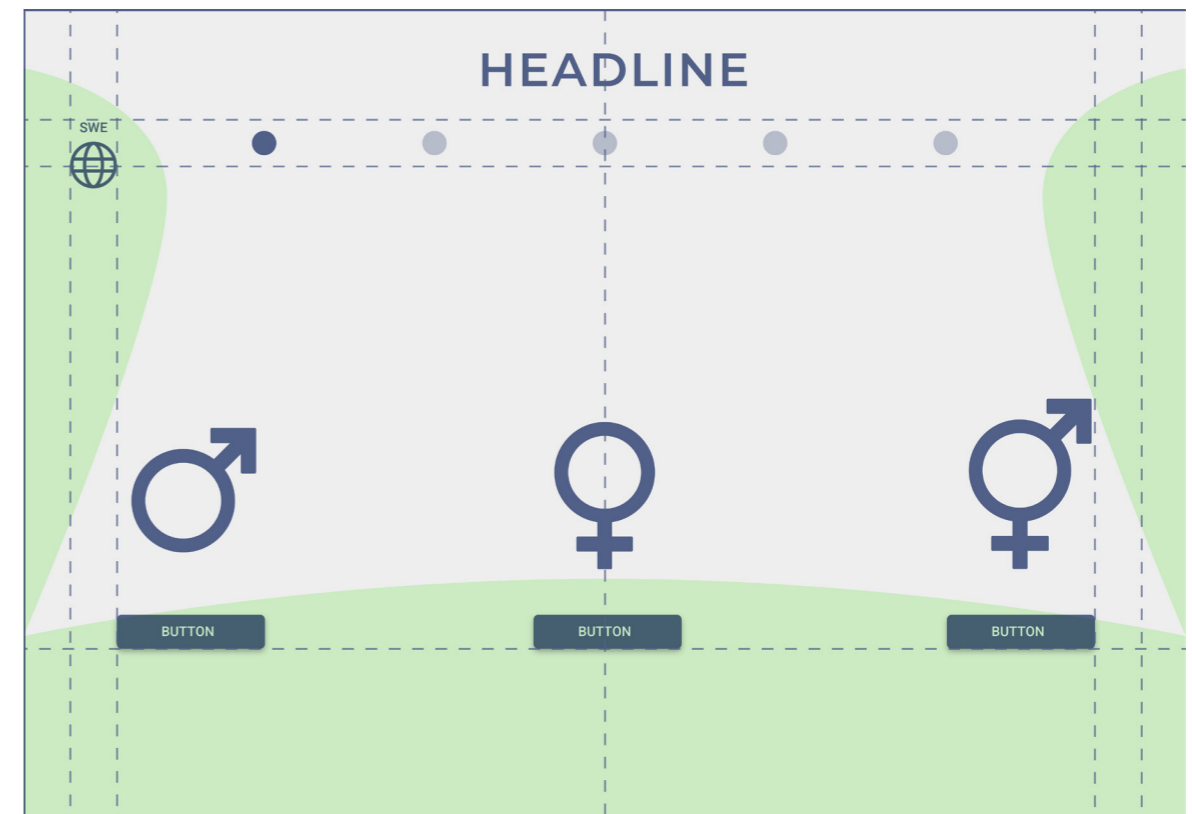
#ffffff

#000000

Layout



Area of interaction



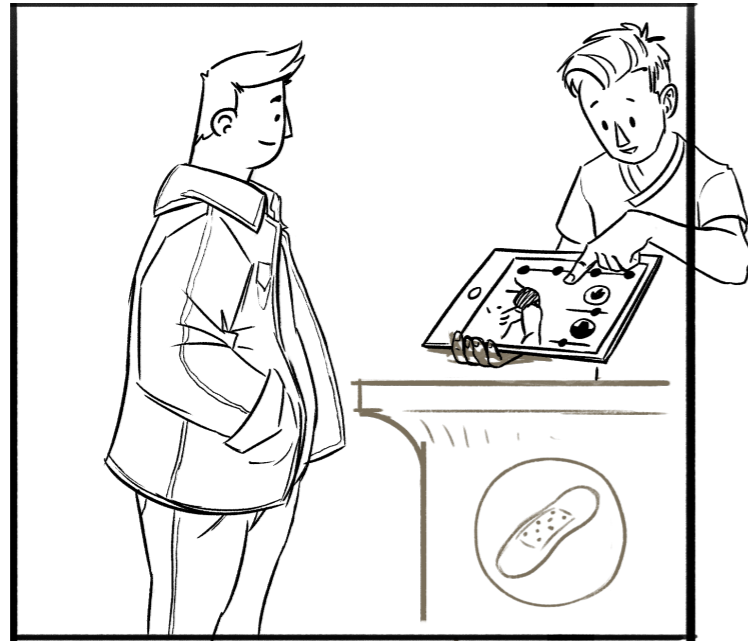
How did it go for Anthony?



Anthony lives a normal pain-free life and is now in his 20s. Recently he has started to experience a diffuse pain in his left knee, that he doesn't really know what it is. From the start, it doesn't bother him that much, that he has pain in his knee after all the pain usually goes away after a while.



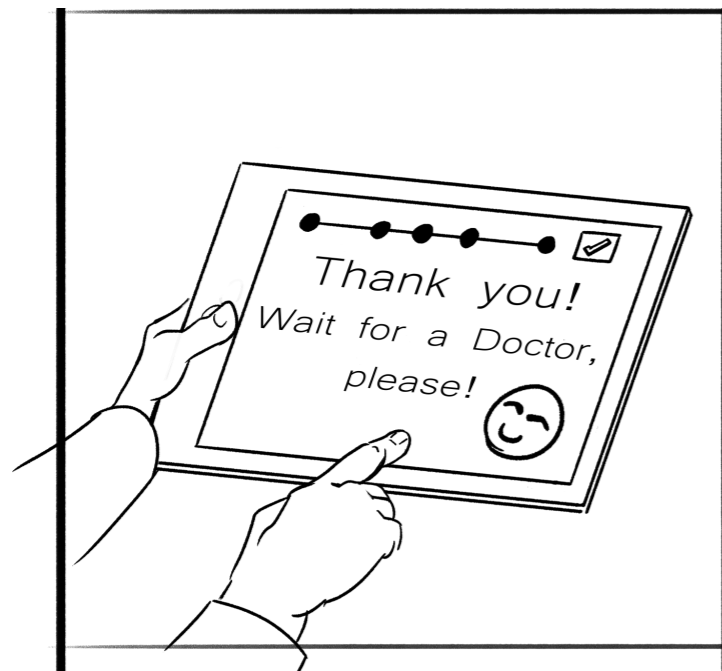
But the pain persisted for several months and he still hasn't gotten a better idea of how the pain feels, his best explanation of the pain is sort of a pulsating, hot and diffuse feeling.



He eventually goes to see a doctor, but before he goes into the doctor he talks to a nurse. He tells the nurse about his problems and that he doesn't really understand how he can explain the pain he is in. The nurse gives him a tablet with the software "Pain Help", here Anthony gets a better idea of the pain he is in. This is achieved with the help of graphical representations and animations of common pain types.



When he finally goes in to see the doctor he have the tablet with him and they sit down and discuss the results from "Pain help". Both Anthony and the doctor gains a better understanding of Anthony's pain and the doctor can give a better diagnosis.



From the nurse, he gets a tablet with Pain Help installed. He sits down in the waiting room and fills out the form, he can clearly see different pain types with the help of graphics. He also chooses the intensity of the pain he is in with animated versions of the pain types.



After the appointment, he feels that he got the treatment that he needed, and he leaves the hospital satisfied.

DISCUSSION

This project has had its ups and downs, especially during the research phase. I oftentimes thought of quitting the project and do something else. But with some pep talk from my classmates and discussing it with my supervisor Jasjit Singh I persevered with it, and I'm very grateful that I did.

One of the things I'm most proud of in this project is the interviews. They gave me an insight into how people perceive and talk about and experience pain that I thought was not possible. Some of my interviewees even thanked me for conducting the interview, due to the fact that they almost never actually sit down and think about what their personal perception of pain is.

Given the time frame and the unique crisis that is Corvid-19, I feel satisfied

Future

I believe that this product is a natural next step in the evolution of pain charts and how patients to healthcare workers communicate with each other. To achieve this further development of PH is necessary. To actually make this a viable product I believe that it is necessary to have a large interdisciplinary team working on

with what I have accomplished. With the limited user testing, I have done I feel that my graphical representations give a fairly good view of the potential of this medium as a way to express pain. I hope that this is something that can be developed further in the future to cover a wider variations of pain types

From the start of the project, I had a goal of making animated versions of the graphics. This turned out to be a completely different experience than I had anticipated. With a lot of trial and error, and many tutorials I was able to create two rudimentary animations of burning and pricking pain. And just like the graphical representations, I hope that this is something that can be developed further in the future.

it, consisting of designers, doctors, nurses, psychologists and pain rehab experts. It would also be interesting to test it in a hospital to see if it actually makes any difference both for the patient and the healthcare workers.

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RECOGNITIONS

Johannes Othén

For helping me with the lovely storyboards and listening to my rants about this project.

Dylan Bertram

For helping me with various things, borrowing his audio equipment, and giving me advice.

Christina Zhou

Lending her voice for the project demonstration video.

And also a big thanks to everyone who let me interview them for this project.

