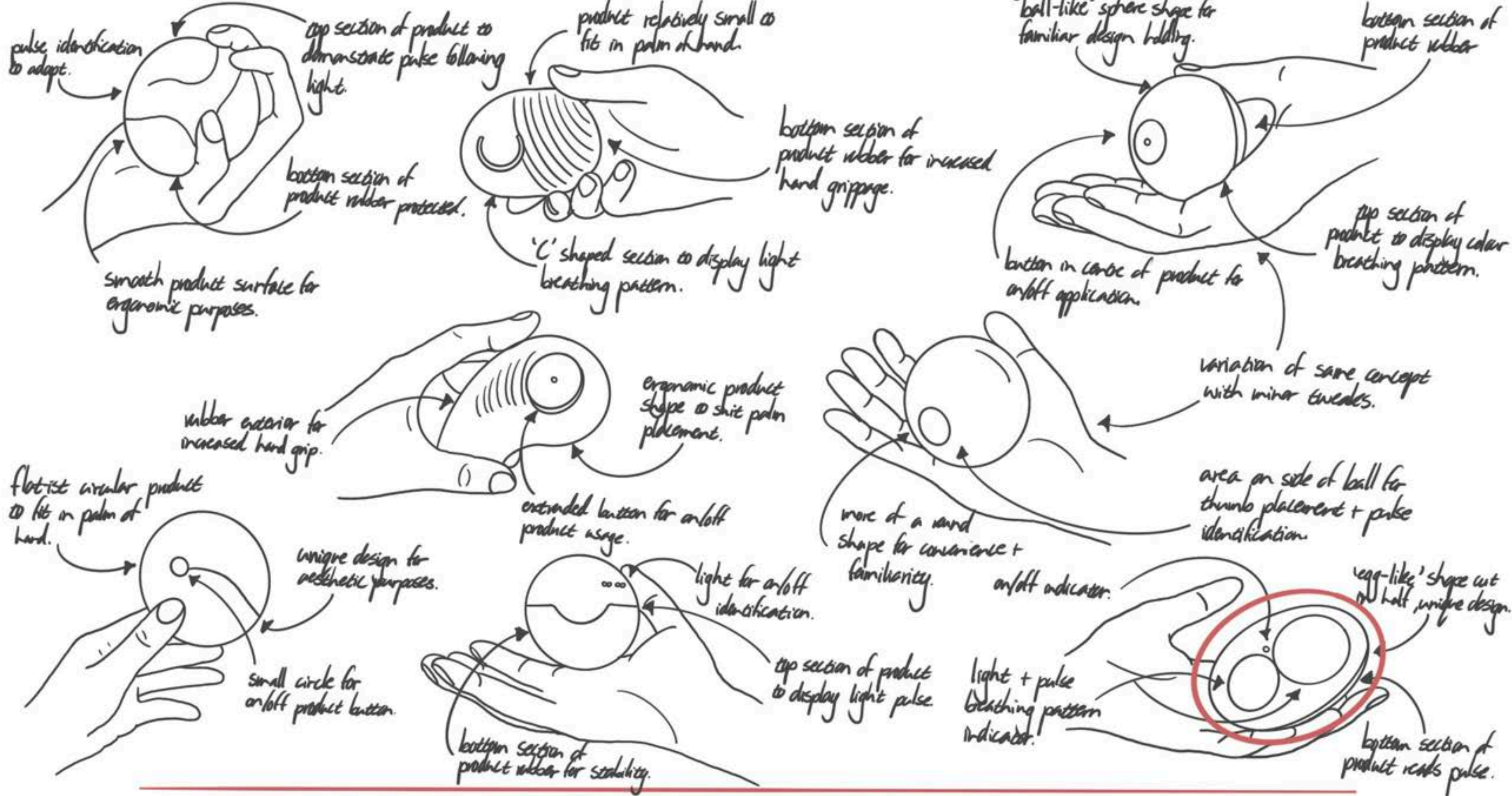


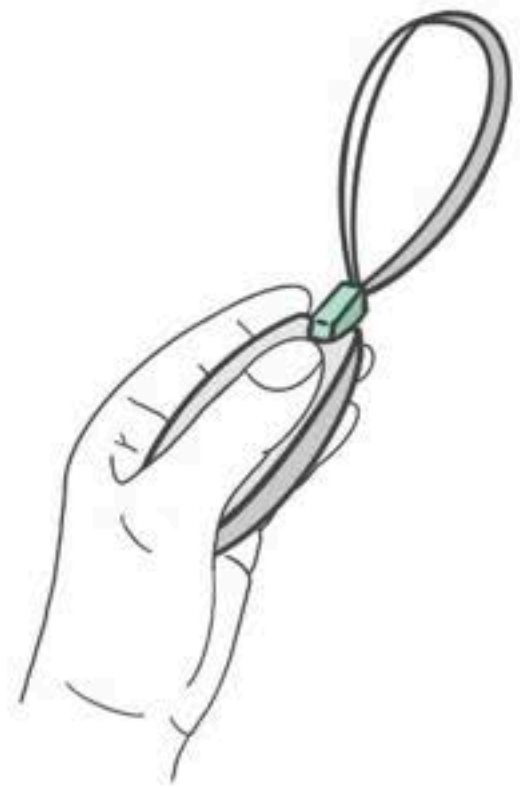
IDEATION | WEEK SIX

- USER INTERACTION + PULSE IDENTIFICATION | CONCEPT FIVE



IDEATION | WEEK SEVEN

- CONCEPT ONE 'FINAL REFINEMENT FOR AI PRESENTATION + REPORT'



plastic synthetic material for increased strength + comfort.

hard plastic 'joint' for decreased levels of disattachment.

loop +/or longer lanyard to attach to uniform, wrist or neck.

screen material to display infrared temperature levels of user + analyse stress/heat levels.

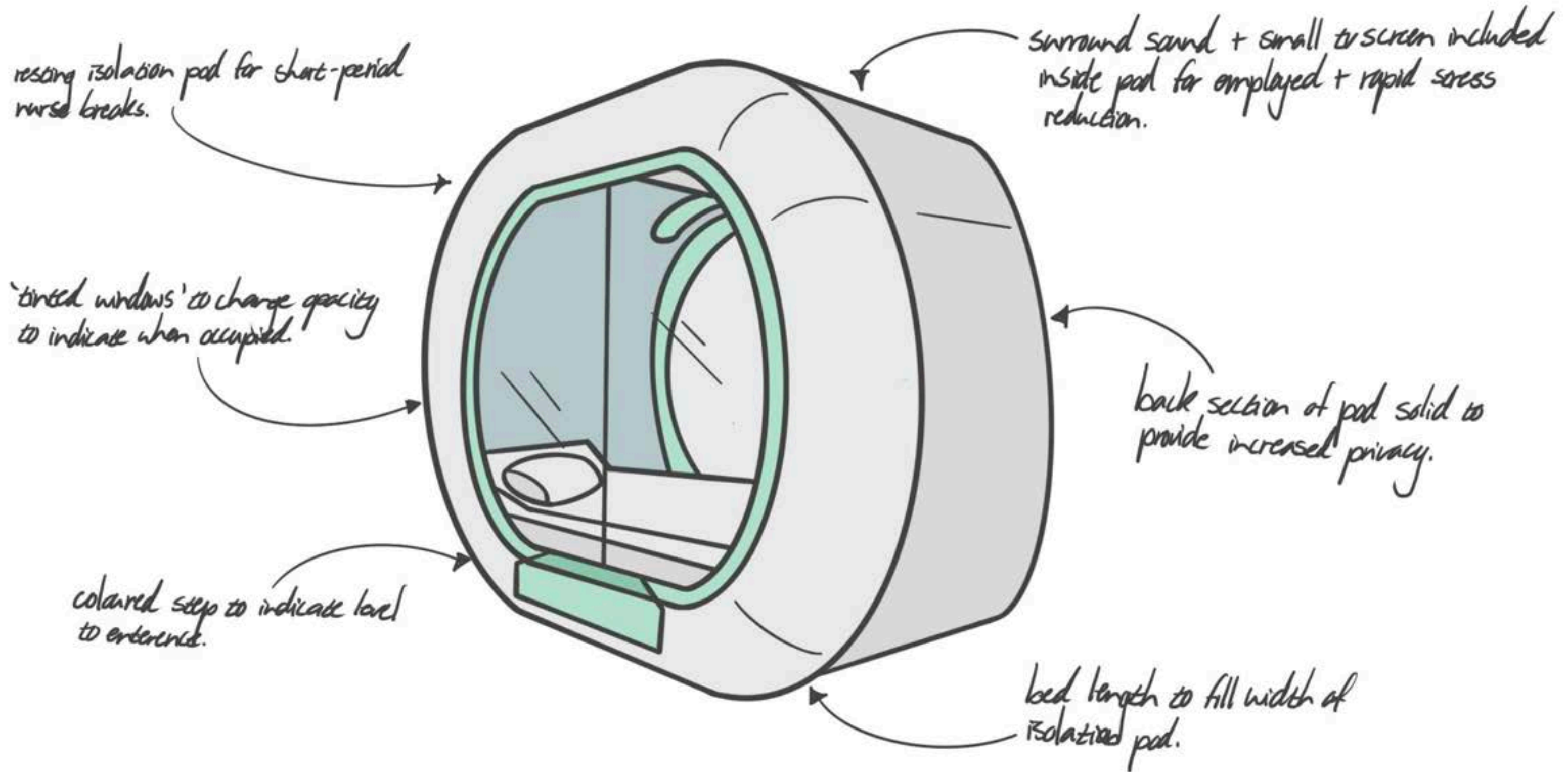
size of product large enough for single thumb rest + placement on darker screen surface.

side of product available for refinement with possible curvature for increased comfort.

front of device indented to allow for natural palm placement against it.

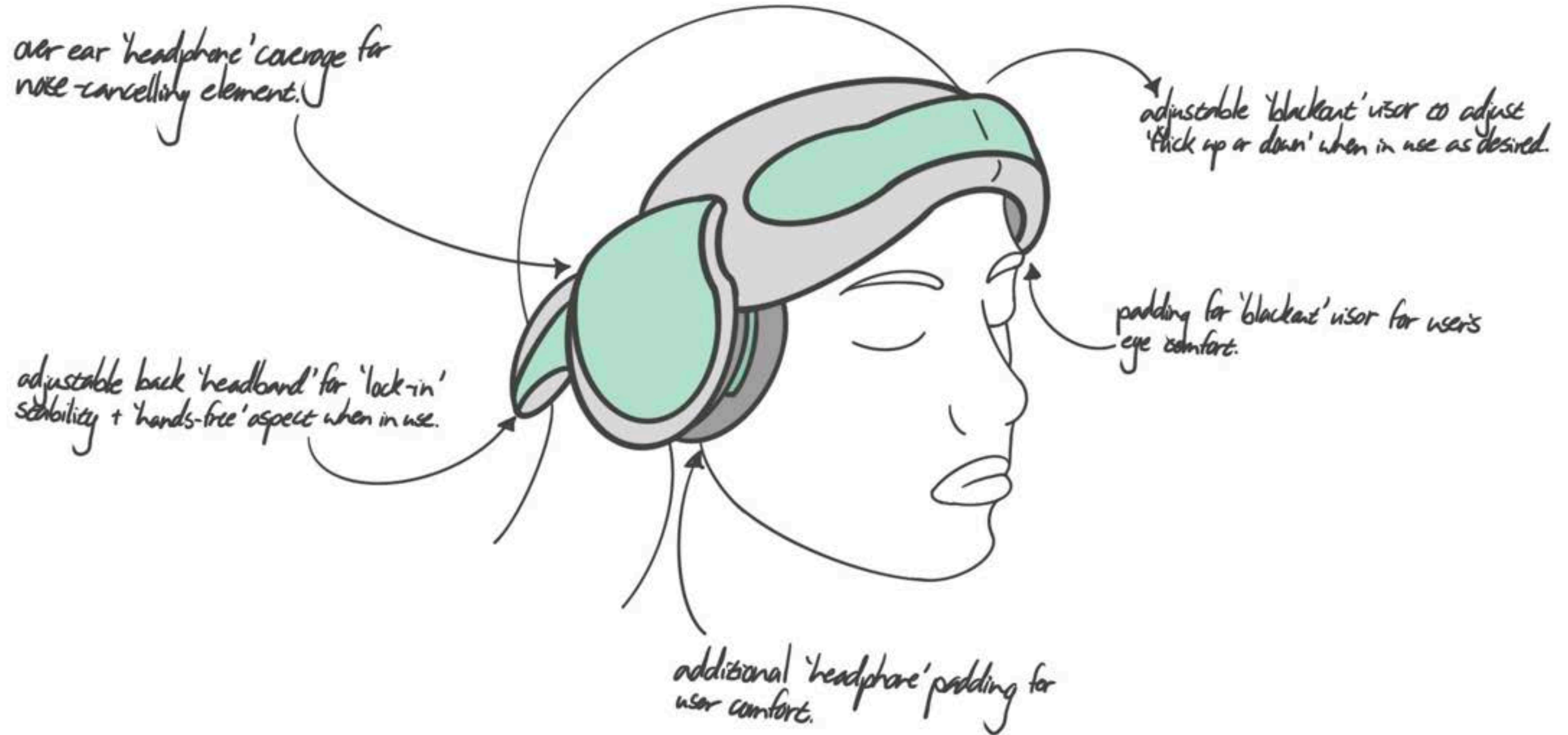
IDEATION | WEEK SEVEN

- CONCEPT TWO 'FINAL REFINEMENT FOR AI PRESENTATION + REPORT'



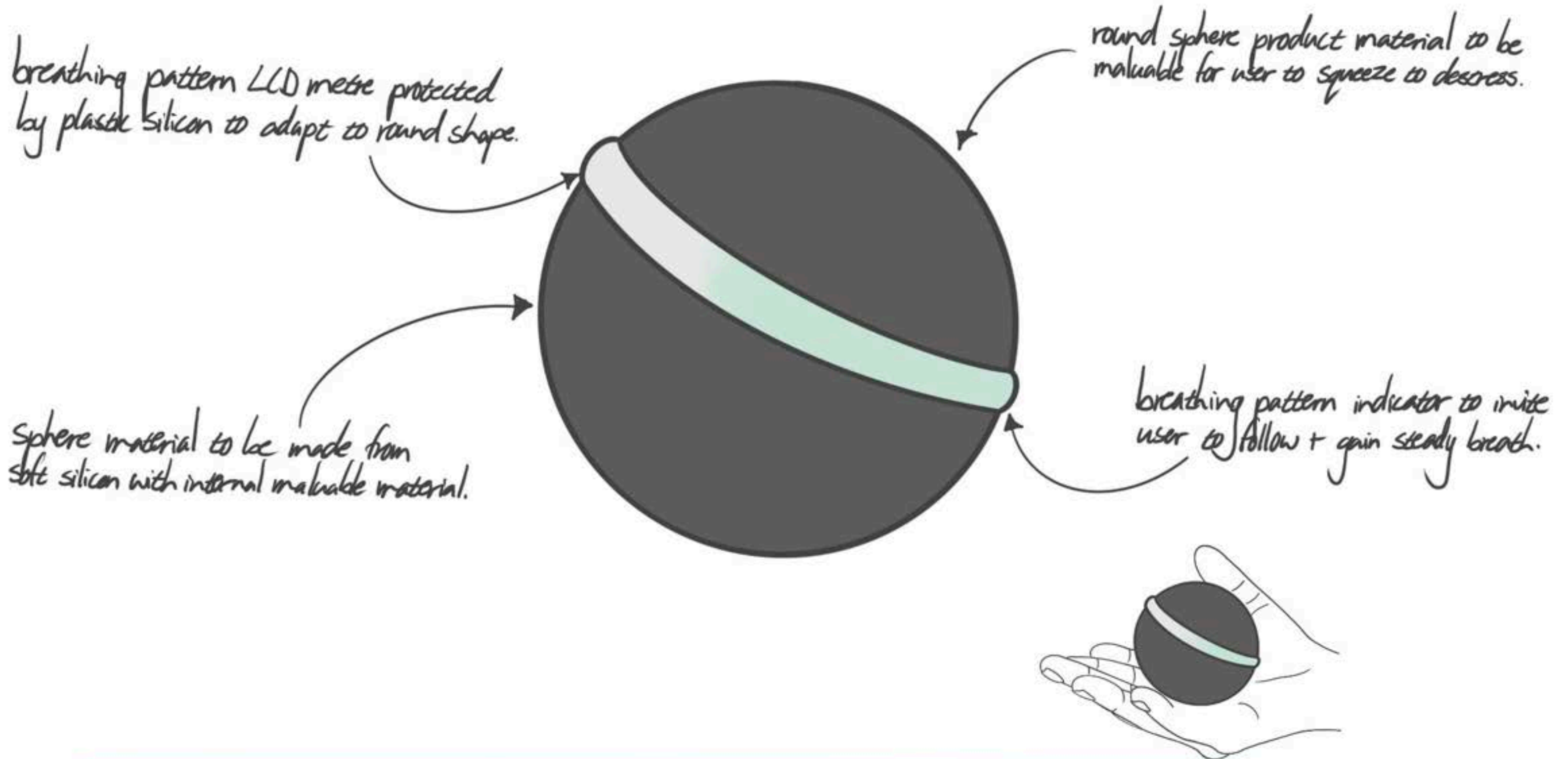
IDEATION | WEEK SEVEN

- CONCEPT THREE 'FINAL REFINEMENT FOR AI PRESENTATION + REPORT'



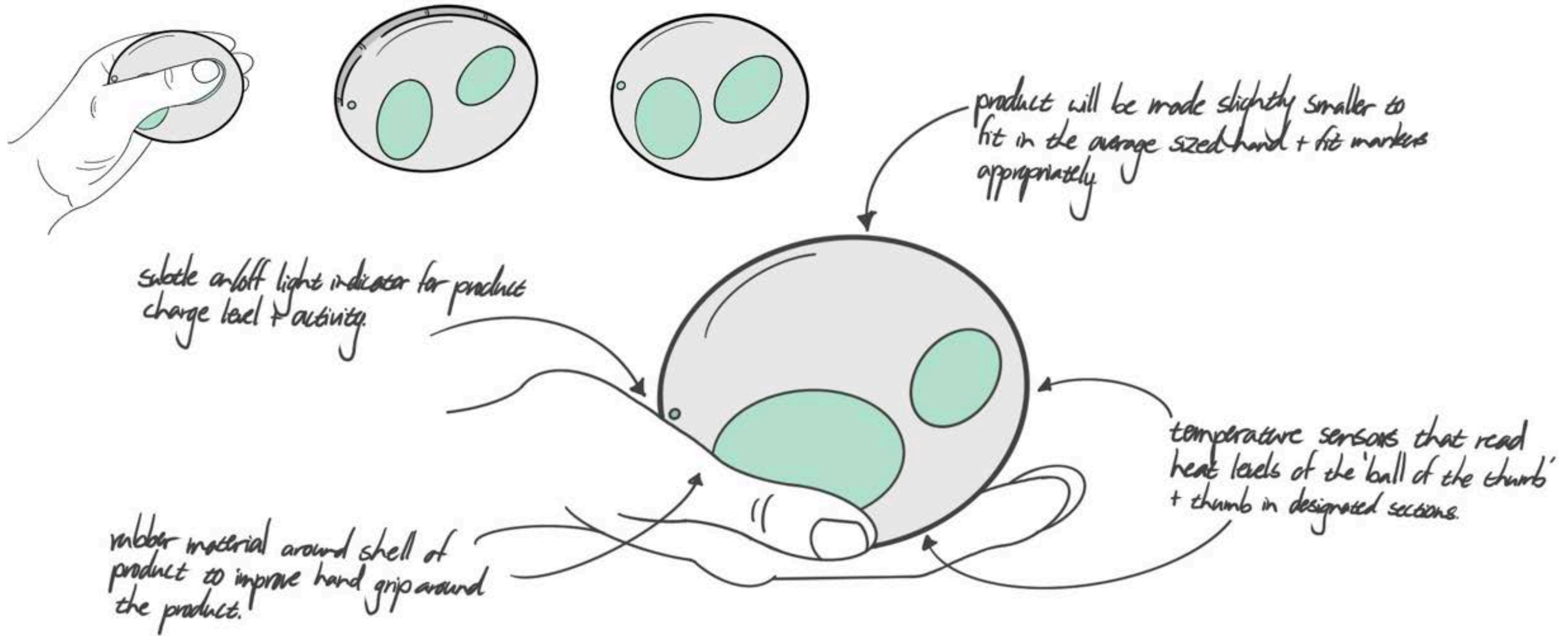
IDEATION | WEEK SEVEN

- CONCEPT FOUR 'FINAL REFINEMENT FOR AI PRESENTATION + REPORT'



IDEATION | WEEK SEVEN

- CONCEPT FIVE 'FINAL REFINEMENT FOR AI PRESENTATION + REPORT'



LECTURE | WEEK SEVEN

- USER-CENTRED DESIGN + ERGONOMICS

Presentation

- o wednesday 13th Sep, 11am-1pm
- o formative digital presentation
- o student-led presentations
- o all students to engage with presentations + feedback

End of year exhibition

- o wednesday 15th Nov

Design Development

1. valuable: what is valuable for users? (beyond product itself)
2. innovative: why is it innovative? (novel tech, sustainable, materials, etc.)
3. purposeful: what does it do for users? does it serve a key purpose?
4. functional: what are its key functions? does it perform these well?
5. usable: is it usable/accessible for intended users?
6. enjoyable: does it fit people's lives, is it enjoyable + experimental?
7. manufacturable: can it be made + fabricated?
8. detailed: have you considered the final touches?
9. presentable: do you have a convincing presentation?

Inspiration

- o QUT honors projects
 - ↳ look at graduating, prior students products.

User-centred Design (UCD)

- o products + environments that are designed to be usable for all people without need for adaptations for all people without need for adaptation or specialised design.
- o UCD elements
 - ↳ physical
 - ↳ psychological
 - ↳ emotional
- o people may experience difficulties in using products when used outside their intended user scenarios, in changed environment or an unusual circumstance.
 - ↳ emergencies
 - ↳ low lights + other assistive aids
 - ↳ temperature
 - ↳ noisy environment
 - ↳ external stress/anxiety
 - ↳ aging + people with disability
- o guidelines + standards
 - ↳ facilitating the application of universal design, safe + UCD.
- o UCD elements
 - ↳ body size + function
 - object size is human size
 - forces + strength
 - ↳ finger, hand + arm
 - dexterity: small + fine movements for older people
 - grip + hold: small buttons + functions
 - carrying limits: size + weight
 - sizing + spacing of info
 - ↳ vision
 - proper labelling: packaging + product info
 - visual field + contrast
 - ↳ hearing + speech
 - alarms + noises
 - context: environmental
 - ↳ mobility
 - movement + transportation, storage
 - ↳ cognition
 - information overload: make it simple
 - ↳ experiential
 - mediation device: achieve a bigger goal than the product itself
 - before, after + during
 - ↳ ergonomics
 - testing
 - anthropometrics
 - prototyping

CONCEPT ONE HEAT + PULSATION

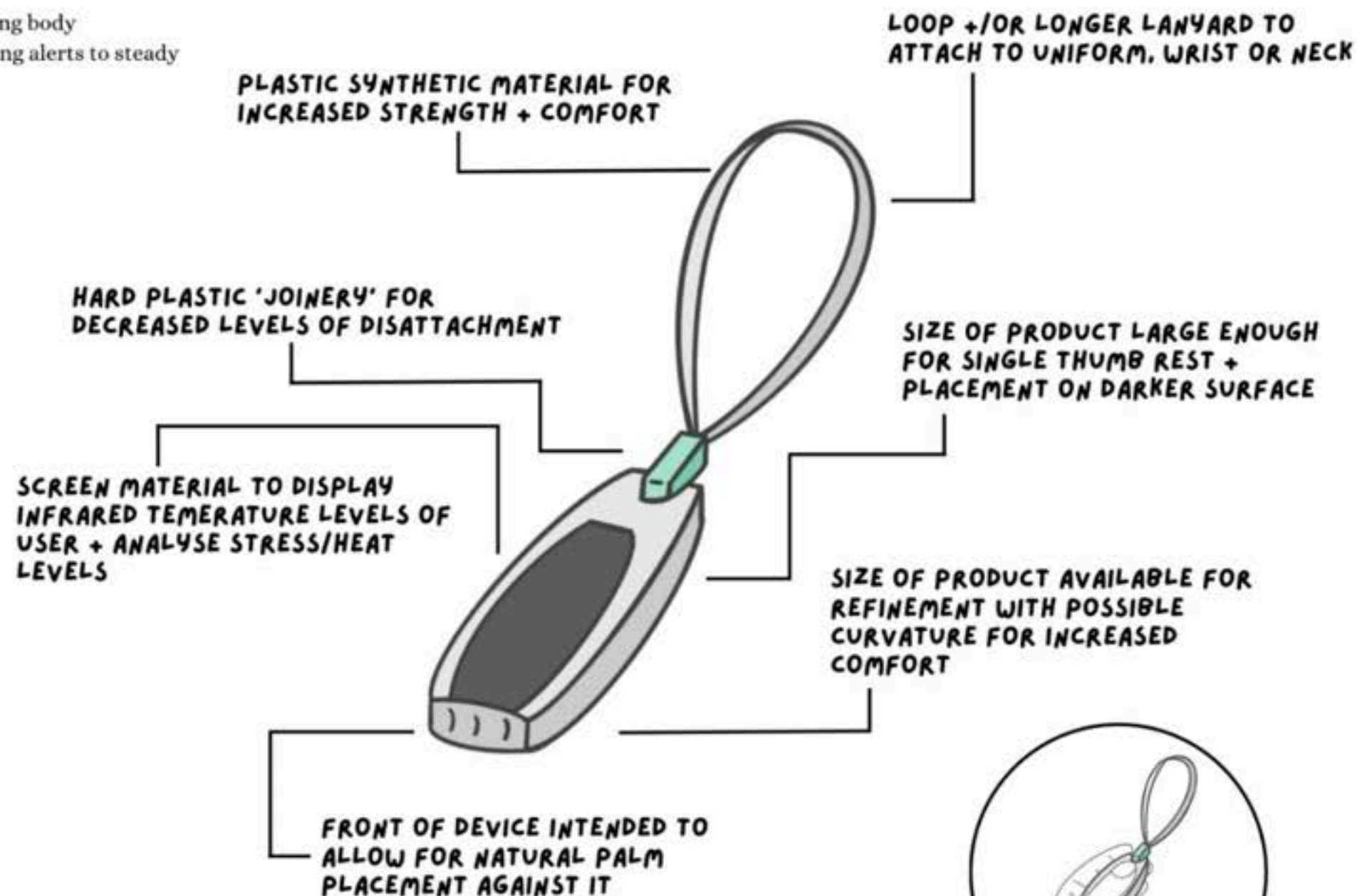
Focuses on lowering stress levels through reading body temperature and heart rate and sending pulsating alerts to steady breathing pattern.

POSITIVES

- Includes an interactive element of analysing infrared hand temperature
- Infrared element distracts user from stress
- Is simple to use and can be easily attached to existing uniform
- Suits the existing uniform of a nurse

NEGATIVES

- Lack of future development
- Stress levels may be inaccurate due to body temperature analysis
- Lack of visual effects when in use
- Lack of visual breathing indicators



211

Nikita Hancock | n11085231

CONCEPT TWO ISOLATION + RELAXATION

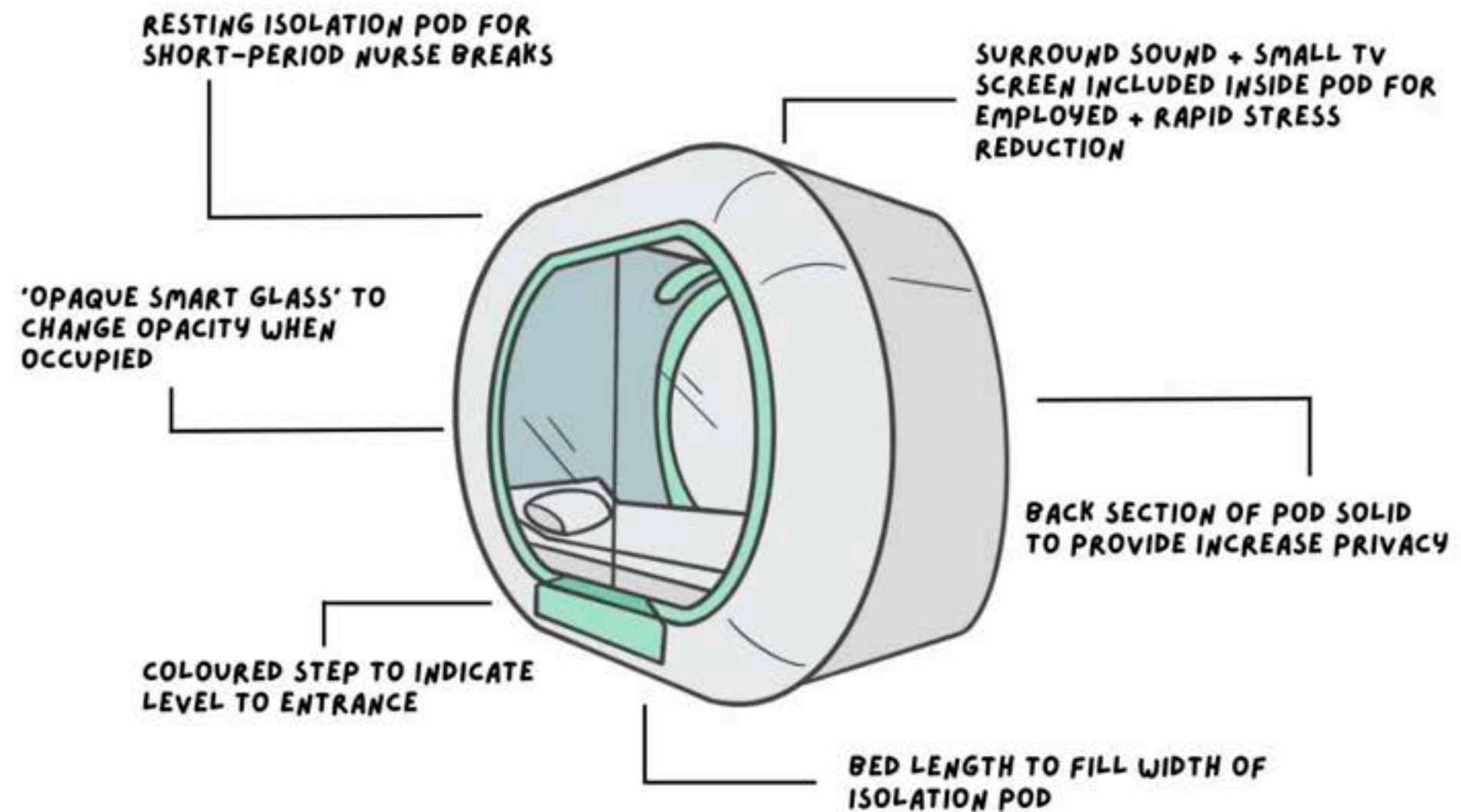
Focuses on lowering stress levels by allowing the user to sit in isolation and debrief after a challenging/stressful situation.

POSITIVES

- A safe space for nurses to de-stress for a short period of time
- Includes surround sound and a TV displaying nature elements and sounds for destressing
- Is private as glass opacity changes when occupied
- Allows for nurses to have their own space in the hospital environment

NEGATIVES

- May have the ability to be misused by nurses (accidentally falling asleep)
- May take up a large area of the hospital hallway space
- May be difficult to maintain/clean over time
- May be an expensive option



21.2

Nikita Hancock | n11085231

CONCEPT THREE SOUND + ATMOSPHERE

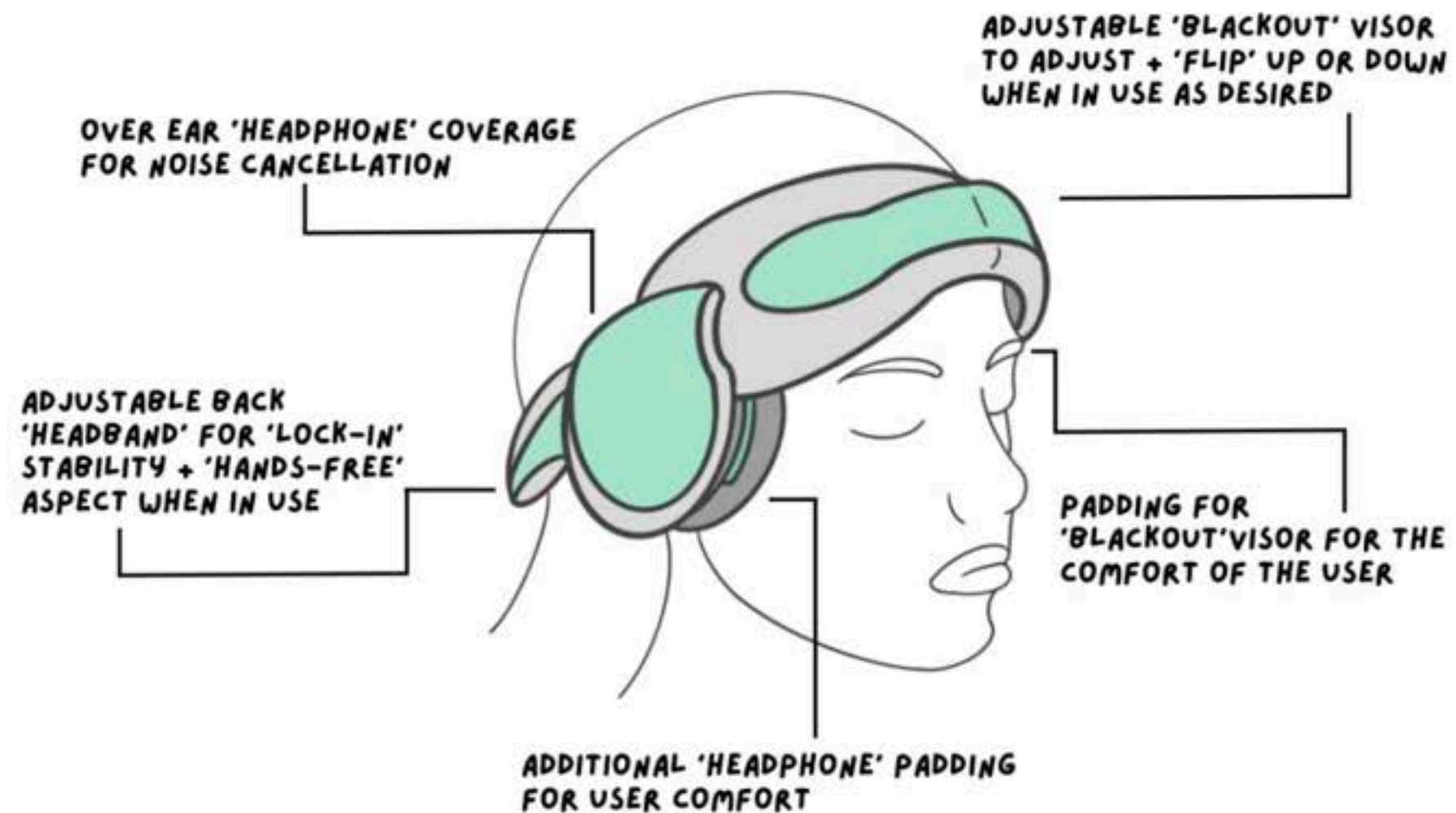
Focuses on lowering stress levels by adopting over-ear noise cancellation headphones and a blackout visor for transportable isolation.

POSITIVES

- Employs noise-cancelling headphones + plays de-stressing sounds (nature, lofi music)
- Uses optional black-out visor to give user the option to fully immerse in isolation
- Adjustable fitted 'headban/gear' for hand-free use
- Allows for nurses to 'disconnect' for a short period of time anywhere

NEGATIVES

- May be too bulky to have 'on-the-go' around the hospital
- Some people may not like looking all senses to de-stress
- Wearable may be too 'restrictive' in retraining certain facial muscles
- Maintenance, sanitation and levels of distribution may become a problem in the long run



CONCEPT FOUR TEXTURE + FEELING

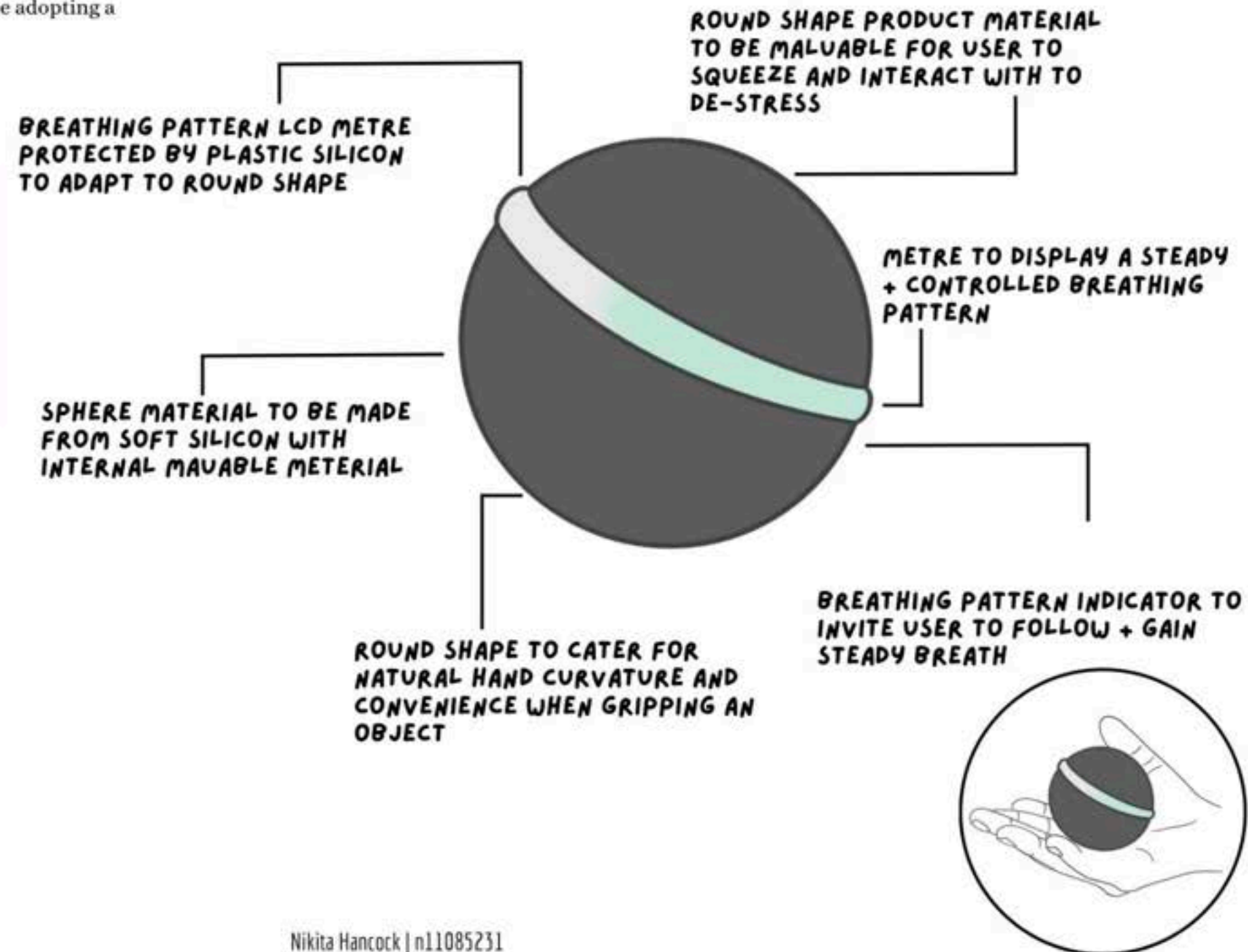
Focuses on lowering stress levels by allowing user to interact with the product and use their physical abilities while adopting a tolerable breathing pattern.

POSITIVES

- Invites user to adopt a steady breathing pattern
- Is physically malleable, users can de-stress by squeezing if frustrated or overwhelmed
- Is very simple to use as well as having a simplistic + minimalistic design
- Is small + transportable

NEGATIVES

- May be too round to keep in users pocket (add lanyard?)
- May be too simple to use/interact with?
- Some people may not like the 'squish' interaction
- May need to be cleaned frequently



21.4

Nikita Hancock | n11085231

LECTURE EIGHT | WEEK EIGHT

- USER EXPERIENCE + MANUFACTURING

Design Development

1. valuable: what is the value for users (beyond the product itself?)
2. innovative: why is it innovative? (nao-tech, sustainable, materials, etc.)
3. purposeful: what does it do for users? does it serve a key purpose?
4. functional: what are its key functions? does it perform these well?
5. usable: is it usable/accessible for intended users?
6. enjoyable: does it fit people's lives, is it enjoyable + experiential?
7. manufacturable: can it be made + fabricated?
8. detailed: have you considered the final touches?
9. presentable: do you have a convincing presentation?

User Experience

- o experience design
 - ↳ a design approach that aims to create appropriate experiences before, during + after user-product-context interaction.
- o experience focused (user expectations)
- o time (longitudinal)
- o context (relevance)
- o fun + enjoyment
- o familiarity
- o challenge
- o novelty
- o surprise
- o emotion
- o sentimental

User Experience

- o need to understand + conceptualise user-product interaction in context.
 - ↳ must also consider how this evolves over time.
- o 5 principles of interaction for product design
 - ↳ affordances:
 - the relationship between the properties of a product + the capabilities of the agent using the product.
 - ↳ signifiers:
 - communicate where the action should take place, what is happening + what other possible actions exist.
 - ↳ mappings:
 - the association/relationships between an action + an event.
 - ↳ feedback:
 - the means of communicating the results of an action.
 - ↳ conceptual model:
 - conceptual models are mental models that people create in their minds of how certain things can be done with a product.
- o 10 interaction design guidelines
 - ↳ expectation
 - ↳ consistent design
 - ↳ functionality
 - ↳ cognition
 - ↳ engagement
 - ↳ user control
 - ↳ perceivability
 - ↳ learnability
 - ↳ error handling
 - ↳ affordability

LECTURE EIGHT | WEEK EIGHT

- USER EXPERIENCE + MANUFACTURING

What you should do

- consider the experience design aspects as you develop your design:
 - ↳ experience focused (user expectations)
 - ↳ time (longitudinal)
 - ↳ context (relevance)
- fit your design within the experience design framework:
 - ↳ how long does it take into account key elements of user-product-context interaction over time.
- apply interaction design principles

Manufacturing

- bill of materials (BOM)
 - ↳ a list of standard + custom parts required to manufacture a particular product - like a list of ingredients in a recipe.
- standard parts
 - ↳ 'standard' or 'off the shelf' parts are items that are produced to a standard or of such a high quantity that they are readily available. standard parts can include:
 - fasteners
 - bearings
 - motors
 - castors
 - hard drives
 - excursions
 - USB's
 - PCB's (circuit boards)

Custom Parts

- 'custom' or 'designed' parts are the items that you sketch, CAD, tool + manufacture. also includes artwork, packaging, graphics.
 - ↳ sheet metal
 - ↳ injection mouldings
 - ↳ specific mechanisms
 - ↳ die castings
 - ↳ brackets
 - ↳ gaskets
 - ↳ artworks
 - ↳ machined parts
- information that may appear on custom parts:
 - ↳ if plastic, the type (parts 25g or more must feature d/s)
 - ↳ part number (shown in B.O.M)
 - ↳ date + time of manufacture
 - ↳ version of part
 - ↳ assembly information

Drawing Specifications

- a typical drawing setup should include:
 1. perspective/pictorial (front + rear)
 2. orthographic (front, side, top)
 3. section view/detail view
 4. overall dimensions
 5. title block
 6. build information/artwork
 7. notes column (note any interesting features the parts are to have.)

LECTURE EIGHT | WEEK EIGHT

- USER EXPERIENCE + MANUFACTURING

Drawing Specifications

1. company name
2. version status
3. date
4. project number
5. part number
6. drawing number
7. design name
8. drawn by
9. approved by
10. material
11. finish
12. scale
13. sheets

BOM

1. part number - QA purposes
2. part image - rendering or screen shot
3. part name - generally some sort of descriptive name
4. version status - QA purposes
5. quality of each part per unit
6. weight of part
7. manufacturing method
8. part finish
9. material of part

10. colour of parts
11. production volume
12. supplier
13. cost per single part
14. additional comments

Quality Assurance (QA)

- o the most important attribute as an Industrial Designer + in design firms.
 - ↳ QA is a way to track all parts ever sources or produced by a design firm.
 - ↳ companies outsourcing work to an industrial design firm will tend to first look at the firm's portfolio + QA procedures.
 - ↳ having sound specification drawing skills + well laid out B.O.M's will form part of the overall QA system in a company.

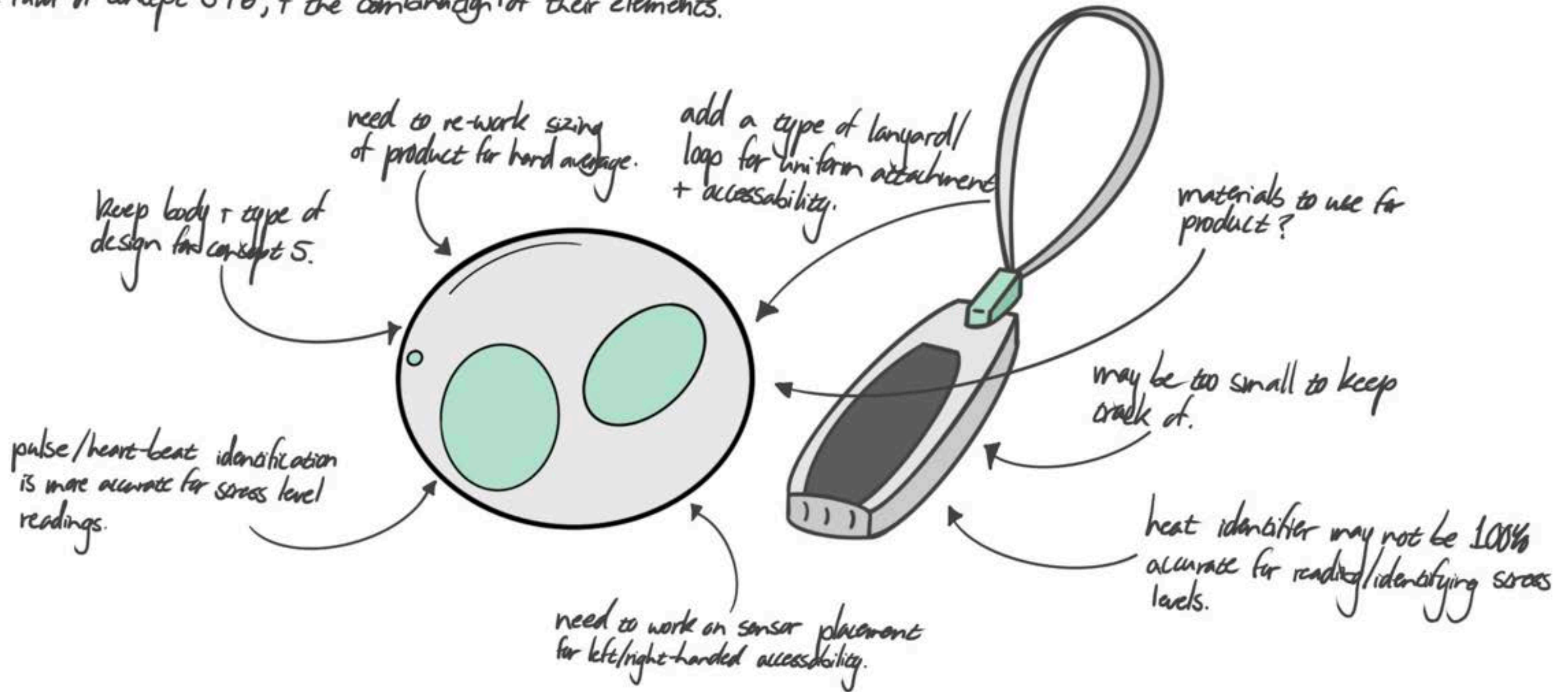
What you should do

- o think about the components / parts in your design
 - ↳ standard + custom parts
- o develop a BOM for your design
 - ↳ build on it through the semester
- o consider what to show in technical drawing package
 - ↳ detail? parts? aspects of design?

CREATIVE DIRECTION FOR A2 | WEEK EIGHT

- PRESENTATION FEEDBACK + PROJECT DIRECTION

o presentation feedback was majoratively positive. most persons were in favor of concept 5+6, + the combination of their elements.



CHECKLIST FOR SUCCESS | WEEK EIGHT

- A STEP-BY-STEP CHECKLIST FOR DEVELOPING + DESIGNING A PRODUCT

1. Define my product
 - o clearly define the problem my product aims to solve + the goal it intends to achieve.
2. Market research
 - o redefine target market + review feedback of presentation + concepts from interview participants.
3. Concept developments
 - o brainstorm + sketch out concepts of my product.
 - o combine + iterate concepts 4+5 for further refining.
4. Form + ergonomics
 - o experiment with shapes of product
 - o think about form + functionality.
5. Design specifications
 - o develop detailed design specifications + requirements for the product
 - o research into anthropometrics + sizing
 - o measurements of product.
6. Materials
 - o research appropriate materials for product sections + aspects.
 - o base materials on functionality + cost.
7. Budgeting
 - o estimate costs for materials, tools, + any necessary equipment for the product.
 - o be as accurate as possible.
8. Prototype development
 - o build physical prototypes based on design sketches + ideation.
9. CAD design
 - o create a 3D CAD model of the chosen rough prototype.
10. Final prototype development
 - o create the physical prototype based on CAD design.
 - o consider using 'arduino' + tech/coding elements for light/pulsation
11. Testing + iteration
 - o test the prototype for functionality + gather feedback.
 - o make necessary design iterations.
12. Safety + ethics
 - o ensure project adherence to safety + ethical guidelines.
13. Documentation
 - o maintain detailed documentation of the design process, iterations + sketching.
14. Presentation skills
 - o keep presentation clear + simple to understand.
 - o make sure to organise + prepare for project video.
15. Post-project evaluation
 - o reflect on learnings + how to apply myself in future projects.

PROBLEM STATEMENT | WEEK NINE

- CLEARLY DEFINING THE PROBLEM MY PRODUCT AIMS TO SOLVE + THE GOAL IT INTENDS TO SOLVE

IN HOSPITAL SETTINGS, THE QUALITY OF PATIENT CARE IS CLOSELY TIED TO THE WELLBEING AND PERFORMANCE OF NURSING STAFF. HOWEVER, A CRITICAL ISSUE OBSTRUCTING THE DELIVERY OF OPTIMAL CARE IS THE ESCALATING STRESS + MENTAL HEALTH CHALLENGES FACED BY NURSES. THE PROBLEM ADVERSELY AFFECTS THEIR ABILITY TO PERFORM AT THEIR BEST, CONSEQUENTLY IMPACTING THE OVERALL QUALITY OF PATIENT CARE.

THIS PROJECT AIMS TO IDENTIFY A COMPREHENSIVE + EFFECTIVE PRODUCT SOLUTION THAT ADDRESS NURSES' STRESS + MENTAL HEALTH ISSUES. BY ENHANCING NURSES' WELLBEING, I SEEK TO IMPROVE THE QUALITY OF CARE PROVIDED TO PATIENTS. THE PROPOSED SOLUTION WILL BE PRACTICAL, SUSTAINABLE + TAILORED TO MEET THE UNIQUE CHALLENGES FACED BY NURSES IN THE HOSPITAL ENVIRONMENT.

TARGET MARKET | WEEK NINE

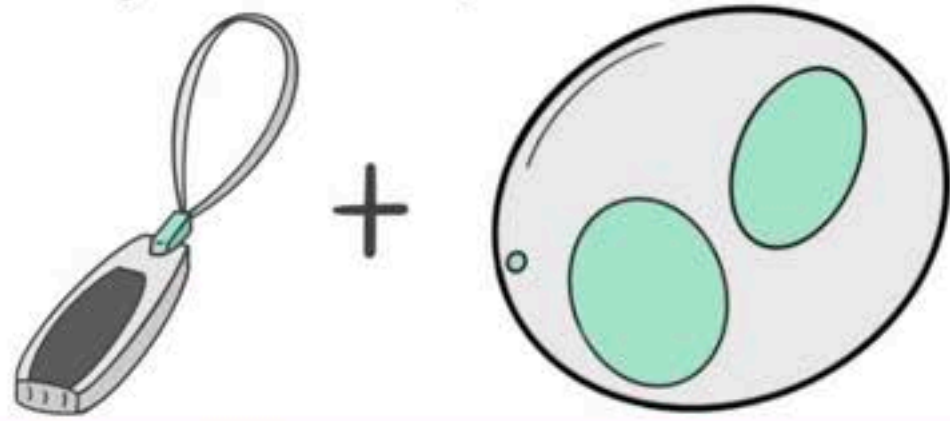
- REDEFINING THE TARGET MARKET + REVIEW OF PRESENTATION + INTERVIEWEE FEEDBACK

TARGET MARKET

THE PRIMARY TARGET MARKET FOR THIS PROJECT ARE AUSTRALIAN NURSES WORKING IN QUEENSLAND HOSPITALS. THIS NOT LIMITED TO AGE OR GENDER OF THE NURSES, AS THE DEVELOPED PRODUCT WILL CATER FOR ALL AGES AND GENDERS.

Feedback from presentation (in class):

- o loved graphical layout + overall presentation of concepts - clean + simple.
- o eliminated concept 2 due to space + ease of potential concept.
- o eliminated concepts 3+4 due to concept viability + functionality.
- o peers were drawn to concept 5 in aesthetics + form of overall concept.
 - ↳ liked the pulse sensors in determining accurate readings.
 - ↳ appreciated 'hand-held' element.
- o peers also liked concept 1 in its individual elements.
 - ↳ liked the practicality of hand/uniform strap
 - ↳ is small + compact
- o peers mentioned combining elements of concept 1 with the form of concept 5.

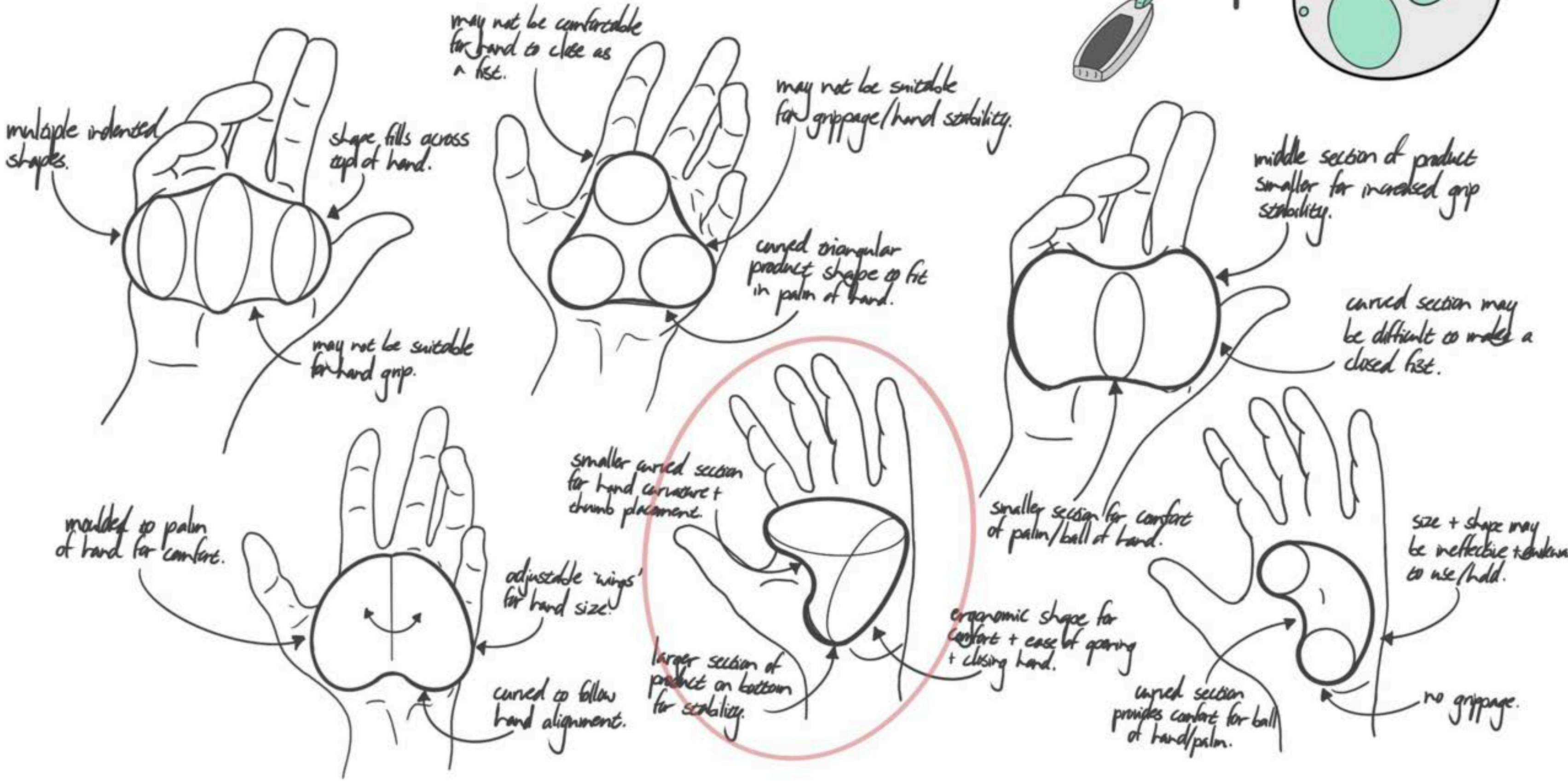
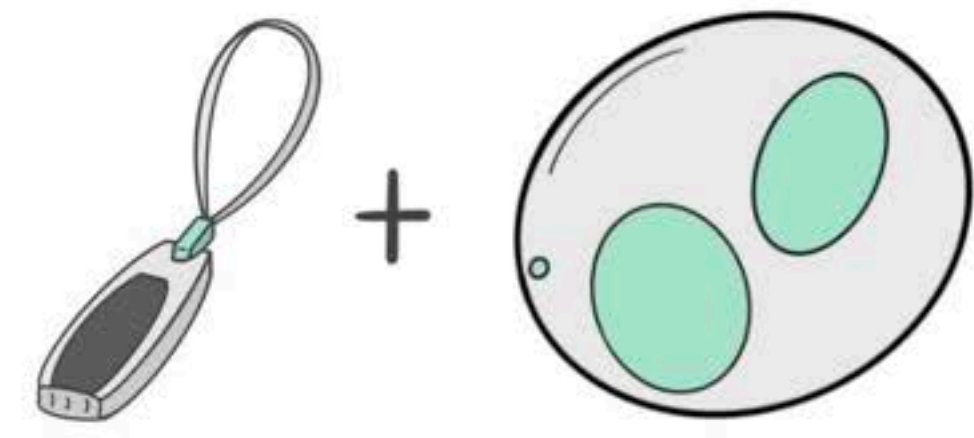


Feedback from interviewees (via email):

- o enjoyed concept 2, however is not practical to have in a hospital environment
 - ↳ is space, time, expensive.
- o concept 5 is more practical, user friendly + affordable.
 - ↳ more favourable concept.

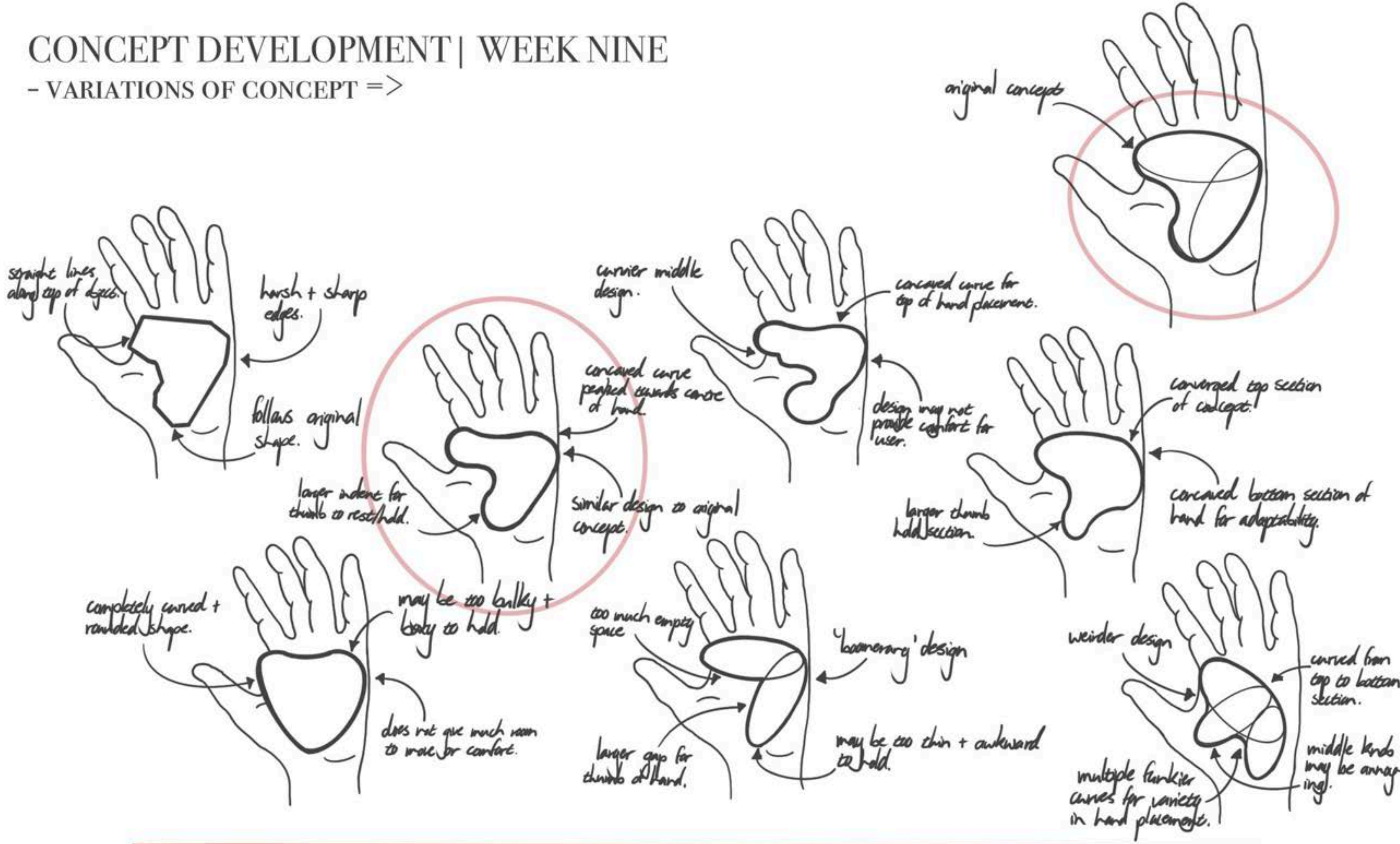
CONCEPT DEVELOPMENT | WEEK NINE

- ITERATING + COMBINING CONCEPT ONE & FIVE FROM ASSESSMENT ONE



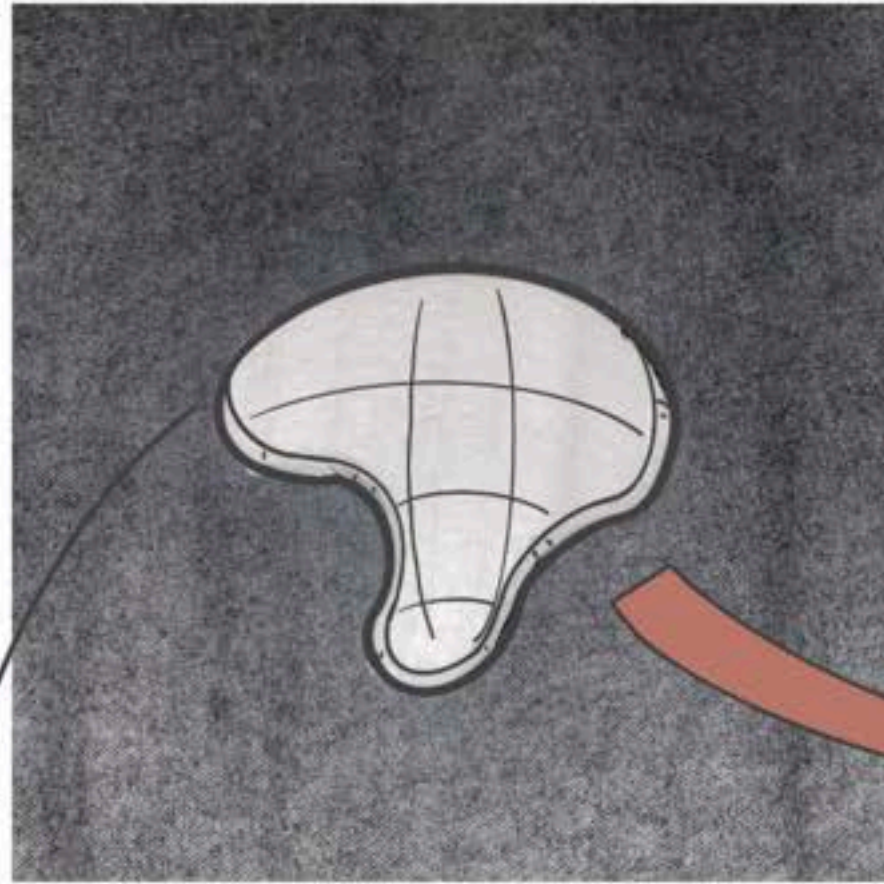
CONCEPT DEVELOPMENT | WEEK NINE

- VARIATIONS OF CONCEPT =>



CONCEPT DEVELOPMENT | WEEK NINE

- FORM ROUGH PROTOTYPING

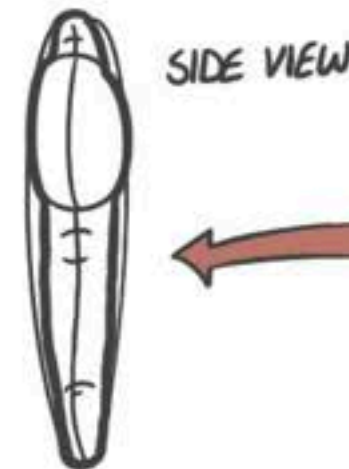


SIDE VIEW

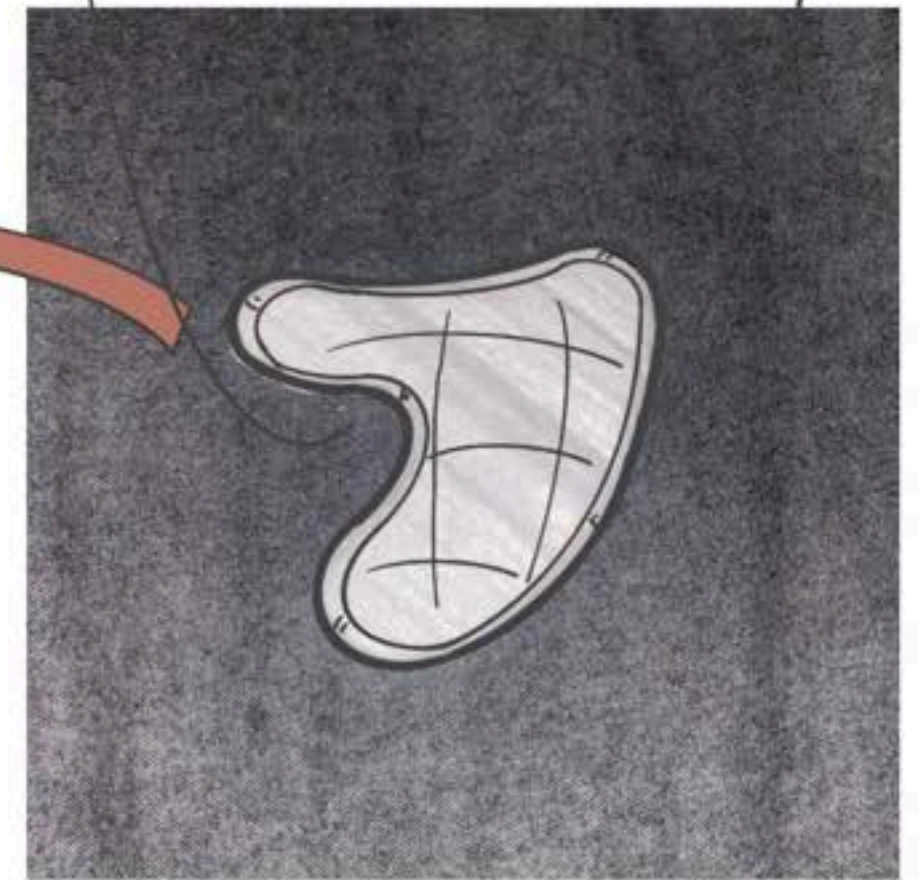


- one of the most favoured concepts on paper + in prototyping.
- rounded top section of prototype for comfort when user is gripping/closing fist.
- faces of prototype curved outwards for comfort while resting flat on hand.
↳ also caters for left + right handedness.

- also one of the most favoured concepts.
- testers were conflicted on the top 'holding' section, however most preferred the convex curve over the concave.
- different top holding section was tested for comfort + convenience.
- larger thumb section to cater for all, larger + smaller hand sizes.

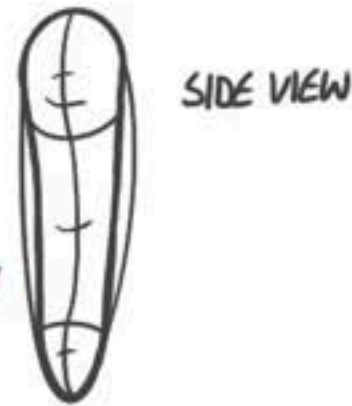
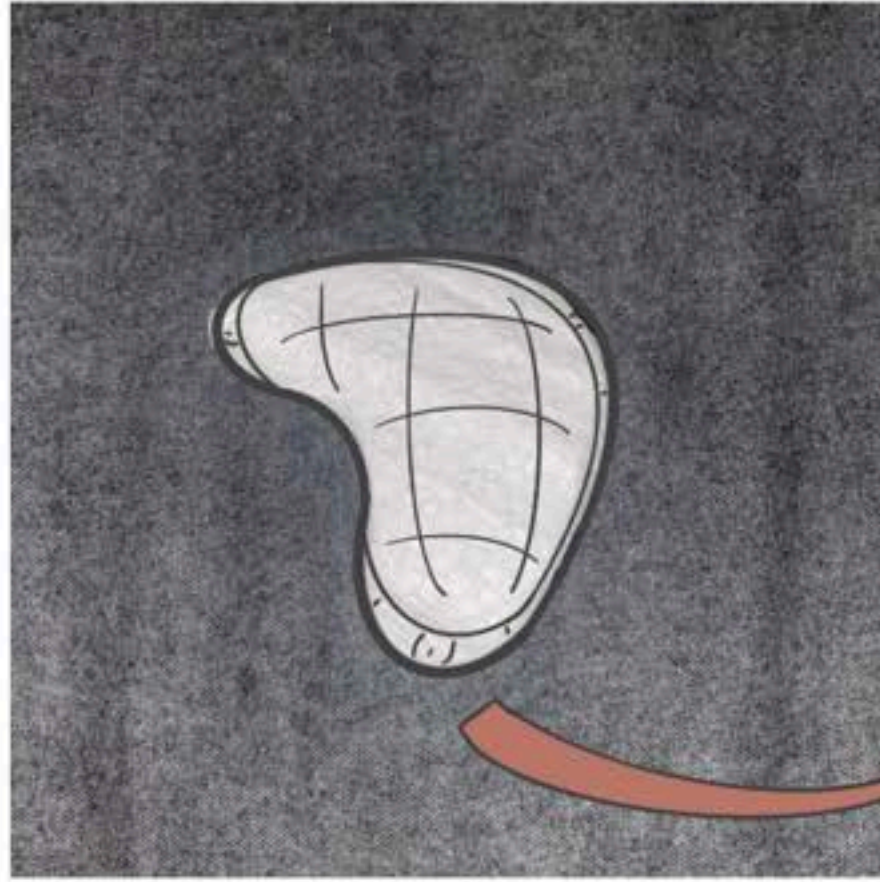


GRIPPED



CONCEPT DEVELOPMENT | WEEK NINE

- FORM ROUGH PROTOTYPING



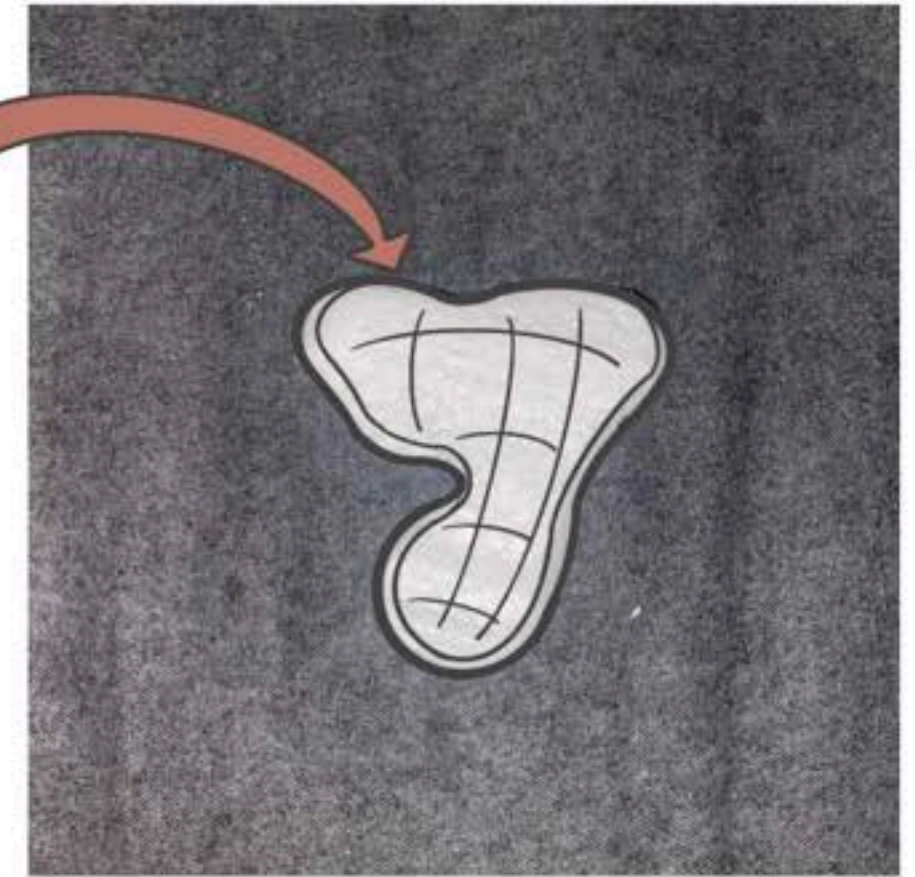
- shape of a generic 'sneak' - lol
- shallow thumb hole to test viability, felt a little awkward as it didn't cover a larger area.
- larger portion of product along straight side of hand
 - ↳ this made the prototype lopsided + heavier where it shouldn't be.
 - ↳ doesn't feel right.

- funky design concept
 - ↳ made to fit into complex hand ergonomics.
- middle part of holding section slight bent inwards to allow middle finger to sit.
 - ↳ improves hand stability.
- thumb hold made different to fit funky design.
 - ↳ is not very comfortable
 - ↳ does not fit into thumb securely.

SIDE VIEW

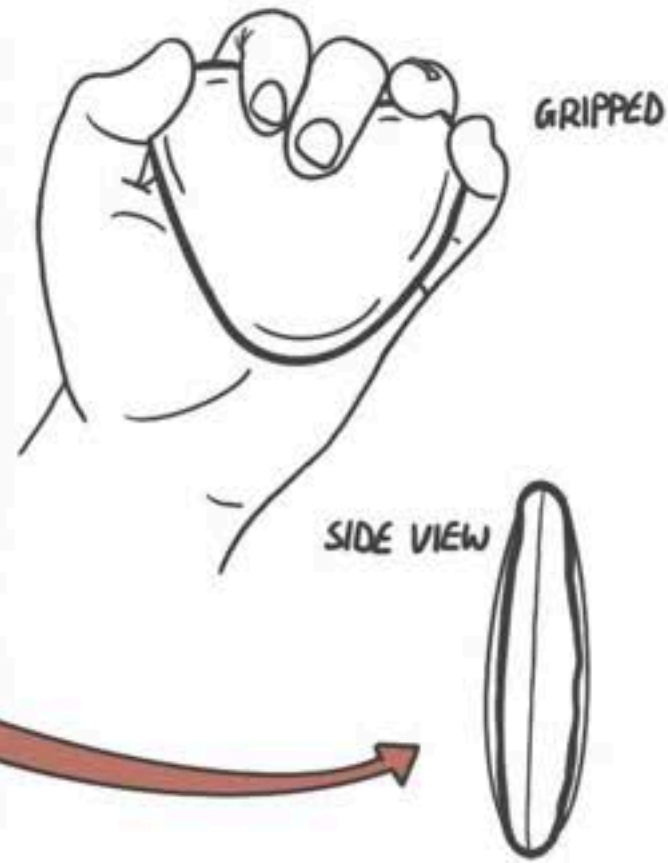
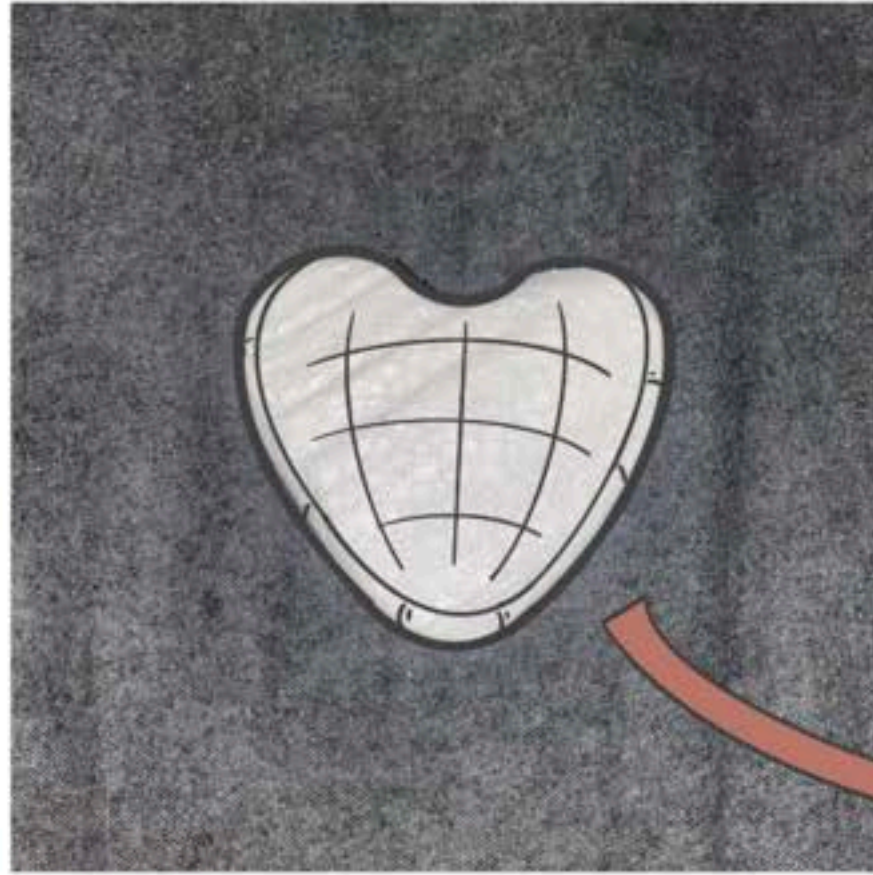


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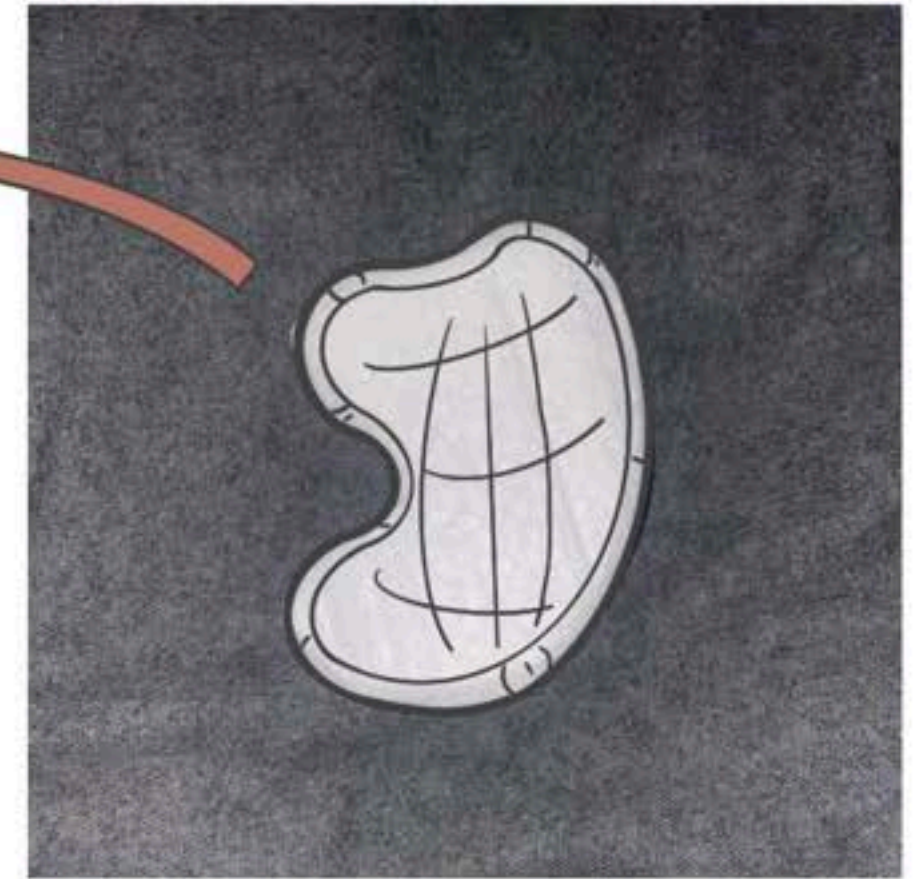
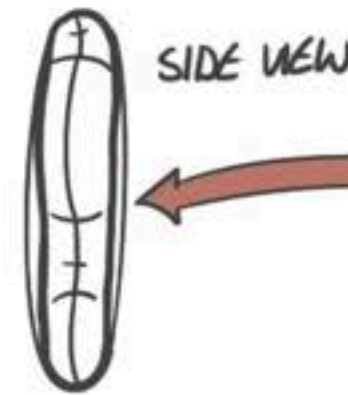
CONCEPT DEVELOPMENT | WEEK NINE

- FORM ROUGH PROTOTYPING



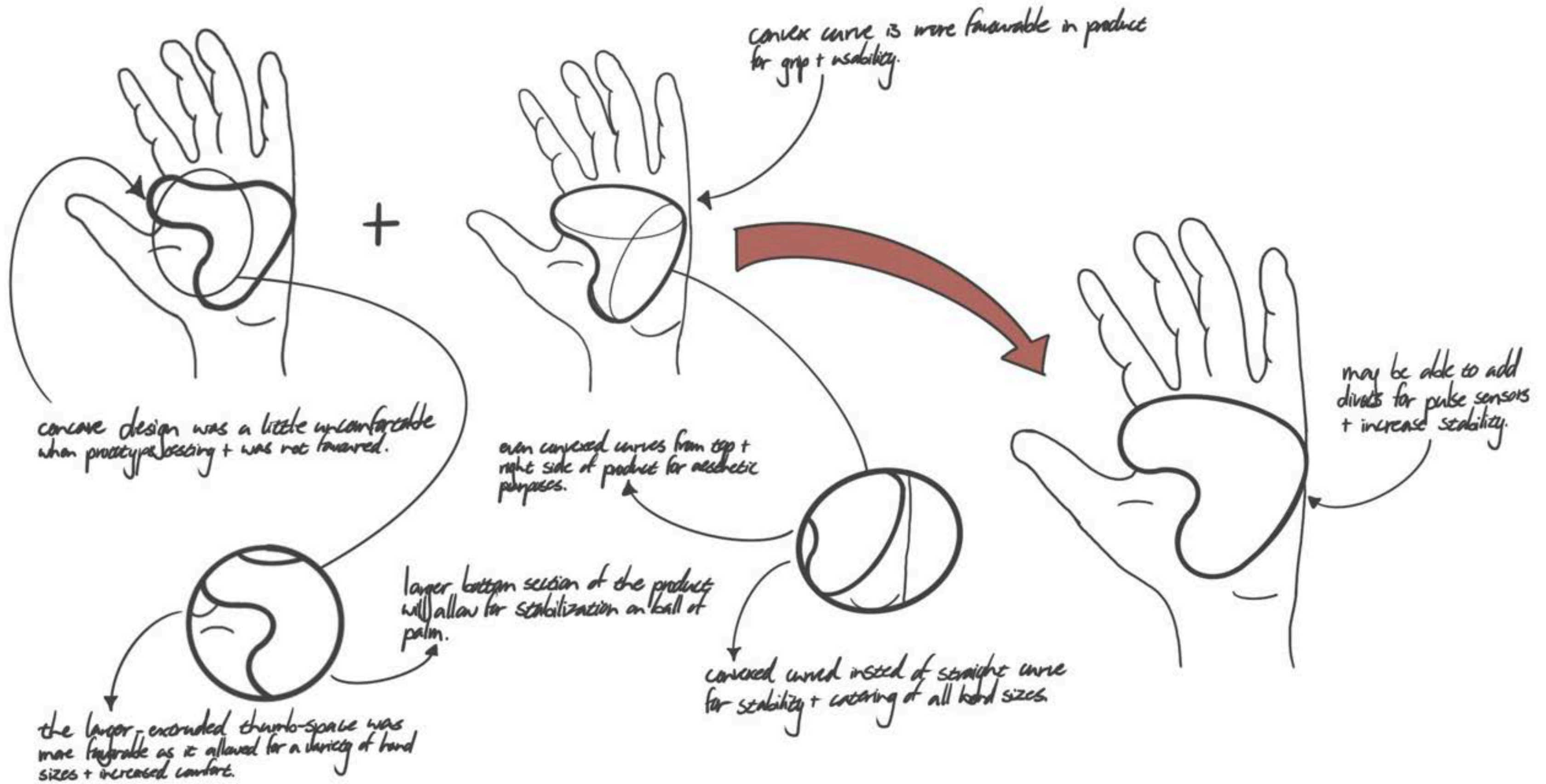
- heart-shaped prototype
 - ↳ to promote colouring use + aesthetics
- is a little bulky + unnatural to hold
 - ↳ no real gripping area
- no thumb placement hole
 - ↳ is not comfortable

- oddly-shaped prototype
 - ↳ top holding section is much smaller than all the other prototypes
 - ↳ this minimises the overall size of the prototype, but also makes it less stable + viable
- the section that runs down the straight side of the hand is much larger.
 - ↳ may make the prototype lopsided + heavier on the larger side.



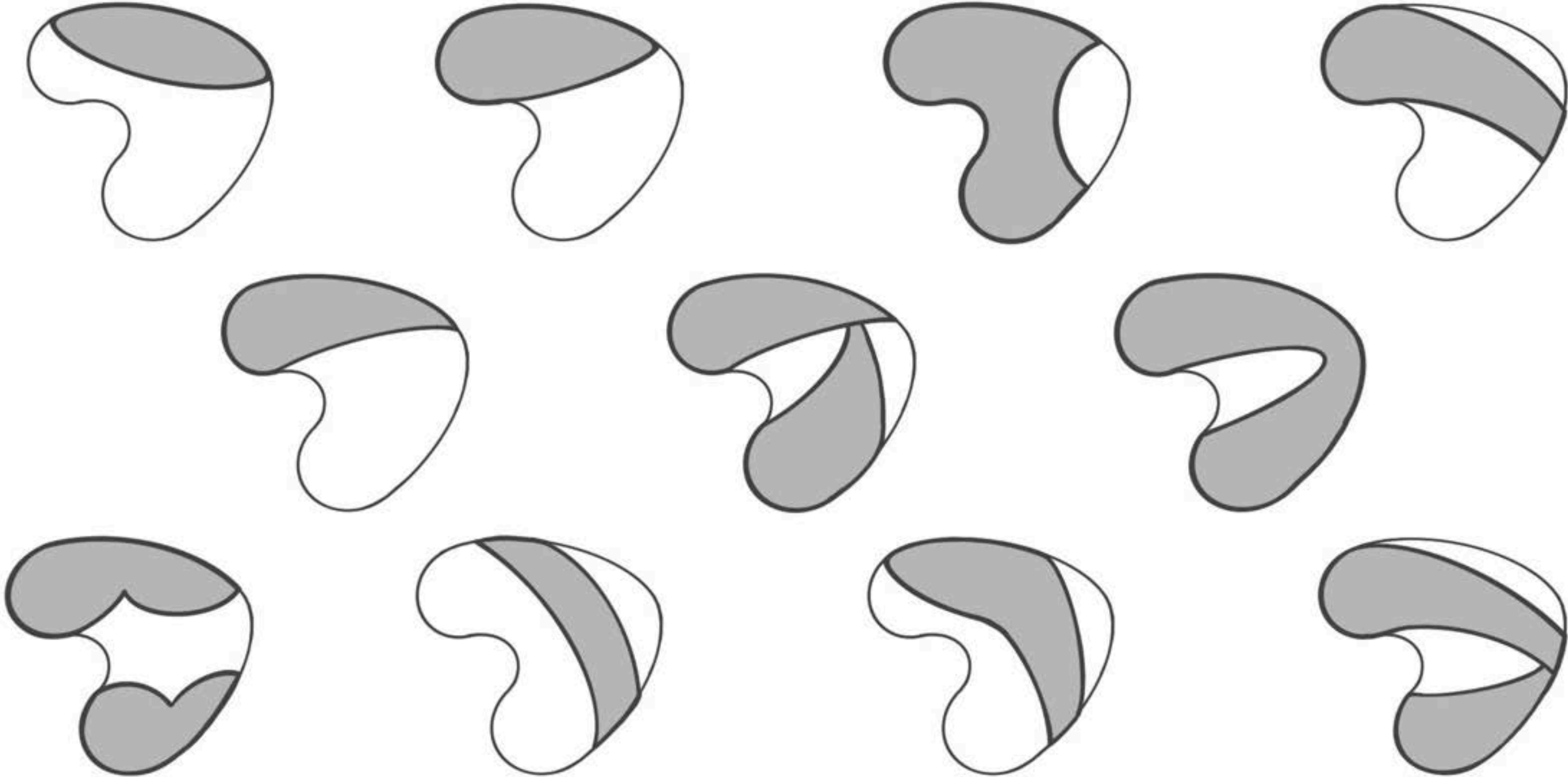
CONCEPT DEVELOPMENT | WEEK NINE

- FINAL FORM OF PRODUCT



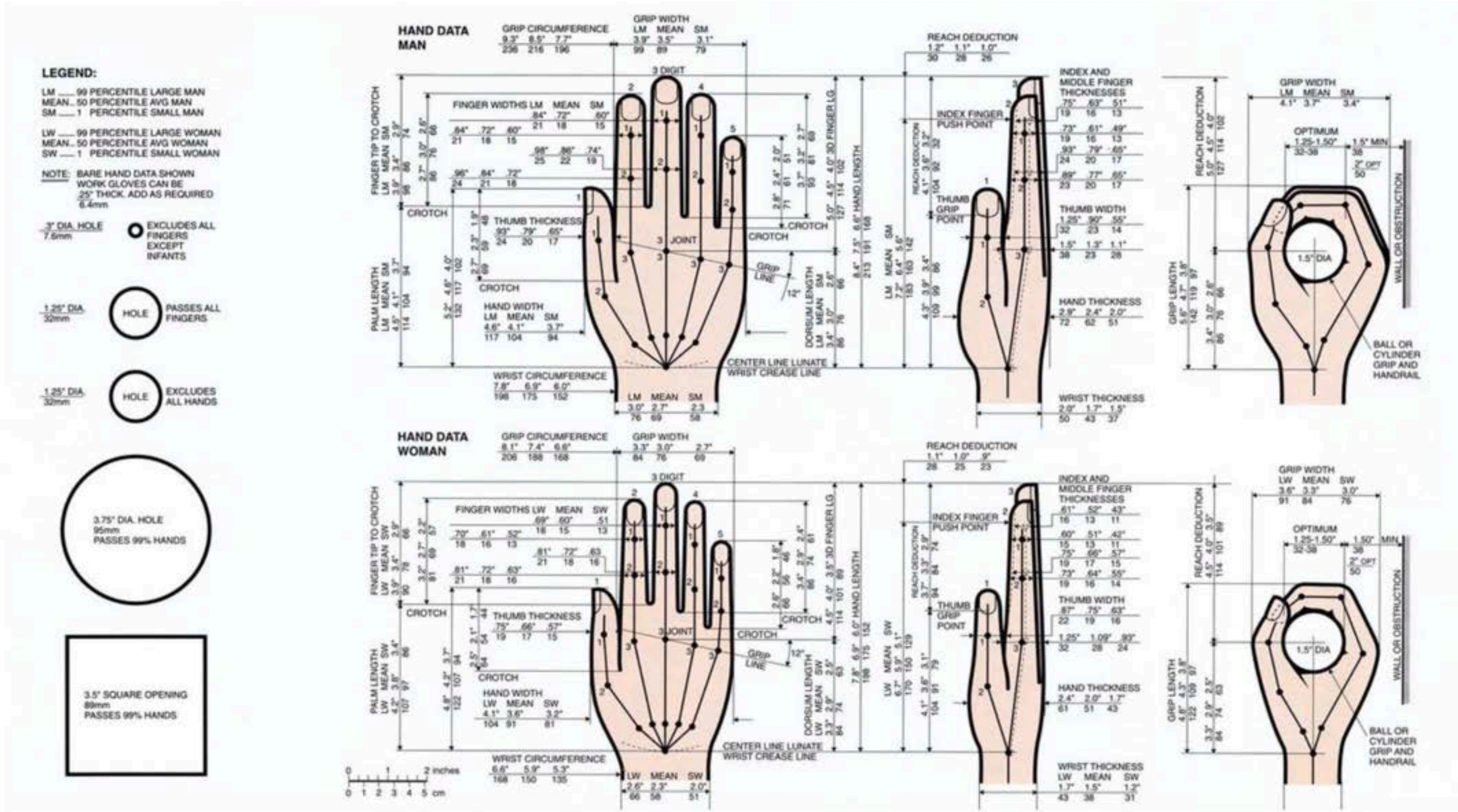
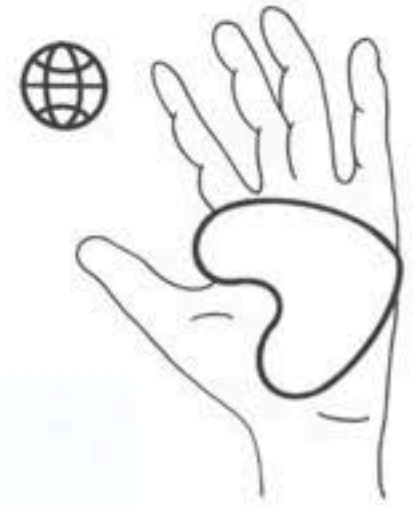
CONCEPT DEVELOPMENT | WEEK NINE

- RUBBER GRIP POSITIONS



CONCEPT DEVELOPMENT | WEEK NINE

- HAND ANTHROPOMETRICS



CONCEPT DEVELOPMENT | WEEK NINE

- HAND ANTHROPOMETRICS



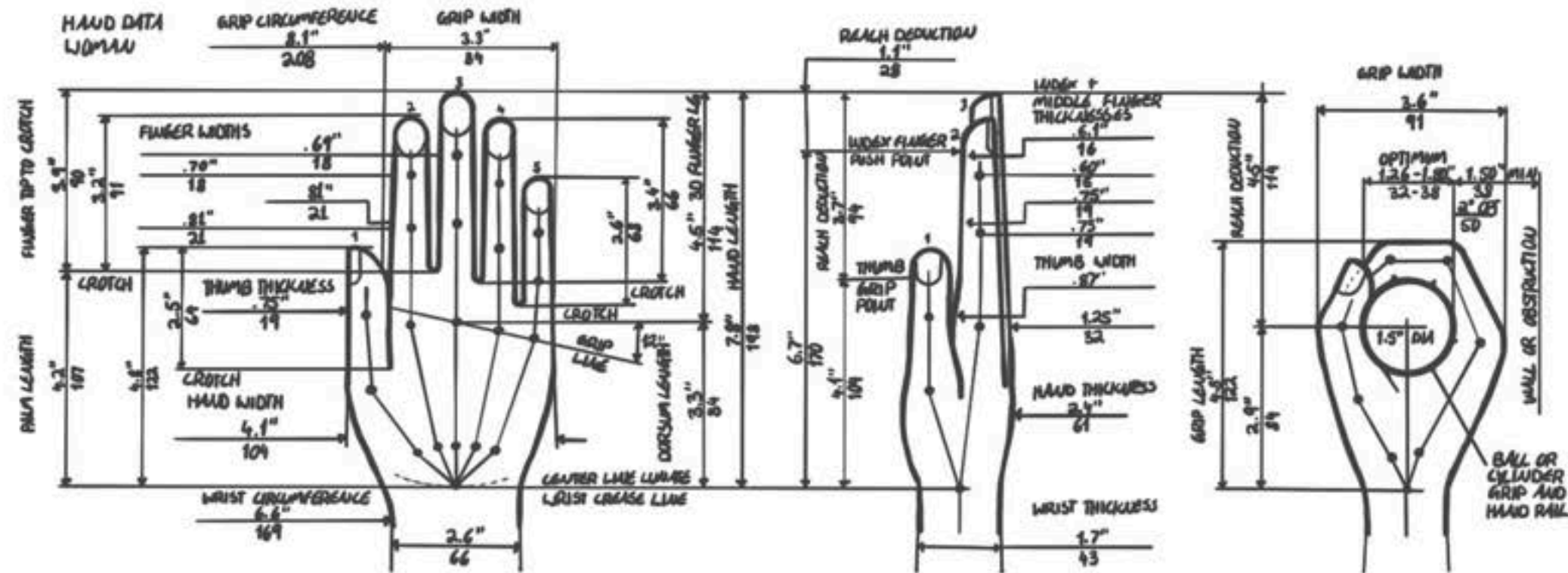
will be basing the size of the product around the larger percentile of a woman's hand

- ↳ this is to cater for all woman's hand sizes + majority of men
- ↳ there is a larger percentage of women nurses than males.

3" DIA. HOLE
76mm ○ EXCLUDES ALL FINGERS EXCEPT MIDDLE

1.25" DIA.
32mm ○ HOLE ○ PASSES ALL FINGERS

1.25" DIA.
32mm ○ HOLE ○ EXCLUDES ALL HANDS





- used on exercise machines to read heart rate.
 - ↳ on treadmills, pulse sensors are often built into the console bar or on a separate bar below the console.
- pulse sensors are not designed to be exact medical devices.
 - ↳ they can however, give a general estimates of the users heart rate
- pulse sensors, aka 'heart rate sensors', find your pulse through the skin of your hands.
 - ↳ they incorporate small electrical signals passing through your skin + amplify them so they can turn those signals into an estimated number of times your heart beats per minute.
- a pulse wave is the change in the volume of a blood vessel that occurs when the heart pumps blood, + a detector that monitors this volume change is called a pulse sensor.
 - ↳ there are 4 main ways to measure heart rate: electrocardiogram, photoelectric pulse wave, blood pressure measurement, + phonocardiography.
 - pulse sensors use the photoelectric method.
- pulse sensors using the photoelectric pulse wave method are classified into 2 types depending on the measurement method: transmission + reflection.
 - ↳ transmission types measure pulse waves by emitting red or infrared light from the body surface + detecting the change in blood flow during heart beats as a change in the amount of light transmitted through the body.
 - this method is limited to areas where light can easily penetrate, such as the fingertip or earlobe.

○ reflection-type pulse sensor (OSHRM)

- ↳ reflection-type pulse sensors (optical sensors for heart rate monitor) emit infrared, red, or green light (~550nm) towards the body + measure the amount of light reflected using a photodiode or phototransistor.
- ↳ oxygenated hemoglobin present in the blood of the arteries has the characteristic of absorbing incident light, so by sensing the blood flow rate that changes following heart contractions over time we are able to measure the pulse wave signal.
 - also, since reflected light is measured, the range of suitable areas is not limited as with transmission-type pulse sensors.
- pulse sensor (OSHRM) applications
 - ↳ by looking at the period of fluctuation from the waveform obtained by measurement of the pulse wave sensor + observing the pulsation (variation) using the heart rate along with both red + infrared waves, it is possible to measure the arterial blood oxygen saturation (SpO₂).
 - ↳ using data from pulse sensors is expected to enable calculation of various vital signs such as HRV analysis (stress level) + vascular age through high-speed sampling + high accuracy measurement.



SECONDARY RESEARCH | WEEK NINE

- TYPES OF PULSE SENSORS



○ treadmills, elliptical machines, + other exercise equipment found in fitness centers + some home exercise rooms often feature handgrip heart rate monitors.

↳ these rely on amounts of sweat from your palms + the metal on the grips to detect the electric signals of your heartbeat.

○ exercise machine - pulse sensors

↳ aka 'heart rate sensors', find your pulse through the skin of your hands. these sensors are silver metallic rings located on the support bars or moving arm bars of exercise machines.

↳ some have a single, large sensor on each side, while others have two, on each side spaced closely together. they interpret small electrical signals passing through your skin + amplify them to turn these signals into BPM.



○ pulse oximeter - medical device

↳ many of these devices clip onto a finger + use optical detection method. these track pulse rate + blood oxygen levels, common in hospital settings + are portable, battery-powered.

↳ the pulse oximeter uses a cold light source that shines a light through the fingertip, making the tip appear to be red.
- by analysing the light from the light source that passes through the finger, the device is able to determine the percentage of oxygen in the percentage of oxygen in the red blood cell.



○ smart rings - wearable

↳ these are devices you wear on one of your fingers like a piece of jewelry.

- they use optical detection to track your heart rate + other vitals. these devices are still very new, + there's limited data on accuracy.

↳ the variety of sensors used in smart rings include a heart or pulse monitor (usually infrared or optical), 3-axis accelerometer (for tracking macromovements like walking, running, sleeping, etc.) gyroscope (for detecting both movement + balance), EDA sensor (for tracking emotions, feelings, + cognition).

- the sensors on the ring read your body + collect information about health + activity.



○ types of pulse sensors

↳ electrical (electrocardiography)

- your heart generates a small electrical current with every heartbeat. heart rate monitors with electrical detection capabilities can detect + track that current.

↳ optical (photoplethysmography)

- these devices use infrared light to see the expansion of your arteries as your heart pumps blood through them. these devices track your pulse rate, + some can also estimate the oxygen levels in your blood.

SECONDARY RESEARCH | WEEK TEN

- MATERIALS | TYPES OF RUBBER



EPDM rubber

↳ a type of synthetic rubber that is used in many applications.



Butyl Rubber

↳ a synthetic rubber, a copolymer of isobutylene with isoprene. the abbreviation IIR stands for isobutylene isoprene rubber.



Neoprene

↳ produced by polymerization of chloroprene. neoprene exhibits good chemical stability + maintains flexibility over a wide temperature range.



Silicone Rubber

↳ an elastomer composed of silicone - itself a polymer - containing silicon together with carbon, hydrogen + oxygen.



Chloroprene

↳ common name for 2-chloro-1,3-butadiene with the chemical formula $\text{CH}_2=\text{CCl}-\text{CH}=\text{CH}_2$.



Nitrile Rubber

↳ aka nitrile butadiene rubber (NBR) - is a synthetic rubber derived from acrylonitrile + butadiene.



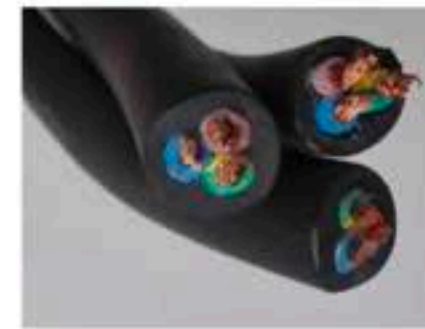
Styrene-Butadiene

↳ describe families of synthetic rubbers derived from styrene + butadiene. these materials have good abrasion resistance + aging stability.



Synthetic Rubber

↳ they are polymers synthesized from petroleum synthesized from petroleum byproducts.



Ethylene Propylene Rubber

↳ acrylic rubber has poor fuel resistance + is susceptible to various chemicals.



Polyurethane Rubber

↳ generally has good corrosion + abrasion resistance but is susceptible to petroleum-based oils.

SECONDARY RESEARCH | WEEK TEN

- MATERIALS | TYPES OF PLASTICS



Polypropylene

↳ used in a variety of applications to include packaging for consumer products, plastic parts + special devices.



Polyethylene

↳ incredibly resistant resin used for grocery bags, milk jugs, recycling bins, agricultural pipe, etc.



Acrylic

↳ strong + transparent, acrylic offers the same clarity as glass without the risk of shattering.



Polycarbonate

↳ transparent material known for its particularly high impact strength relative to other plastics



HDPE

↳ denser form of PE that has high tensile strength, making it perfect for items like milk jugs, trashcans + soap bottles.



High Impact Polystyrene (HIPS)

↳ a soft-touch plastic product that's used extensively in vacuum applications, including refrigerator linings, food packaging, etc.



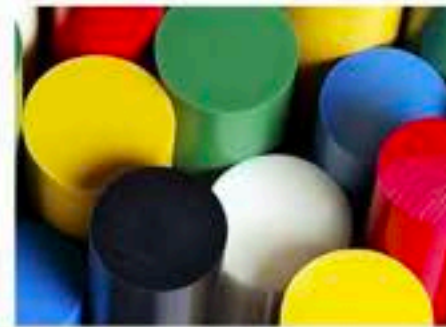
Thermoplastic

↳ can melt + take shape only once: after they have solidified, they stay solid. they are melted when heated + harden upon cooling.



Polyoxymethylene

↳ another high strength engineering plastic, which often competes with PC.



Engineering Plastics

↳ exhibit higher performance than standard materials, making them ideal for demanding engineering applications.



Polysulfone

↳ high-temperature melt-processable resin used in membranes, filtration media, water heater dip tubes + other high-temperature applications.

SECONDARY RESEARCH | WEEK TEN

- MATERIALS

SILICONE RUBBER (VMQ)

↳ an umbrella term for a number of elastomers which are produced from dimethylchlorosilane by the polycondensation of appropriate secondary products.

- the main molecular chain in silicone elastomers does not consist of carbon, but is made up of alternating oxygen + silicon atoms.

↳ silicon rubber offers long service under adverse mechanical + chemical conditions, electrical insulating capability, flexibility + elasticity virtually independent of temperature + is odorless.

- silicone rubber is exceptionally pure + is especially suitable for use in the food + medical sectors.



OPTICAL PULSE SENSOR

↳ these pulse sensors use infrared light to see the expansion of arteries as your heart pumps blood through them.

- these devices track pulse rate + oxygen levels in your blood.

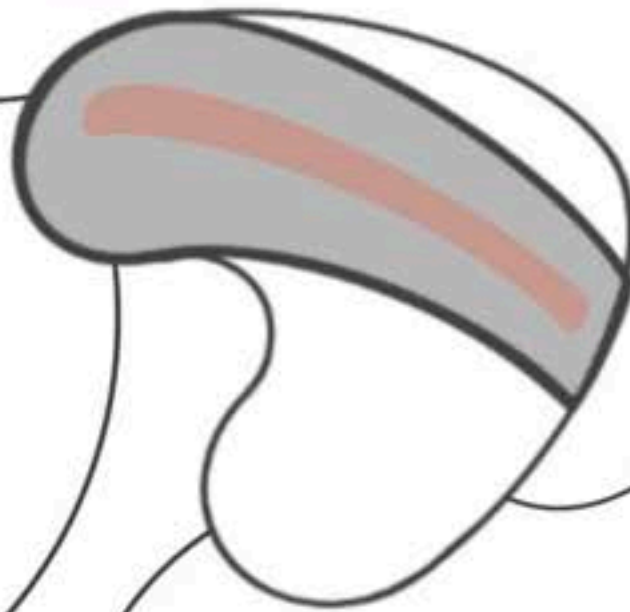


POSITIONING ON PRODUCT

↳ small slit throughout the center of the silicone rubber to allow for pulse reading of the distal palmar.

POSITIONING ON PRODUCT

↳ over 'gray' section to indicate where the 'distal palmar' rests, aka - the underside of the knuckles.



HDPE PLASTIC

↳ high density polyethylene plastic is a thermoplastic that is known for being both lightweight + strong.

POSITIONING ON PRODUCT

↳ the inner-structure + lining of product. a smaller box inside of product will also contain + hide electrical elements.

TRANSLUCENT OPAL ACRYLIC SHEET

↳ high gloss opal acrylic sheet that can be drilled, cut, laser cut or fabricated + are best suitable for light boxes + creative purposes.

- translucent opal acrylic sheet is able to diffuse light passing through it (75% light transmission).

- objects can't be seen through, while the sheets will glow brightly when backlit.



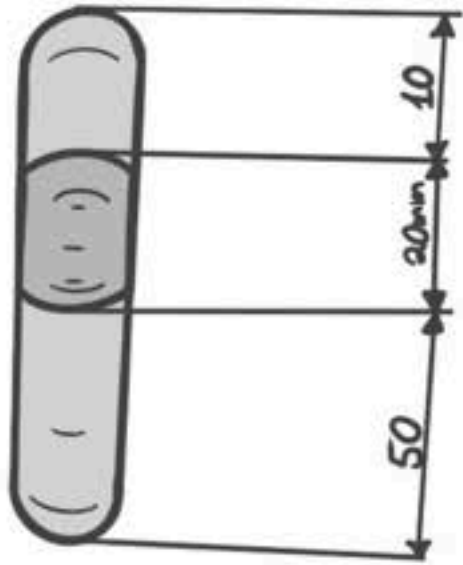
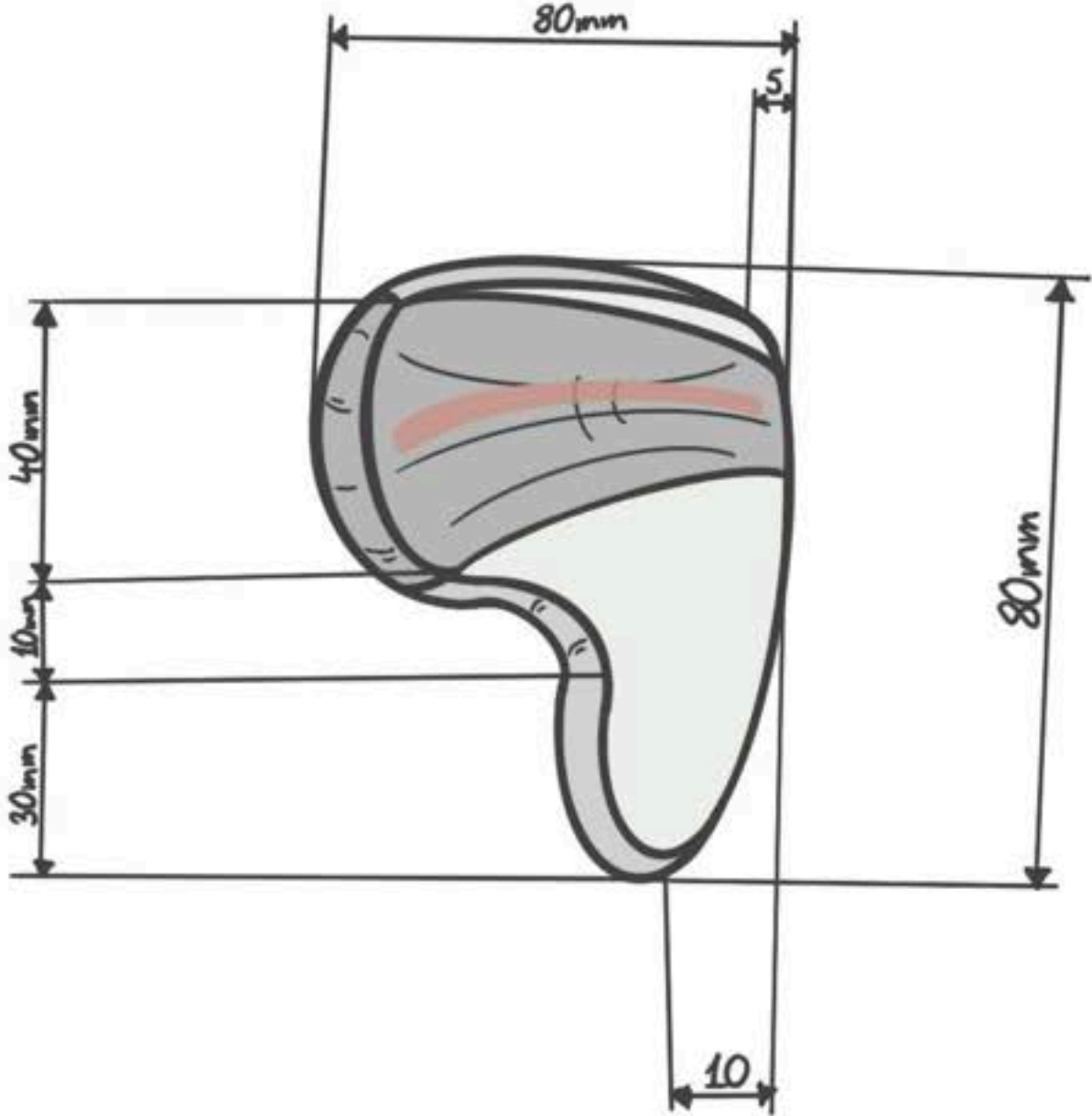
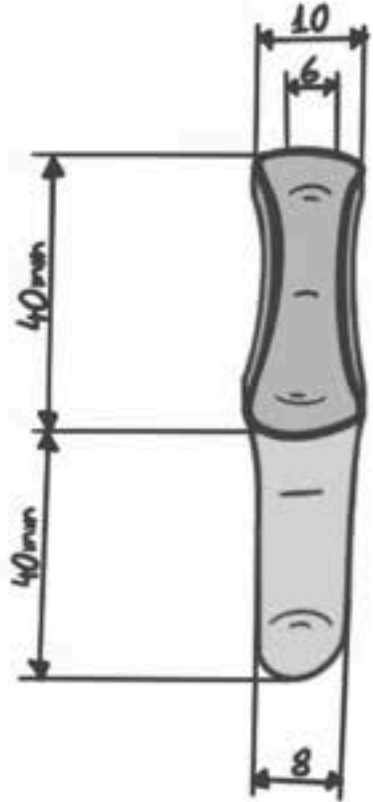
POSITIONING ON PRODUCT

↳ will be used on the outer-shell of the product.

- this material will allow the product to display glowing LED lights (internal) for breathing pattern.

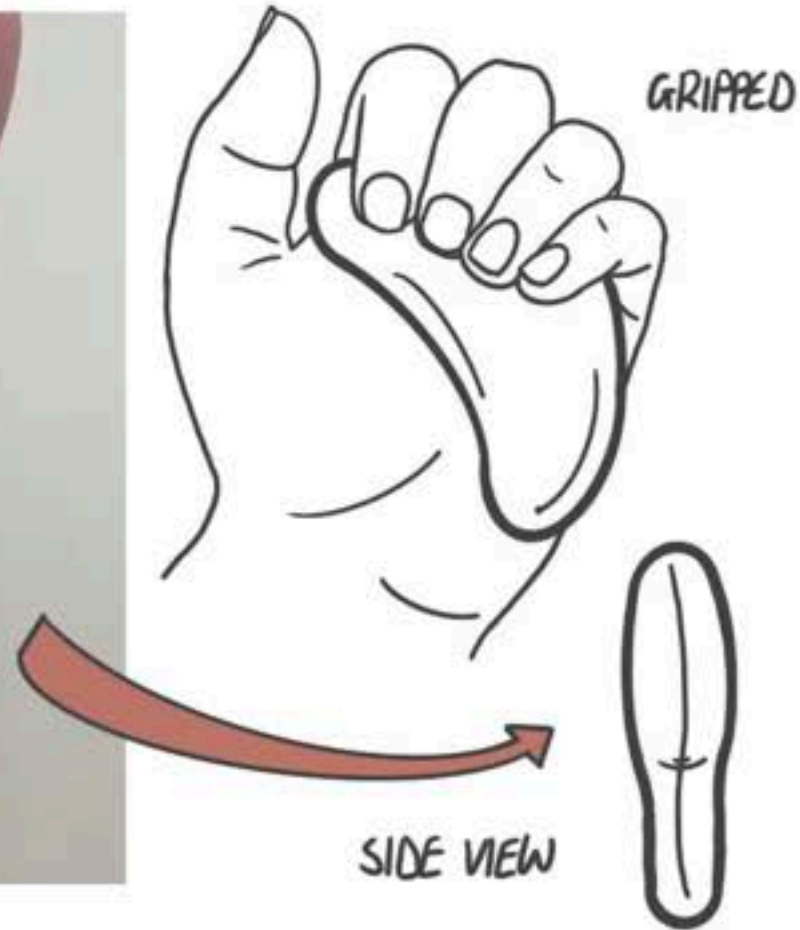
CONCEPT DEVELOPMENT | WEEK TEN

- DRAFT FINAL FORM OF PRODUCT



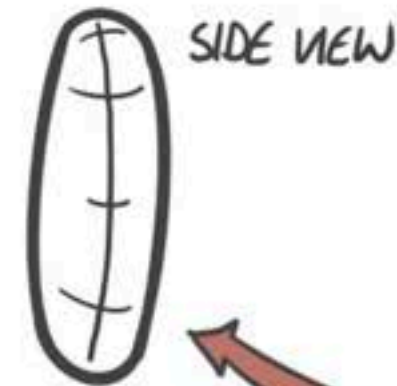
CONCEPT DEVELOPMENT | WEEK TEN

- VARIATIONS OF FINAL PROTOTYPE



- Feedback
- o palm section feels a little restrictive for the palm of the hand.
 - o finger curved indent feels confusing, however may be too small for larger hands.
 - o longer side of the prototype feels too long/unnecessary.
 - o gap between finger crease + product feels too big - needs to fit snug for comfort.

- Feedback
- o tail/longer side of the product was made shorter
 - ↳ more preferred - feels less restrictive for larger hands + more comfortable for smaller hands.
 - o palm section of product made larger for unrestricting ball of palm for both smaller + larger hands.
 - o indented sections on front + back for palm pulse reading + comfort of grasping fingers.

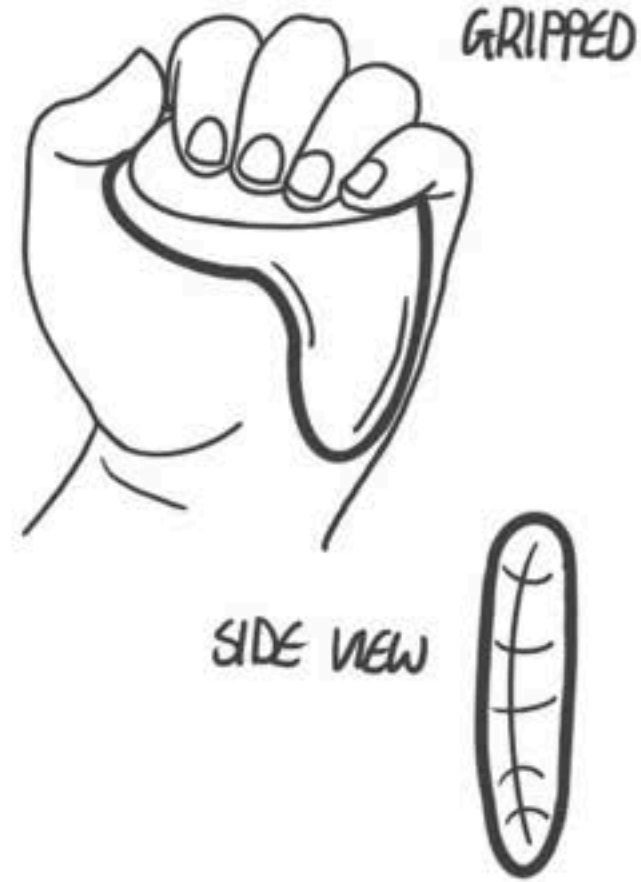


GRIPPED



CONCEPT DEVELOPMENT | WEEK TEN

- VARIATIONS OF FINAL PROTOTYPE

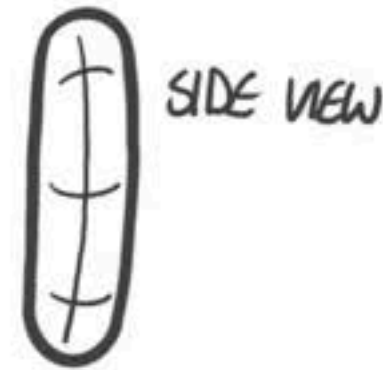


Feedback

- top surface of product feels too shallow - too much of a gap between finger gaps + the products.
- product feels too wide across palm of hand.
 - ↳ finger indent size from larger to smaller across palm of hand.

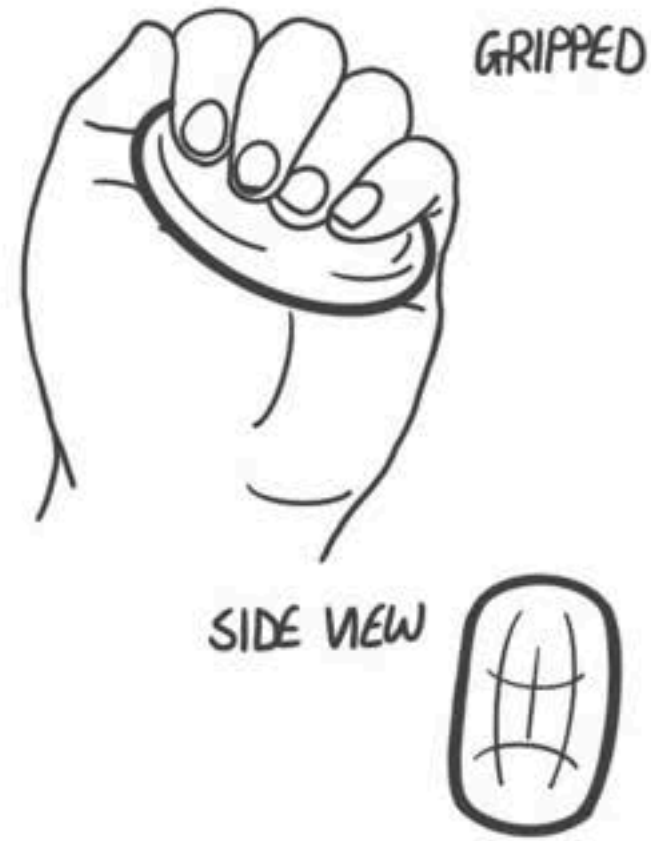
Feedback

- tail of product is shorter than all the other prototype
 - ↳ fits into all hand sizes - large + small
 - ↳ compact + snug fit in hand
- prototype is also thicker + feels more comforting than thinner products.
- palm sensors are larger + curved downwards to fit larger hand sizes + is more comforting.



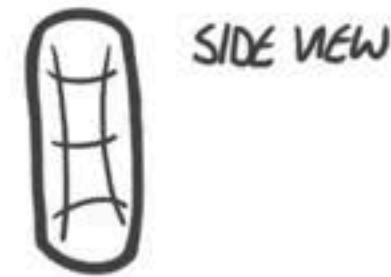
CONCEPT DEVELOPMENT | WEEK TEN

- VARIATIONS OF FINAL PROTOTYPE



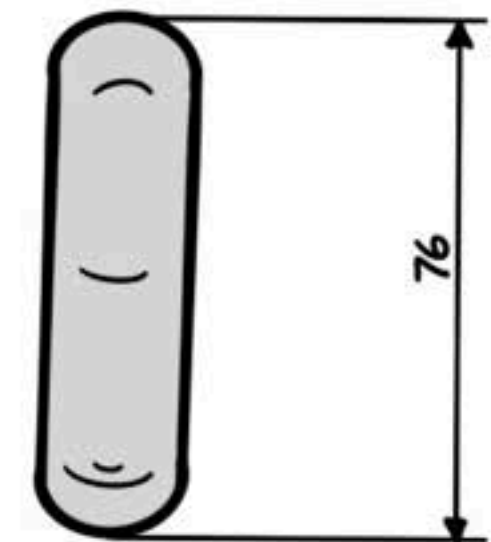
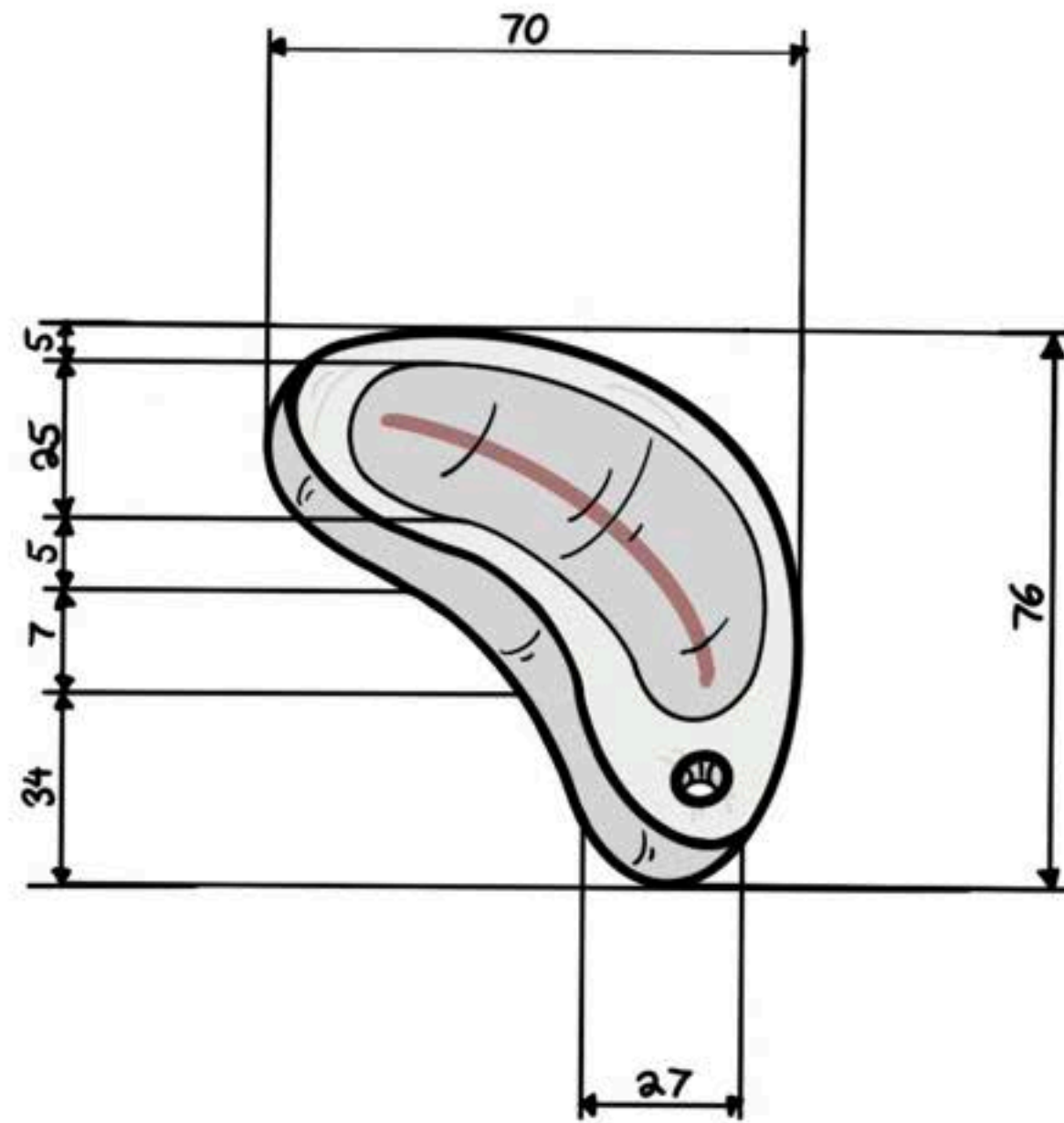
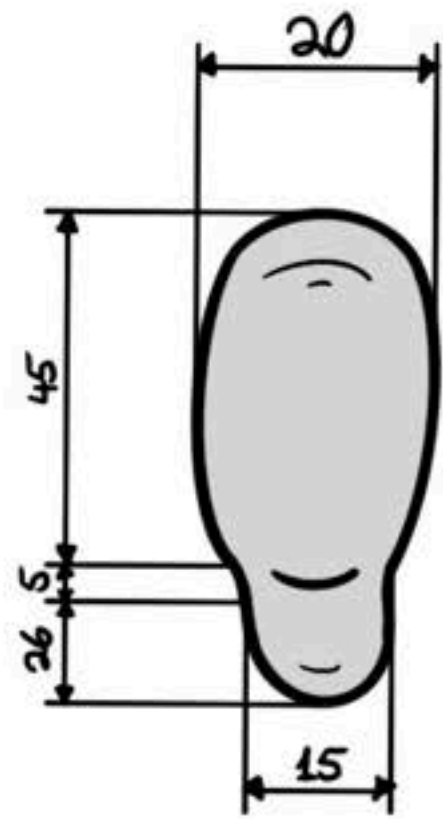
- o feels very comfortable + comforting to hold
 - ↳ snug fit
- o is too small for a medication device
 - ↳ not large enough to display colour changing recommended breaching program.
- o palm indents made larger to fit more securely in hand.

- o feels too wide against hand for a smaller-handed female.
 - ↳ feels unnatural to hold + awkward.
- o tail is shorter + fits into palm of hand
 - ↳ feels very comfortable + is long enough to not be an inconvenience.



CONCEPT DEVELOPMENT | WEEK TEN

- PROTOTYPE FORM OF PRODUCT



metric = mm

Self purchase range - Queensland Health accessory + complementary uniform items.

- ↳ these are non-compulsory items which are intended to enhance the basic uniform
 - employees may self-purchase garments or accessories
 - employees are to deal with the supplier on all range matters
 - responsibility of employee to launder + maintain
 - items can only be worn in accordance with Queensland Health policy

Infection prevention + control + dress code

- ↳ to ensure best infection prevention + control practice, all clinical staff must be 'bare below the elbow' when undertaking clinical activities.
- ↳ lanyards should not be used by clinical staff when performing procedures when contamination from lanyards is possible.
 - nurses employed by health care facilities are typically allowed to wear some jewelry although the exact allowances made be stipulated by company policy.
 - for nurses' own personal safety + their patients, some nurses choose to forego certain types of jewelry - e.g. necklaces, earrings/piercings.

Appearance

- ↳ clothing + accessories must be clean, modest, respectful + kept well maintained. it is important that personal apparel is laundered daily.
- ↳ perfume + cologne may become an irritant to some people + should be used by nurses, midwives + AEs with discretion.
- ↳ in clinical areas, for safety of the employees + patients, anything that can come into contact with the patients should be secured.
 - e.g. ID badges
- ↳ staff members should remove anything that may come into contact with the patient when moving, lifting or transferring a patient.

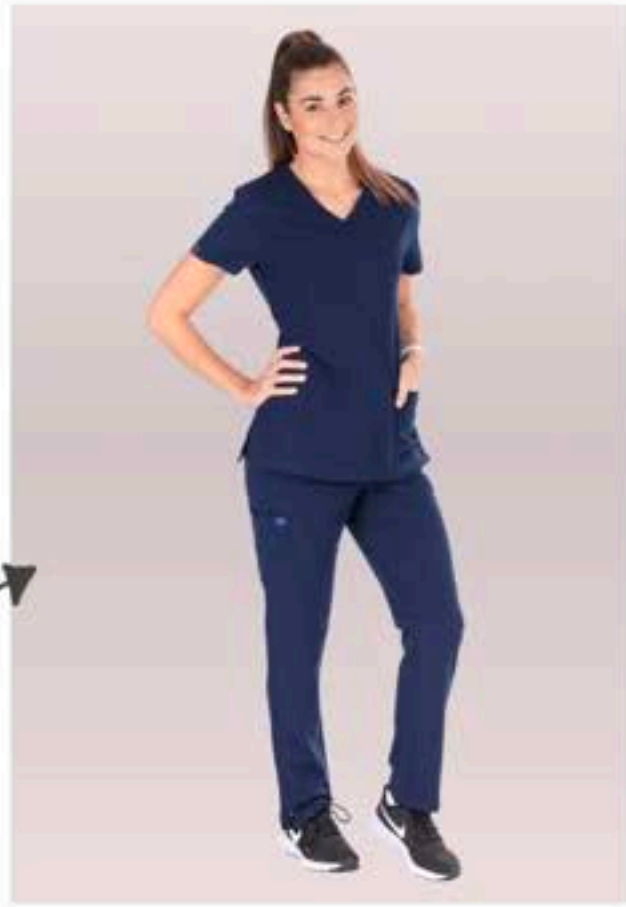
Key Takeaway Points

- nurses may wear additional accessories as long as they enhance their uniform + don't interfere with patient interaction.
- wearing lanyard-based accessories are not recommended as they interfere with patient interactions + procedures.
- additional accessories may be worn on uniforms if they are discrete + professional.
- accessories must be appropriately secured + not loose.

SECONDARY RESEARCH | WEEK TEN

- NURSING UNIFORM ANALYSIS

Fit Right Medical Scrubs 



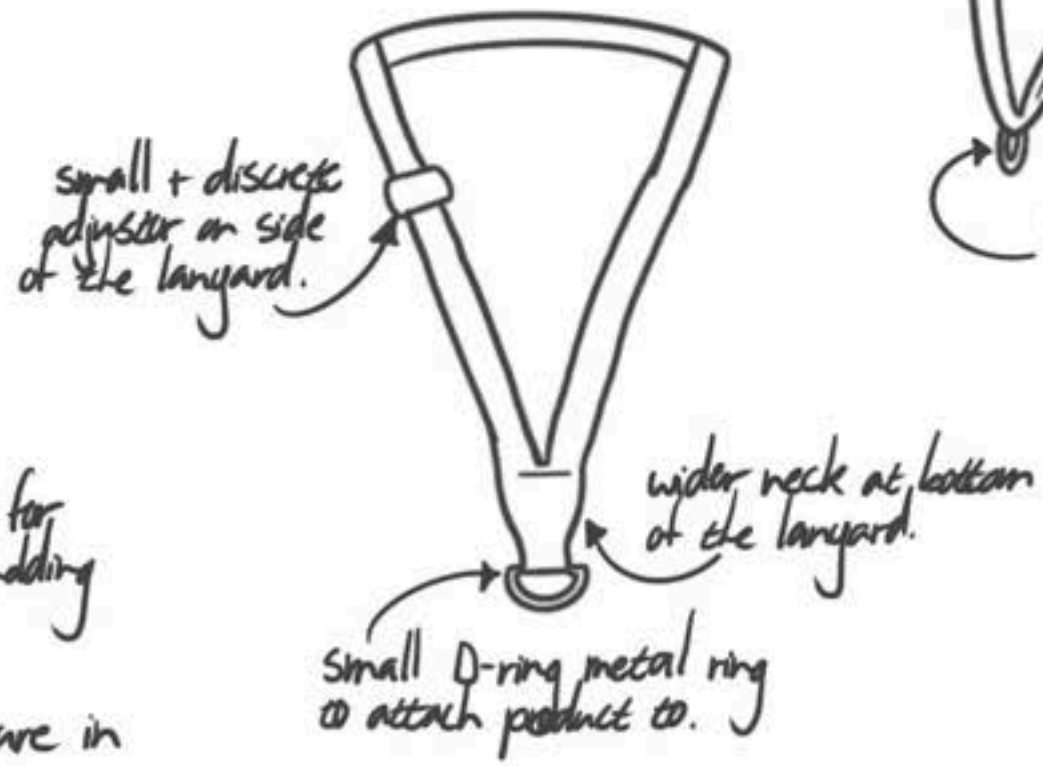
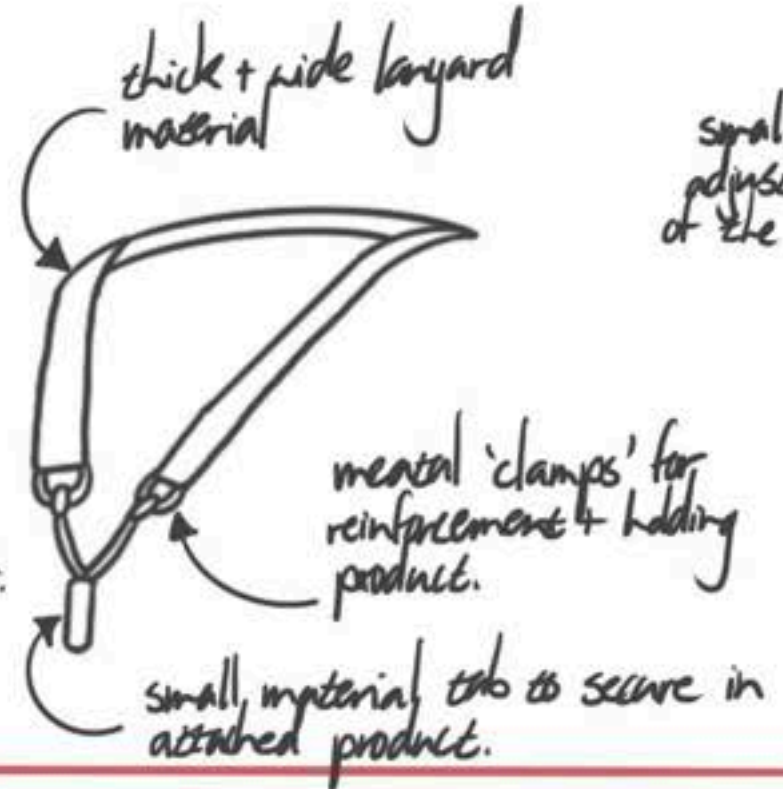
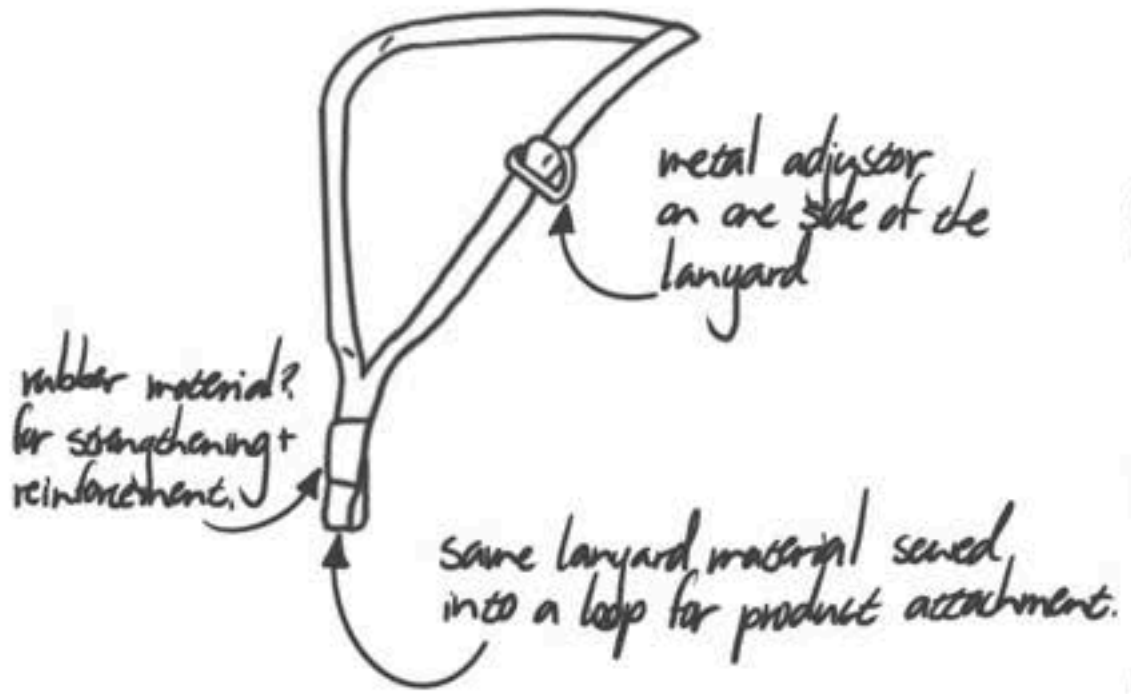
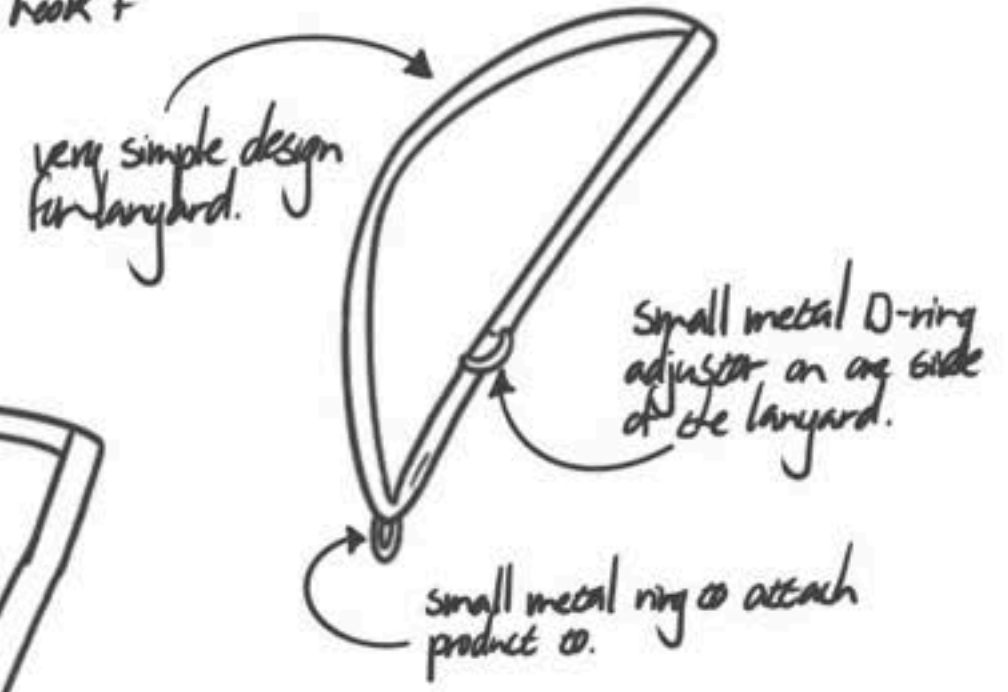
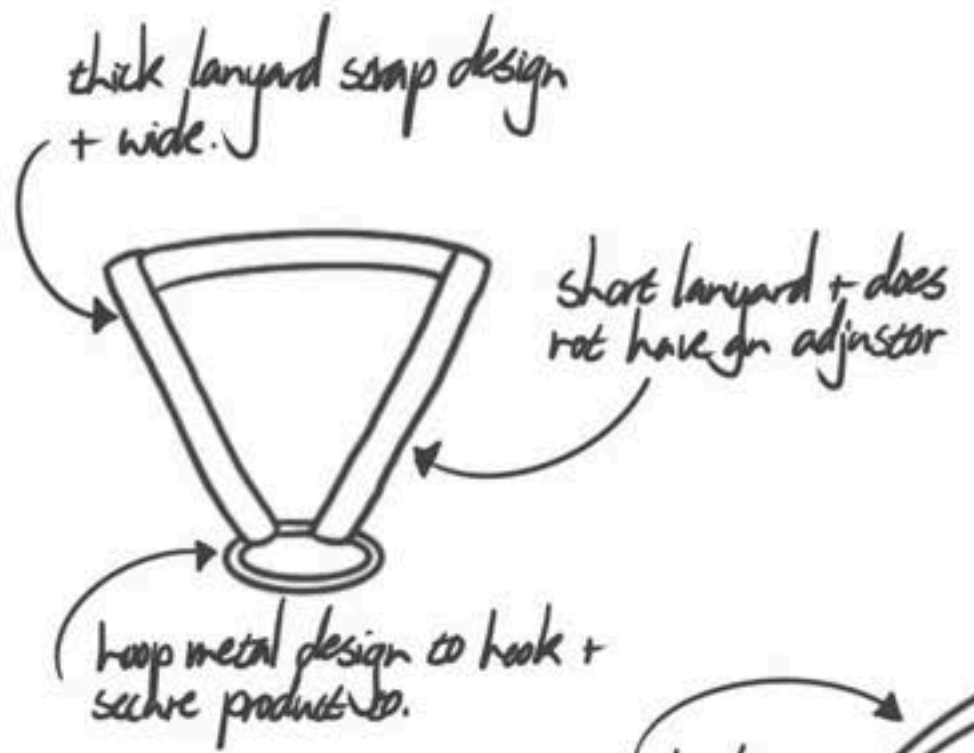
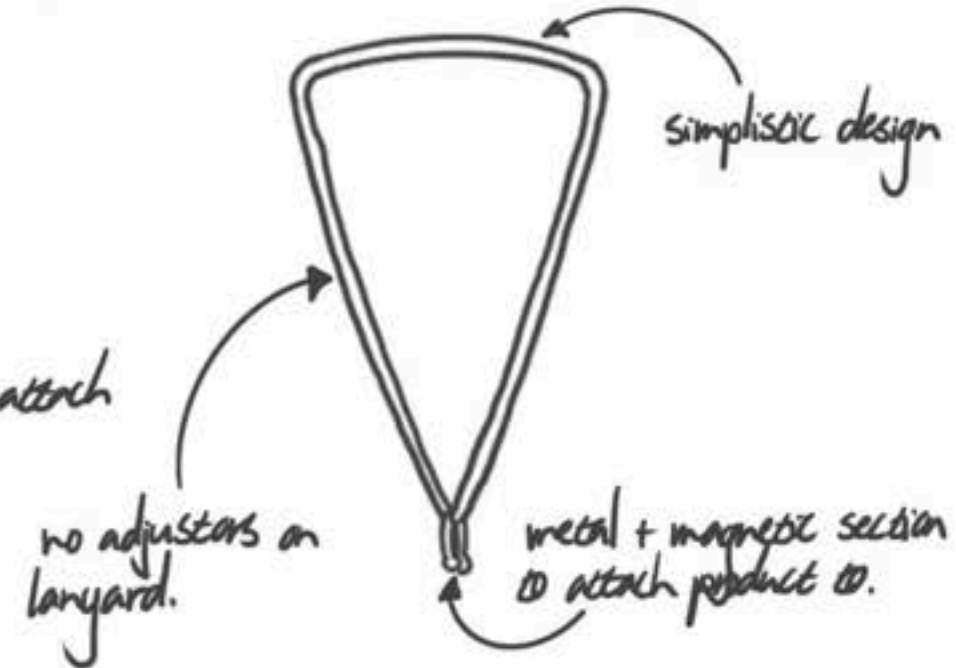
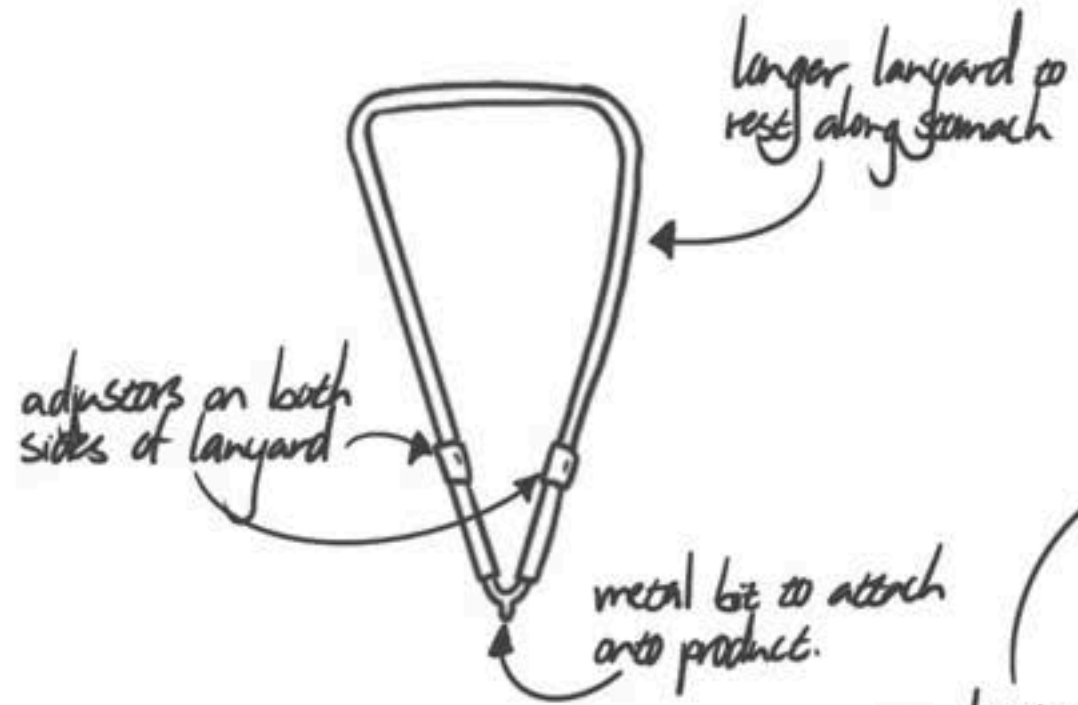
uniform on nurse



* will opt for more lanyard/waist strap-based attachments instead of uniform attached as the product does not look medical/professional enough to display.
↳ product is also too large to display on uniform + may be too heavy for an 'attachments'

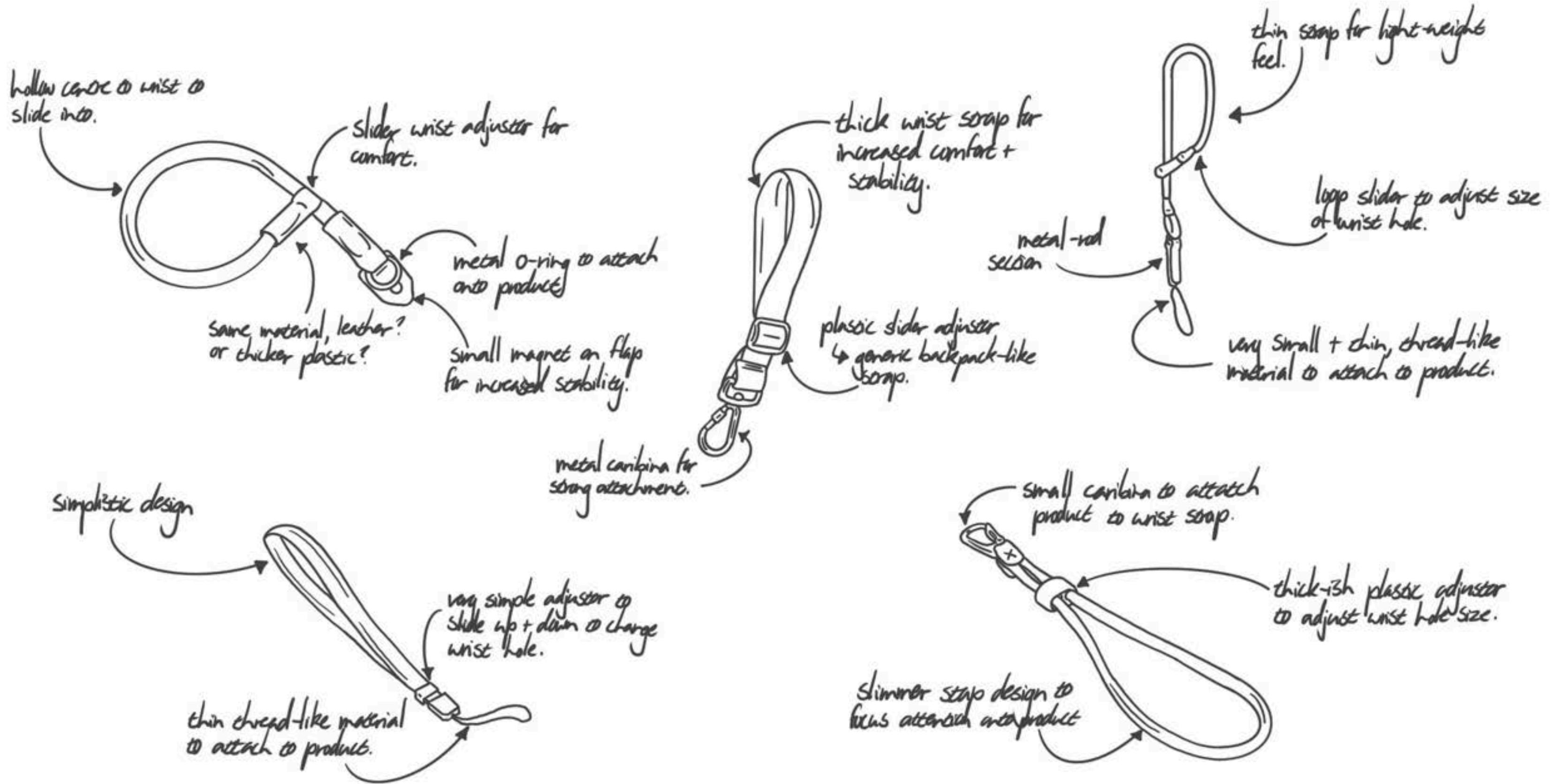
SECONDARY RESEARCH | WEEK TEN

- ATTACHMENT ONTO PERSON OR UNIFORM | LANYARD



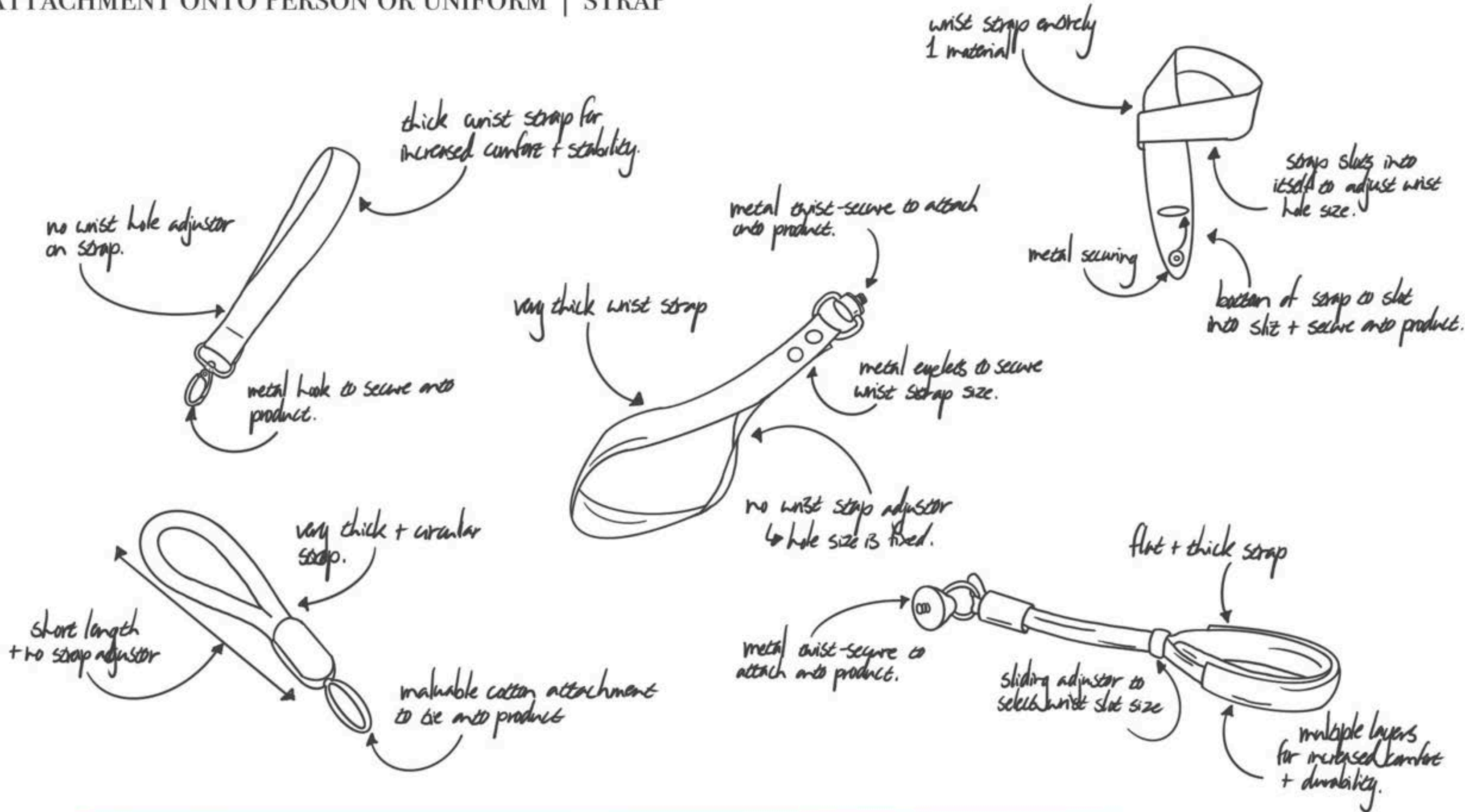
SECONDARY RESEARCH | WEEK TEN

- ATTACHMENT ONTO PERSON OR UNIFORM | STRAP



SECONDARY RESEARCH | WEEK TEN

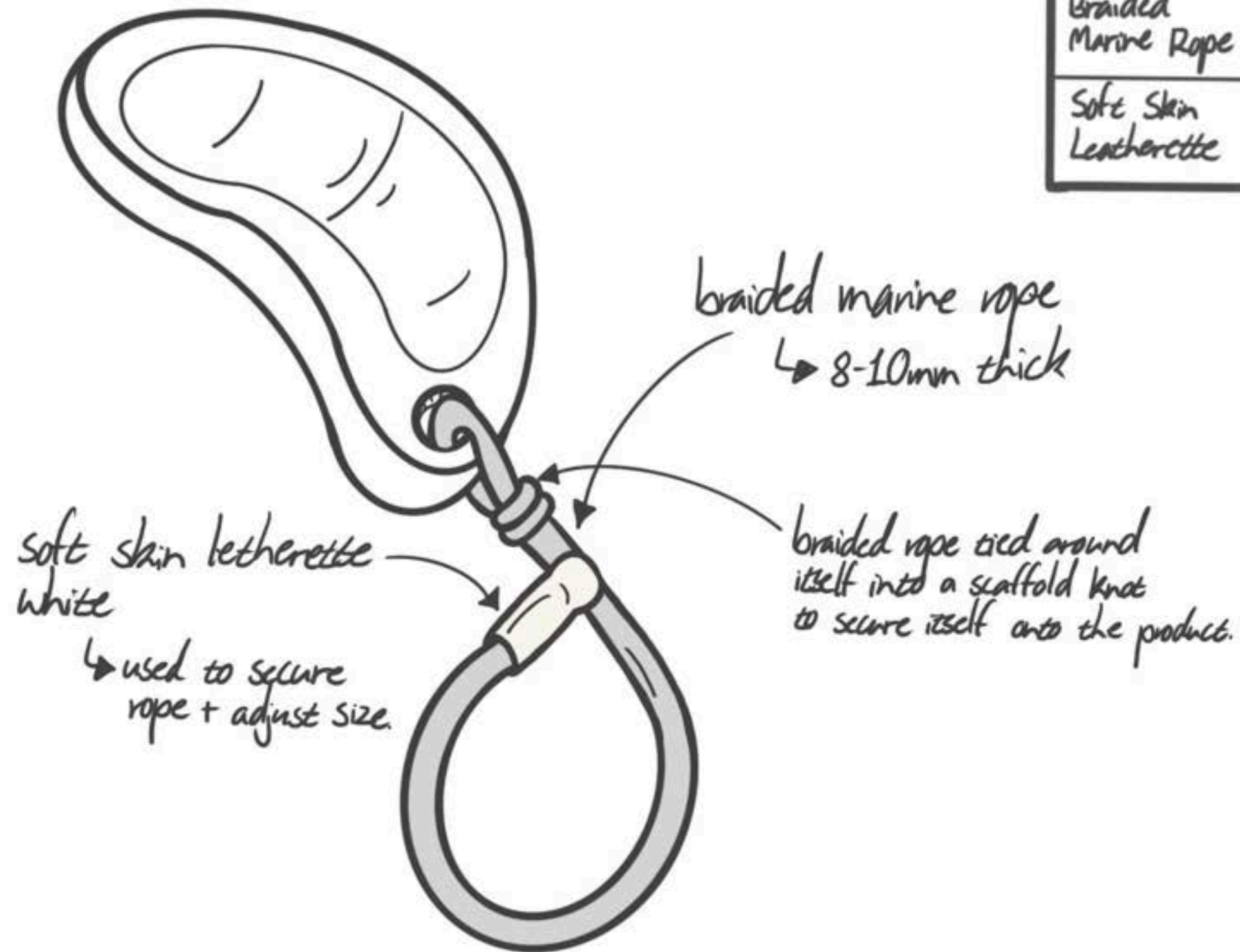
- ATTACHMENT ONTO PERSON OR UNIFORM | STRAP



SECONDARY RESEARCH | WEEK TEN

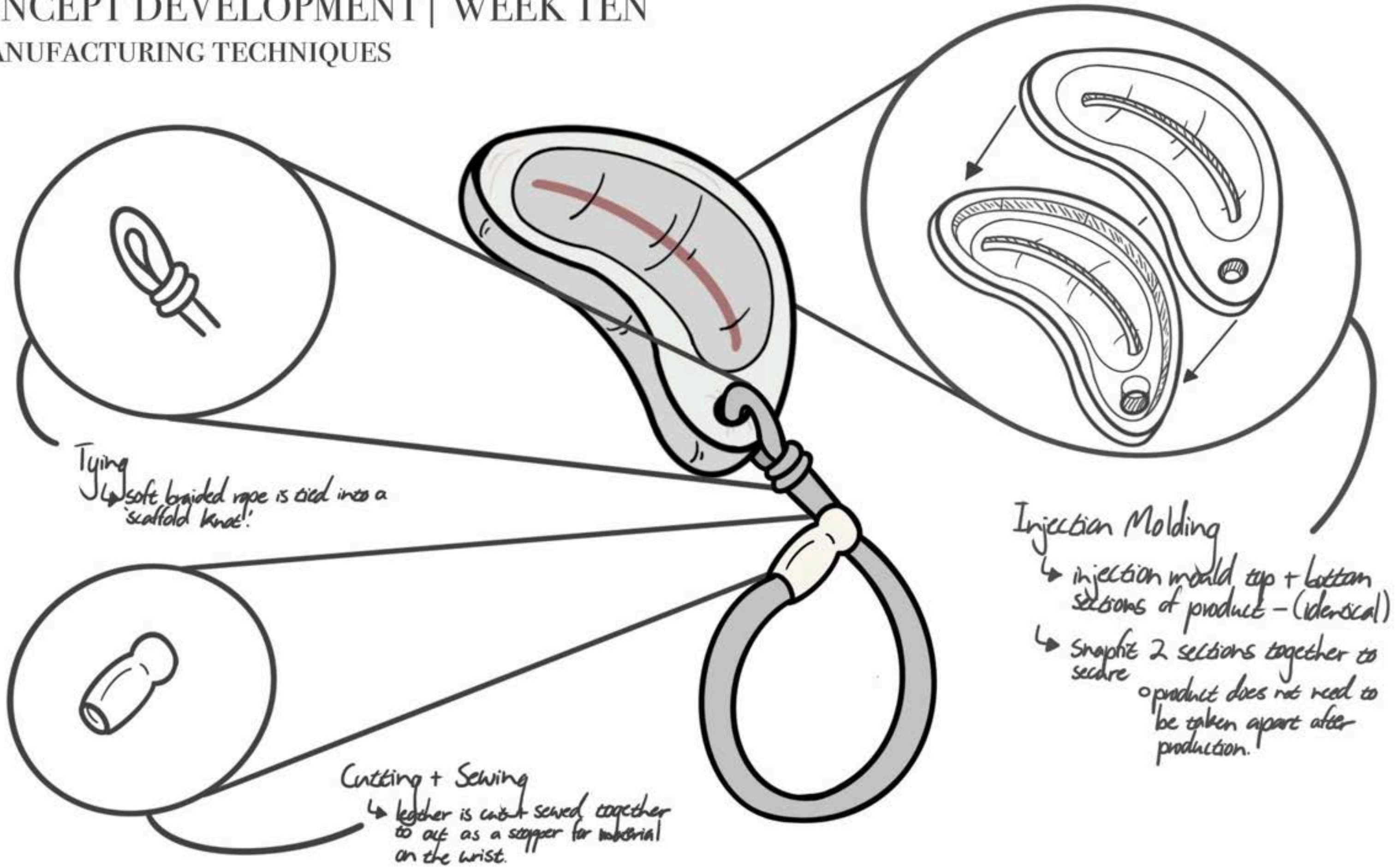
- FINAL WRIST STRAP FOR PRODUCT | MATERIALS

| Materials | Length | Qty. |
|-----------------------|--------|------|
| Braided Marine Rope | 300mm | 1 |
| Soft Skin Leatherette | 30mm | 1 |



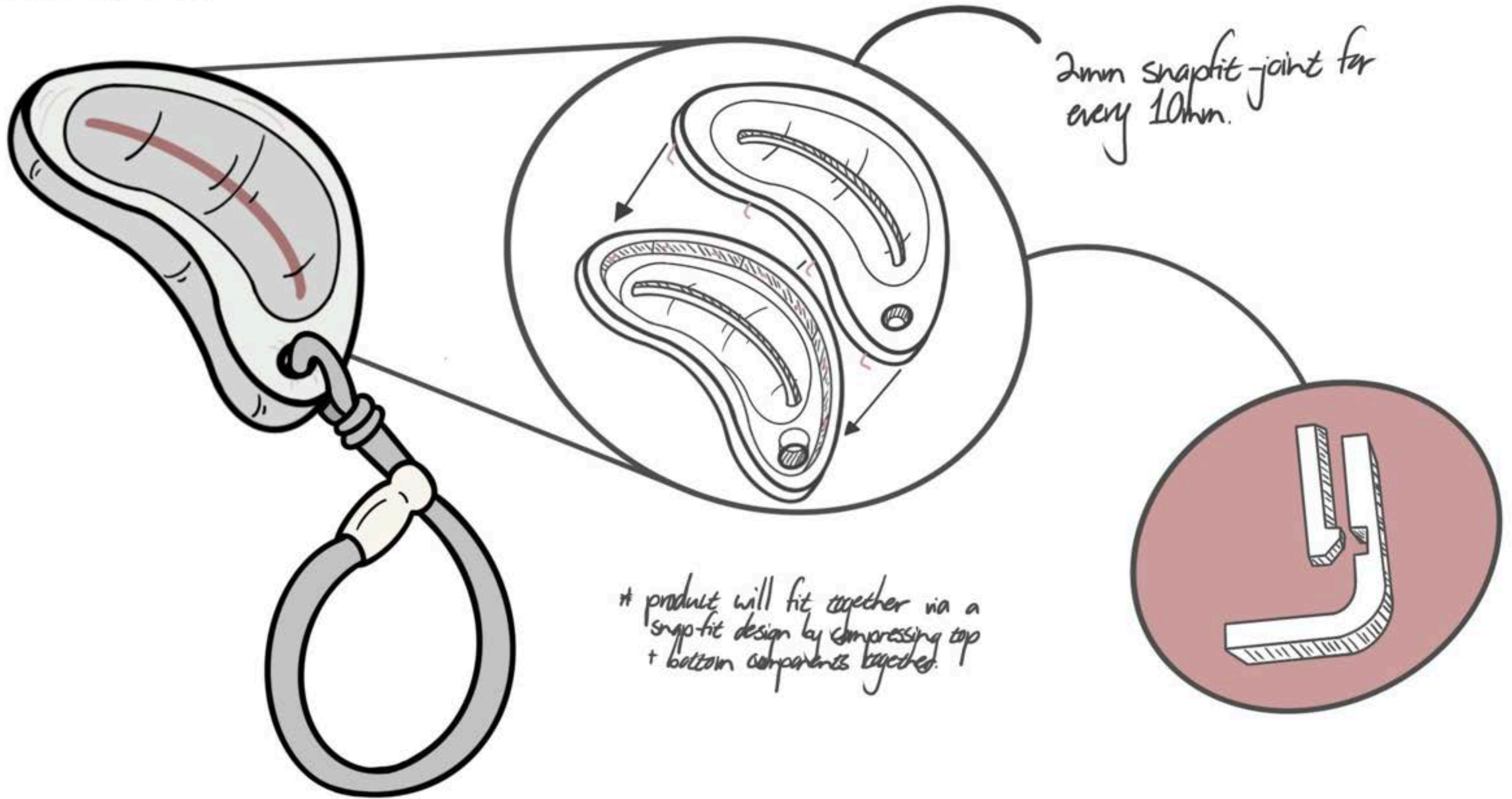
CONCEPT DEVELOPMENT | WEEK TEN

- MANUFACTURING TECHNIQUES



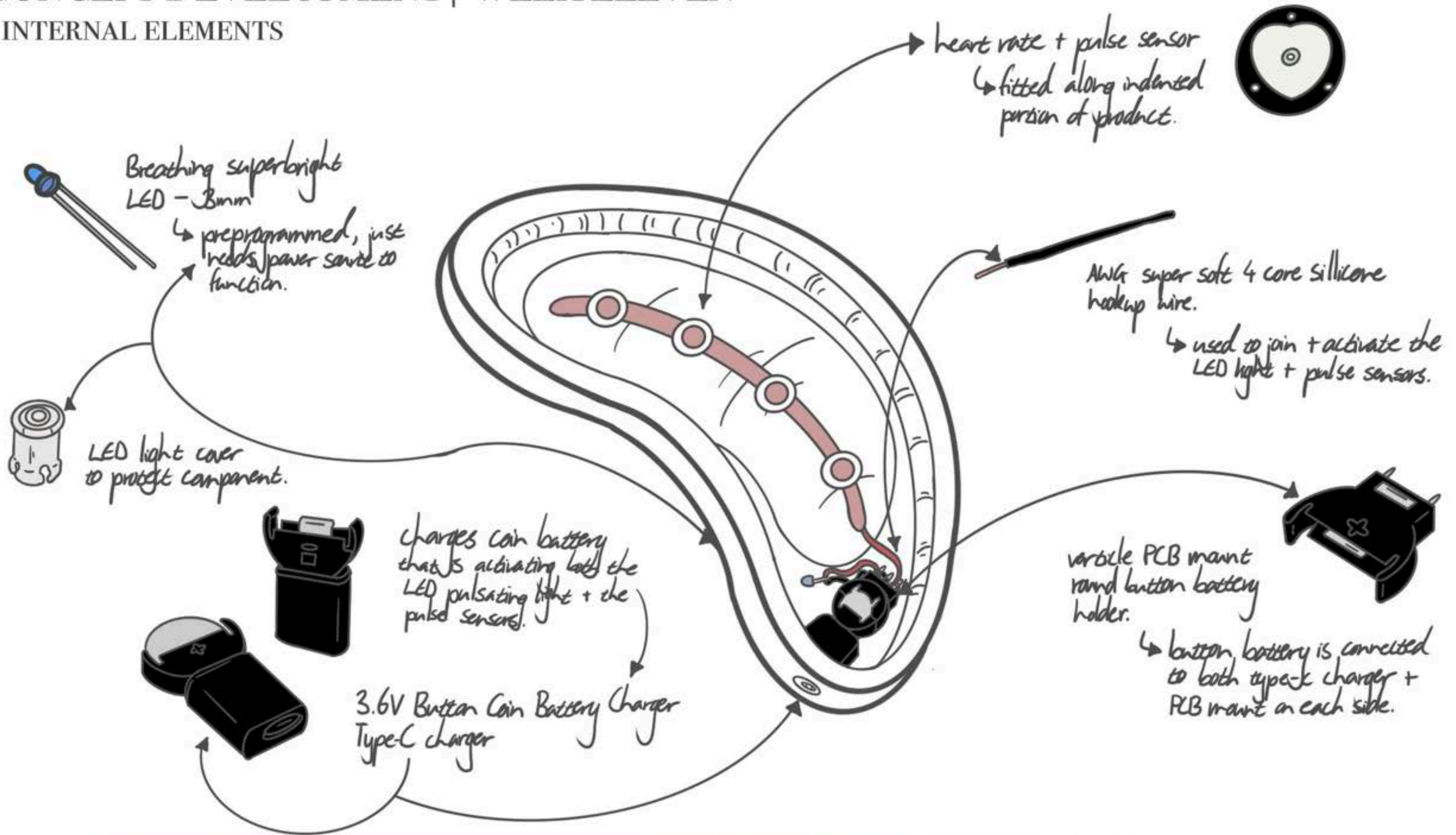
CONCEPT DEVELOPMENT | WEEK ELEVEN

- SNAP-FIT JOINTS



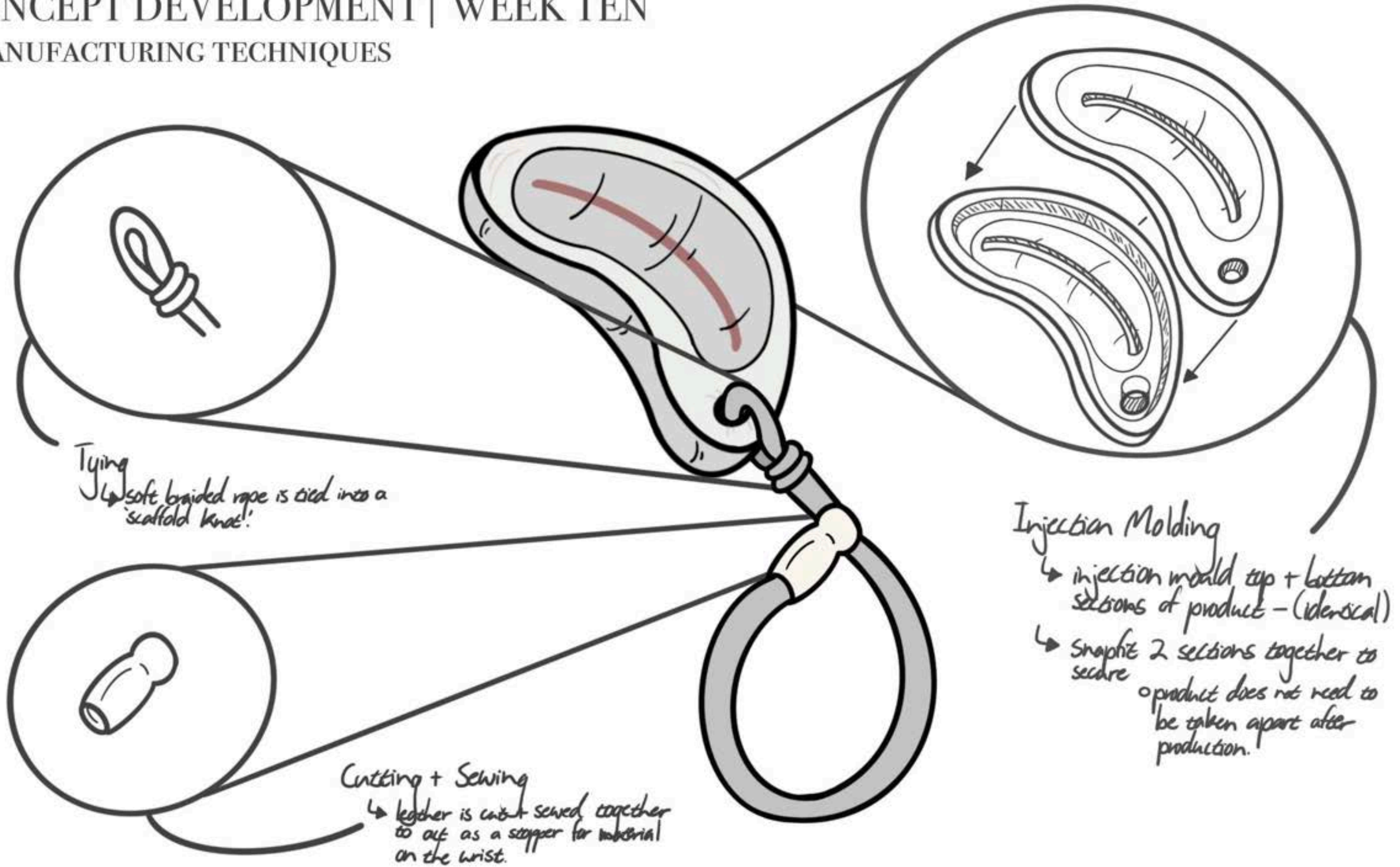
CONCEPT DEVELOPMENT | WEEK ELEVEN

- INTERNAL ELEMENTS



CONCEPT DEVELOPMENT | WEEK TEN

- MANUFACTURING TECHNIQUES



CONCEPT DEVELOPMENT | WEEK ELEVEN

- FINAL MATERIALS

Cost for 1 = \$52.19

Metal Mate Aluminium

- ↳ lightweight + easy to work with, all points katawa mill finish.
- ↳ will be used over the pulse sensors (red strip) for skin contact.
- ↳ cost
 - 3mm, 20 x 1000mm = \$9.74
 - 3mm, 5 x 70mm = \$1.22 (per product)

Marine Braided Rope

- ↳ used for the wrist-attachment material
- ↳ cost
 - 8mm x 40m = \$46
 - 8mm x 400mm = \$4.60

Vertical PCB mount battery holder

- ↳ used for holding coin battery + hooking up wires to electrical components.
- ↳ cost
 - 1 holder = \$0.30

Alwir super soft 4 core silicone hookup wire

- ↳ used to connect battery to electrical components
- ↳ cost
 - 24 pack = \$4
 - 4 wires = \$0.66

SILICONE RUBBER (VMA)

- ↳ silicone rubber offers long service under adverse mechanical + chemical conditions.
- ↳ will be used within the grey concave/curved area, where the 'discal patches' rest.
- ↳ cost
 - 100mm = \$17.50 (per product)

TRANSLUCENT OPAL ACRYLIC SHEET

- ↳ high gloss opal acrylic - laser suited for high beams + sensitive processes.
- ↳ will be positioned on the outer-shell of the product to display the glowing internal LED lights for breathing patterns.
- ↳ cost
 - 3mm, 1000 x 1000mm = \$75.50
 - 3mm, 100 x 100mm = \$7.55 (per product)

HDPE PLASTIC

- ↳ a thermoplastic that is known for being both lightweight + strong.
- ↳ will be the inner-structure of the product. a smaller internal box will contain + hide the electrical elements.
- ↳ cost
 - 1mm, 1000 x 1000 = \$16.80
 - 1mm, 100 x 100 = \$1.68 (per product)

Soft Skin Leatherette

- ↳ used to secure braided rope to itself
- ↳ cost
 - 1m = \$12
 - 200mm = \$2.40

Panel mount LED holder

- ↳ used to stabilize LED
- ↳ cost
 - x1 = \$0.20

Buccan lithium battery

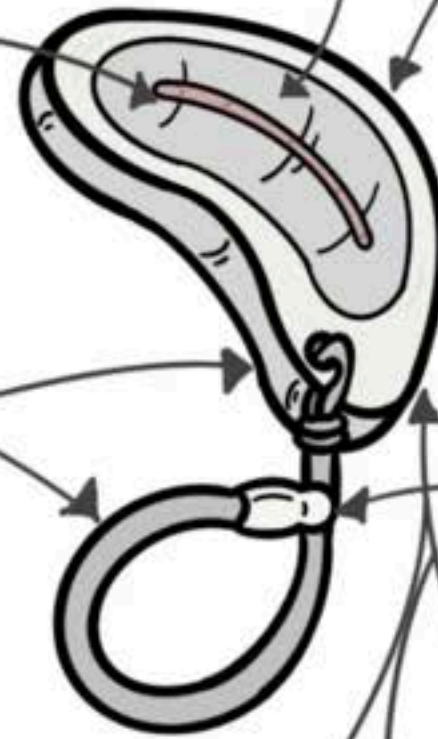
- ↳ used to power electronic elements
- ↳ cost
 - x5 = \$5.65
 - x1 = \$1.13

Battery type-c charger button battery

- ↳ used to charge button battery through external source.
- ↳ cost
 - x1 = \$5.70

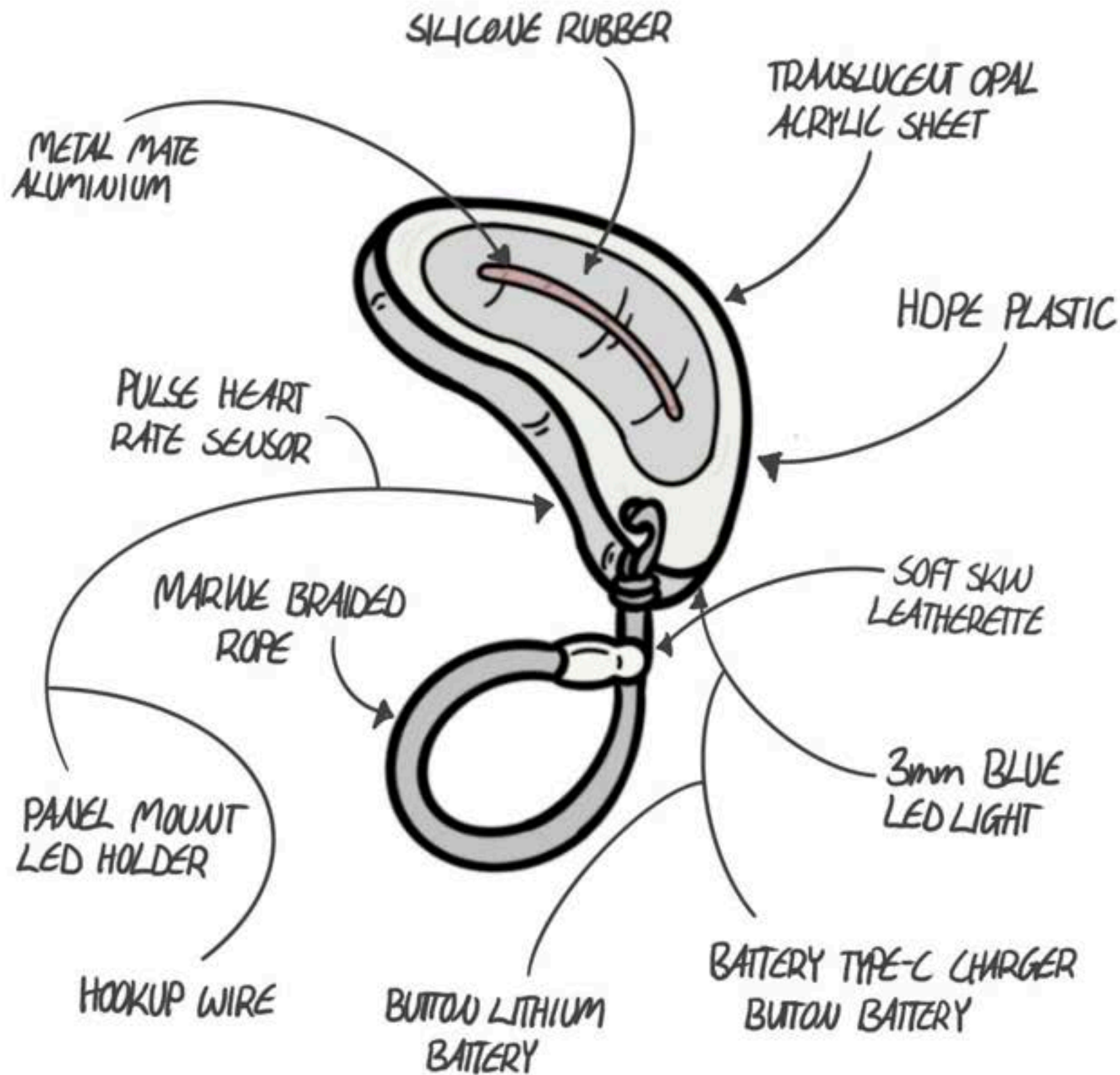
3mm blue breathing LED

- ↳ used as internal pulsating light
- ↳ cost
 - 3mm = \$0.25



CONCEPT DEVELOPMENT | WEEK ELEVEN

- FINAL MATERIALS



| Materials | Size | Cost | Qty |
|---------------------------------------|--------------------|---------|-----|
| TRANSLUCENT OPAL ACRYLIC SHEET | 3mm, 1000x1000mm | \$7.55 | 1 |
| HDPE PLASTIC | 1mm, 100x100mm | \$1.68 | 1 |
| SOFT SKIN LEATHERETTE | 200mm ² | \$2.40 | 1 |
| SILICONE RUBBER (VMQ) | 100mm ² | \$17.50 | 1 |
| METAL MATE ALUMINIUM | 3mm, 5x70mm | \$1.22 | 1 |
| BRAIDED MARINE ROPE | 8x400mm | \$4.60 | 1 |
| SOFT SKIN LEATHERETTE | 200mm ² | \$2.40 | 1 |
| BLUE BREATHING LED LIGHT | 3mm | \$0.25 | 1 |
| PANEL MOUNT LED HOLDER | 3mm | \$0.20 | 1 |
| BUTTON LITHIUM BATTERY | 25mm | \$1.13 | 1 |
| BATTERY TYPE-C CHARGER BUTTON BATTERY | 25mm | \$5.70 | 1 |
| VERTICAL PCB MOUNT BATTERY HOLDER | 25mm | \$0.30 | 1 |
| PULSE HEART RATE SENSOR | 16mm | \$9 | 8 |

TOTAL COST : \$52.19

CONCEPT DEVELOPMENT | WEEK TWELVE

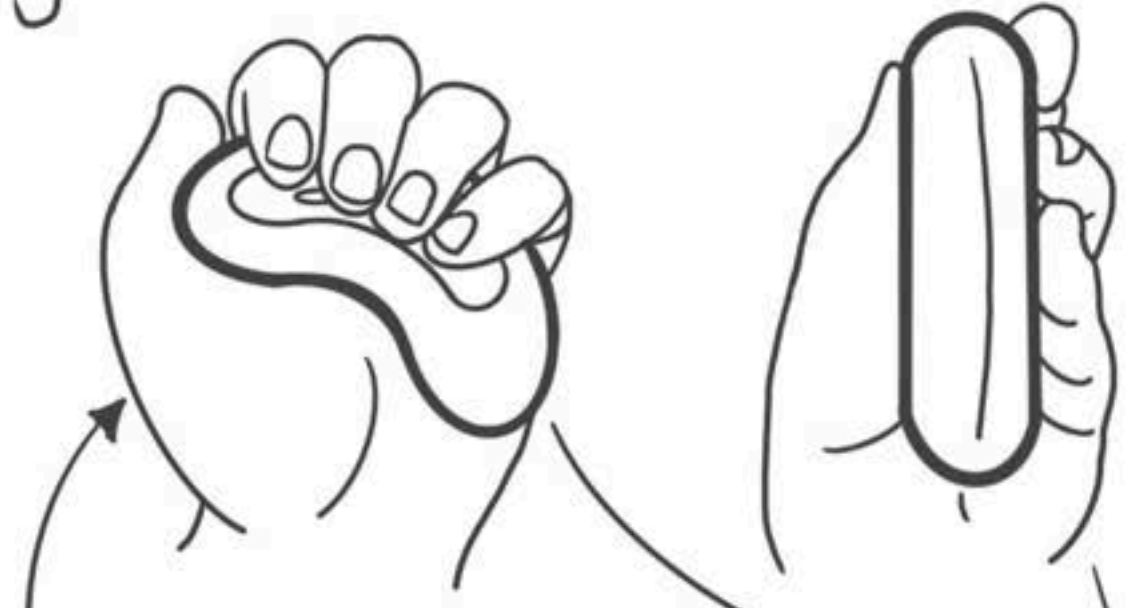
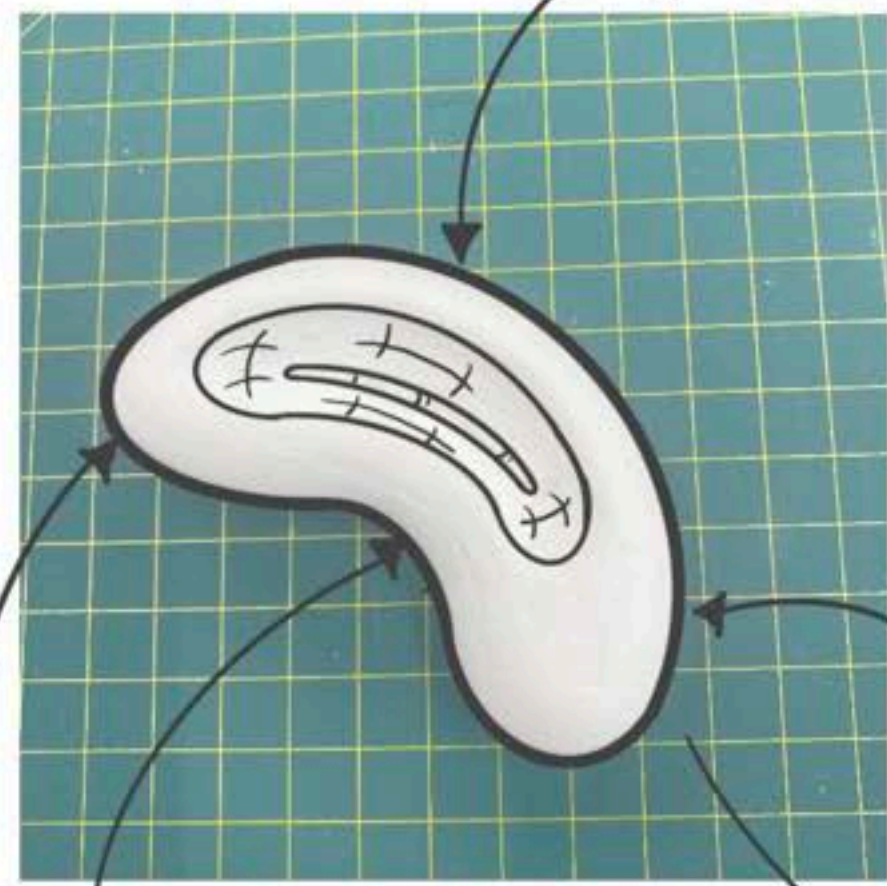
- 3D PRINTING PROTOTYPES

POSITIVE

IMPROVEMENT

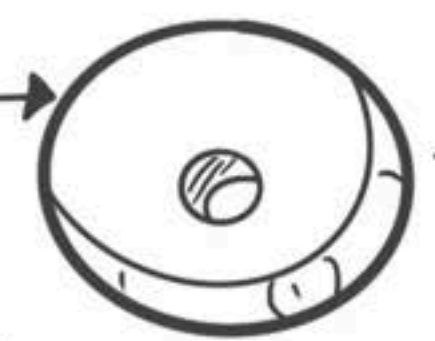
NEGATIVE

3D printed using FDM



add hole for wrist strap to secure on a persons!

feels nice to hold + is ergonomically natural in hand.



palm curvature is appropriate to hold for a range of hand sizes.

may need to make this model larger to fit internal electronic elements.

front pointer feels secure to hold + gives a comforting vibe

increase width of the product from 20mm to 28mm.
↳ fits all of internal elements.

CONCEPT DEVELOPMENT | WEEK TWELVE

- 3D PRINTING PROTOTYPES

POSITIVE

IMPROVEMENT

NEGATIVE



Sits alot higher on curved fingers, compared to other models.
↳ feels more secure + comfortable for larger hands.

have increased the size of width from previous model 20mm to 28mm.

hold added into 3D print for wrist strap to secure onto user.

model B made alot thicker to fit internal materials.

may need to add subtle finger moulds to indicate proper hand placement.
↳ feedback indicated confusion on how to hold the product.

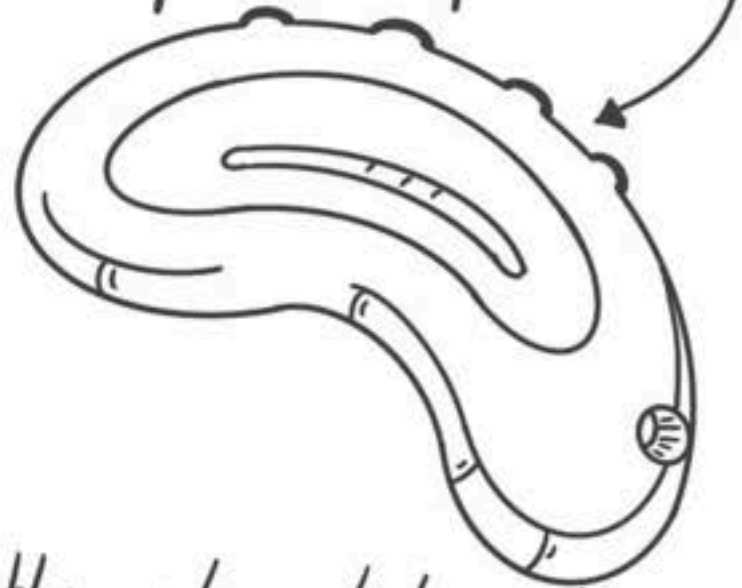
- 3D printed from SLA-Resin Clear
- o maybe final material used for presentation.
- o material will need to be clear to display internal pulsating light.
- o will need to use a opaque (frosted) spray paint to conceal the internal elements.

CONCEPT DEVELOPMENT | WEEK TWELVE

- 3D PRINTING PROTOTYPES

* 3D model of print will have indents, however the final model will have a rubber overlay to concentrate gripping points

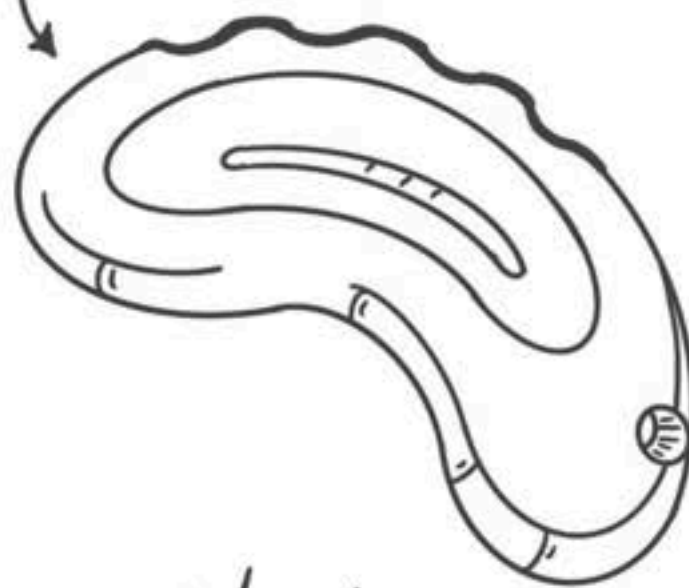
smaller extended dents along the spine of the product.



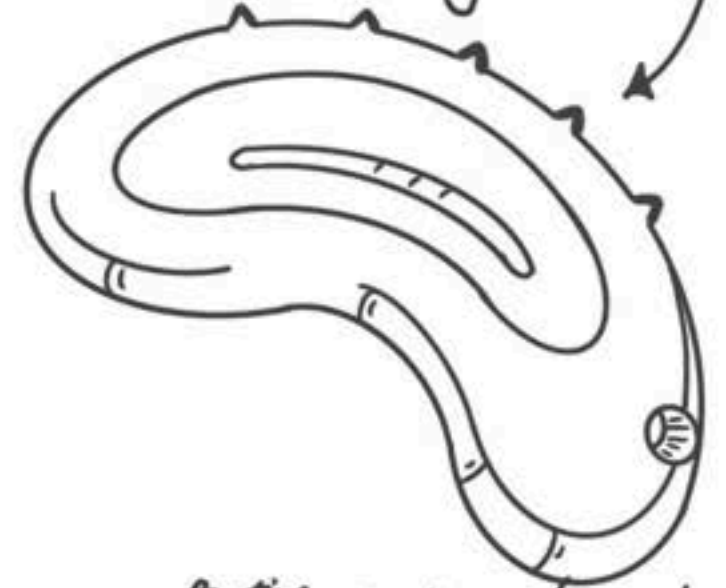
finger-width spaced indents along the spine of the product.



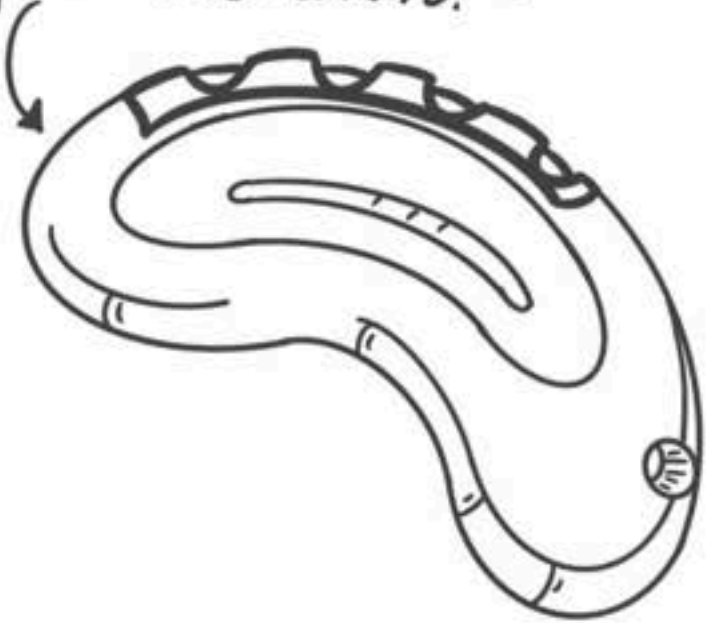
indents along spine, a little more shallow for comfort.



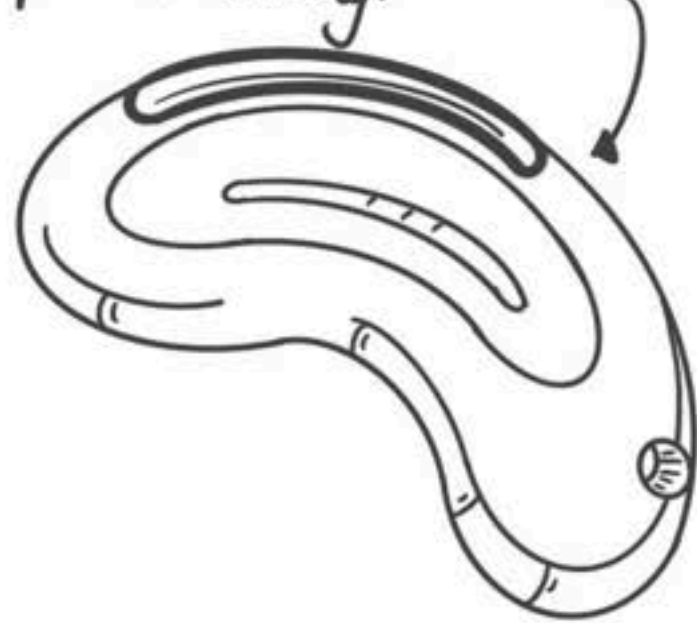
triangular extensions to indicate finger spacing.



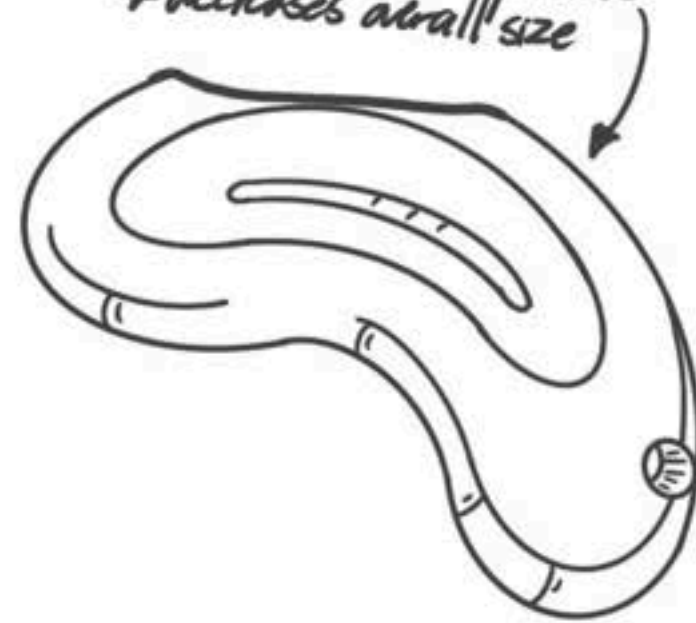
rubber overlayer, thickens product + provides more comfort.



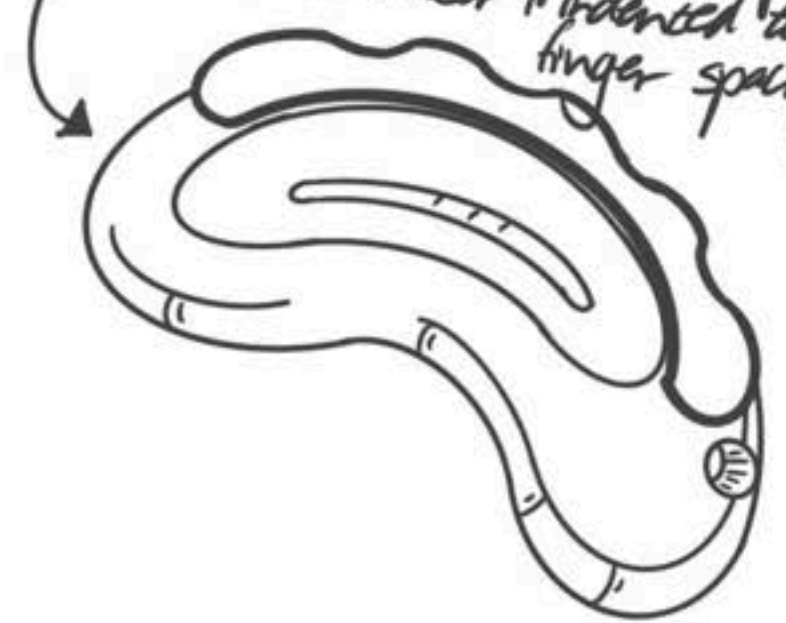
solid rubber slab to curve over spine for stability.



indented section of product decreases overall size



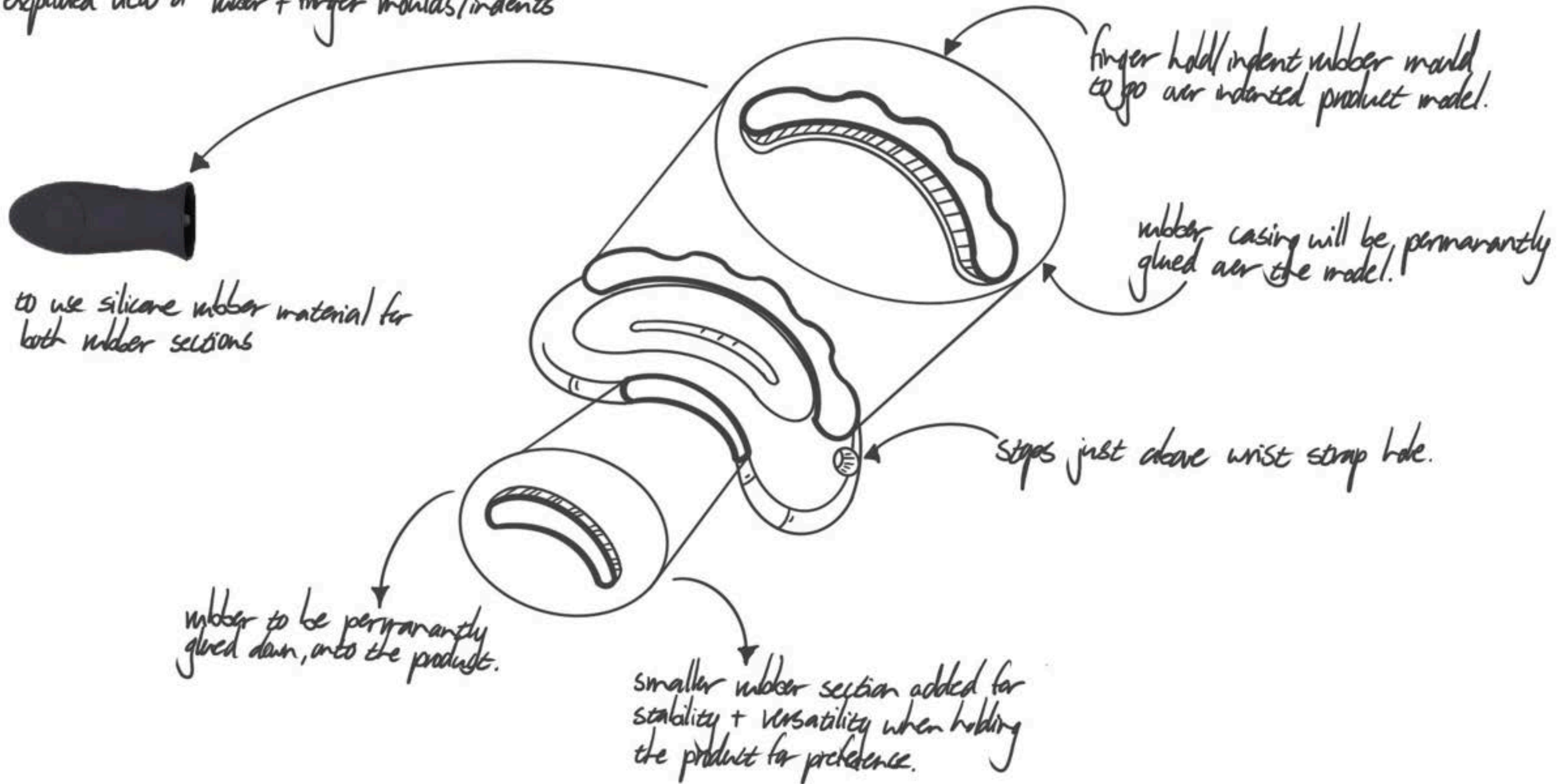
entire portion of product's spine covered in rubber + indented to create finger spacing.



CONCEPT DEVELOPMENT | WEEK TWELVE

- RUBBER + FINGER MOULDS/INDENTS

* exploded view of rubber + finger moulds/indents



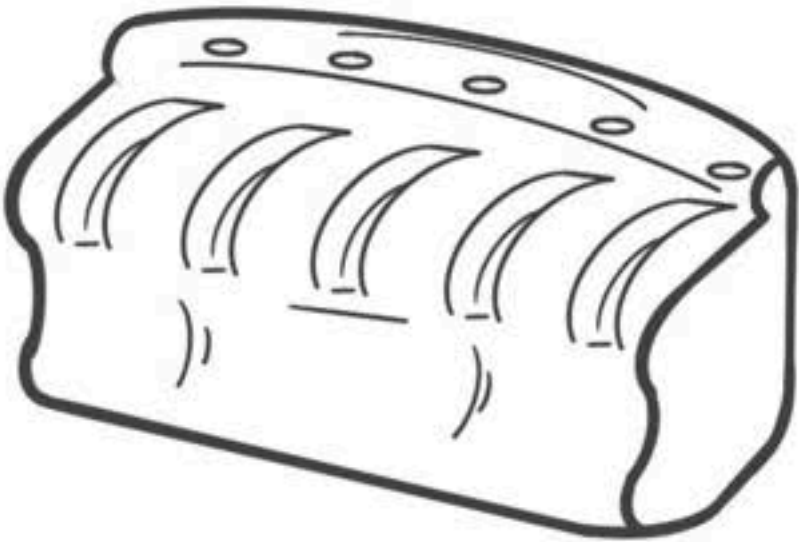
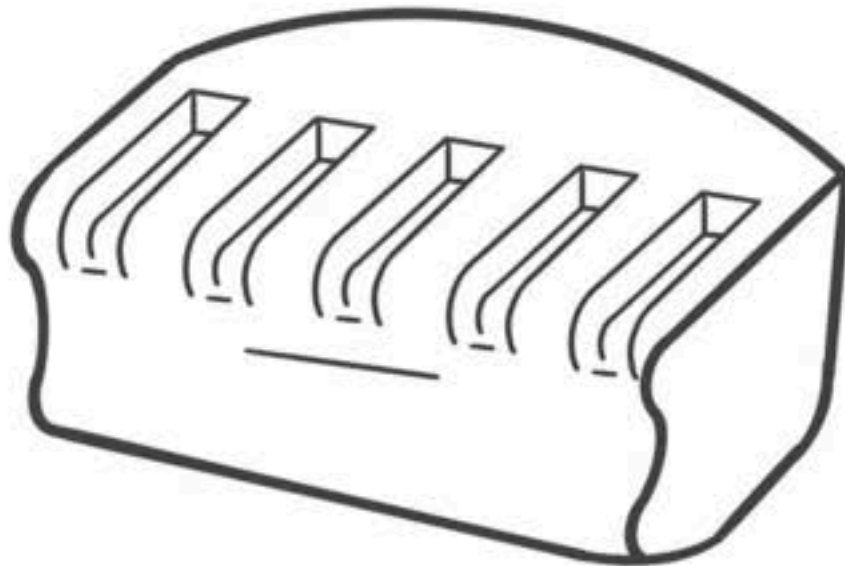
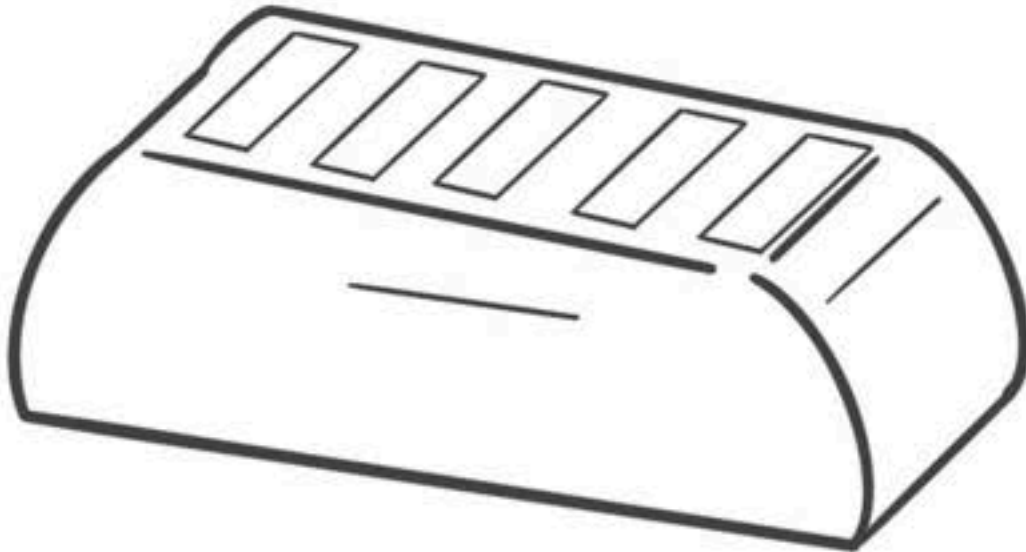
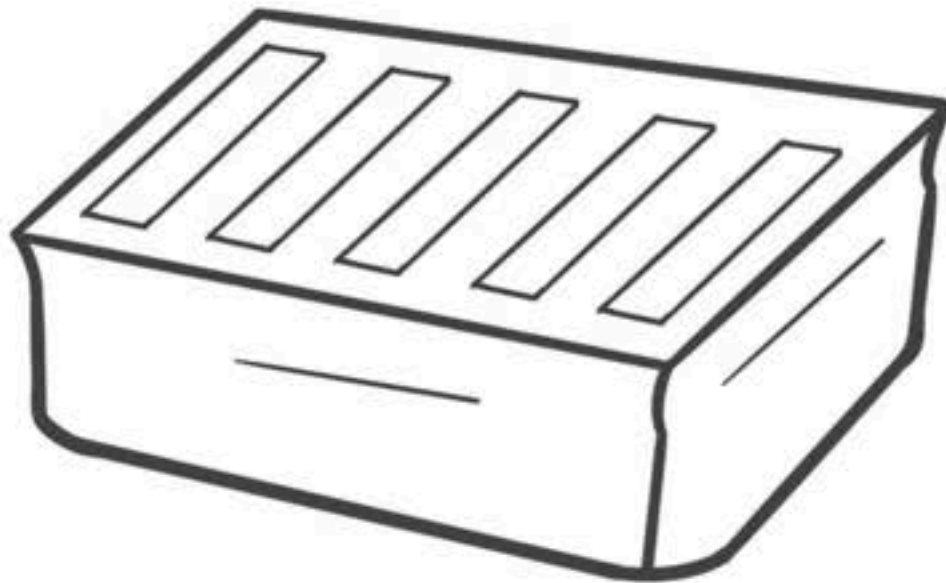
CONCEPT DEVELOPMENT | WEEK TWELVE

- PRODUCT NAME DEVELOPMENT



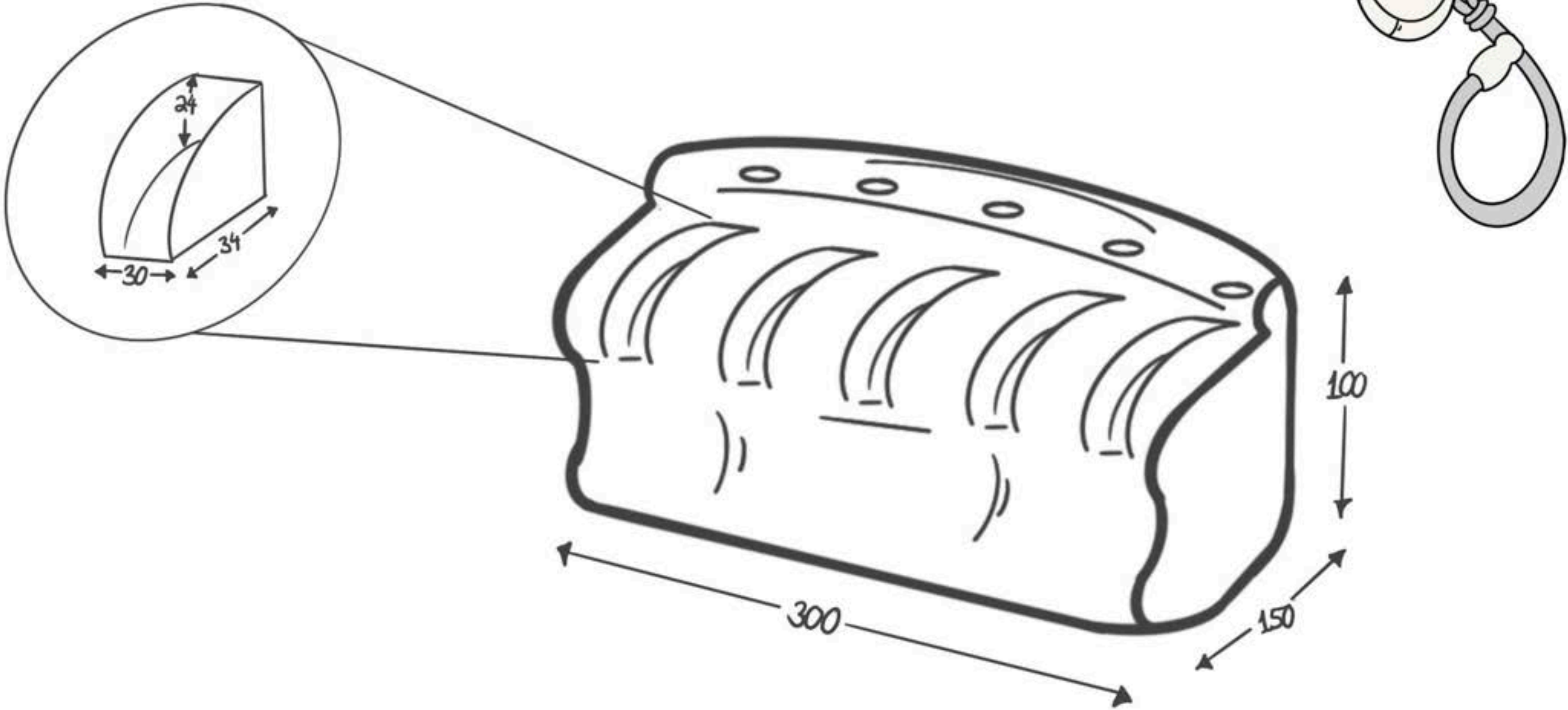
CONCEPT DEVELOPMENT | WEEK THIRTEEN

- DOCK FOR PRODUCT



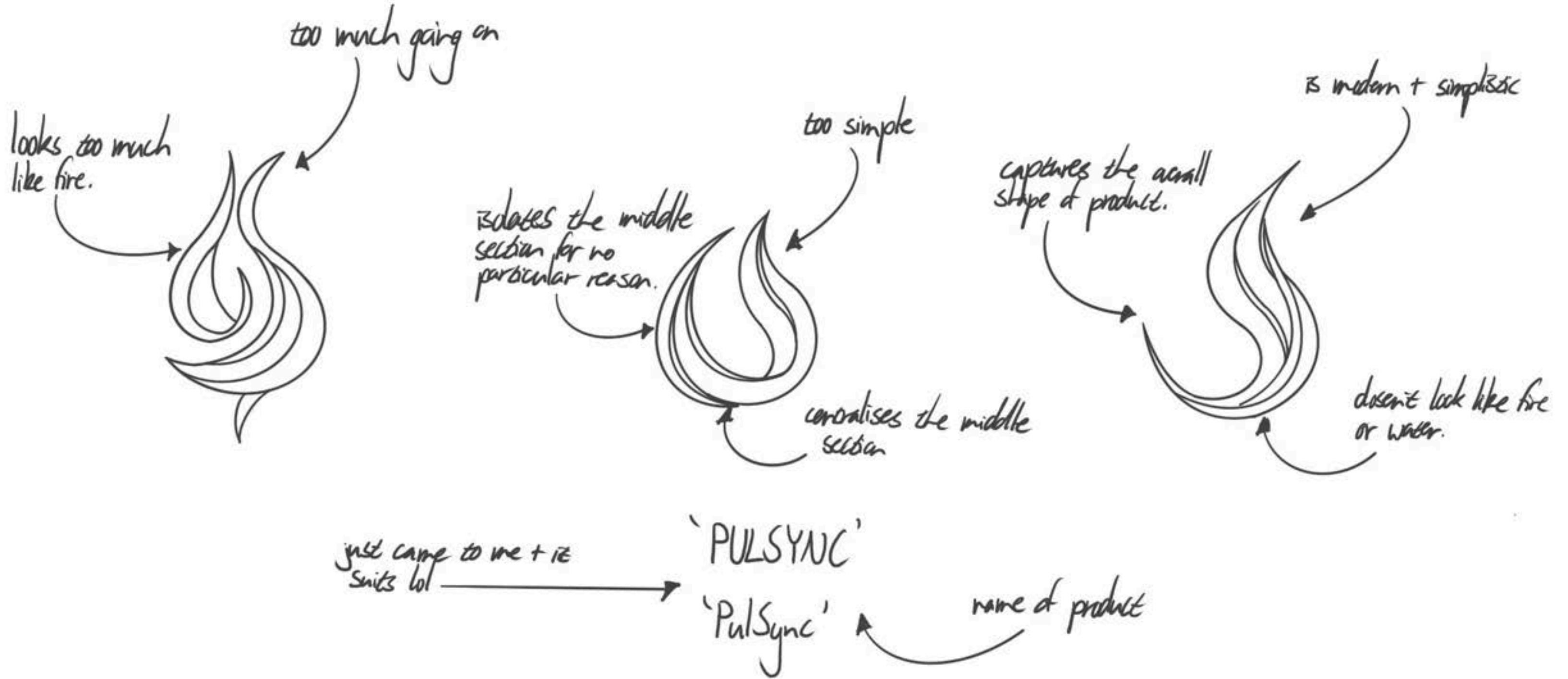
CONCEPT DEVELOPMENT | WEEK THIRTEEN

- DOCK FOR PRODUCT



CONCEPT DEVELOPMENT | WEEK THIRTEEN

- LOGO + NAME FOR PRODUCT



CONCEPT DEVELOPMENT | WEEK THIRTEEN

- LOGO + NAME FOR PRODUCT

loop in a unique design + holds 2 different images

blue/aqua colour palette to match the blue LED internal light in product.

taken from previous slide

logo uses a range of 4 blues + white to keep the design cohesive with the product.

blank space indicates the silhouette of the product.

logo was transferred onto 'Carra' to create the brand underneath it.

text includes 2 capital letters to break apart the text + make it visually interesting.

pulsync. OR PULSYNC.

↓
PulSync.

simplistic logo + font design to match simple product.

PulSync.

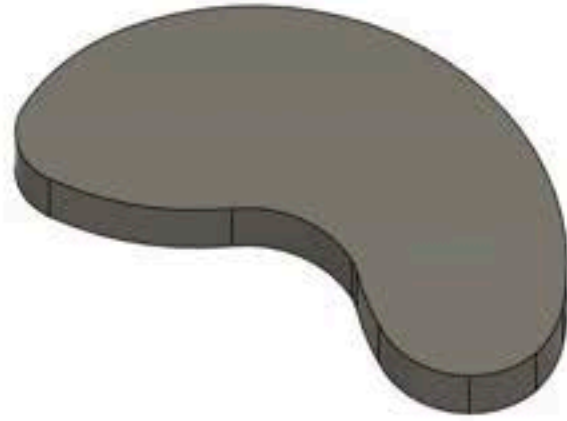
play on words of 'Pulse' + 'Sync'.

2 separate colours taken from loop palette. different colours adds new layers to simplistic design.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

- CAD PROCESS | PULSYNC DEVICE

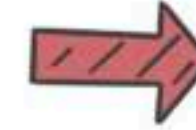
NOTE: ALL OF THE CAD COMPONENTS WERE NOT CREATED IN WEEK 13, JUST INCLUDING THE FULL PROCESS HERE AND ALTOGETHER.



I FIRST CREATED THE BASE SHAPE THROUGH MAKING A SKETCH AND EXTRUDING IT UPWARDS.



THE SHAPE WAS THEN 'FILLETED' TO CREATE CURVES ALONG THE EDGES OF THE PRODUCT.



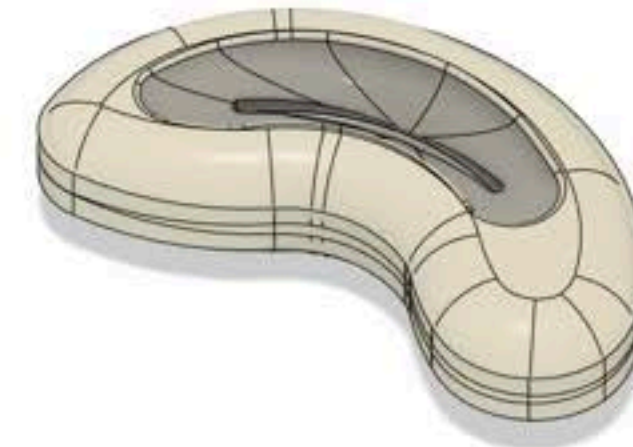
THIS SECTION OF THE PRODUCT WAS THEN 'SHELLED' TO CREATE A HOLLOW INSIDE.



THE MIDDLE SECTION OF THIS COMPONENT HAD THEN BEEN CREATED BY CUTTING AND EXTRUDING A SKETCH.



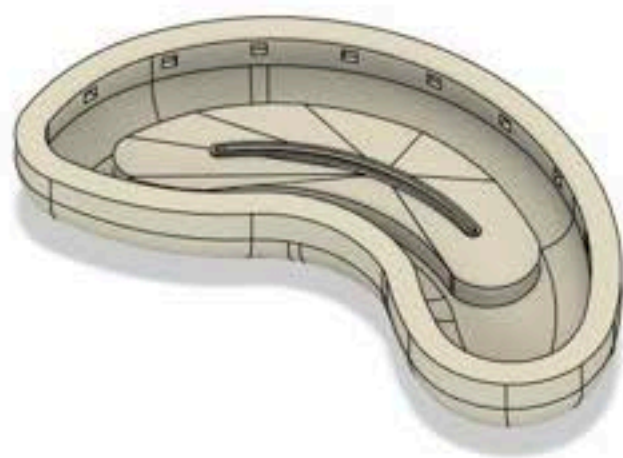
A SMALL BAR WAS THEN MADE INSIDE THE NEW SECTION- CALLED THE 'HEART RATE SENSOR'.



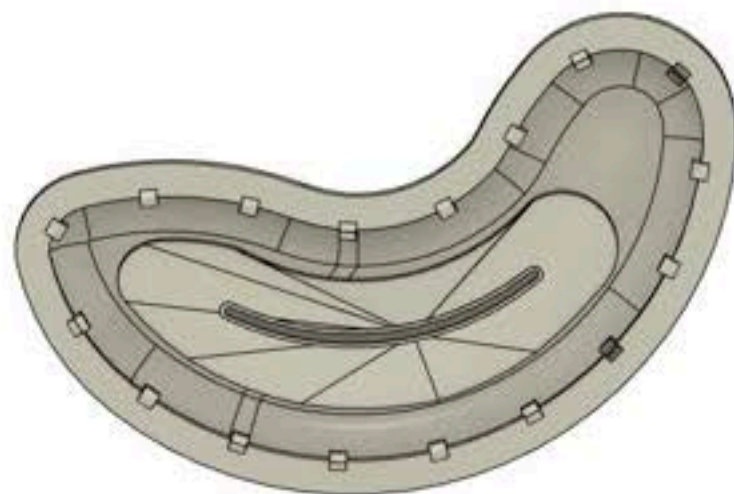
THE COMPONENTS CREATED WERE THEN DUPLICATED AND FLIPPED TO BE PLACED UNDERNEATH AND CREATE THE SHELL OF THE FULL PRODUCT.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

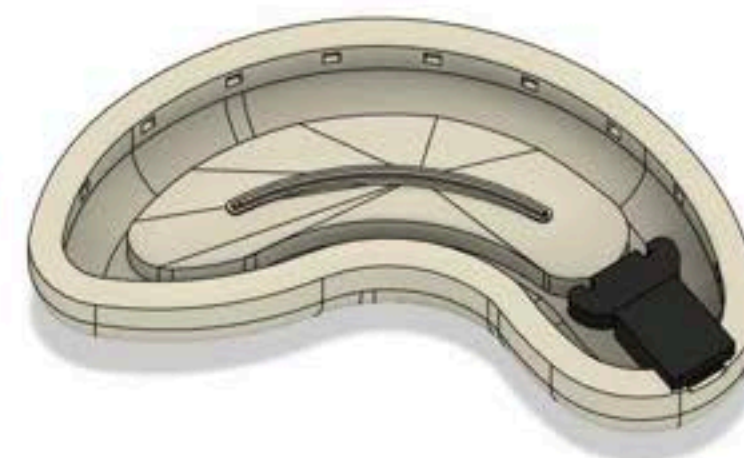
- CAD PROCESS | PULSYNC DEVICE



BOTTOM SECTION WITH SNAP-FIT INDENTS TO PAIR WITH THE TOP SECTION.



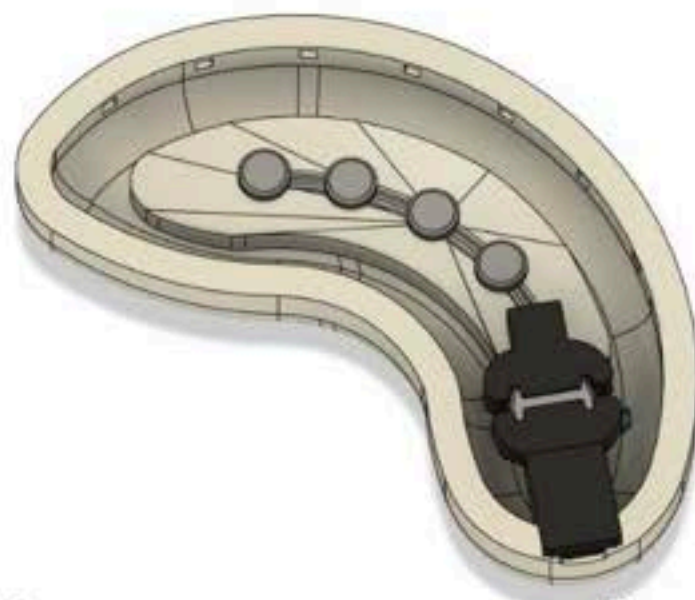
TOP SECTION SNAP-FIT JOINTS TO FIT INTO THE BOTTOM SECTION.



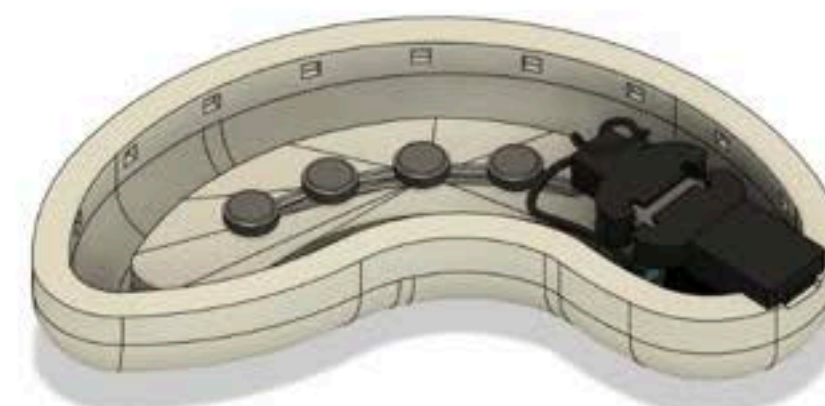
BUTTON BATTERY TO USB-C CHARGER CREATED AND INSERTED INTO THE PRODUCT, FOR REUSABILITY.



BUTTON BATTERY INSERTED AND THE BUTTON BATTERY HOLDER TO CONNECT TO WIRES. LEDS ALSO INSERTED UNDERNEATH USB-C CHARGER.



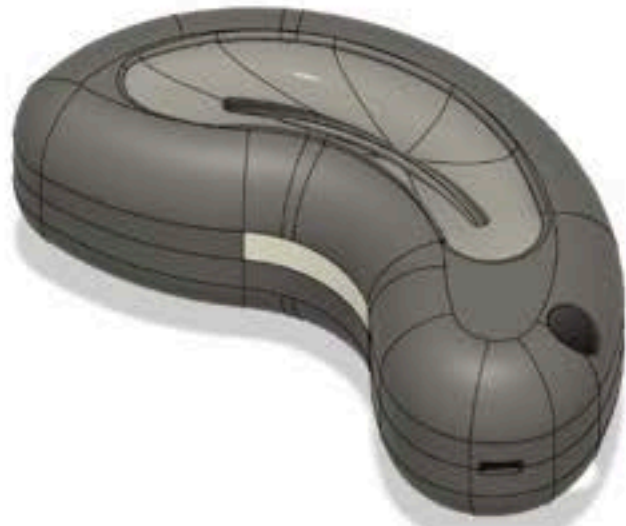
'HEART RATE SENSORS' INSERTED ALONG THE PALM INDENTS ON BOTH THE TOP AND BOTTOM SECTIONS.



WIRES CREATED USING THE 'SPLINE' AND 'REVOLVE' TOOLS.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

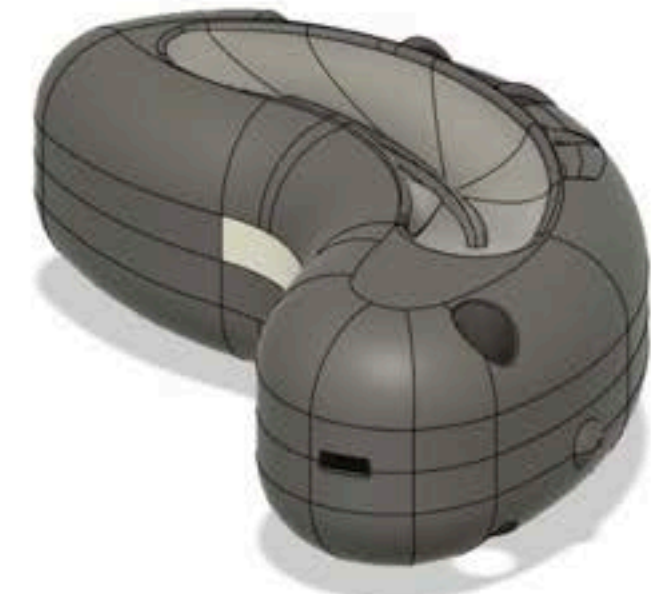
- CAD PROCESS | PULSYNC DEVICE



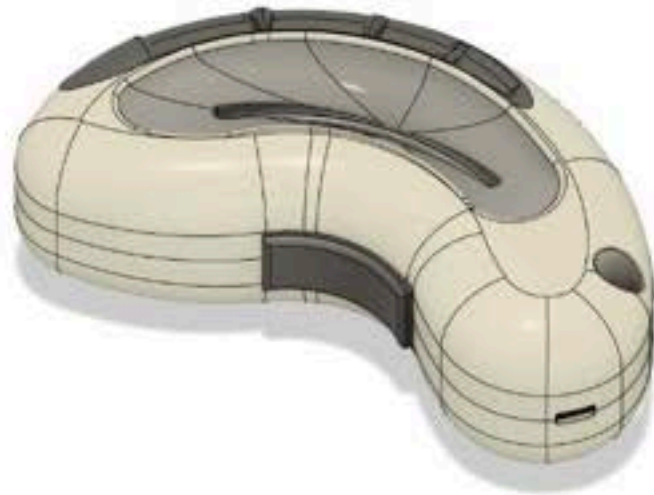
HOLE CREATED IN THE BOTTOM PORTION OF THE PRODUCT FOR THE WRIST STRAP WITH THE EXTRUSION TOOL.



FINGER GRIPS ADDED ALONG THE 'SPINE' OF THE PRODUCT FOR INCREASED STABILITY.



BUTTON ADDED TO THE RIGHT SIDE OF THE PRODUCT TO ACT AS THE ON/OFF FUNCTION.



RUBBER COMPONENTS ADDED TO THE GRIPPING AREAS FOR COMFORT AND SUPPORT FOR USERS.



WRIST STRAP ELEMENT ADDED BY USING THE SPLINE AND REVOLVE TOOL AGAIN.



END OF THE 'ROPE' CUT INTO TO THE OFF LOOSE ENDS FROM PREVIOUSLY USED TOOLS.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

- CAD PROCESS | PULSYNC DEVICE



KNOT CREATED NEAR THE TOP OF THE ROPE TO 'HOLD IT IN PLACE'.



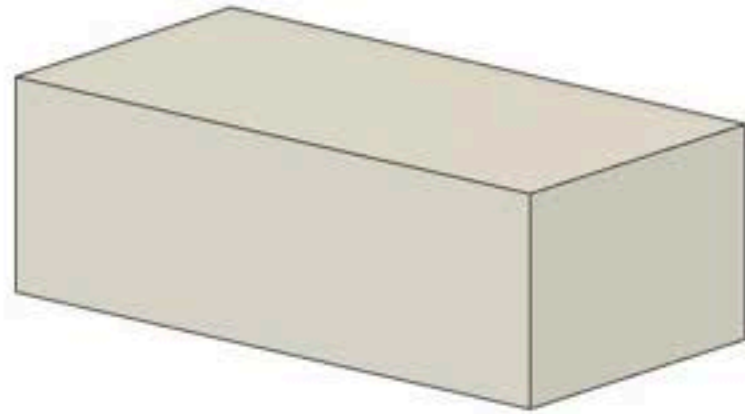
'SLIDER' PORTION OF ROPE ELEMENT CREATED TO EFFECTIVELY AND SEAMLESSLY ADJUST WRIST SIZE/PORION.



APPEARANCES OF THE PRODUCT PUT ONTO THE COMPONENTS. THIS IS THE FINAL APPEARANCE OF 'PULSYNC'.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

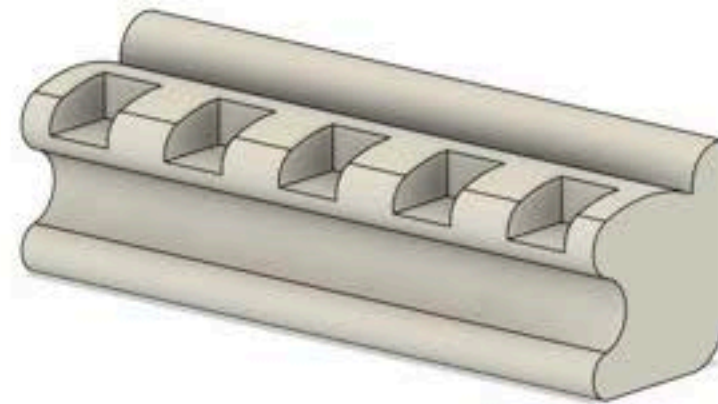
- CAD PROCESS | PULSYNC CHARGING DOCK



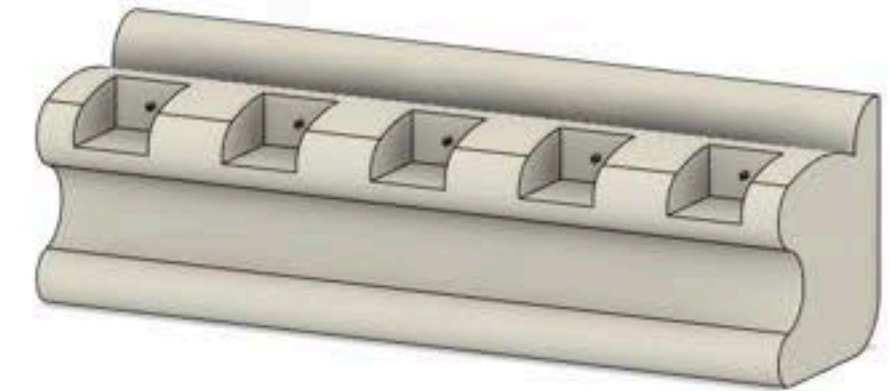
INITIAL SHAPE MADE FROM A RECTANGLE THAT HAD BEEN SKETCHED AND EXTRUDED.



FORM HAD BEEN CREATED FROM A SIDE SKETCH AND EXTRUDED THROUGHOUT THE ENTIRE COMPONENT. FORM FOLLOWED FROM SKETCH DONE PREVIOUSLY IN DDR.



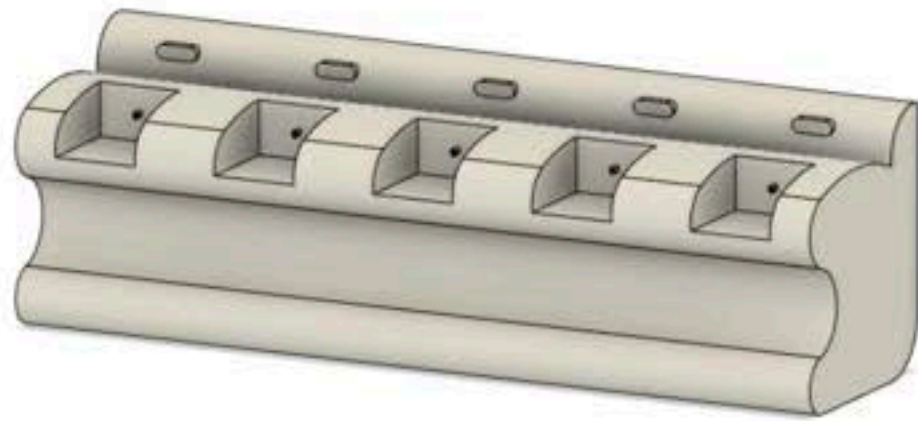
AN OFF-SET SKETCH HAS BEEN CREATED JUST ABOVE TO THE TOP SECTION OF COMPONENT. RECTANGLE SHAPE CREATED IN THE SKETCH AND CUT INTO THE COMPONENTS WITH THE EXTRUSION TOOL.



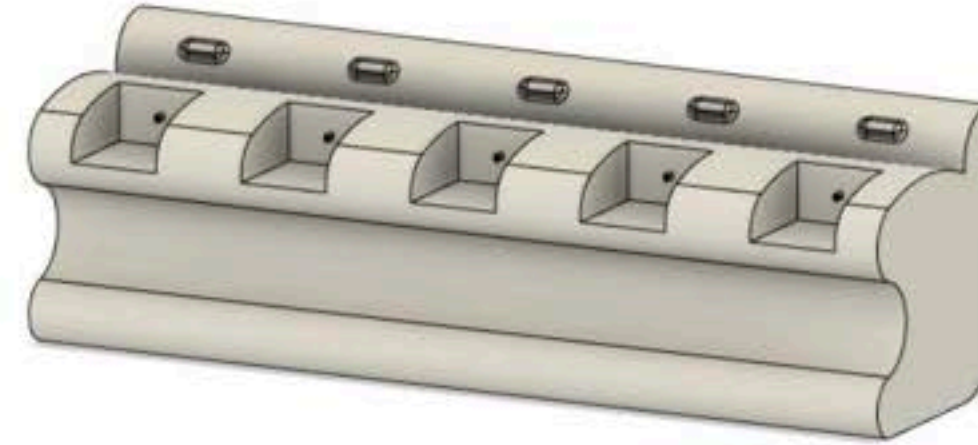
USB-C CHARGERS SKETCHED ONTO THE FLAT SECTION OF CUT-OUT AND EXTRUDED TO MAKE CHARGERS. PULSYNC PRODUCTS TO BE SLOTTED INTO THESE CUT-OUTS TO CHARGE.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

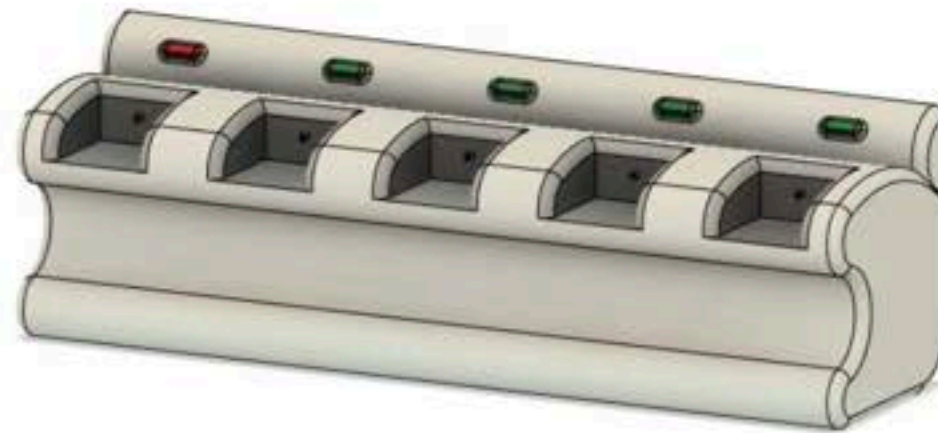
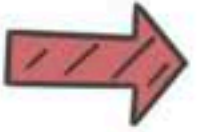
- CAD PROCESS | PULSYNC CHARGING DOCK



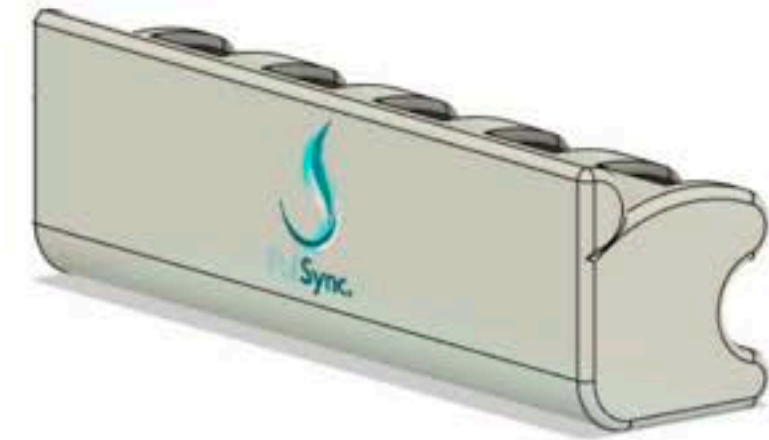
RECTANGLES EXTRUDED OUT FROM THE TOP SECTION OF COMPONENT AND FILLETED TO CREATE A CURVED RECTANGLE.



EDGES OF THE RECTANGLE FILLETED TO CREATE A CURVED TOP AND CREATE THE SHAPE FOR THE LED CHARGE INDICATORS FOR PULSYNC.



EDGES OF THE PULSYNC SLOTS FILLETED TO CREATE A NICE AESTHETIC AND CREATE A COHESIVE APPEARANCE ACROSS THE PRODUCTS.



PULSYNC LOGO ADDED TO THE BACK OF THE CHARGING DOCK. THIS IS THE FINAL APPEARANCE FOR THE CHARGING DOCK.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

- PROTOTYPING | PULSYNC PRODUCT



1. ONCE COLLECTED FROM THE 3D PRINTER, I FIRST SANDED THE SEPERATE PRODUCTS TO CREATE A SMOOTH SURFACE.

2. I THEN SPRAYED THE INSIDE OF THE PRODUCT WITH 'FROSTED GLASS SPRAY' TO HIDE THE INTERNALS OF OF THE PRODUCT.

3. AFTER A FEW COATS OF THE 'FROSTED GLASS SPRAY' I THEN COVERED IT WITH A CLEAR COAT FINISH TO PROTECT THE PAINT UNDERNEATH.

4. THE OUTSIDE OF THE PRODUCT WAS THEN TAPED TO COVER ANY PARTS NOT WANTING TO BE SPRAYED WITH THE 'ALUMINIUM SILVER SPRAY'. I THEN APPLIED A FEW COATS OF THE SPRAY + COVERED WITH A CLEAR COAT.

5. THE INDENTED PORTION OF THE PROJECT WAS THEN PAINTED WHITE, AS I LEARNT SPRAYING WAS TOO MESSY.

6. A CLEAR COAT WAS THEN APPLIED OVER THE ENTIRE PRODUCT TO CREATE A SMOOTH AND COHESIVE FINISH.

CONCEPT DEVELOPMENT | WEEK THIRTEEN

- PROTOTYPING | ELECTRONICS



CUT WIRING FROM WHEEL FOR DESIRED LENGTH



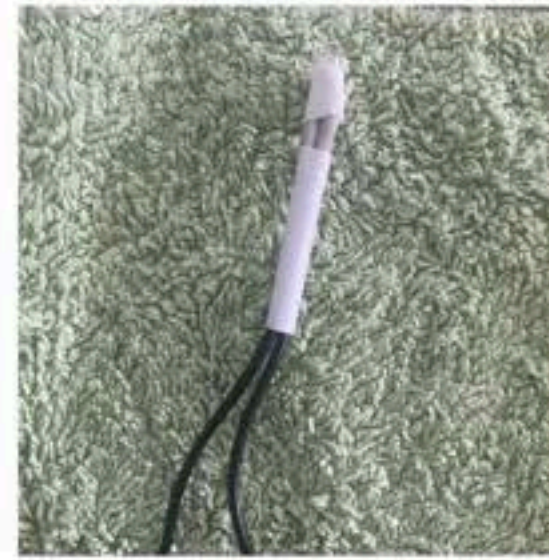
CUT BLACK EXTERIOR OF THE WIRE TO EXPOSE IT + ATTACH TO LED LIGHT



SLIP THE SHRINK TUBING ONTO THE WIRE.



BURN THE TUBE TO SHRINK IT DOWN + COVER THE EXPOSED WIRES



PUT MORE SHRINK TUBING OVER THE TOP + BOTTOM OF THE OTHER SHRINK TUBING



BURN THE TUBING TO MELT IT DOWN + SECURE

CONCEPT DEVELOPMENT | WEEK THIRTEEN

- PROTOTYPING | ELECTRONICS



TURN THE WIRES AROUND
+ CUT THEN BLACK
EXTERIOR OF THE WIRE



SLIP THE SHRINK TUBE
ONTO THE WIRES



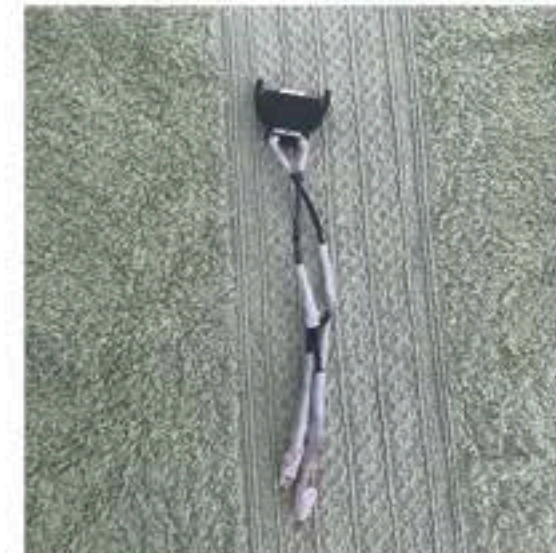
TWIST THE WIRES ONTO
THE BATTERY HOLDER



BURN THE TUBE TO
SHRINK IT DOWN + COVER
THE EXPOSED WIRES



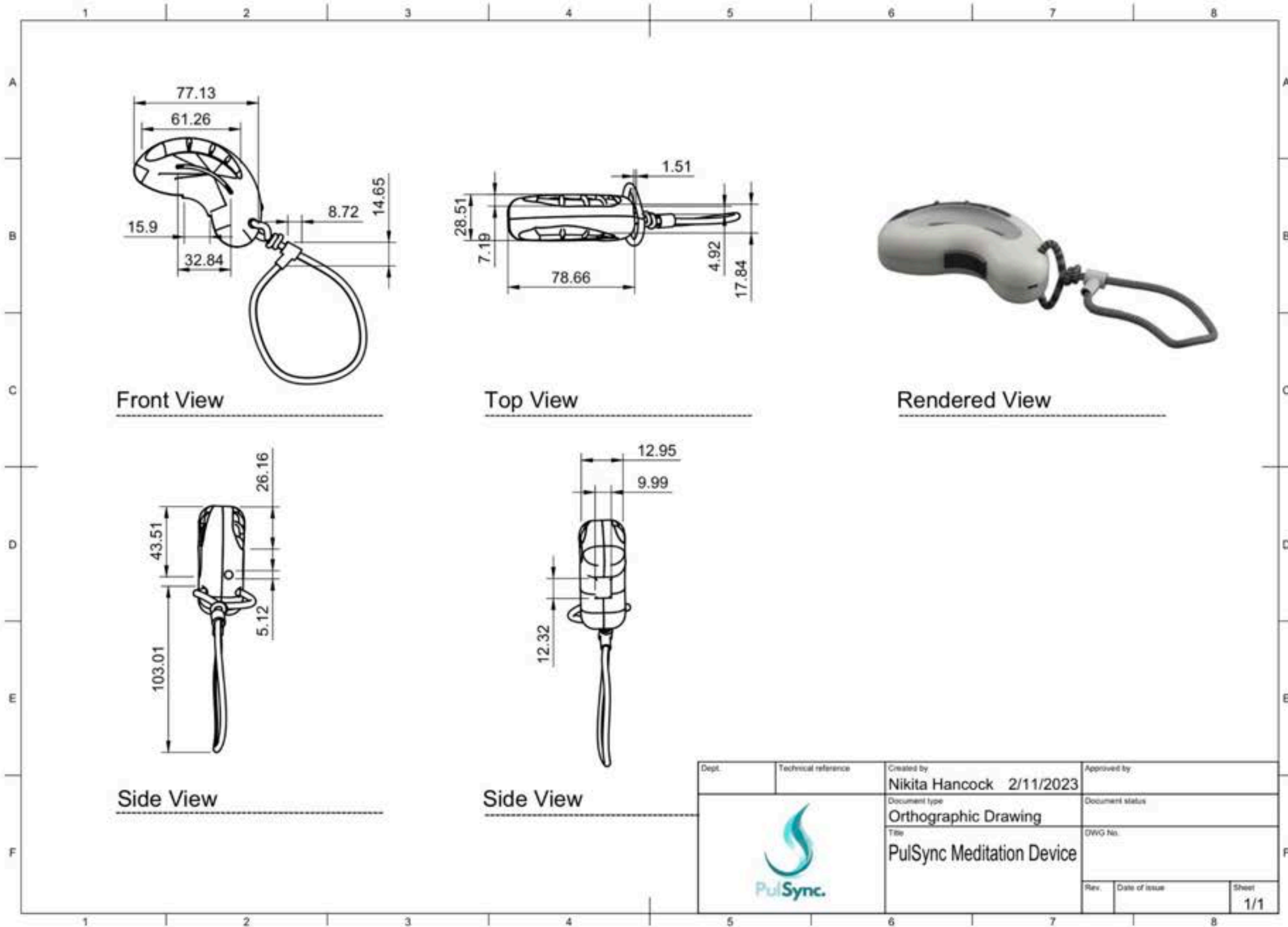
CREATE ANOTHER SET OF
WIRES + ATTACH THE
POSITIVE AND NEGATIVE
WIRES TO EACH OTHER




THIS IS THE FINAL
INTERNAL LOOK OF THE
ELECTRONIC PARTS

TECHNICAL DRAWINGS | WEEK THIRTEEN

- ORTHOGRAPHIC DRAWINGS



| | | | |
|---|---------------------|--|-----------------|
| Dept. | Technical reference | Created by Nikita Hancock 2/11/2023 | Approved by |
|  | | Document type Orthographic Drawing | Document status |
| | | Title PulSync Meditation Device | DWG No. |
| | | Rev. | Date of issue |
| | | Sheet 1/1 | |

TECHNICAL DRAWINGS | WEEK THIRTEEN

- EXPLODED VIEW + B.O.M

| Parts List | | | | | |
|------------|-----|-----------------------------------|---------------------------------------|------------------|---------|
| Item | Qty | Description | Material | Size | Cost |
| A 2 & 3 | 1 | Top and bottom shell of product | Translucent Opal Acrylic Sheet | 3mm, 1000x1000mm | \$7.55 |
| 33 | 1 | Wrist Strap Adjustor | Soft Skin Leatherette | 200mm | \$2.40 |
| 25 | 1 | Rubber used for hand/finger grips | Silicone Rubber | 100mm | \$17.50 |
| B 2 & 3 | 1 | Metal palm reader | Netal Matte Aluminium | 3mm, 5x70mm | \$1.22 |
| 26 | 1 | Wrist Strap | Braided Marine Rope | 8x400mm | \$4.60 |
| 11 | 2 | LED Breathing Light | LEDs | 3mm | \$0.25 |
| 11 | 2 | LED cover | Panel Mount LED Holder | 3mm | \$0.20 |
| C 8 | 1 | Battery | Lithium Button Battery | 25mm | \$1.13 |
| 7 | 1 | Battery Charger | Battery Type-C Charger Button Battery | 25mm | \$5.70 |
| 9 | 1 | Battery Holder | Verticle PCB Mount Battery Holder | 25mm | \$0.30 |
| D 14 | 8 | Heart Rate Sensor | Pulse Heart Rate Sensor | 16mm | \$9.00 |
| | | | | Total: | \$52.19 |


| | | | | | | | | | | | | | | | | | | |
|-----------------------------------|---------------------|---|-----------------|---------------------|---|-------------|--|--|--|-----------------|--|--|--|---------|------|---------------|---------------------|--|
| <h3>Exploded View</h3> <p>1:2</p> | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Dept.</td> <td style="width: 15%;">Technical reference</td> <td style="width: 30%;">Created by Nikita Hancock 2/11/2023</td> <td style="width: 40%;">Approved by</td> </tr> <tr> <td colspan="2"></td> <td>Document type Exploded View & Parts List</td> <td>Document status</td> </tr> <tr> <td colspan="2"></td> <td>Title PulSync Mediation Device</td> <td>DWG No.</td> </tr> <tr> <td>Rev.</td> <td>Date of issue</td> <td colspan="2">Sheet 1/1</td> </tr> </table> | Dept. | Technical reference | Created by Nikita Hancock 2/11/2023 | Approved by | | | Document type Exploded View & Parts List | Document status | | | Title PulSync Mediation Device | DWG No. | Rev. | Date of issue | Sheet 1/1 | |
| Dept. | Technical reference | Created by Nikita Hancock 2/11/2023 | Approved by | | | | | | | | | | | | | | | |
| | | Document type Exploded View & Parts List | Document status | | | | | | | | | | | | | | | |
| | | Title PulSync Mediation Device | DWG No. | | | | | | | | | | | | | | | |
| Rev. | Date of issue | Sheet 1/1 | | | | | | | | | | | | | | | | |



PulSync.

HELPING NURSES
BE HUMAN.

OUR NURSES



- BACKBONE OF THE HOSPITAL.
- FRONTLINE SUPPORT FOR PATIENTS.
- PROVIDING EMOTIONAL SUPPORT FOR PATIENTS + FAMILIES.

THE TOPIC NURSING SUPPORT

In hospital settings, the quality of patient care is closely tied to the well-being and performance of nursing staff.



The problem adversely affects their ability to perform at their best, consequently impacting the overall quality of patient care.



THEIR BIGGEST PROBLEMS


As expressed in the interviews, nurses are often the middlemen for most situations and take on the abuse from patients and co-workers.



- UNDERSTAFFING: 50% of the nurses interviewed expressed work-overload due to under-staffing.
- WORK OVERLOAD: 50% of nurses mentioned under/short-staffing from patient medical demand.
- DECREASED QUALITY OF CARE
- BURNT OUT NURSES
- ANXIETY & DEPRESSION

RESEARCH SUMMARY

Used Support Services



7.1% of the nurses interviewed have used the support services offered by the hospital.

Interviewed: 38.3%

Not interviewed: 54.6%

Not used: 38.3%

Used: 7.1%

"Want to counselling and was just referred to another counselling service after 'free session'."

METHOD ONE

ONLINE SURVEYING
Deploying 19 questions, targeting nurses and their work environment.
10Q- Scale-based, 9Q-Open-ended

PARTICIPANTS = 24

METHOD TWO

IN-PERSON INTERVIEWS
Asking the nurses 10 questions about their nursing life & work environment. All participants interviewed separately.

PARTICIPANTS = 4

DESIGN DIRECTION


Target Market:
The primary target market for this project are Australian nurses working in hospitals. This is not limited to age or gender of the nurses as the developed product will cater for all ages & genders.

Create a meditation device that address nurses' stress and mental health issues. By enhancing nurses' well-being, it will seek to improve the quality of care provided to patients.




SUMMARY OF IDEATION & DIRECTION

HEAT & PULSATION




1.

ISOLATION & RELAXATION




2.

SOUND & ATMOSPHERE



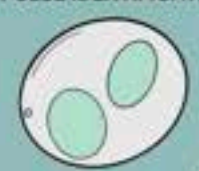
3.

TEXTURE & FEELING




4.

USER INTERACTION & PULSE IDENTIFICATION




5.

FORM



FEATURES



WHAT IS IT? PulSync.



PulSync is a handheld meditation device that provides nurses with immediate stress relief in the working environment. Nurses can use in PulSync in the aftermath of high-stress and emotional situations/encounters.

FEATURES



PULSE HEART RATE SENSOR

Sensors are activated when touching the palm of the user.



REACTIVE BREATHING PATTERN

LEDs are responsive to heart rate, LEDs indicate recommended breathing pattern.



PULSE VIBRATION

PulSync vibrates when LEDs are lit up to further indicate breathing pattern without the use of sight.

TECHNOLOGY PulSync.

METAL MATTE ALUMINUM

Provides 'PulseHeart Rate Sensors' with skin-to-skin contact through transferable material.

PULSE HEART RATE SENSORS

Sensors are activated when user is touching 'Metal Matte Aluminium'. Reads the users pulse & heart rate.

REACTIVE BREATHING LEDs

LEDs react to the users pulse & adjusts its blinking rate to provide a recommended breathing pattern for user to follow.



LITHIUM BUTTON BATTERY, HOLDER & CHARGER

Lithium button battery powers the entire product. The holder connects the battery to the electrical components & the charger converts to a USB-C for rechargability.

WRIST STRAP & SIMPLE ADJUSTOR

Simple adjustor allow the user to slip the wrist strap on & tighten to desired size quickly.

RUBBER FINGER GRIPS

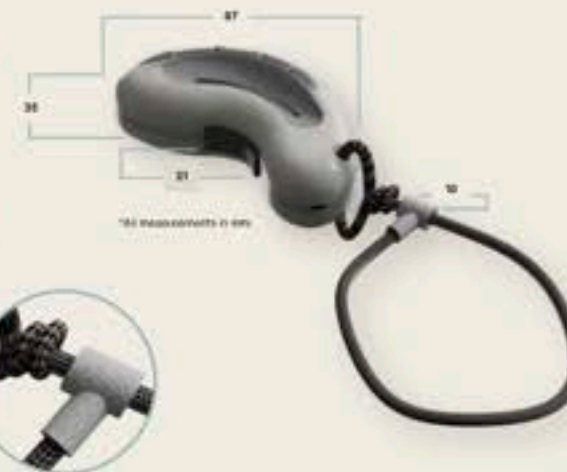
Allows for increased stability in stressful situations. User can wear without dropping product.

MANUFACTURING TECH PulSync.

SHELL MATERIAL:
Translucent Opal Acrylic Sheet

RUBBER MATERIAL:
Silicone Rubber

3D PRINT MATERIAL:
SLA Resin Clear



INJECTION MOULDING

Injection moulding used to create the shell of the 'top' & 'bottom' plastic parts. Injection moulding will also create the snap-fit joints, used to secure the parts together.



CASTING


Lithium button battery powers the entire product. The holder connects the battery to the electrical components & the charger converts to a USB-C for rechargability.



RUBBER MOULDING

Rubber moulding used for top sections of the 'finger moulds' and middle lining of rubber for hand placement.

HOW TO USE PulSync.



01 LOCATE PULSYNC CHARGING DOCK
Here you can find a set of PulSync's

02 REMOVE ONE OF THE PULSYNCS
Twist unlock the filter to remove

03 TURN ON PULSYNC DEVICE
Small button located on the lower spine of the product

04 START MEDITATING
The pulse sensors will adjust pulsation/breathing pattern speed based on users heart rate

05 RETURN PULSYNC BACK TO CHARGING DOCK
Place PulSync back into retrieved slot

PULSE HEART RATE SENSOR
PulSync only needs 2-5mins for meditation completion.

WIKITA HANCOCK | N11085

DOES IT SOLVE THE PROBLEM?



PulSync provides nurses with an option to mitigate stress effectively. It uses meditation and breathing pattern techniques to quickly bring down the users heart rate and gather their emotions.

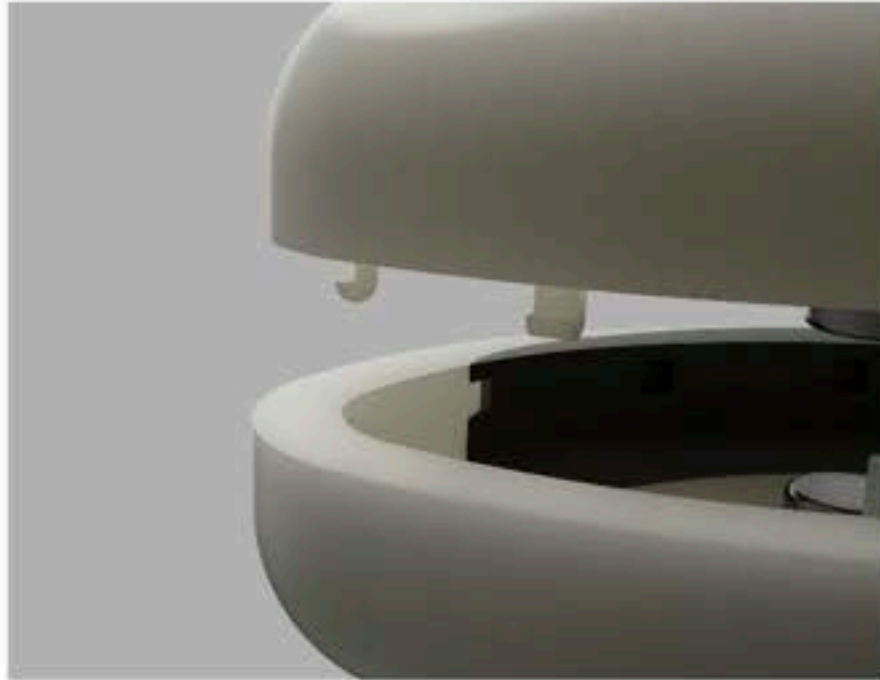
While PulSync does not solve all mental health problems or replace services such as counselling, it helps nurses get through the day, encourages them to express their emotions and allows them to be human.

WIKITA HANCOCK | N11085



RENDERS | WEEK THIRTEEN

- RENDERS OF FINAL PRODUCT



NIKITA HANCOCK

NIIO85231

DNB 3II

RENDERS | WEEK THIRTEEN

- RENDERS OF FINAL PRODUCT



NIKITA HANCOCK

NIIO85231

DNB 3II

RENDERS | WEEK THIRTEEN

- RENDERS OF FINAL PRODUCT



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DNB 3II

RENDERS | WEEK THIRTEEN

- RENDERS OF FINAL PRODUCT



NIKITA HANCOCK

NIIO85231

DNB 3II