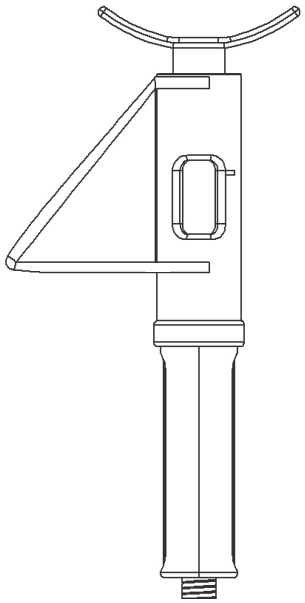
HanD Pen

an insulin pen for aging individuals living with diabetes and arthritis



Designed by Julia Liverton

Pratt Institute 2020 | Industrial Design
Professor Ignacio Urbina | Design for Aging

Project Description

After conducting research with arthritis and diabetes specialists, I learned the three main self-injection challenges for aging individuals living with these conditions: keeping the pen in for 6 seconds after injection, existing insulin pens have poor ergonomics, and remembering the last injection site.

I set out to design an insulin pen with a separate accessory that could address these issues. The pen is designed to be compatible with standard insulin pen supplies and has 4 key features:

- A 6 second tracking band that provides audio and visual cues

- An ergonomic plunger that allows palm depression and comfortable dose dialing

- Rubber stoppers to keep the cartridge from falling out or moving while being replaced

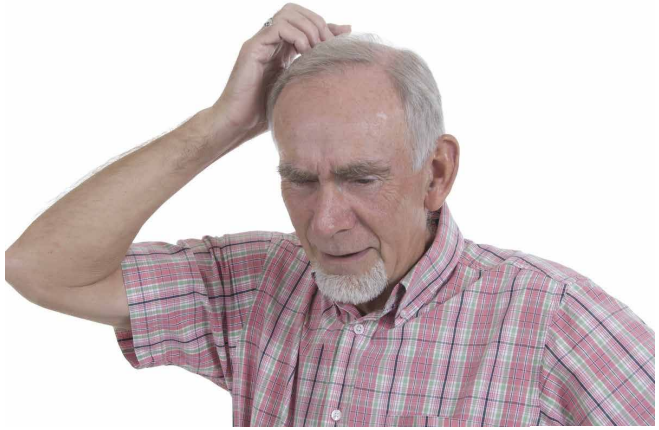
- A removable cartridge holder

The separate accessory functions as both an injection site tracker and suction aid to eliminate the need to pinch skin. The center concavity in the accessory allows the user to align the pen so that the needle slips into the needle hole, injecting the user while supporting the pen. After injection, the user can twist the band on the accessory until the indicator lines up with the injection site (RA – right arm, LT – left thigh, etc.).

50 million

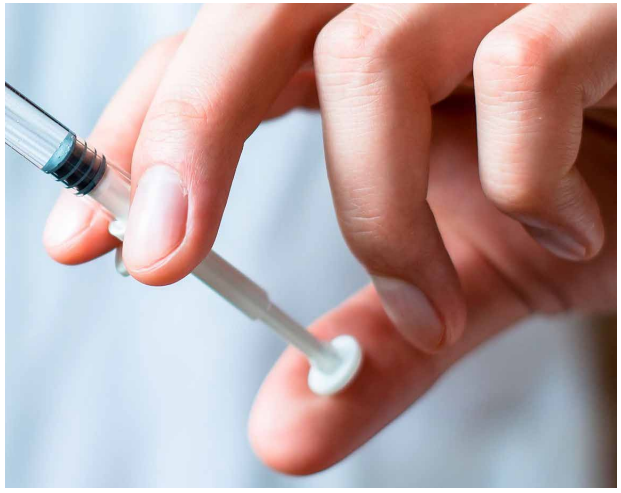
According to the CDC, more than 100 million U.S. adults are living with diabetes or prediabetes. Almost half of all adults with diabetes also have arthritis.

Holding the pen in for 6 seconds



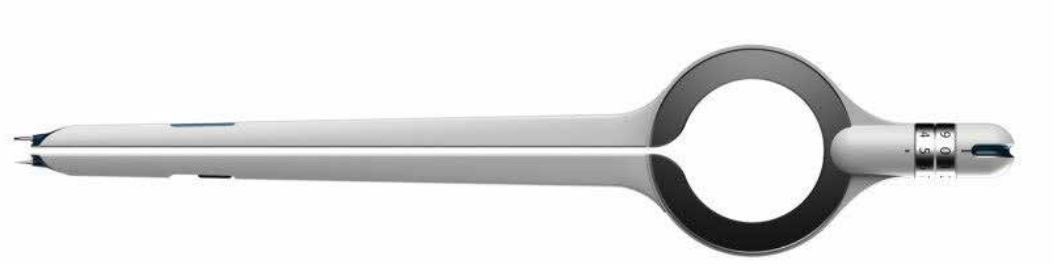
Remembering last injection site

Existing insulin pens are painful


Pain Points		Goals
1	Painful to inject and dial	Ergonomic plunger
2	Painful to replace	Simplify insulin vial replacement
3	Forgetting last injection site	Record injection sites
4	Forgetting to hold pen in	Record 6 second period

Clean



Sleek

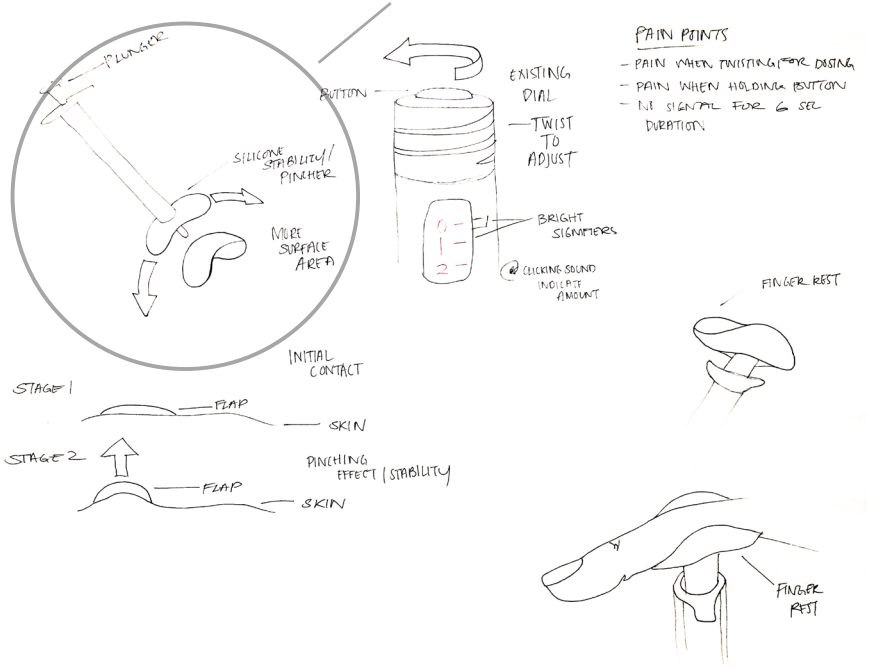
Minimalistic

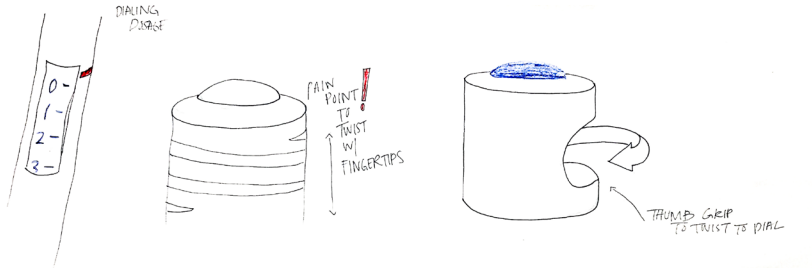
Minimalistic with supportive arm

Bulkier for palming

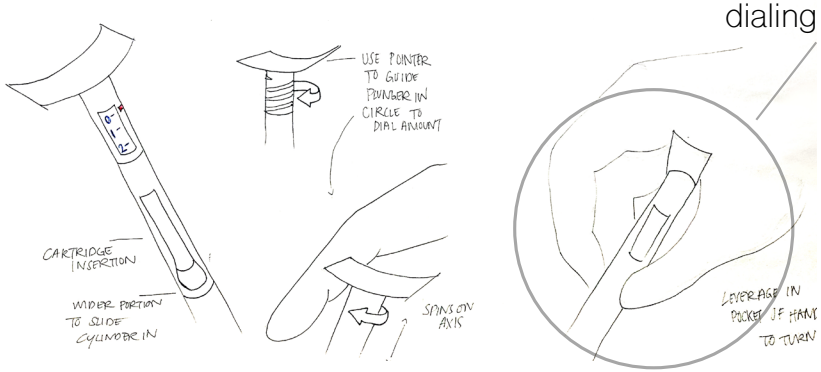
Finger sleeve for extra stability

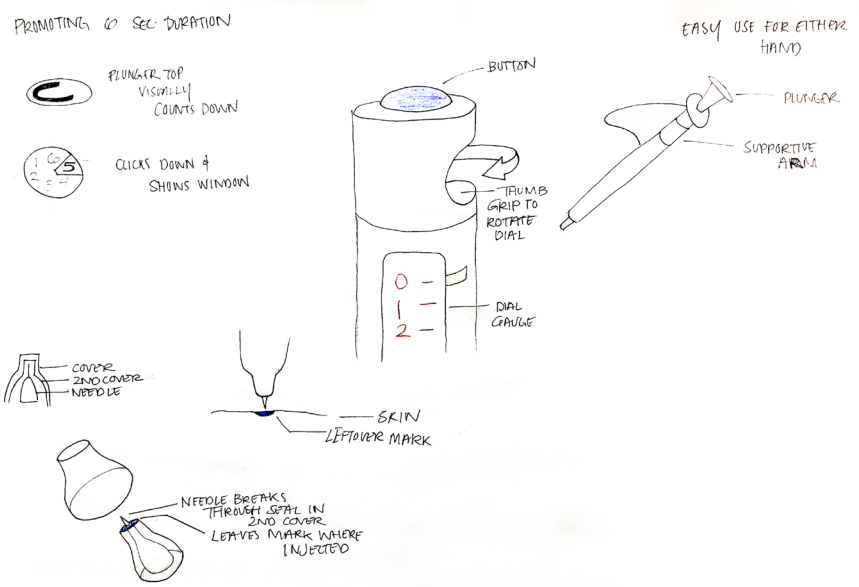
suction aspect - eliminates pinching

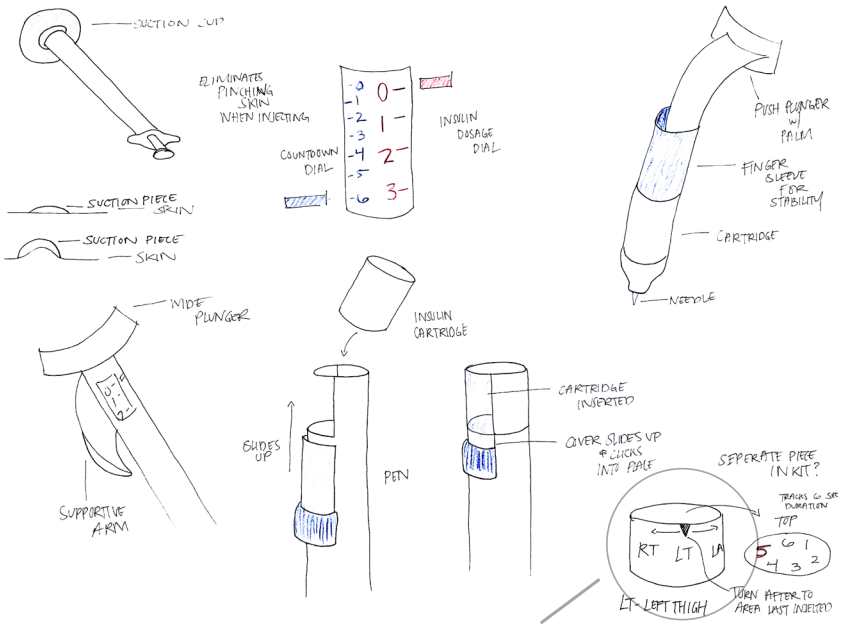




dialing insulin







separate accessory

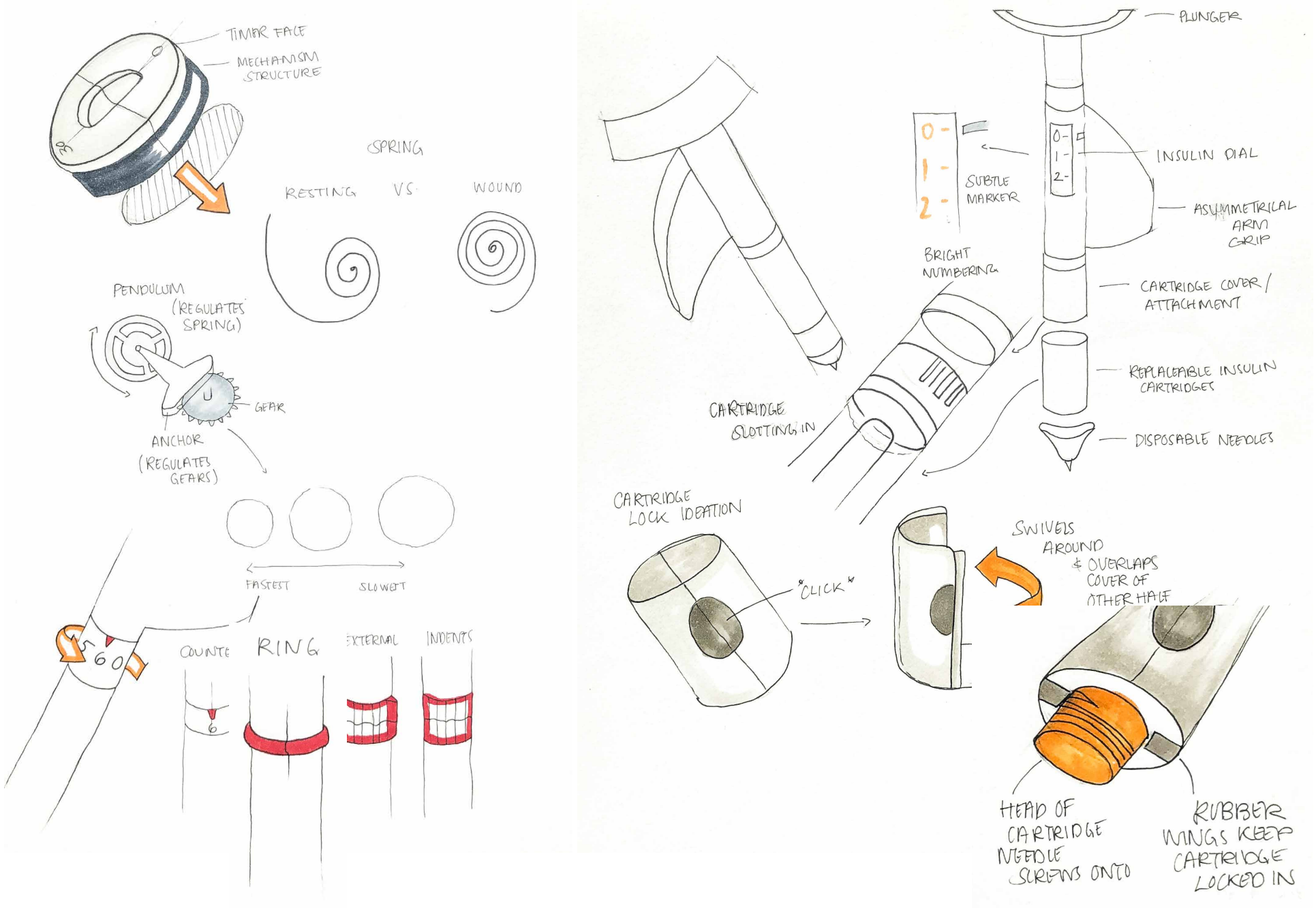
Insulin Dial Ideation

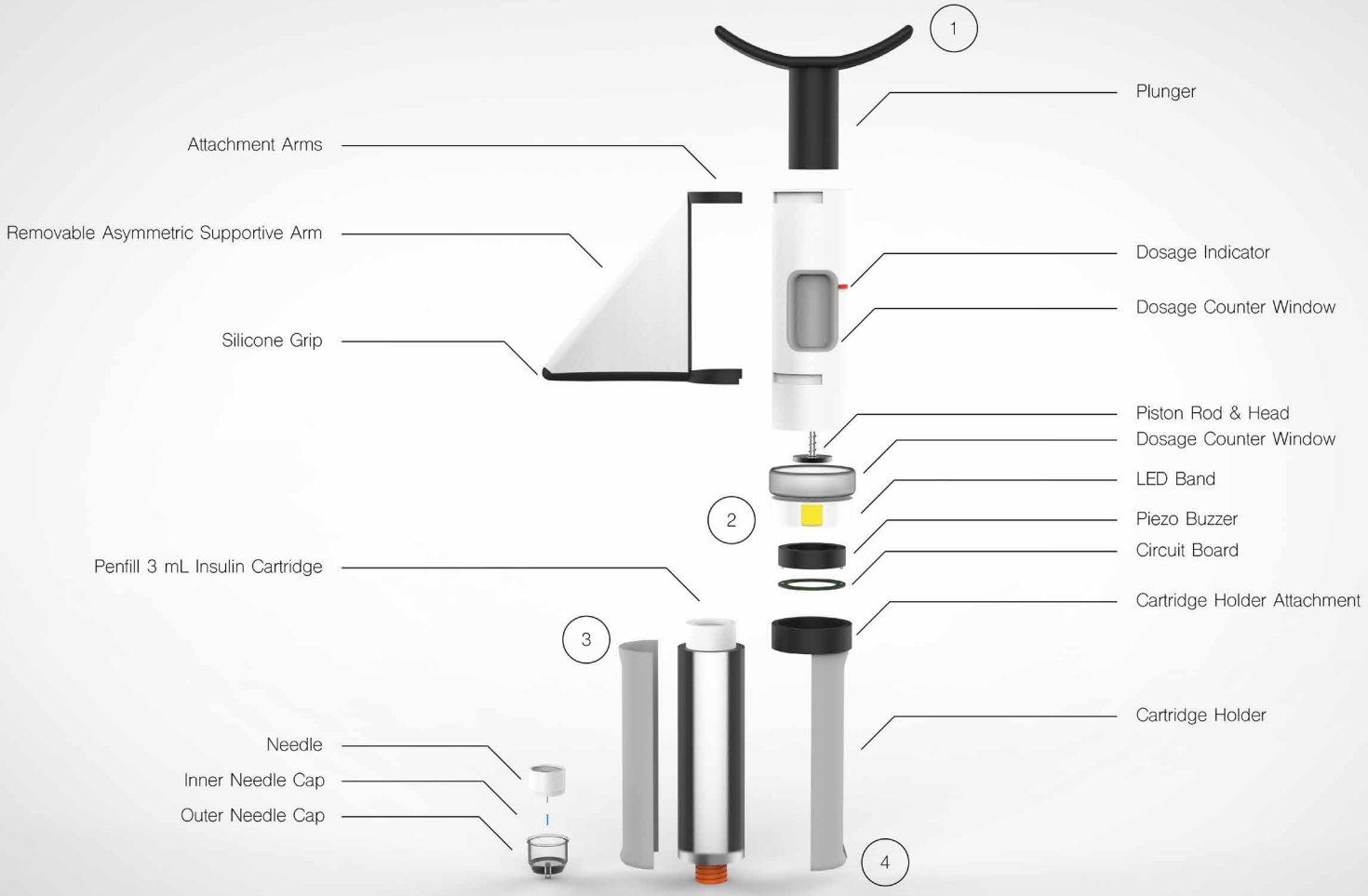
Suction Aspect

Insulin Replacement Ideation

Site & Duration Tracker


push with palm
easy to replace
range of gestures
suction piece
site and time tracker


TIMER FACE
MECHANISM STRUCTURE
SPRING
RESTING
VS
WOUND
PENDULUM (REGULATES SPRING)
GEAR
ANCHOR (REGULATES GEARS)
FASTEST
SLOWEST
COUNTE
RING
EXTERNAL
INDENTS
PLUNGER
0-
1-
2-
SUBTLE MARKER
INSULIN DIAL
ASYMMETRICAL ARM GRIP
BRIGHT NUMBERING
CARTRIDGE COVER / ATTACHMENT
REPLACEABLE INSULIN CARTRIDGES
CARTRIDGE SLOTTING IN
DISPOSABLE NEEDLES
CARTRIDGE LOCK IDEATION
"CLICK"
SWIVELS AROUND & OVERLAPS COVER OF OTHER HALF
HEAD OF CARTRIDGE NEEDLE SCREWS ONTO
RUBBER WINGS KEEP CARTRIDGE LOCKED IN



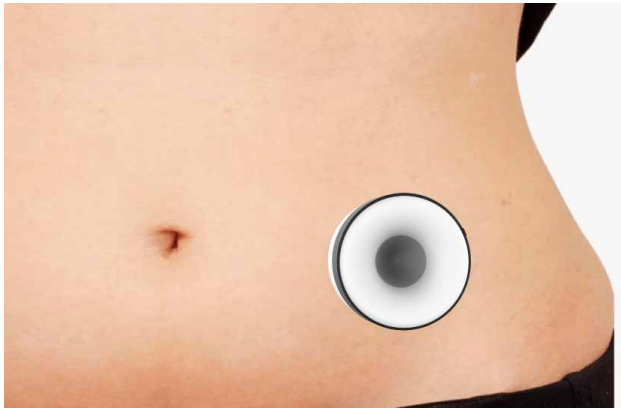
The plunger is designed to be pushed in by either the palm or fingers. The elongated arms allow for the user to easily dial their insulin dosage with whichever part of their hand is most comfortable.

This removable band functions as both a visual and audial cue for the advised 6 second period. While the buzzer beeps for each second, the LED lights flash as well. Upon completion, the flashing and beeping become more rapid.

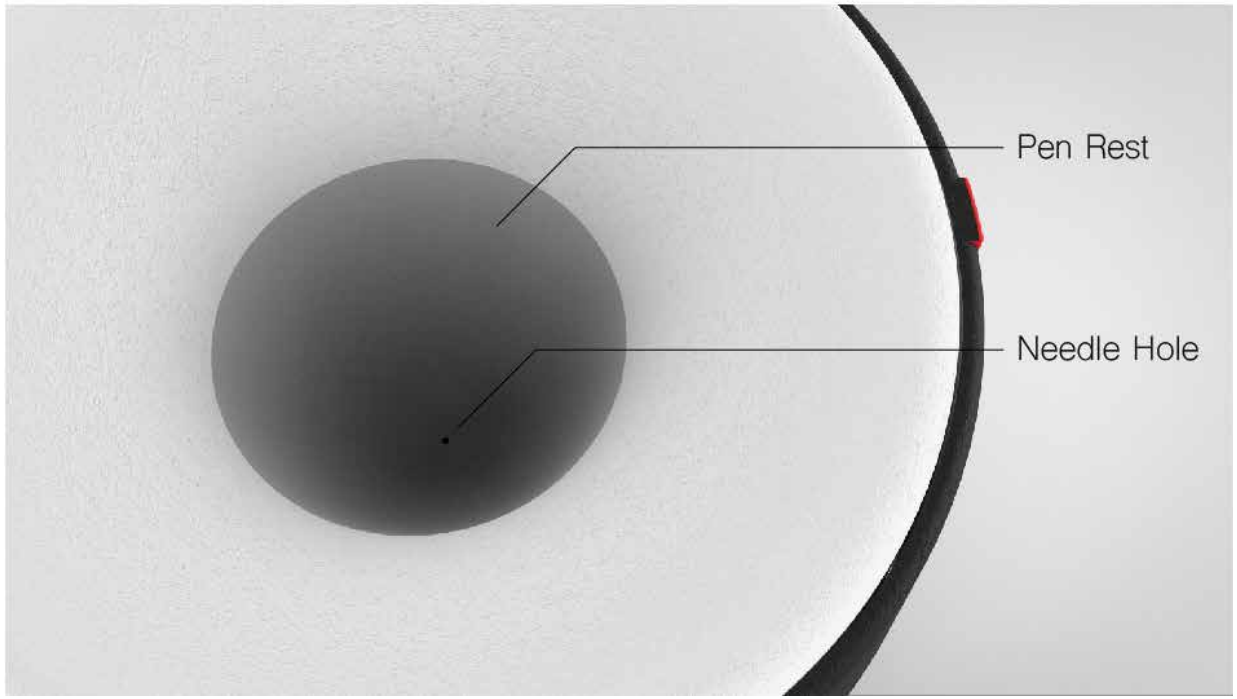
The removable cartridge holder feature reduces the amount of stress on the fingers when it comes to replacing the insulin cartridge.

Rubber stoppers are at the bottom of the cartridge holders, ensuring that the insulin cartridge does not move or fall out.

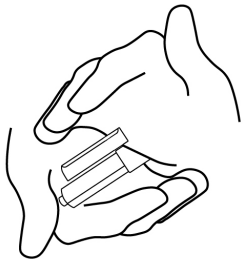

Twist Band
Indicator
Site Labels
LA
RA
LT
Suction Cup



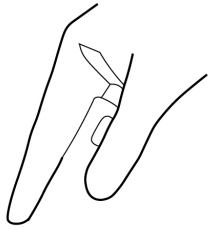

LA
RA
LT


Pen Rest
Needle Hole

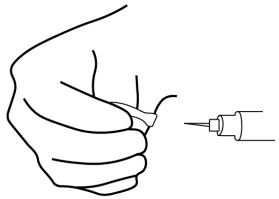
Instructions



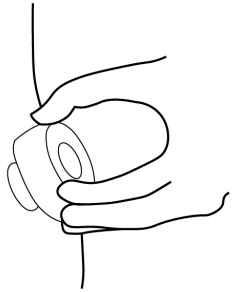
1. Replace cartridge with removable cartridge holder feature.



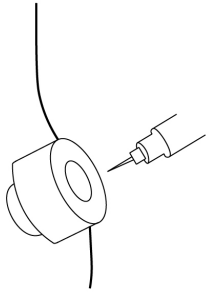
2. Dial insulin dosage with ergonomic plunger design.



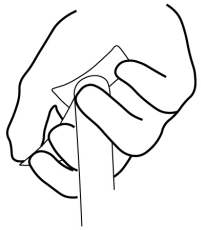
3. Replace needle and test insulin cartridge.



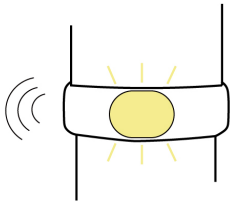
4. Place suction cup accessory where you are going to inject.



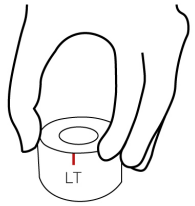
5. Line the pen up with pen rest part of the accessory.



6. Push the plunger down with your palm or another part of your hand.



7. Remove pen once the band begins to blink and beep rapidly.



8. Twist band until the indicator lines up with the last injected site.