Fixed Dose Pen

Safe and cost effective dose delivery pen for convenient self-injection
The Challenge

Treatment of various ailments require injecting medication using dispensing devices at intervals prescribed by medical practitioners. Efficacy of treatment is based on capability of the device to dispense accurate dose of medicine to prevent contraindications in patients.

Additional patient safety measures include ensuring that the device is not used beyond its recommended lifetime to prevent hazards such as microbial growth, contamination, blunt or broken needle and formation of lumps on the skin.

Currently, the hand held medical devices especially the injection systems are patented by leading healthcare companies, and device design patents are sold to drug manufacturers with a royalty. This results in high cost, which in turn is passed on, to the end users / patients.

The Opportunity

Our extensive visits to hospitals and meticulous study of the drug delivery process put us in the patients and medical practitioners’ shoes. Our aim and challenge hence was to design an accurate and cost-effective fixed dose drug delivery device for liquid drugs that comes with an end-of-life mechanism.
The Idea

Safe and Cost-effective dose delivery design

• An innovative cam-drum mechanism in the device, allows the users to set a fixed dose and deliver it accurately every single time.

The ratchet and pawl lever mechanism within the cam drum provides a foolproof dose setting mechanism. If the user sets a wrong dose by mistake and attempts to inject the medication, the cam drum gets locked and prevents delivery of wrong dose.

• A unique end-of-life mechanism prevents the user from re-using the device after the preset number of doses are delivered. After a specified number of doses of medication is dispensed, the thumb pad is locked and cannot be pulled out, which gives the indication to dispose off the dose delivery pen.

The components of the mechanism are engineered and developed using plastic, which helps in maintaining cost advantage over competition, which uses metal components.

• The innovative Fixed-Dose Pen design has been developed by Tata Elxsi’s ‘Innovation Lab’ team, offers convenience to users, and prevents from any intentional or unintentional misuse of devices.

QUICK LOOK

• Cost-effective design
• Innovative cam-drum mechanism
• End-of life in-built to the driving mechanism
• Unique mechanism to arrest wrong dose setting and delivery

SCOPE OF WORK

• Design Research
• Product Design
• Design Engineering
• 3D Prototyping
• The mechanism delivers the drug only if the thumb pad is pulled out to the desired position marked by the red band.

• End of life locking which ensures that the user will not be able to use the device and suggests disposal of the device.

• The pen cannot be reused by resetting the lead screw.

• Step 1: Remove the cap and add a needle.

• Step 2: Pull out the thumb pad.

• Step 3: Inject at the desired location and press the thumb pad to deliver the dose.
Impact

Insight-driven, intuitive, and rich with unique features, this easy-to-use and cost-effective fixed dose drug delivery pen has the potential to shape every facet of drug delivery experience in the future and deliver affordable healthcare globally.