

Adjustable Volume Ureteroscopic Biopsy Instrument

Team 7: Innovative Cobras

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Problem Statement

Current ureteroscopic tissue sampling instruments often do not provide an adequate specimen for pathological diagnosis. Our aim is to design a urothelial biopsy instrument that provides a sufficient volume and quality of specimen that can be retrieved safely and consistently by surgeons.

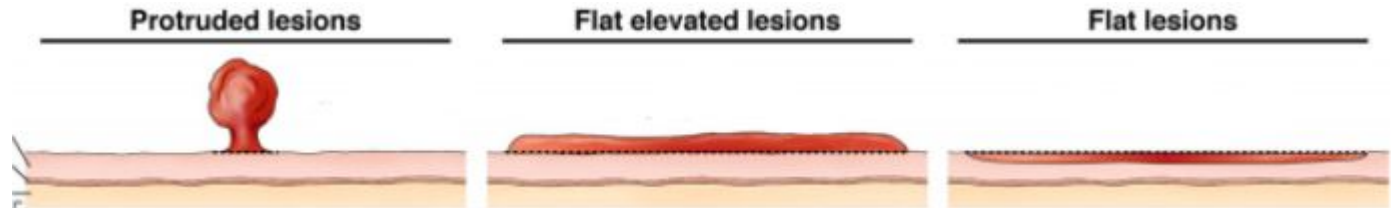
Problem

Outcome

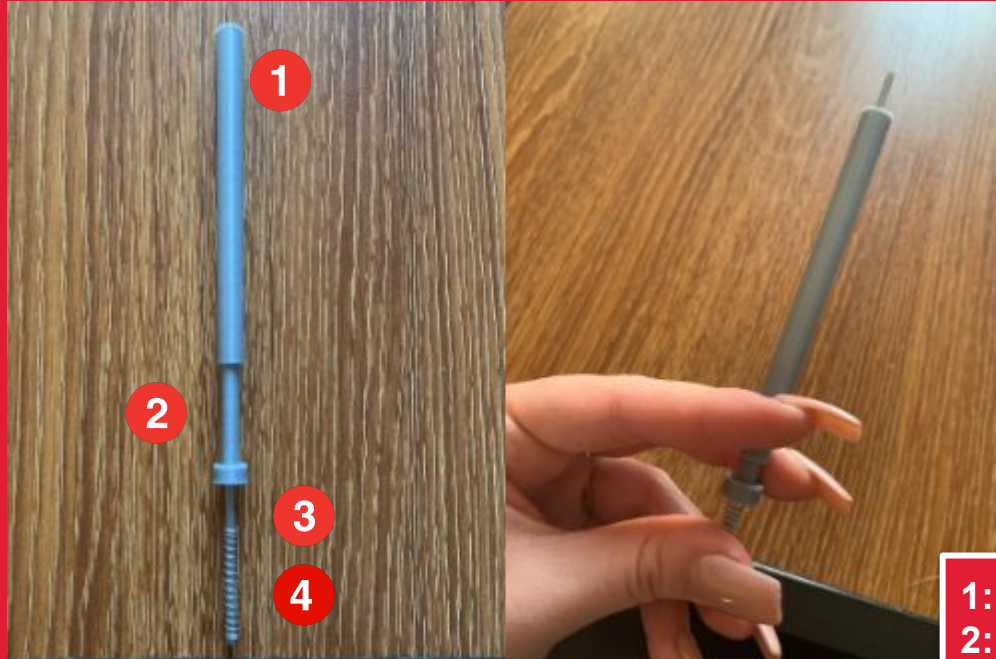
Population

Background

- Biopsies are the most accurate method of diagnosing suspicious lesions in the kidney
- Obtained specimens are often deemed insufficient for analysis which leads to repeated procedures
- Upper urinary tract lesions can have various geometries, but current devices are only ideal for protruding lesions.



First Prototype



- 1: Outer Sheath
- 2: Base
- 3: Inner Part
- 4: Spring

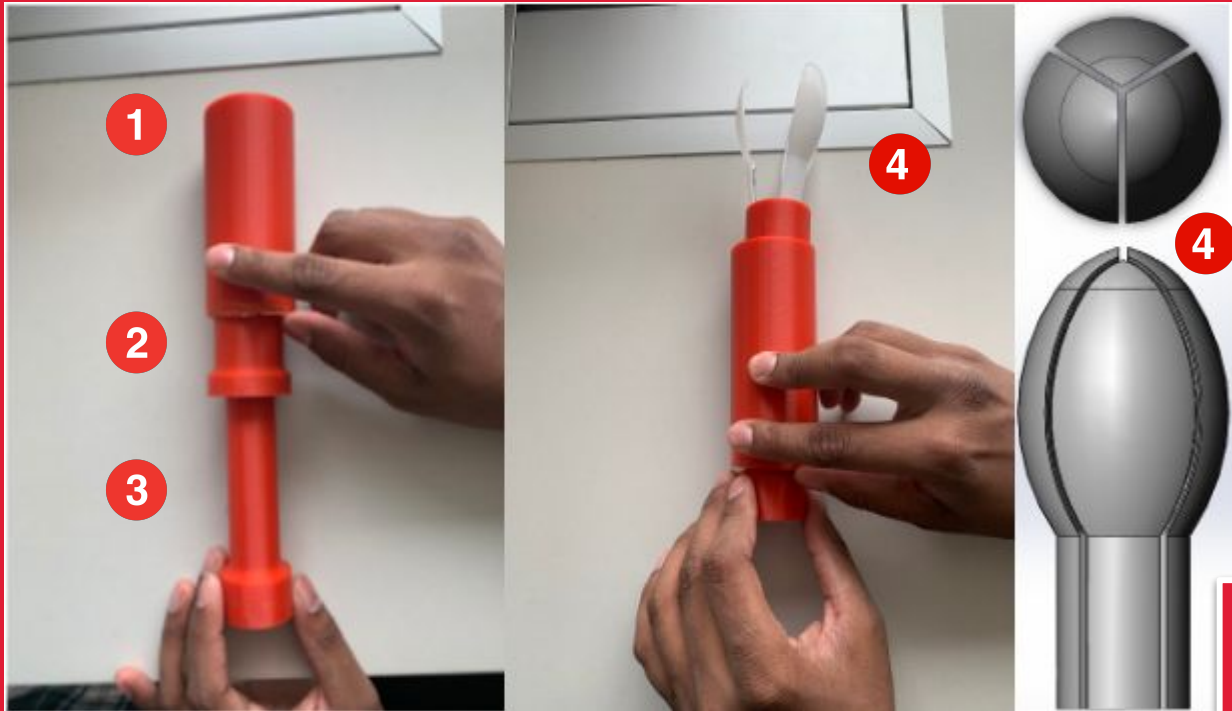


Second Prototype



- 1: Outer Sheath
- 2: Base
- 3: Spring
- 4: Inner Part
- 5: Forceps

Third Prototype



- 1: Outer Sheath
- 2: Base
- 3: Inner Part
- 4: Forceps



Experimental Protocol

Materials

- Jello (Specimen)
- Beakers
- Graduated Cylinders
- Third Prototype
- Scale

Methods

1. A specific mass of jello was first submerged in predetermined volume of water in a graduated cylinder. The mass of jello was divided by the change in volume to determine the density of jello.

Methods cont.

2. After advancing and opening the forceps, the device was positioned in front a container full of jello to completely pierce the jello.

3. The forceps were then slowly closed by the wall of the base as the forceps were pulled back.

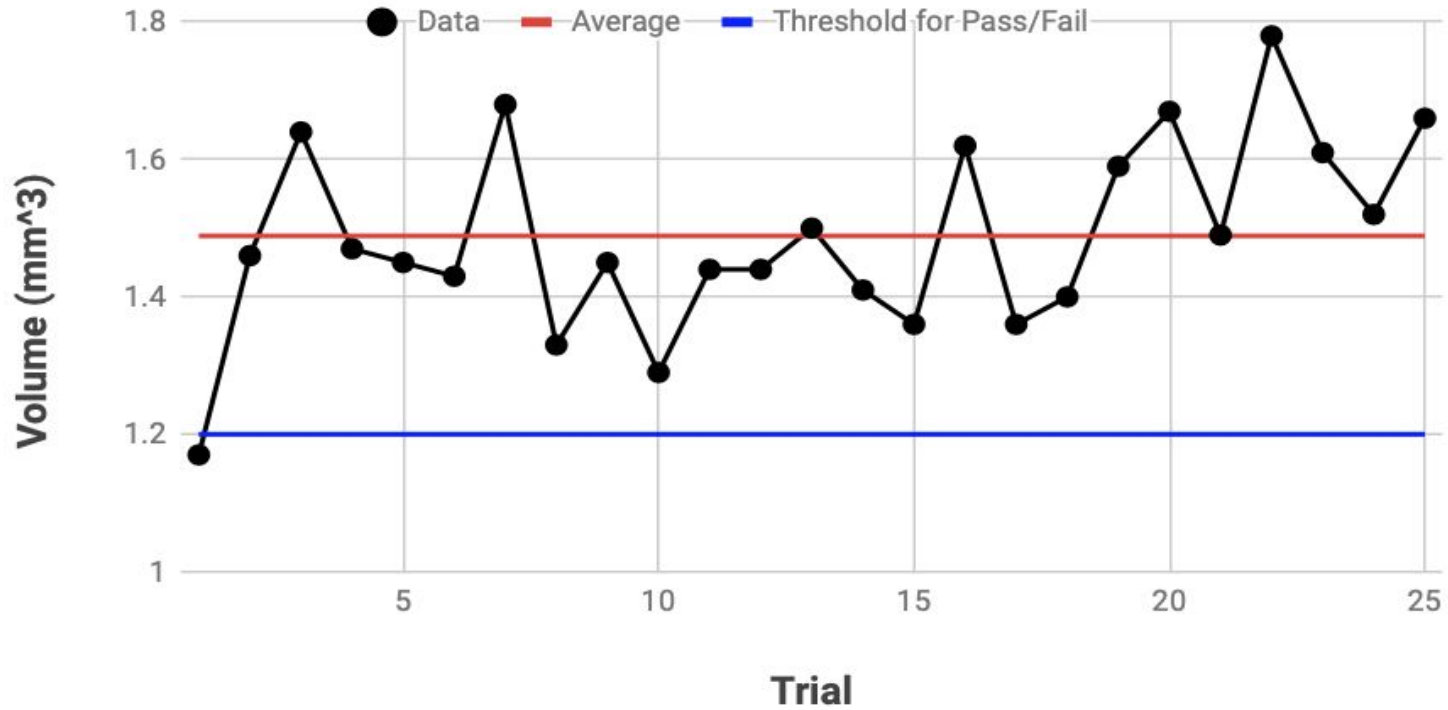
4. The obtained jello was weighed

5. The obtained mass was divided by the density of the jello to calculate the volume of specimen.





Results



Reflection

- Final design
 - Flexible tubing to mimic the actual semi-flexibility
 - Includes safety mechanism
 - Reproducible hinge
- Delivery to sponsor
 - Refine current prototype
- Proposed changes for potential future design
 - Quote was \$350 for forceps at 19x scale
 - Manufacture at the right scale





Ask me a question

Type something....

