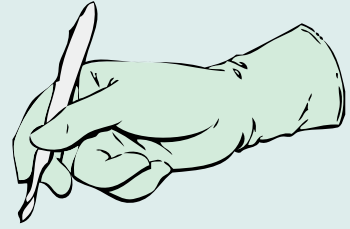


Project Calculus

Our mission is to develop a tool to **reduce** the rate of complications caused by **inaccurate puncturing** during Percutaneous Nephrolithotomy (PCNL) kidney stone removal surgery.

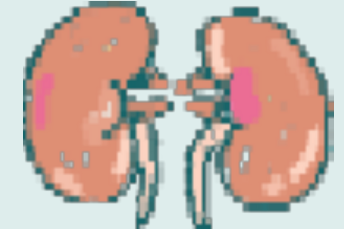
Unmet need



Difficult in planning trajectory of puncture from 2D CT scans.



Severe bleeding requiring transfusion (10%), infection rates and failure to remove stones completely (20%)



Poor visualisation of the kidney, stone and vital surrounding structures

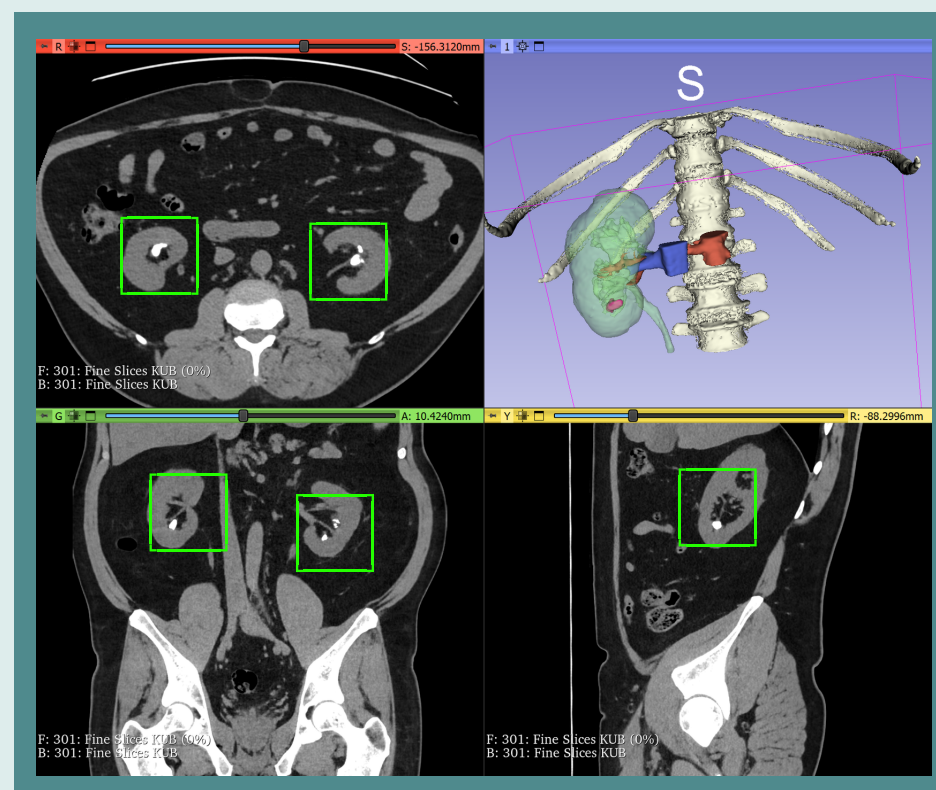
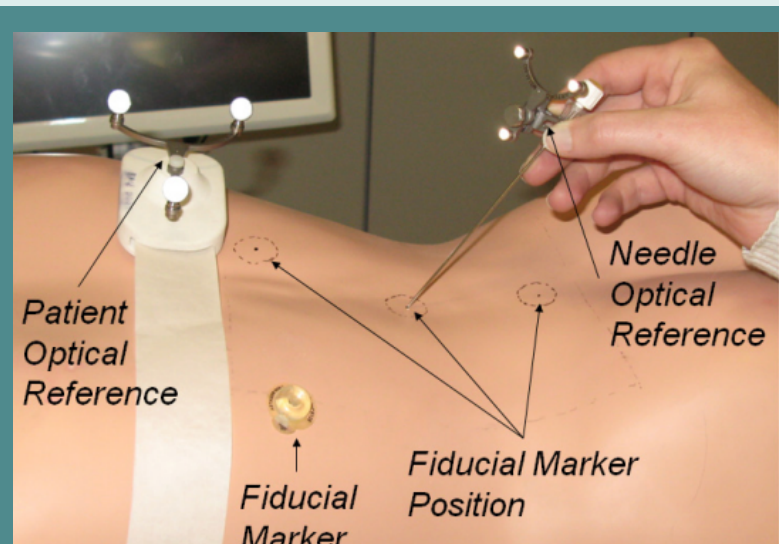
Solution

Stereotactic guidance system

- Puncture alignment assist
- Path planning / needle trajectory
- Reduced operator dependency

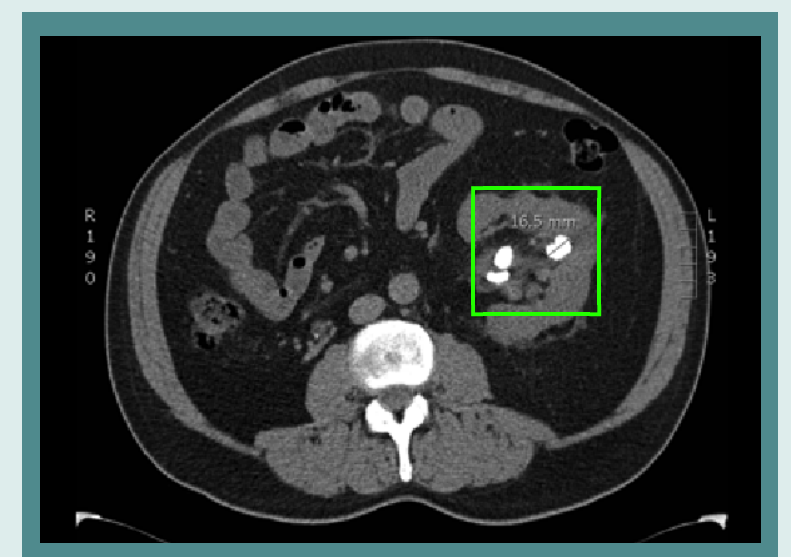
3D visualisation

- Auto-segmentation from CT scans
- Live mapping of puncture trajectory in 3D space



Impact

- User friendly real time 3D navigation of kidney
- Reduce punctures, bleeding, time under anaesthesia and reduced need for further procedures
- Reduced healthcare costs
- Increased surgical confidence



HISS

Apr 2023

Oct 2023

2024

Validated surgical workflow

3D Visualisation model - Auto Segmentation

Surgical planning software - stereotactic guidance

Proof of concept prototype & simulation of prototype with 3D printed phantoms.

Also selecting clinical cases with experienced proctors.

Organisation of Clinical Trials.

ARTG registration and TGA discussions regarding Class IIa medical device.

Current team: Nandini Pandya & Mohaiees Idzhan
Clinical Champion: Dr Jasamine Coles-Black
Affiliations: Monash Health

