

TOWARDS NEXT-GENERATION IMPLANTABLE DEVICES FOR STOMA CARE - FROM DESIGN TO PRECLINICAL VALIDATION

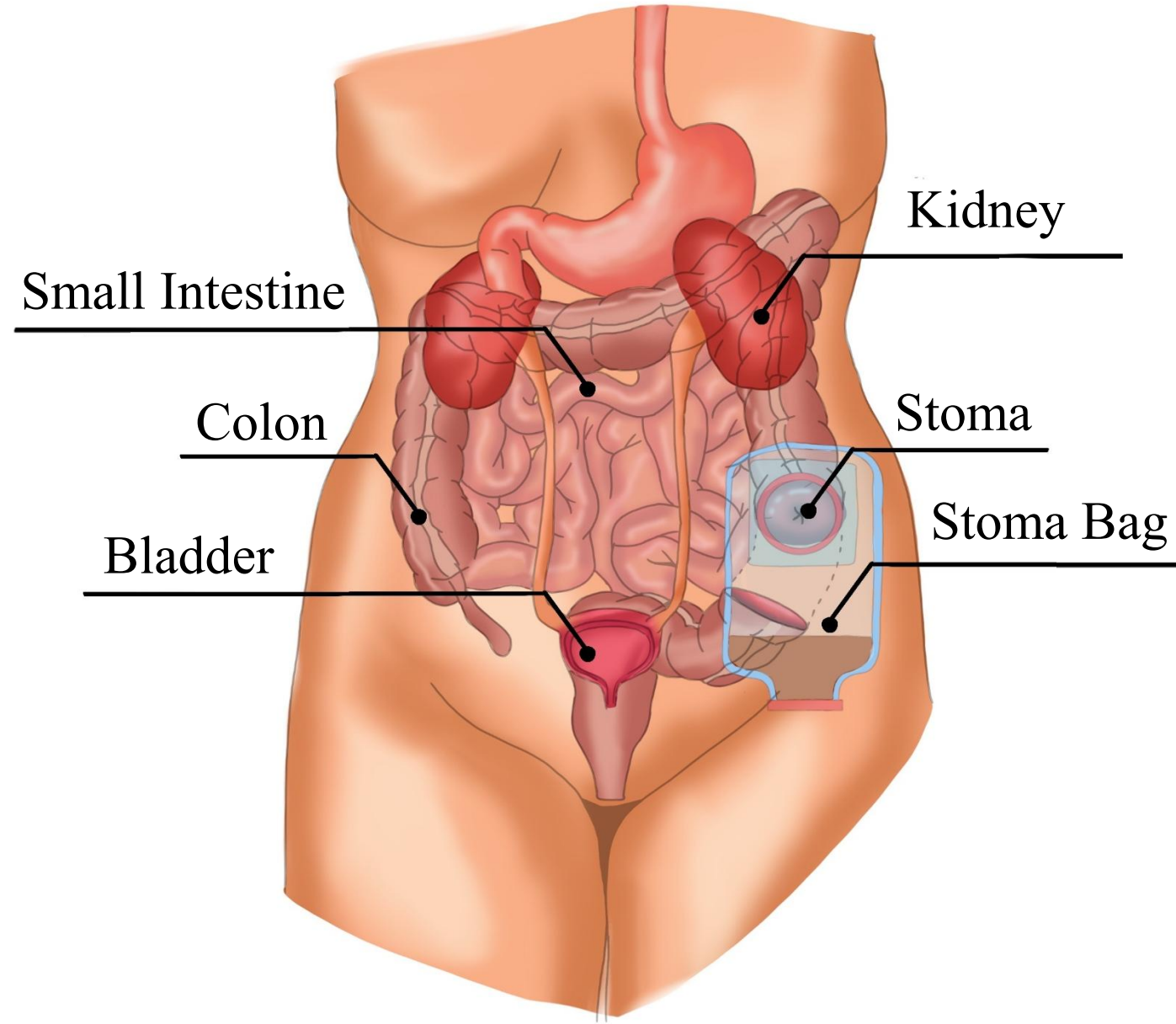
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Background

- **Stoma formation surgery** creates an artificial opening in the abdominal wall to divert faecal or urinary output for patients with colorectal cancer, inflammatory bowel disease, and related conditions¹.
- **As the stoma is not a natural orifice and lacks voluntary sphincter control**, waste is discharged continuously rather than at controlled intervals.
- **Continuous waste output** requires patients to always wear an external appliance to contain and collect faeces or urine.



Population Worldwide ~ 13,000,000 ostomates²

UK spends ~ £400 m/yr on stoma products³

Global spend ~ £3 bn/yr on stoma products⁴

Challenges



Quality of life

Significant deterioration in overall daily living standards and lifestyle adaptability¹



Physical Challenges

Frequent appliance leakage, peristomal skin infection, and irritation¹



Psychological Impact

Reduced self-confidence, altered body image, and increased social isolation¹

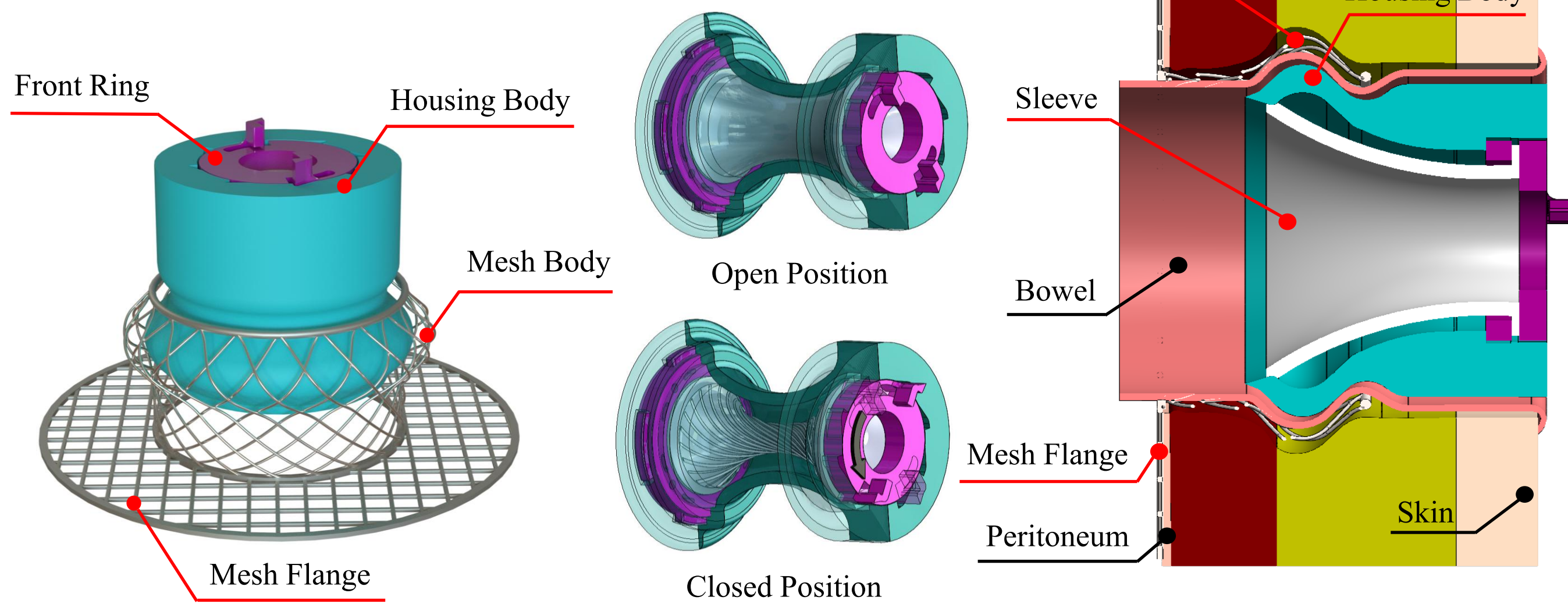


Surgical Challenges

High risk of parastomal hernia formation requiring surgical intervention⁵

Solution

Our approach: An implantable device reducing the use of stoma bag composed of surgically inserted 3D printed Titanium mesh and non-surgically inserted soft valve stoma plug.



Impact

Patients

- ✓ Enabling patients to actively control waste excretion.
- ✓ Reduce the need for continuous stoma bag use and alleviate associated challenges.
- ✓ Personalised stoma implant design using 3D printing for enhanced comfort and function.

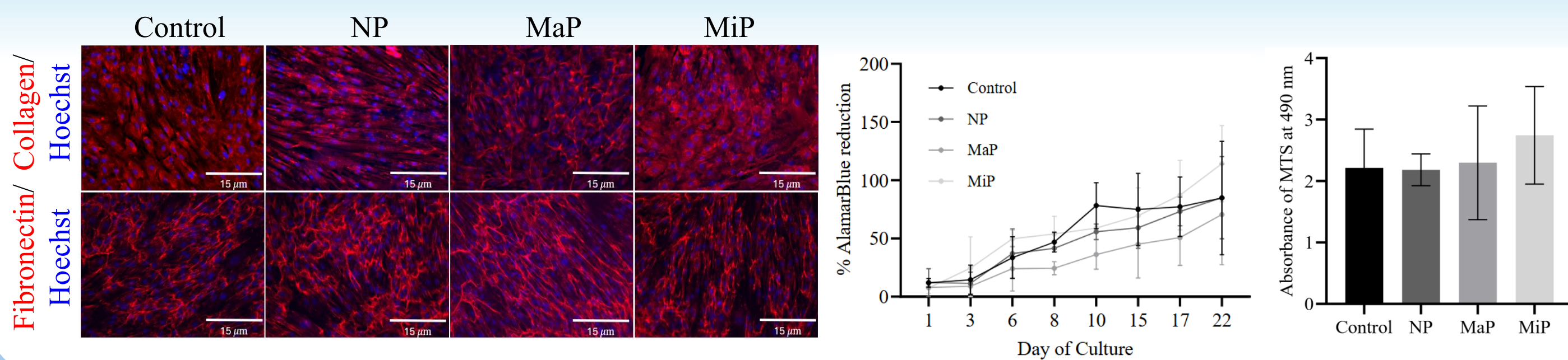
NHS

By **reducing** stoma-related complications and the need for further **surgical interventions**, while **lowering** consumption of stoma accessories, this implant has the potential to significantly **decrease overall healthcare costs**.

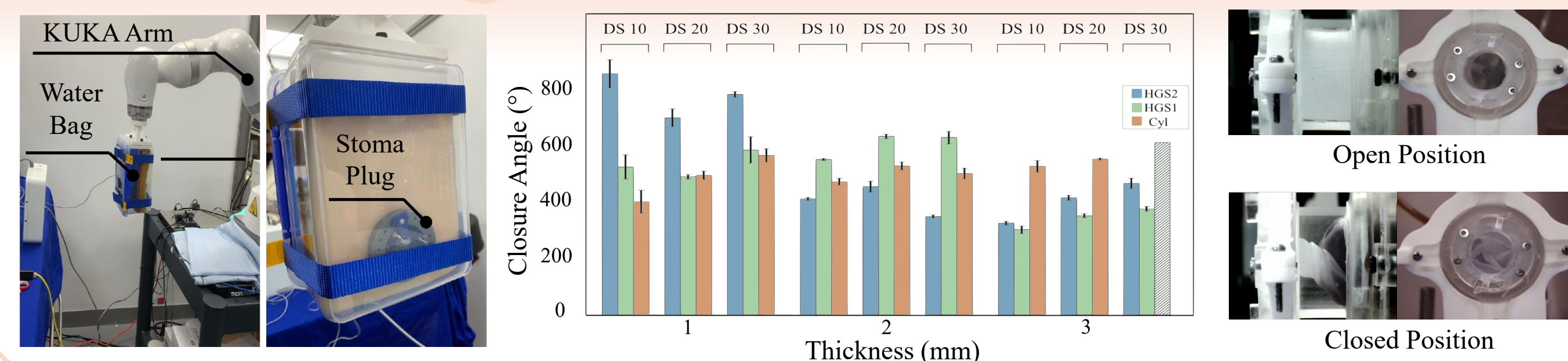
Experimental Validation



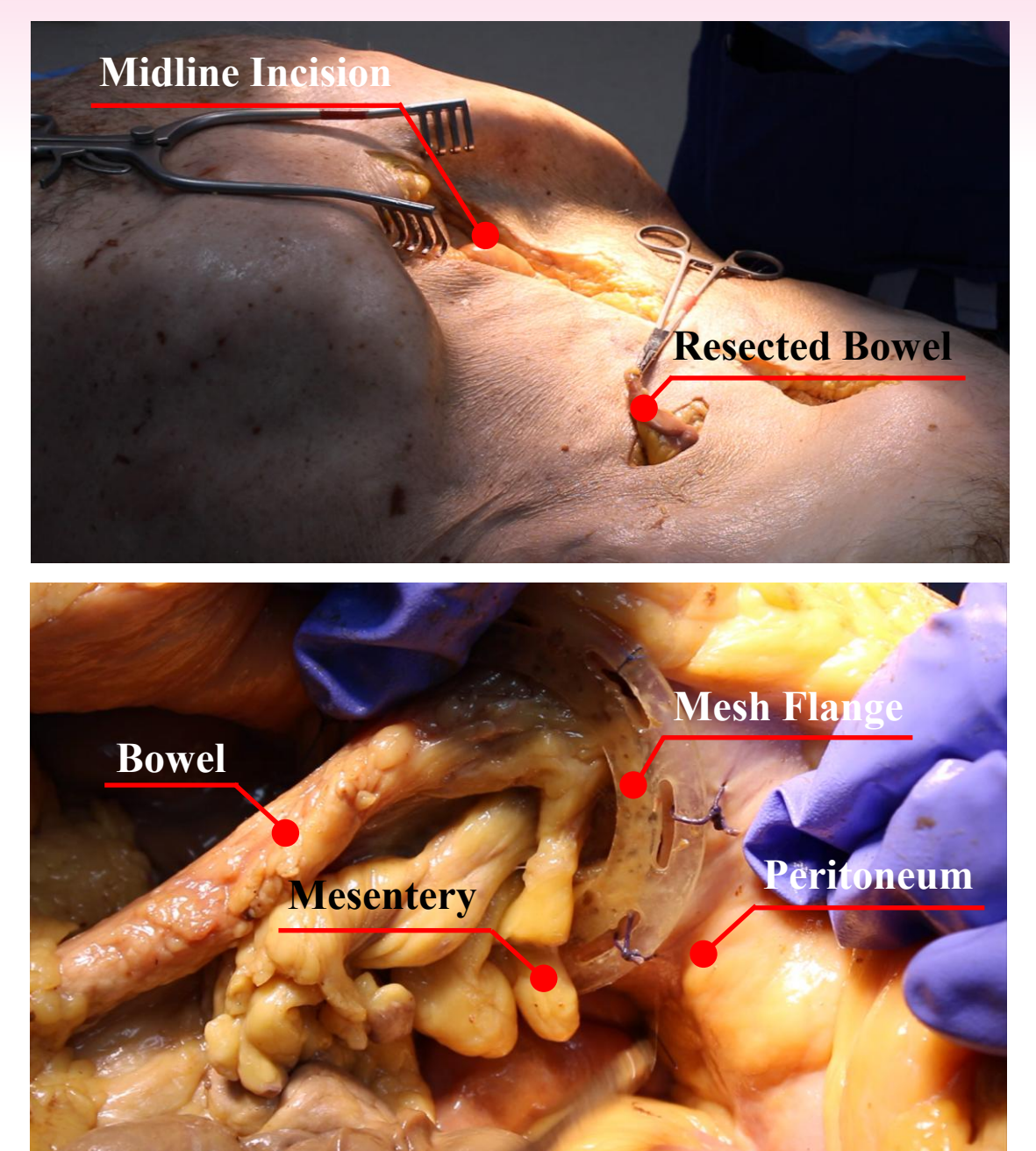
Biocompatibility of Titanium Mesh



Valve Sealing Capability



Surgical Insertion Technique



¹Bowles, T. M., Moses, C. & Perry-Woodford, Z. L. The voice of ostomates: an exploration of stoma care in England. Br. J.Nurs., ²Comfizz (2023) How many people worldwide have an ostomy?, Comfizz Blog, 3 April., ³Kendall, A. (2022) Stoma savings: helping to reduce waste and spend in the NHS, Nursing Times, 28 September. ⁴Markets and Markets (2022) Ostomy care accessories market. January., ⁵Boyles, A. & Hunt, S. Care and management of a stoma: maintaining peristomal skin health. Br. J. Nurs.