3D-Printed Personalized Ostomy Appliance

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Introduction

- Nearly half of ostomies become problematic due to peristomal skin breakdown and pouching difficulties.[A]
- Currently available ostomy appliances have limited personalization to ostomy shape, retraction, and patient contour.
- Patients frequently struggle to cut and shape appliances due to limited dexterity.

Standard of Care

- Current appliances feature one- and two- piece appliances with an adhesive ostomy baseplate and collection system.
- Products differentiate themselves over cost, baseplate contour, adhesive properties, and material longevity.
- Patients typically use a scissors to cut out the stoma opening.



Standard of Care ostomy appliance examples. Hollister (left) and Coloplast (right)

Personalized Ostomy Appliance

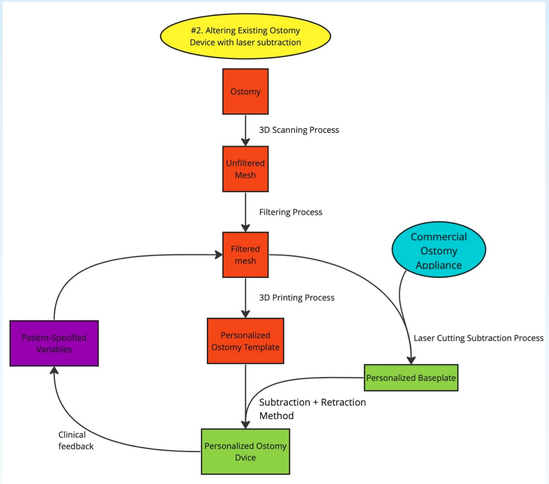


Figure 1: Algorithm for personalized ostomy device using the laser-cutting method to customize an existing ostomy appliance, and then using a personalized template to mold this altered device for a better fit.

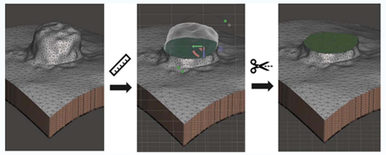


Figure 2: Mesh filtering based upon patient-specific variables.

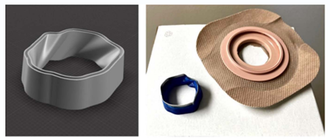


Figure 5: Subtraction ("Cookie Cutter") method. The laser cutting method results in a similar personalized baseplate.

Pipeline

- Targeted patient groups:
  - Difficult to pouch ostomies (e.g., retraction, scarring, peristomal hernia, wound moisture)
  - Limited dexterity and family support
  - Convenience
- Direct-to-consumer service
- Prospective clinical trial comparing standard of care versus personalized ostomy appliance protocol
- Creation of a scoring system to assess satisfaction of ostomy appliance.

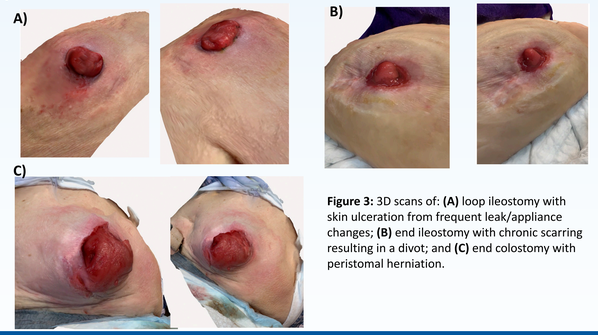


Figure 3: 3D scans of: **(A)** loop ileostomy with skin ulceration from frequent leak/appliance changes; **(B)** end ileostomy with chronic scarring resulting in a divot; and **(C)** end colostomy with peristomal herniation.

Resources

A. Arumugam PJ, Bevan L, Macdonald L, Watkins AJ, Morgan AR, Beynon J, Carr ND. A prospective audit of stomas--analysis of risk factors and complications and their management. Colorectal Dis. 2003 Jan;5(1):49-52. doi: 10.1046/j.1463-1318.2003.00403.x. PMID: 12780927

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