Customizable Skull Prosthesis for Protection Following Craniectomy

Lead Inventor:

Susan C. Pannullo, M.D.
Director, Neurosurgical Radiosurgery and Neuro-oncology, Weill Cornell Brain and Spine Center
Associate Professor of Clinical Neurological Surgery, Neurological Surgery, Weill Cornell Medical College

Business Development Contact:
Donna J. Rounds
Interim Senior Technology Licensing Officer
(646) 962-7044
djr296@cornell.edu
# Customizable Skull Prosthesis for Protection Following Craniectomy

## Background & Unmet Need
- A decompressive craniectomy is a surgery in which a bone flap of the skull is removed to relieve intracranial pressure on the brain.
- Every year, >100 K people in the United States have decompressive craniectomies, primarily as a result of stroke, infection, or traumatic brain injury.
- The procedure to replace the bone flap (cranioplasty) may not occur for several months, leaving the brain unprotected and vulnerable to outside forces.
- To protect the brain from further injury, patients usually wear a helmet, which is heavy and uncomfortable.

**Unmet Need:** A low-cost skull protective device that provides personalized protection, comfort, and cosmetic appeal is needed.

## Technology Overview
- **The Technology:** An external skull prosthesis that offers localized protection of the brain at the surgical site after cranial bone removal.
- The prosthesis is designed to curve around the skull, providing a cranial protection at a specific surgical site.
- This skull protective prosthesis has a precise joint system for size adjustment, and incorporates holes for breathability and future attachment capability.
- **PoC Data:** A prototype of the device was successfully produced using 3D printing and incorporated into multiple cranial attachment systems, including a head wrap, wig, and skull cap.
- Compared to bulky protective devices such as helmets, this technology offers targeted protection that reduces weight, improves patient comfort, and is more aesthetically pleasing.

## Inventors:
- Susan C. Pannullo
- Karli Dale Thornton
- Stacey Kim
- Shwetha Sairam
- Tyler Nicole Webb
- Joseph Miller
- John Cheeseborough

## Patents:
- PCT Application Filed

## Biz Dev Contact:
- Donna Rounds
- (646) 962-7044
- djr296@cornell.edu

## Cornell Reference:
- D-9891
Customizable Skull Prosthesis for Protection Following Craniectomy

<table>
<thead>
<tr>
<th>Technology Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• External skull prosthesis to provide brain protection in individuals following craniectomy</td>
</tr>
<tr>
<td>• Prosthesis for other conditions in which a portion of the skull is weakened or missing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Simple to customize to meet the needs of each patient</td>
</tr>
<tr>
<td>• Aesthetically appealing with various attachment options</td>
</tr>
<tr>
<td>• Excellent breathability and comfort</td>
</tr>
</tbody>
</table>

Supporting Data / Figures

Figure 1: Prototype of the customizable skull prosthesis, demonstrating the interlocking sections and utilizing a wig as an exemplary attachment device.

Inventors:
Susan C. Pannullo  
Karii Dale Thornton  
Stacey Kim  
Shwetha Sairam  
Tyler Nicole Webb  
Joseph Miller  
John Cheeseborough

Patents:
PCT Application Filed

Biz Dev Contact:
Donna Rounds  
(646) 962-7044  
djr296@cornell.edu

Cornell Reference:
D-9891