

Completely Customised Cranial Cap (C4)

Overview

Patients who have severe stroke or a traumatic brain injury may undergo a life-saving operation, called “*decompression craniectomy*”. In this surgery, a portion of the patient’s skull bone has been removed, leaving a bone defect in the skull which offers little protection for the underlying brain.

The medical team will replace the missing skull bone several weeks or months later. During this period, the patient will potentially be at risk of secondary brain injury in case of a fall. As such, patients are usually recommended to wear rigid sports helmets as standard temporary protection. However, both types of helmets are bulky and uncomfortable to wear for long durations due to Singapore’s tropical heat and humidity.

TTSH’s Solution – Completely Customised Cranial Cap (C4)

The completely customised cranial cap (C4) was developed in 2019 to 2020 from a joint collaboration between TTSH Rehabilitation Centre and National Neuroscience Institute's (NNI) Neurosurgery Department. It is individually created using 3D printing design technology and is proven to be a safe and acceptable solution.

Benefits of Using C4

As compared to standard helmets, there are several benefits of using a completely customised cranial cap.

- Custom fitted to the wearer as it is modelled precisely according to their intact skull
- It is light weight (200-250 grams)
- Ventilated material is used over the cap
- Improved comfort



A 3D-printed Completely Customised Cranial Cap

How Is C4 Prescribed

- Before you are prescribed a C4, you will go through strict screening and clearance by your medical team. Including an assessment of your surgical wound healing, CT scans of the brain, and your verbal consent.
- Each C4 takes one to two weeks to print and customise. It will also require fitting and strapping onto your scalp by experienced therapists, followed by a 30-minute observation period.
- You may wear the C4 for as long as you have a skull defect.

Caring for Your C4

Your medical team will provide detailed instructions on the use and care for your C4. Please follow all instructions.



A patient wearing a Cranial Cap

If you have any enquiries, please contact the following hotlines:

6889 4580 (TTSH CART), 6843 5309 (TTSH ICH Ward 9G), 6357 7095 (NNI Clinic)