Researchers:
ASSOC. PROF. DR. DASMAWATI MOHAMAD
Professor Dr. Zainul Ahmad Rajion
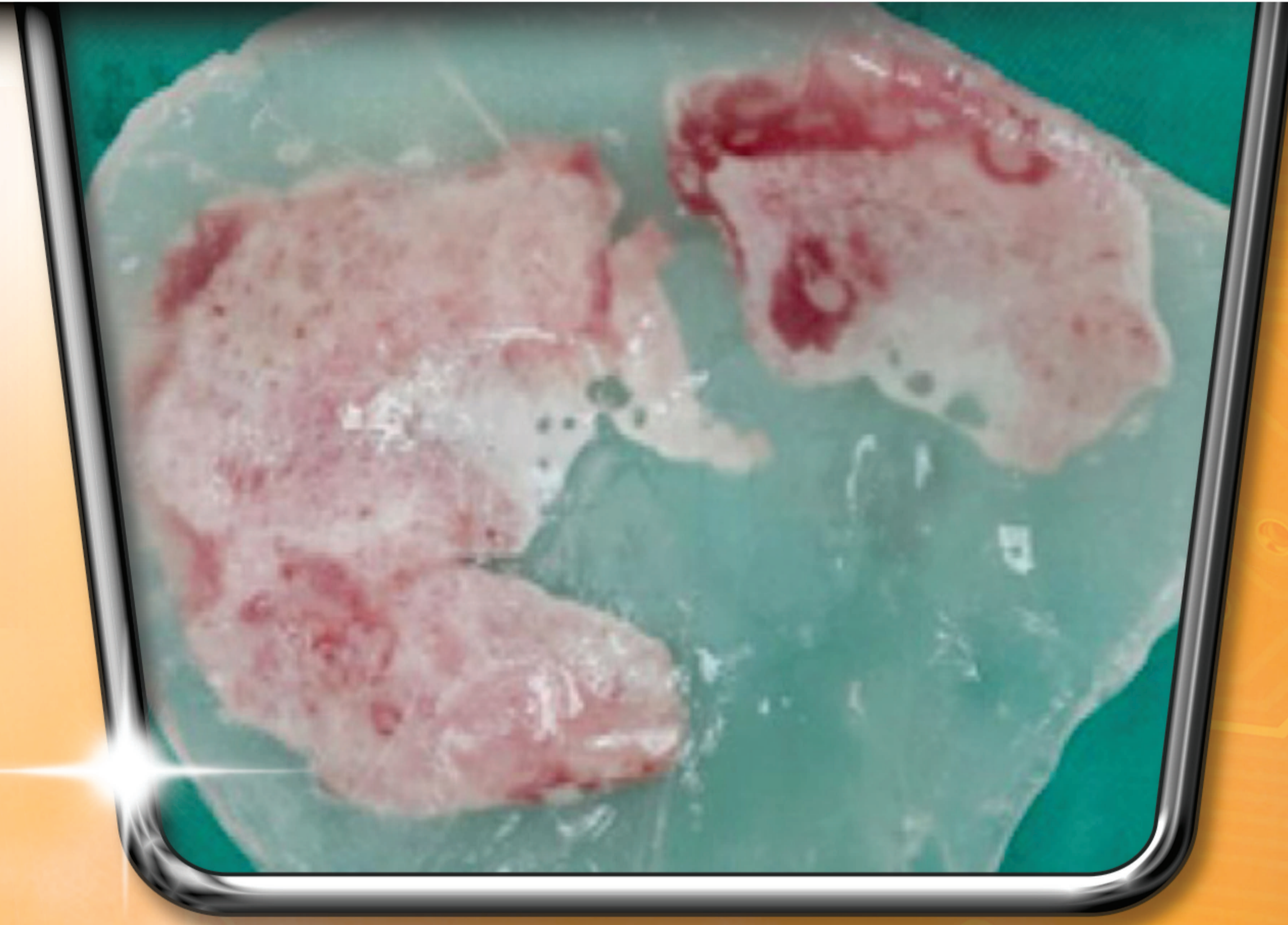Professor Dr. Zamzuri Idris
Dr. Low Peh Hueh
Dr. Johari Yap Abdullah
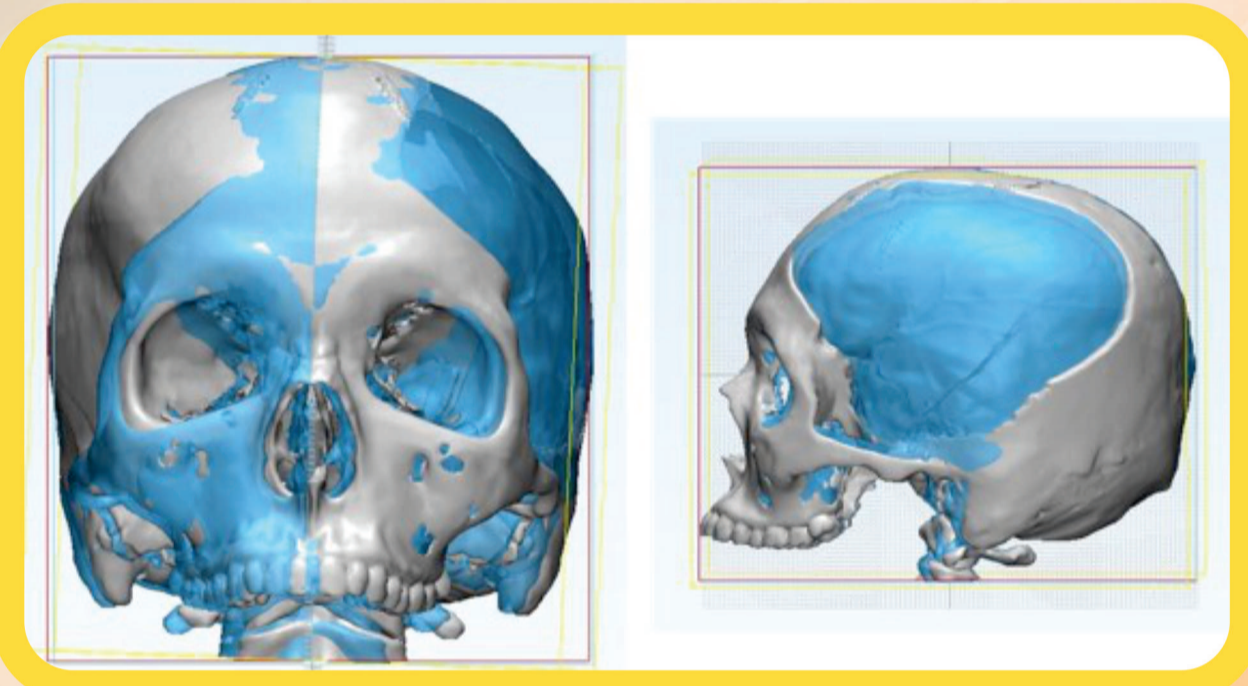Abdul Manaf Abdullah
Suzana Mohd Yahya

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A NOVEL COMPUTER AIDED RECONSTRUCTION IN HYBRID CRANIOPLASTY

Introduction:

This invention developed a patient-specific implant hybrid cranioplasty. Cranioplasty is an elective procedure after recovery of life saving procedure of decompressive craniectomy. This reconstructive surgery of cranioplasty is carried out to protect the underlying brain to help ensure the potential for recovery of the injured brain. Current method of cranioplasty is based on the skills of the surgeon whereby most of the small to medium size defect are was topped up with alloplastic material on a free hand basis intra-operatively, which often resulted in inaccurate implant approximation with unsatisfactory cosmetic result.

Novelty & Inventiveness

- Generating virtual 3D implant by mirror imaging, 3D print and form a mould by using a 3D printed model.
- Placement of defect autologous bone in a mould and added with alloplastic material to form hybrid cranioplasty implant.

Applicability

- Trauma patient with cranial defect
- Reduce operating time
- Aesthetic

Product/Technology Readiness

- TRL 7
- Already applied to 13 patients at HUSM, no significant complication was reported

Research Achievement

- Silver Award ITEX 2019, KLCC
- Publications:
  (a) 3 Scopus, 3 ISI
  (b) MMED Thesis, "Patient - Specific Reconstruction Utilizing Computer Assisted 3d Modelling For Partial Bone Flap Defect In Hybrid Cranioplasty"
  (c) Published in Varsiti Inovasi, Berita Harian, 11th July 2019
- Funded by Research University Grant (RUT 1001/PPSG/852004) and (RUI 1001/PPSG/8012241)
- Talent : 1 Graduated MMed Neurosurgeon, Dr Low Peh Hueh

Intellectual Property

- Copyright: LY2019000404

Industry/Business Partner

- USAINS Holding Sdn Bhd

Commercialization Potential

- Road casualties statistics in Malaysia every year is about 400,000 cases (MIROS, 2012) where many of the survivors have to go for craniectomy
- 10 cases/month (HUSM alone)
- All hospitals included general and private hospitals

Level of Impact

- Computer assisted modelling lead to high dimensional accuracy resulting in to an aesthetical implant
- Reduce rejection and donor site morbidity by using patient's own bone (autologous)
- Patient regain self confidence
- Affordable

Presentation and Other Strength

- Poster Presentation:
  (a) APASTB 2018 in Conjunction with 3rd Regional Biomaterials Scientific Meeting (RBSM), Bangi-Putrajaya Hotel, Selangor, 27-30 August 2018
  (b) European Association of Neurosurgeon Society (EANS) 2017 Congress, Venice Congress Centre, Venice, Italy, 1-5 October 2017

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