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G. Zambon, D. Nuzzi, A. Segna

OSTEOINTEGRATION OF POROUS HYDROXYAPATITE CERAMIC IMPLANT FOR PEDIATRIC CRANIOPLASTY: A PEDIATRIC CASE REPORT WITH 12 YEARS OF FOLLOW-UP

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Aims: The use of porous hydroxyapatite ceramic implant for the treatment of skull defects facilitates osteoblast migration and therefore optimizes osteointegration with the host bone. The purpose of this study is to report a single paediatric patient experience to demonstrate evidence of bone/biomaterial osteointegration using bone densitometry detected by CT scan over 12 years of follow-up period.

Materials and methods: The case of a patient who underwent cranioplasty with a porous hydroxyapatite implant in 2011 and underwent follow-up for 12 years was retrospectively reviewed. Bone density was measured in Hounsfield units and osteointegration was calculated using Mimics Software® (Mimics Innovation Suite v. 17.0 Medical, Materialise, Leuven, Belgium).

Results: Results were evaluated over a 12-year period, the patient showed 99-100% osteointegration. Average bone density was 2092 Hounsfield units (standard deviation 1324-2860). Only bone density is estimated to have a Hounsfield value between 400 and 2000 Hounsfield units depending on the body region and the bone quality. From a safety point of view, no intraoperative complications or postoperative adverse events were recorded during 12-year follow-up from the time of reconstructive surgery. Despite the patient's repeated traumas due to epileptic pathology and convulsion episodes, the prosthesis remained intact and did not show any fractures. The post-operative aesthetic result was judged subjectively excellent by the patient, parents and surgeon.

Conclusions: Hydroxyapatite ceramic implants for cranioplasty in paediatric patients are a good choice for children also under 7 years of age and primary porous hydroxyapatite ceramic implantation can be considered even in patients with severe comorbidities. The systems prove to be excellent osteointegration (already at 90% after 1 year of follow-up from the time of surgery) and aesthetic results.

Keywords paper: Cranioplasty, Densitometry, Pediatric, Hydroxyapatite, Implant, Osteointegration.