A large calvarial bone defect in a child: osteointegration of an implant

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Object

This report describes for the first time the ossification of a large calvarial bone defect in a child by a bioactive, biostable non-metallic implant. The resorption of cryopreserved bone affects up to 50 % of patients and 22-50 % need a reoperation. As the risk of bone resorption seems to be strongly related to younger age, it has been suggested to consider using primary cranioplasties with a synthetic material with osteoconductive and osteoinductive properties.

Methods

A case study of a young child with an infantile fibrosarcoma of occipital bone. The malignancy of occipital bone was removed from a child of 2.5 years of age, and the defect site was reconstructed with an on-lay glass fibre-reinforced composite – bioactive glass (FRC – BG) implant (Figure 1). This procedure was part of a clinical study on FRC – BG implants (NCT01202838 and NCT01874613).

Results

After 5 years and 7 months, the follow-up examination showed no signs of recidive. Computed tomography demonstrated considerably large areas (approximately 70 % of the total area) of bone on-growth to the peridural surface of the implant (Figure 2). During the follow-up period, the contour of the reconstructed area followed skull anatomical development (Figure 3).

Conclusion

In the future, a synthetic cranioplasty material that is capable to integrate with cranial bone may be considered superior to cryopreserved bone grafts in younger age groups.