Bone flap resorption

Bone flap resorption is one of the most frequent complications associated with autologous bone flap cranioplasty after decompressive craniectomy ¹⁾.

Bone resorption continued to occur beyond 12 months after autologous cranioplasty; use of primary titanium cranioplasty after decompressive craniectomy reduced the number of reoperations needed and the associated long-term total hospital costs².

In a resource-limited situation, when bone flaps placed in the abdomen undergo demineralisation and sutures are used to fix the flap as opposed to plates, where artificial cranial flap substitutes are prohibitively expensive and frequent postoperative imaging may not be feasible, prevention and management of this complication will continue to remain a problem ³⁾.

Aseptic bone resorption or aseptic bone necrosis of reimplanted autologous bone flaps occurred more frequently in the series of patients than in most reports in the literature. Most cases were identified between 6 and 12 months postoperatively. Clinical observation or CT scans of patients with autologous bone flaps are recommended for at least 12 months. Patient-specific implants may be preferable to autologous bone flaps ⁴.

Cranial vault frozen allografts are a good alternative to autologous bone when the latter is absent or not present in sufficient amount ⁵⁾.

Bone flaps removed during decompressive craniectomy are commonly frozen at -80 °C and stored until cranioplasty. Histological integrity and regenerative capacity have been shown for cryoconserved bone. The effects of cryoconservation on the surface structure are unknown, although these might cause mechanical instability or facilitate bacterial adhesion. This study evaluates the surface structure of cryoconserved bone by scanning electron microscopy. Five patients were identified who could not receive their autologous bone flaps after decompressive craniectomy. These redundant bone specimens were obtained after cryoconservation for 6-8 months and the outer surface was analyzed by scanning electron microscopy. We found varying surface structures which did not correlate with any variables, such as patient age, gender or duration of freezing, and probably reflect physiological interindividual variation. Pathological findings, such as microscopic crack formation, were not observed. Cryoconservation for up to 8 months does not appear to alter the surface structure of skull bone on scanning electronic microscopy.⁶⁾.

Case series

Bone flap resorption case series.

1)

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3)

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Beez T, Sabel M, Ahmadi SA, Beseoglu K, Steiger HJ, Sabel M. Scanning electron microscopic surface analysis of cryoconserved skull bone after decompressive craniectomy. Cell Tissue Bank. 2014 Mar;15(1):85-8. doi: 10.1007/s10561-013-9378-9. Epub 2013 May 15. PubMed PMID: 23673469.

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