Healing of rabbit calvarial critical-sized defects using autogenous bone grafts and fibrin glue.

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Abstract:

Purpose: This study aimed to evaluate ossification of cranial bone defects comparing the healing of a single piece of autogenous calvarial bone representing a bone flap as in cranioplasty compared to particulated bone slurry with and without fibrin glue to represent bone collected during cranioplasty. These defect-filling materials were then compared to empty control cranial defectsMethods: Ten White New Zealand adult male rabbits had bilateral critical-sized calvarial defects which were left either unfilled as control defects or filled with a single full-thickness piece of autogenous bone, particulated bone, or particulated bone combined with fibrin glue. The defects were left to heal for 6 weeks postoperatively before termination. CT scans of the calvarial specimens were performed. Histomorphometric assessment of hematoxylin-eosin- and Masson trichrome-stained specimens was used to analyze the proportion of new bone and fibrous tissue in the calvarial defectsResults: There was a statistically significant difference in both bone and soft tissue present in all the autogenous bone-grafted defect sites compared to the empty negative control defects. These findings were supported by CT scan findings. While fibrin glue combined with the particulated bone seemed to delay ossification, the healing was more complete compared to empty control non-grafted defectsConclusions: Autogenous bone grafts in various forms such as solid bone flaps or particulated bone treated with fibrin glue were associated with bone healing which was superior to the empty control defects.