

**Bone marrow seeded bone graft versus bone graft; compact bone critical sized defect healing pattern in rabbit.**

ABSTRACT

The main aim of the present study was to investigate the effect of combination of bone marrow as the primary origin of osteoblast and at the same time as the seed cell and corticocancellous bone graft as the natural scaffold in repair of compact bone full thickness segmental critical sized defect in rabbits. Twelve rabbits had been divided into two groups; In Group one, fresh autogenous bone marrow aspirate has been seeded into the scaffold of autogenous corticocancellous bone graft which was utilized to repair critical size compact bone defect in mid shaft of radius. Corticocancellous bone graft alone was used as the Group 2 or control group. Up to 8 weeks, radiographs were taken to evaluate the level of osteogenicity in both groups. Rabbits were euthanized on week eight postoperative and the implants were harvested for gross, histological and scanning electron microscope observations. New bone formation and osteogenesis was observed at the margins and centre of the Group 1. Combination of mature and immature trabeculae covered the defect and bone formation pattern included osteogenesis, osteoinduction and osteoconduction. In the implant of corticocancellous bone graft alone or group 2, the major new bone formation was at the margins of the defect and osteogenesis was not observed at the centre of the defect and the major bone formation pattern was creeping substitution. As the conclusion, combination of bone marrow and corticocancellous bone graft had better results than corticocancellous bone graft alone in osteogenesis potential. Bone formation capability and critical sized defect repair was faster and more efficient and successful in Group 2 defect.

**Keyword:** Bone graft; Bone marrow; Bone tissue engineering; Critical size defect; Mesenchymal stem cell; Rabbit.