



Role of Mesenchymal Stem Cells Densities When Injected as Suspension in Joints with Osteochondral Defects

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Abstract:

Objective. The aim of this study was to evaluate an intraarticular injection of different doses of autologous mesenchymal stem cells (MSCs) for improving repair of midterm osteochondral defect. **Design.** At 4 weeks postoperative marrow stimulation model bilaterally (3 mm diameter; 4 mm depth) in the medial femoral condyle, autologous MSCs were injected into knee joint. Twenty-four Japanese rabbits aged 6 months were divided randomly into 4 groups (n = 6 per group): the control group and and MSC groups including 0.125, 1.25, and 6.25 million MSCs. Repaired tissue was assessed macroscopically and histologically at 4 and 12 weeks after intraarticular injection of MSCs. **Results.** At 12 weeks, there was no repair tissue in the control group. The gross appearance of the 1.25 and 6.25 million MSC groups revealed complete repair of the defect with white to pink tissue at 12 weeks. An osteochondral repair was histologically significantly better in the 1.25 and 6.25 million MSC groups than in the control and 0.125 million MSC groups at 4 and 12 weeks, due to presence of hyaline-like tissue in the deep layer at 4 weeks, and at 12 weeks hyaline cartilage formation at the periphery and fibrous tissue containing some chondrocytes in the deep layer of the center of the defect. Subchondral bone was restructured in the 1.25 and 6.25 million MSC groups, although it did not resemble the normal bone. **Conclusion.** An intraarticular injection of 1.25 or 6.25 million MSCs could promote the repair of subchondral bone, even in the case of midterm osteochondral defect.

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