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RETENTION RATE OF PERIOSTEAL FLAPS IN AN EXPERIMENTAL RABBIT MODEL

Stig Heir[1,3,5], Asbjørn Årøen[1,3,4], Sverre Løken[1,3,6], Finn P Reinholt[2], Lars Engebretsen[3,6]

[1]Institute of Surgical Research, Rikshospitalet University Hospital, Oslo, Norway
[2]Department and Institute of Pathology, Rikshospitalet University Hospital, Oslo, Norway
[3]Oslo Sports Trauma Research Center, Norwegian University of Sport & Physical Education, Oslo, Norway
[4]Akershus University Hospital, Lørenskog, Norway. [5]Martina Hansen Hospital, Bærum, Norway.
[6]Ullevål University Hospital, Oslo, Norway

Purpose of the study: Periosteal flaps are frequently used in repair procedures of articular cartilage defects. Repair tissue hypertrophy, assumingly derived from the periosteum, is a clinical problem, however not reported in experimental studies. Too vigerous mobilization of the experimental animals, presumably causing flap detachment, might be an explanation for that. The objective of this experimental study was to investigate the retention rate of periosteal flaps, in respect to various postoperative mobilization and the introduction of bone marrow elements underneath the periosteal flap.
Material and methods: A chondral lesion in both patella of 18 New Zealand rabbits was established. The subchondral bone was left undamaged in one knee, in the other it was perforated allowing bone marrow elements to enter the defect. All defects were covered with a periosteal flap, sutured and glued to the rim of the cartilage defect. The rabbits were kept in cages for 4 days and then exposed to different degrees of mobilization. Sacrifaction was performed at day 4 or 14.
Results: Sixteen of 23 periosteal flaps detached within two weeks, with no difference in the retention rate in respect to mobilization regime or established access to bone marrow elements in the defect. The periosteum still served as a cover of the defect in 10 out of 12 knees at day 4 (retention rate 83 %), decreasing to 7 out of 23 knees at day 14 (retention rate 34 %).
Conclusions: Our study is the first to document the retention rate of periosteal flaps in a rabbit model. The low retention rate observed might explain why periosteal hypertrophy is not reported in experimental studies on cartilage repair using periosteal graft.