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Xenogeneic Cartilage Scaffold as a Promising Alternative for Full-thickness Cartilage Defect Treatment: A Prospective Pilot Study on Clinical Outcome of Novel Bovine Cartilage Scaffold

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All authors have none to disclose



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BACKGROUND

A full-thickness knee cartilage defect requires osteoconductive properties of scaffold to improve healing. The availability and affordability of scaffolds may hinder the treatment option in some countries. A novel and more affordable cartilage scaffold of xenogeneic origin might provide an opportunity of feasibility to fill the defect.

PURPOSE

To investigate the short-term clinical outcomes of full-thickness knee cartilage defect treated with a bovine-origin cartilage scaffold after a routine microfracture procedure.



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METHODS

- Patients with full-thickness cartilage defect who underwent microfracture and implantation of bovine cartilage scaffold were followed prospectively for at least 18 months.
- Clinical outcomes were examined with patient-reported scoring instruments that consisted of the Tegner Activity Scale, International Knee Documentation Committee (IKDC) subjective score, visual analog scale, and Knee injury and Osteoarthritis Outcome Score (KOOS).
- Pre- and postoperative scores were compared and analyzed. The association between patient age, body mass index, lesion size, or the number of treated lesions with outcome scores was evaluated.

STUDY DESIGN: Prospective case series, Level of evidence 4





RESULTS

Twelve patients with a mean age of 42.5 years were evaluated prospectively for a mean of 20 months (range 19-26 months). Cartilage lesion size was recorded (median, 7.2 cm²; range, 2.4-30.2 cm²).

At the final follow-up, median Tegner, visual analog scale, and IKDC subjective scores were 4, 0.4, and 86, respectively. The KOOS subset scores at the final follow-up were as follows: Pain, 95; Symptoms, 88; Activities of Daily Living, 98; Sports/Recreation, 87; and Quality of Life, 87. At the final follow-up, all scores were significantly increased ($P < .001$).

The rank correlation analysis showed a negative correlation between age and outcome scores of the Tegner, IKDC, and KOOS subsets of Pain, Activities of Daily Living, and Sports/Recreation. Associations between lesion size, body mass index, number of lesions, and outcome scores were not identified.





DISCUSSION AND CONCLUSION

- A scaffold is essential to fill cartilage defect for healing.
- The ideal scaffold must be biocompatible, biodegradable, nontoxic, widely available, and affordable.
- Implantation of the novel bovine cartilage scaffold in full-thickness cartilage defect offers good to excellent clinical outcomes at short-term follow-up.
- This pilot study sparks the hope for more affordable treatment options for full-thickness cartilage defects.

Keywords: cartilage scaffold, chondral injury, biologic, tissue engineering

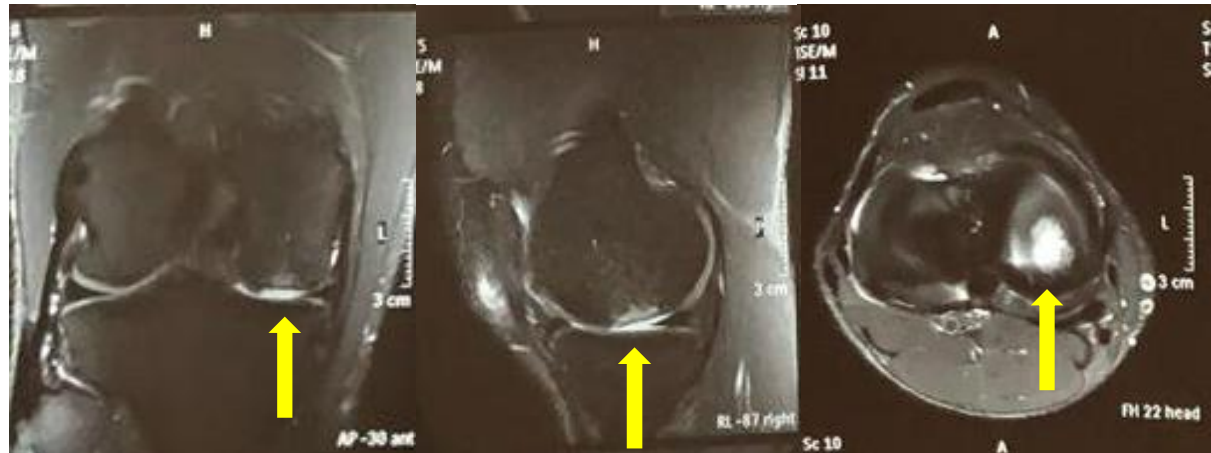


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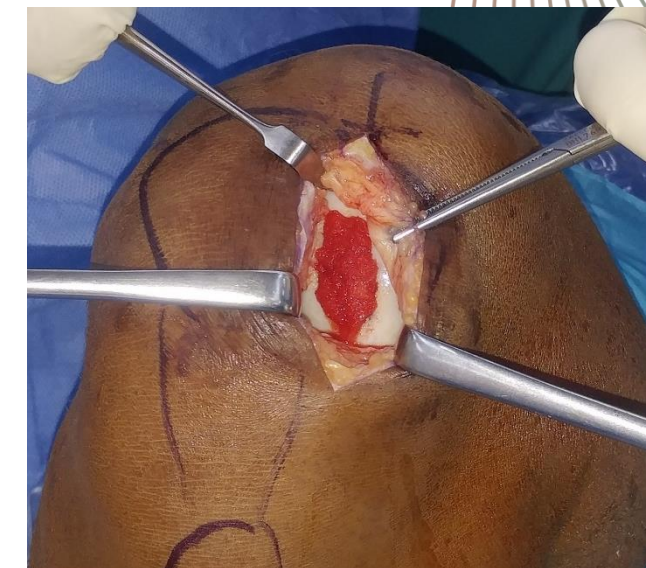
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Male, 29-year-old, professional football player.
MRI showed large a osteochondral defect



Bovine cartilage scaffold



Implanted scaffold at the defect site



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