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Histological and Viability Evaluation of Chondral Flaps of Patients with Cam Type FAI

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Summary:
Chondral flaps from patients with CAM FAI remain viable. However, the tissue suffers constant degeneration. Removal of the flap followed by a restorative cartilage technique may be the best treatment option for this pathology

Abstract:
INTRODUCTION
Chondrolabral damage is commonly observed in patients with CAM type FAI. Most surgeons debride the flap and subsequently micro-fracture the exposed bone left underneath. Arthroscopic repair of this delaminated articular cartilage has been suggested as a possible treatment. However, this flap may experience degeneration and necrosis secondary to sheer forces generated by constant impingement.

PURPOSE
Evaluate the viability and tissue characteristics of chondral flaps obtained from patients with FAI CAM type.

MATERIALS & METHODS
Included were eight male patients with a mean age of 30 (±5) who underwent hip arthroscopy secondary to CAM type FAI who presented with a chondral flap. During arthroscopy the chondral flap was removed with subsequent evaluation in the lab. In addition, a control cartilage biopsy was obtained from normal articular cartilage from the fovea. Viability of the samples using live-dead test was performed using Calcein AM and ehthidium bromide homdimer-1 (Molecular Probes, Eugene, OR). Percent of live cells was performed manually counted as the number of live cells divided by the total number of cells (lived and dead) multiplied by 100%. Histological analysis was performed with Safranin- O stained sections and graded using the modified Mankin scoring system. Independent samples t-test to evaluate differences between control and study samples was performed.

RESULTS
The flap cartilage showed less viable cells compared to the control cartilage (55% viable cells compared to 95% in the control cartilage). This was not significant ($p>0.05$). However, when analyzing the tissue quality, samples from the study group showed a degenerative tissue that was mostly composed of fibrous tissue compared to normal articular cartilage from control tissue (Mankin 13 (±2) in study group vs Mankin 0.66 (±1.5) in control ($p<0.05$)).

CONCLUSION
Chondral flaps from patients with CAM FAI remain viable. However, the tissue suffers constant degeneration. Removal of the flap followed by a restorative cartilage technique may be the best treatment option for this pathology.