**Introduction:** Periosteal autologous chondrocyte implantation (ACI-P) was the first technique to highlight the therapeutic potential of autologous cell therapy in cartilage resurfacing. However, the use of a periosteum patch has been noted to have postoperative complications in the literature [3]. Accordingly, matrix-induced autologous chondrocyte implantation (MACI) has applied the concept of direct cell inoculation onto a collagen scaffold for implantation. In 2003, Cherubino published improved clinical outcomes, no complications, and MRI-visualized hyaline-like repair following MACI in a small patient cohort (2). Moreover, in comparison to conventional surgical treatment, Basad has reported MACI to show a significantly better functional outcome (Lysholm-Gillquist) compared to microfracture at 24 months [1]. However, recent research suggests that the lack of measurement standardization across these studies, makes reliable large scale multi-centre cohort analysis extremely difficult.

We have conducted both a prospective single-surgeon cohort study and a retrospective multi-centre satisfaction survey of over 200 patients treated with MACI for chondral injury to the knee.

**Materials and Methods:** Prospective Study

A consecutive series of 31 implantations were performed in 28 patients (18 male; 10 female) at a minimum of 24 months. The mean age at assessment of the clinical outcomes of MACI for focal chondral defects of the knee was 36.5 years (range: 13–60 years) and mean BMI was 25.9 (range: 17.2–33.9). Clinical assessment by the Six-Minute Walk Distance Test, and the self-administered Knee Injury and Osteoarthritis Outcome Score (KOOS) was conducted preoperatively, and at 3, 6, 12, and 24 postoperatively. MRI scans were conducted at 3, 12 and 24 months postoperatively using a previously established cartilage imaging sequence protocol and scoring system. The relationship between MRI and functional outcome was also calculated. Graft failure was assessed postoperatively, both clinically and radiographically.

**Retrospective Study**

The original patient group (n=240) was narrowed to 202 patients for the survey based on medical records. A mean age of the surveyed cohort was 36.9±10.7 (range 14–77) years, male:female sex ratio 114:88, and mean time from MACI to survey of 22.7±8.61 (range 12–49). Patients were included in the survey if they were 12 months or greater postoperatively following MACI. Patient exclusion was based on significant reoperation (realignment osteotomy etc) of the joint following MACI, cognitive impairment, or if they were not contactable. The questionnaire was comprised of ten questions, based mainly on pain and symptom relief, functional restoration of the joint, quality of life, and patient satisfaction with MACI. Raw answers to the questionnaire were also converted to a line-like repair following MACI in a small patient cohort (2). Moreover, in comparison to conventional surgical treatment, Basad has reported MACI to show a significantly better functional outcome (Lysholm-Gillquist) compared to microfracture at 24 months [1]. However, recent research suggests that the lack of measurement standardization across these studies, makes reliable large scale multi-centre cohort analysis extremely difficult.

We have conducted both a prospective single-surgeon cohort study and a retrospective multi-centre satisfaction survey of over 200 patients treated with MACI for chondral injury to the knee.

**Discussion:** The MACI technique addresses the periosteal problems of traditional ACI, and shows comparable outcomes clinically. Herein, we have evidenced functional and structural (MRI) improvement at 2 years in patients with chondral injury to the knee following MACI; a finding consistent with previous studies [2]. We also showed a strong relationship between MRI and KOOS score, suggesting that, with improving technology, MRI may be able to used for functional prognosis.

Our patient satisfaction survey revealed that a high percentage of patients are satisfied with their pain relief, and the restoration of quality of life and function following their MACI procedure. Interestingly, the survey also evidenced significant differences in MACI outcomes with the variables of age, postoperative months at survey, and defect location in the joint. Notably, a significant improvement in overall satisfaction was seen for patients participating in formalised rehabilitation compared to those not. In summary, the aforementioned clinical outcomes and comparative analysis is essential for furthering our understanding of the factors which influence patient outcomes in the treatment of cartilage injury by autologous chondrocyte implantation therapy such as MACI.

**References:**


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**A Clinical Evaluation of Matrix-Induced Autologous Chondrocyte Implantation (MACI): Functional and Structural Restoration, and Patient Satisfaction**

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