

## Adipose-Derived Mesenchymal Stem Cells for Knee Articular Cartilage Focal Lesions Treatment

**Michail Ilias Iosifidis, MD, PhD, GREECE**

Theofylaktos Kyriakidis, MD, BELGIUM

Efstathios Michalopoulos, PhD, GREECE

Theophanis Chatzistamatiou, PhD, GREECE

Andreas Papasavas, PhD, GREECE

Ioannis Tsitouridis, MD, PhD, GREECE

Aikaterini Stavropoulos, MD, PhD, GREECE

Anastasios Kyriakidis, MD, GREECE

2nd Orthopaedic Department, "Papageorgiou" G.H, Thessaloniki. Radiology Department, "Papageorgiou" G.H., Thessaloniki, Hellenic Cord Blood Bank, Biomedical Research Foundation Academy of Athens (BRFAA) Thessaloniki, Athens, GREECE

### Summary:

Promising results of new matrix-induced cell-based therapy for knee articular cartilage focal lesions from a pilot prospective case series study

### Abstract:

#### PURPOSE

The aim of this pilot prospective case series study was to evaluate the results of this matrix-induced cell-based technique for the treatment of knee focal chondral.

#### METHODS

20 ICRS grade 3 and 4 cartilage defects with a mean size of 4.3 cm<sup>2</sup> (range 1.7 - 6.1 cm<sup>2</sup>) in 19 patients (11 male and 8 female) with an average age of 31.36 years (range 16-45 years) were treated with matrix-induced autologous transplantation of adipose-derived mesenchymal stem cells. This single-staged procedure involved filling of each defect with autologous culture-expanded mesenchymal stem cells embedded in a trimmed-to-fit commercially available biodegradable matrix. The patients were followed for at 1st, 3rd, 6th, 12th and 24th p.o. month (mean follow-up 22.7 months) and their outcome analysis was based on the Knee injury and Osteoarthritis Outcome Score (KOOS) and the International Knee Documentation Committee (IKDC) forms, whereas the non-parametric Wilcoxon Signed Rank test was used ( $p < 0.05$ ). In addition the patients underwent MRI (3 Tesla) at the 12th and 24th p.o. month using the Magnetic Resonance Observation of Cartilage Repair (MOCART) scoring system.

#### RESULTS

No complications and/or adverse events had been reported; analysis of the results showed a significant increase in the mean values of the IKDC total score (from 46.1 to 70.4,  $p = 0.15$ ) and all KOOS subscales (Symptoms and Stiffness from 52.8 to 75.7-  $p = 0.06$ , Pain from 54.0 to 86.0-  $p = 0.02$ , Activities of Daily Living from 51.6 to 90.8-  $p = 0.02$ , Sports and Recreation from 27.2 to 60.7  $p = 0.02$ , and Knee-related Quality of Life from 25.0 to 62.7  $p = 0.013$ ). The MOCART score revealed significant development of tissue resembling the healthy cartilage.

#### CONCLUSIONS

This study has shown promising preliminary results for the treatment of focal knee chondral lesions with a single-staged cell-based technique almost 2 years postoperatively.