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Non-responsive knee pain with osteoarthritis and concurrent meniscal disease treated with autologous micro-fragmented adipose tissue under continuous ultrasound guidance: A case study

R Striano, H Chen, N Bilbool, K Azatullah, J Hilado and K Horan
OptimumJoint, USA

Background: Adipose tissue has gained increased interest in the medical and scientific community over the last few years as a source for ortho-biologic therapies. It is readily accessible and simple to harvest. Adipose can be used to provide cushioning and filling of structural defects and has been shown to have an abundance of bioactive elements and regenerative peri-vascular cells.

Objective: To evaluate the potential benefits of injecting a severely arthritic knee with concurrent meniscal disease with micro-fragmented non-digested adipose tissue using a novel technique by obtaining minimally manipulated and micronized fat tissue with intact stromal vascular niches harboring regenerative cellular elements. The case is non-responsive knee pain with osteoarthritis and concurrent meniscal disease.

Case description: This case is the first of a 100-subject IRB study approved by IRCM. The patient is a 59-year-old male with severe knee pain who has failed a multitude of treatments, including arthroscopic meniscal surgery. The MRI prior to surgery revealed evidence of osteoarthritis, medial meniscal tear, and chondromalacia patella. The patient was followed for 6 months, and will continue to be followed for two years.

Material & Methods: Micro-fragmented fat was obtained by using a minimal manipulation technique in a closed system (Lipogems®), without the addition of enzymes or any other additives. The final product consisted of micronized fat tissue yielding fat clusters with preserved vascular stroma of about 500 microns with intact stromal vascular niches and harboring regenerative cellular elements. In this treatment protocol, the micronized fat was injected with a 22-gauge needle under continuous ultrasound guidance into the joint and filling the hypoechoic defects in the medial meniscus. No other biological or pharmacological agents were used in combination with the micronized fat. Outcomes were measured immediately following the treatment, 24 hours, 1 week, 5 weeks, 3 months, 6 months and 1 year after the injections. At 6 months, a repeat MRI of the joint was performed.

Results: One year after the treatment, we found improvement in all measured scores. VAS pain score on a 1-10 scale, with 10 being worse, improved from 8 to 0; the KOOS (Knee Injury and Osteoarthritis Score) outcome, with a score of 100 being perfect, improved from 45 to 92.9. MRIs taken at 6 months post-treatment, revealed improved signal and thickness of the cartilaginous tissue over the medial femoral condyle, with a widened joint space. Radiologist initial measure of articular cartilage reported as 0.75mm and at 6 months reported as 1.5mm.

Conclusion: The injection of autologous micro-fragmented adipose tissue obtained with the new technique, Lipogems® in the case of non-responsive knee pain appears to be a promising and viable treatment. Due to the arthroscopic surgery taking place following the original MRI and prior to the treatment with micronized fat, the change in the meniscus after 6 months is not comparable. Further studies are underway.

rstriano@aol.com

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