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Case Report

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The Effect of Autologous Adipose Derived Mesenchymal Stem Cell Therapy in Chronic Patellar Tendinitis: A Case Study

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Abstract

Background: *A prospective analysis of the effect of autologous adipose derived mesenchymal stem cell (MSC) therapy in the treatment of a chronic patellar tendinitis.*

Case presentation: *After failed conventional management of patellar tendinitis a 56 years old patient underwent intra-articular MSC therapy. Repeat MRI analysis showed healing of patellar tendon tissue.*

Conclusion: *In this report, the use of MSCs, after unsuccessful conventional patellar tendinitis management, resulted in structural, functional and pain improvement. These results highlight the possibility of adding autologous adipose derived mesenchymal stem cell therapy as a new option of treatment for patellar tendinitis.*

Keywords: *adipose stem cells. knee, patellar tendinitis, patellar tendon, mesenchymal stem cells.*

Introduction

Patellar tendinopathy is a condition which is characterized by anterior knee activity–related pain. It has a high incidence among athletes who are engaged in jumping sports [1]. It is also common in the sedentary population and as a work-related condition with an incidence of 17% reported in the general population and may become a chronic condition [2]. Many theories have been proposed on the pathogenesis of patellar tendinopathy, including vascular, mechanical, and these changes are considered to result from several intrinsic and extrinsic factors, where repetitive tendon overload plays a key role in the onset of microscopic cell and matrix failures that lead to the weakening of the mechanical properties of the tendon and, finally, to chronic impingement-related, and nervous system causes [3]. Nonoperative management is still the first choice, and several nonsurgical treatment options have been proposed ranging from specific exercise protocols and physical therapies to the more ambitious novel regenerative injective treatments: drugs (NSAIDs and corticosteroids), PRP-based injections (platelet-rich plasma), eccentric exercise, and physical therapy such as extracorporeal shockwave therapy (ESWT) [4, 5]. On the other hand, some operative treatments (i.e., open or arthroscopic debridement of the proximal patellar tendon and the inferior patellar pole region, resection of part of the distal pole of the patella, removal of hypertrophic synovium and fat pad) could provide good results with a 90% success rate but it is an invasive approach and requires a longer recovery time and concerns related to surgery [6, 7]. A recent review was unable to estimate supremacy benefits of surgery over eccentric exercise in terms of pain, function or participant-reported treatment success [8]. Despite the increasing number of treatments, clear indications on the most effective approach to address patellar tendinopathy are still lacking, and clinicians thus lack support in making treatment decisions.

Case Report

A 56 years old active male presented with increasing left knee pain and functional disability without any trauma. His pain was a peripatellar pain that often radiated medially or laterally from the patella, exacerbated by climbing stairs, running, as well as squatting. He was unable to perform any daily activities. His Examination revealed peripatellar swelling, tenderness at inferior

border of his left patella in full extension and crepitus, full range of motion and the knee was stable. His Radiological examination included magnetic resonance imaging (MRI) scan of his knee. The MRI scan of his knee showed tendon thickening and abnormality area at the insertion of the tendon on the inferior part of the patella as shown in **figure 1 and figure 2.**

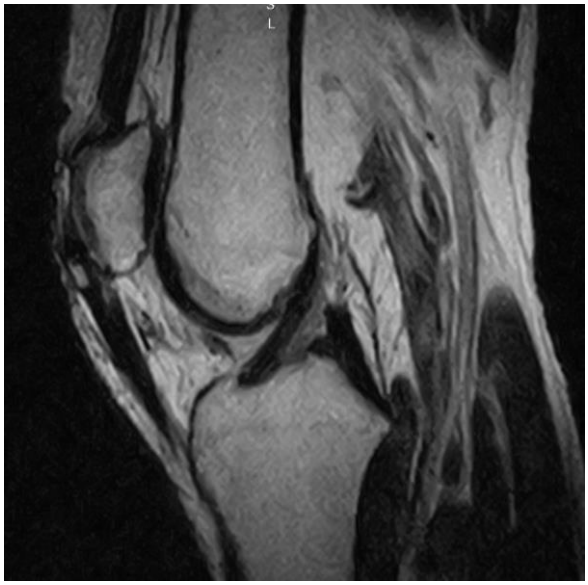

Figure 1: Radiographs of the patient's knee at 56-years-old. Sagital T2-weighted fat suppressed MRI sequences showed abnormality area of degeneration at the inferior part of patella attachment area.

Figure 2: Radiographs of the patient's knee at 56-years-of age. sagittal T1-weighted MRI sequences showed an area of abnormality of degeneration at the inferior part of patella attachment area.

This was appropriately treated conservatively with 6 months of ice, rest, activity modification, followed by physical therapy as stretching of quadriceps and hamstrings eccentric exercise program without relief of symptoms. He quit any recreative activity for 1 year because of pain. After 1 year, we opted for adipose-derived mesenchymal stromal cells (AD-MSCs) intra-articular therapy according to the procedure described by Tremolada et al. [9] . The patient has received the written informed consent regarding the use of AD-MSCs therapy, including relative risks of this therapy and also relevant treatment alternatives that could otherwise be explored. Post-operative radiological evaluation was performed at 12 months after AD-MSCs procedure as shown in **figure 3** and **figure 4**.

Figure 3: 12 months after AD-MSC treatment in sagittal T2-weighted MRI T2 sequences the patellar tendon showed an area of regeneration and fill of high water content suggestive of patellar tendon repaired.

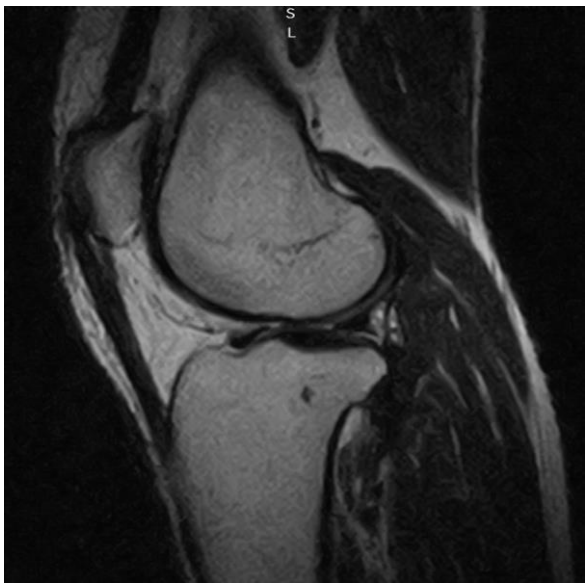

Figure 4: 12 months after AD-MSC treatment in b sagittal T2-weighted MRI T2 sequences of the in patella showed that the area was almost regenerated with good tendon morphology.

Pre-operative and post-operative clinical evaluation were collected at 6-months and 12-months follow-up using IDKC, Lysholm and Tegner scores **Table 1**.

SCORES	PRE-OP	6 MONTHS POST-OP	12 MONTHS POST-OP
IKDC	25	82	99
LYSHOLM	23	98	100
TEGNER	0	4	4

After surgery, the patient began a McConnell program of lateral retinacular stretching, patellar taping, and vastus medialis obliquus muscle exercises. The patient was encouraged to swim and cycle to reduce impact loading.

Using AD-MSC, he reported a complete relief of pain after 1 year from the procedure and he had MRI scan of the knee which showed evidence of appreciable improvement in patellar tendon volume and architecture at the site of the damage area.

Discussion

There are many studies about chronic patellar tendinopathy treatment. Everhart et al. [10] had analysed the efficacy of common invasive and non-invasive patellar tendinopathy treatment strategies. They concluded that the first approach could be eccentric squat-based therapy, shockwave, or PRP as monotherapy or an adjunct to accelerate recovery. Surgery or shockwave can be considered for patients who fail to improve after 6 months of conservative treatment. Corticosteroid therapy should not be used in the treatment of patellar tendinopathy [10]. A recent systematic review concluded that eccentric exercises may seem the strategy of choice in the short-term, but multiple PRP-injections may offer more satisfactory results at long-term follow-up and can be therefore considered a suitable option for the treatment of patellar tendinopathy [1]. There have been studies specifically that had evaluated stem cells use in the patellar tendon. Pascual-Garrido et al. [11] used bone marrow-derived cells in eight patients who had failed 6 months of conservative treatments. At a 5-year follow-up, there was a statically significant improvement and seven of eight patients said they would repeat the procedure if needed. Although an interesting result, the lack of a control group makes interpreting these results difficult. A significant increase in large randomized controlled trials studies using stem cells in patellar tendinopathy is needed. The use of AD-MSCs therapy could be a solution, using a simple injectable technique without risks and complications due to invasive intra-articular surgery, in particular as second option after conservative treatment failed and before to use other more invasive.

Abbreviations

AD-MSCs: Adipose-derived mesenchymal stromal cells; MRI: Magnetic Resonance Imaging; MSC: Mesenchymal stem cells; PRP: platelet-rich plasma;

Conflict of Interest Statement

None declared.

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