



Mosaicplasty as a Salvage Procedure after Failed Primary Treatment with Silicone Implantation for Focal Osteochondral Lesion of the Knee Joint; a Case Report

Emre TY^{1*}, Atbaşı Z², Demircioğlu DT³, Seyhan B⁴ and Uzun M⁴

¹Department of Orthopaedia and Traumatology, Memorial Hizmet Hospital, Turkey

²Department of Orthopaedia and Traumatology, Ankara Military Hospital, Turkey

³Department of Physical Medicine and Rehabilitation, Memorial Hizmet Hospital, Turkey

⁴Department of Orthopaedia and Traumatology, Etimesgut Military Hospital Ankara, Turkey

Abstract

The successful treatment of chondral and osteochondral lesions of the weight-bearing surfaces of the knee joint is a challenge for orthopedic surgeons. If the primary treatment fails, revision or salvage procedures are even limited particularly when subchondral bone integrity is lost. A 35-year-old male patient presented with right knee pain, locking and limited range of motion. His past medical history revealed a femoral osteochondral injury which had been treated with silicone implantation. The implant was removed, and remaining large osteochondral (5cm²) lesion was treated with mosaicplasty. At the 5-year follow-up, the patient was symptom-free with almost complete radiographic incorporation of the graft. This case suggests that mosaicplasty is a good alternative salvage procedure for osteochondral defects of the femoral condyle even when the subchondral bone integrity is lost.

Keywords: Mosaicplasty; Cartilage repair; Revision; Silicone implant

OPEN ACCESS

*Correspondence:

Tuluhan Yunus Emre, Department of Orthopaedia and Traumatology, Memorial Hizmet Hospital, Halkalı Caddesi Yeşilköy Toplu Konut Sitesi A 31 Yeşilköy, Istanbul, Turkey, Tel: 0090 53330770 08; Fax: 00 90 212 408 66 41;

E-mail: drtuluhan@yahoo.com; drtuluhan@gmail.com

Received Date: 17 Jun 2016

Accepted Date: 15 Jul 2016

Published Date: 18 Jul 2016

Citation:

Emre TY, Atbaşı Z, Demircioğlu DT, Seyhan B, Uzun M. Mosaicplasty as a Salvage Procedure after Failed Primary Treatment with Silicone Implantation for Focal Osteochondral Lesion of the Knee Joint; a Case Report. *Clin Surg*. 2016; 1: 1048.

Copyright © 2016 Emre TY. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

Focal chondral lesions are a common condition of the knee joint that leads to pain, effusion, locking, and stiffness at initial stages and eventually leads to osteoarthritis and loss of knee function [1,2]. Treatment of these lesions in young patients is particularly important because progression of osteoarthritis may develop quickly at an early age if left untreated. However, mature hyaline cartilage has poor regenerative potential, even in young patients, because it is devoid of vascular, nervous and lymphatic networks [3]. Currently, a wide variety of treatment options exist for focal cartilage lesions of the knee joint ranging from simple chondral abrasion and micro fracture to complex cell-based therapies. Although the decision making is usually based on the patient's activity level, age, size, extent of chondral defect, and the presence of accompanying problems such as instability and malalignment, there is no comprehensive algorithm on the management and indications of several techniques overlap [4,5]. But, in general micro fracture technique is used as a first line option for small and medium sized defects (less than 2-3cm²). If the primary treatment method fails, there are very limited numbers of techniques that can be used as a salvage procedure particularly when the subchondral bone integrity is lost. Mosaicplasty is a well-defined technique which involves obtaining small-sized cylindrical osteochondral grafts from the minimal weight bearing periphery of the femoral condyles at the level of the patella-femoral joint and transplanting them to prepared defect sites on the cartilage defects. This technique is first described by Hangody et al. [6,7] and presented as a first line treatment modality for cartilage defects weight bearing surfaces of knee joint. Since then, several studies reported good and excellent results of this technique in focal cartilage lesions of the knee joint [8-10]. However, there are few reports regarding its use as a salvage procedure in case of failure of primary treatment especially with large osteochondral defects. Herein, we described a patient who underwent mosaicplasty as a salvage procedure after failed treatment of a large focal osteochondral lesion with a silicone rubber implant (spacer).

Case Report

A 35-year-old male patient employed as an army officer was admitted to our outpatient clinic

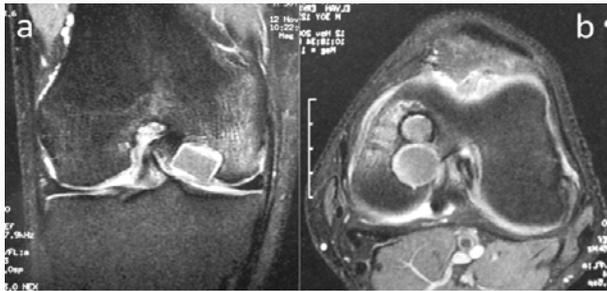


Figure 1: MRI image of osteochondral lesion in the femoral condyle which had been previously treated with a silicone implant. Note the fluid accumulation deep around the implant.



Figure 2: Osteochondral lesion (a) seen on the patella through a knee arthrotomy after the removal of implants (b).

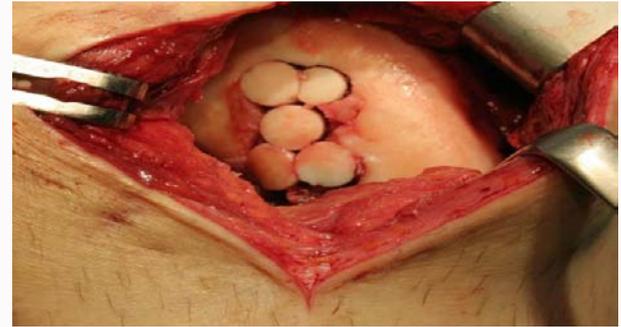


Figure 3: Intraoperative and final appearance after the implantation of the chondral grafts.

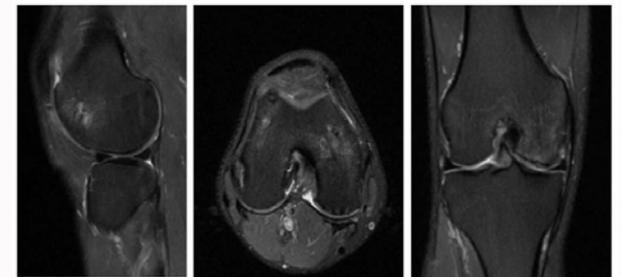


Figure 4: The Patient's MRI images at 5th year follow-up.

with the complaints of right knee pain. The patient was involved in amateur sports three times a week and had a history of knee pain due to a traumatic femoral osteochondral lesion which had been treated with silicone implantation one year ago. The patient's complaints were alleviated after the surgery but six months after implantation, pain and loss of function recurred despite conservative treatment efforts. The patient was evaluated with clinical examination and radio diagnostic studies. On clinical examination, the patient had an antalgic gait and the knee range of motion was restricted and painful. No effusion was detected on the knee joint. Lachman and pivot shift tests and McMurray sign were negative. The x-ray studies displayed an osteo-chondral defect in the medial femoral condyle accompanied by minimally degenerative changes. MR imaging revealed a silicone implant in the knee joint as shown in (Figure 1).

Diagnostic arthroscopy was scheduled for exploring the lesion and the accompanying knee pathologies. During arthroscopic evaluation, a cartilage lesion at medial femoral condyle and a loosened silicone implant was observed. We decided to remove the silicone implant and a medial parapatellar approach was used to expose the silicone implant. After the removal the lesion size was 5 cm² and 1.5 cm in depth (Figure 2). Five plugs of osteochondral auto graft 10x25 mm in size were harvested from the ipsilateral knee. Standard mosaicplasty was applied to the defect of the medial femoral condyle as described by Hangody et al. but the grafts were 1.5cm in length [7] (Figure 3). On postoperative day 1, the patient was mobilized and walked with crutches. For the following 12 weeks, semi weight-bearing was permitted on the right extremity, followed by full weight bearing. The patient was clinically evaluated with Lysholm knee scores before treatment and during each follow-up. The Lysholm knee score was 55

points preoperatively and increased to 84 points at sixth month and to 92 points at the 5th year follow-up visits. The MRI images of the patient at 5th year follow-up are shown in (Figure 4). At the 5th year follow-up, the patient's mechanical symptoms of the affected knee have resolved completely along with the pain and his knee no longer interfered with the functional, social or professional life of the patient and he was able to perform his sportive activities without a problem.

Discussion

Since silicone rubber has been introduced as a biomaterial, it has found widespread applications in various fields of medicine such as catheters, breast implants and small joint arthroplasty. However, silicone rubber implants may cause several side-effects including synovitis and lymphadenopathy [11,12]. There are few reports regarding its use as a spacer in cartilage defects. Wang and Yu used hard silicone implants in 20 patients and with cartilage defects and reported that this implant may delay the pathogenetic progression of osteoarthritis [13]. During implantation of this implant a socket has to be prepared which disrupts the subchondral bone. In our case, it was obvious that the subchondral bone integrity was lost, based on the observations both during the MRI examination and the surgery.

When there is large osteochondral cartilage defect of the knee joint in a young patient similar to our case, there are few options for the treatment. First, fresh frozen osteochondral allografts can be used. However, this technique has some disadvantages such as high-cost, risk of viral disease transmission, difficulty in finding matching fresh donors, allograft failure and high re-operation rate. Gracitelli et al. [14] reported 41.7% reoperation rate in 163 patients who underwent osteochondral allograft (OCA) transplantation as a salvage procedure after various cartilage repair surgeries. Furthermore, viability of chondrocytes in such mega osteochondral allografts has been debated by some authors [15]. Second option can be the use of osteochondral biphasic scaffolds. A biphasic osteochondral scaffold

unit has two layers. Superficial layer resembles the cartilage tissue and the deep layer simulates the bone structure. Thus this type of scaffolds may repair both the cartilage and the bone simultaneously [16]. Although, in previous studies promising results has been reported, poor osteochondrogenesis has been shown in current studies [17,18]. As a third option, autologous mosaicplasty can be used in our case. However, this technique is limited with the availability of donor osteochondral plugs particularly when the cartilage defect exceeds 4cm². In his original article Hangody et al. advised to use this technique in cartilage defects up to 4cm² [6,7]. In our case, the defect size was 5cm². The second important issue in this technique is reconstruction of the surface congruity. When the defect is large, it is not easy to provide the convexity of the femoral condyle.

Conclusion

We described a patient with a large osteochondral defect after failed primary treatment with a silicone rubber implant. This is the first case in current literature which documents the failure of silicone rubber treatment for articular cartilage repair of the knee joint. Mosaicplasty can still be a good option as a salvage procedure even in large defects exceeding 4cm² in the knee joint, however a meticulous technique should be followed to reconstruct the surface anatomy. Mosaicplasty can reconstruct both bone and the cartilage effectively during the salvage procedure.

References

1. Curl WW, Krome J, Gordon ES, Rushing J, Smith BP, Poehling GG. Cartilage injuries: a review of 31,516 knee arthroscopies. *Arthroscopy*. 1997; 13: 456-460.
2. Widuchowski W, Widuchowski J, Trzaska T. Articular cartilage defects: study of 25,124 knee arthroscopies. *Knee*. 2007; 14: 177-182.
3. Buckwalter JA, Mankin HJ. Articular cartilage: degeneration and osteoarthritis, repair, regeneration, and transplantation. *Instr Course Lect*. 1998; 47: 487-504.
4. Richter DL, Schenck RC Jr, Wascher DC, Treme G. Knee Articular Cartilage Repair and Restoration Techniques: A Review of the Literature. *Sports Health*. 2016; 8: 153-160.
5. Cucchiari M, Henrionnet C, Mainard D, Pinzano A. New trends in articular cartilage repair. *J Exp Orthop*. 2015; 2: 8.
6. Hangody L, Kish G, Kárpáti Z, Szerb I, Udvarhelyi I. Arthroscopic autogenous osteochondral mosaicplasty for the treatment of femoral condylar articular defects. A preliminary report. *Knee Surg Sports Traumatol Arthrosc*. 1997; 5: 262-267.
7. Hangody L, Ráthonyi GK, Duska Z, Vászárhelyi G, Füles P, Módis L. Autologous osteochondral mosaicplasty. Surgical technique. *J Bone Joint Surg Am*. 2004; 86-86A: 65-72.
8. Hangody L, Dobos J, Baló E, Pánics G, Hangody LR, Berkes I. Clinical experiences with autologous osteochondral mosaicplasty in an athletic population: a 17-year prospective multicenter study. *Am J Sports Med*. 2010; 38: 1125-1133.
9. Emre TY, Ege T, Kose O, Tekdos Demircioglu D, Seyhan B, Uzun M. Factors affecting the outcome of osteochondral autografting (mosaicplasty) in articular cartilage defects of the knee joint: retrospective analysis of 152 cases. *Arch Orthop Trauma Surg*. 2013; 133: 531-536.
10. Marcacci M, Kon E, Zaffagnini S, Iacono F, Neri MP, Vascellari A, et al. A Multiple osteochondral arthroscopic grafting (mosaicplasty) for cartilage defects of the knee: prospective study results at 2-year follow-up. *Arthroscopy*. 2005; 21: 462-470.
11. Christie AJ, Weinberger KA, Dietrich M. Silicone lymphadenopathy and synovitis. Complications of silicone elastomer finger joint prostheses. *JAMA*. 1977; 237: 1463-1464.
12. Perlman MD, Schor AD, Gold ML. Implant failure with particulate silicone synovitis (debritlet synovitis). *J Foot Surg*. 1990; 29: 584-588.
13. Wang M, Yu C. Silicone rubber: an alternative for repair of articular cartilage defects. *Knee Surg Sports Traumatol Arthrosc*. 2004; 12: 556-561.
14. Gracitelli GC, Meric G, Pulido PA, McCauley JC, Bugbee WD. Osteochondral Allograft Transplantation for Knee Lesions after Failure of Cartilage Repair Surgery. *Cartilage*. 2015; 6: 98-105.
15. De Caro F, Bisicchia S, Amendola A, Ding L. Large fresh osteochondral allografts of the knee: a systematic clinical and basic science review of the literature. *Arthroscopy*. 2015; 31: 757-765.
16. Li X, Ding J, Wang J, Zhuang X, Chen X. Biomimetic biphasic scaffolds for osteochondral defect repair. *Regen Biomater*. 2015; 2: 221-228.
17. Delcogliano M, de Caro F, Scaravella E, Ziveri G, De Biase CF, Marotta D, et al. Use of innovative biomimetic scaffold in the treatment for large osteochondral lesions of the knee. *Knee Surg Sports Traumatol Arthrosc*. 2014; 22: 1260-1269.
18. Christensen BB, Foldager CB, Jensen J, Jensen NC, Lind M. Poor osteochondral repair by a biomimetic collagen scaffold: 1- to 3-year clinical and radiological follow-up. *Knee Surg Sports Traumatol Arthrosc*. 2016; 24: 2380-2387.