

# Early Weight Bearing Post Subchondral Microfracture Knee Arthroscopy: A Case Report

Katon Harwood<sup>1\*</sup>, Kelsey Fraser<sup>2</sup>, John Spellman<sup>2</sup>

<sup>1</sup>School of Osteopathic Medicine, Campbell University, Lillington, NC, USA

<sup>2</sup>Department of Orthopedic Surgery, Carteret Health Care, Morehead City, NC, USA

Email: \*krharwood0828@email.campbell.edu

**How to cite this paper:** Harwood, K., Fraser, K. and Spellman, J. (2022) Early Weight Bearing Post Subchondral Microfracture Knee Arthroscopy: A Case Report. *Open Journal of Orthopedics*, 12, 253-257. <https://doi.org/10.4236/ojo.2022.125024>

**Received:** April 6, 2022

**Accepted:** May 28, 2022

**Published:** May 31, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

## Abstract

Traditionally physicians have advised patients to be non-weight bearing post arthroscopic knee microfracture surgery for at least 2 to 8 weeks. The microfracture procedure is a simple, low-risk method to induce self-cartilage regeneration to focal lesions. The procedure has shown that small fractures to the subchondral bone can recruit mesenchymal stem cells and growth factors to regenerate the fibrocartilage without compromising the subchondral plate. With the simplicity of this procedure and the positive effect it can have on patients, it is natural to want to push the bounds of rehabilitation to see what is necessary. The patient in this case report exhibits the potential for positive outcomes with early weight-bearing status in patients receiving microfractures via subchondral drilling. This positive outcome, along with others, should encourage clinicians to consider reestablishing evidence-guided rehabilitation post microfracture with new studies. Shortened rehabilitation time would decrease a barrier to surgery for many patients and would only enhance our treatment with this surgical modality.

## Keywords

Microfracture, Patellofemoral Chondrosis, Patellar Maltracking

## 1. Introduction

Nearly 22% of the adults around the world older than 40 years old have arthritis in their knees and more than 14 million are symptomatic Americans [1]. Arthritis is more common today than ever before. As people age and increase their weight, arthritis in the knee joint only continues to cause them issues with pain and overall knee function.

Injuries or degenerative processes that involve the cartilage of a joint are dif-

difficult to treat due to the decreased blood flow and healing potential that are present in the area. Cartilage is responsible for resisting compressive forces, enhancing bone resilience and providing support to bony areas where there is a need for flexibility [2]. Cartilage is made primarily by chondrocytes in the bone, consisting of different combinations of glycosaminoglycans, proteoglycans, and other collagenous fibers [2]. After cartilage is made it becomes avascular, and any wear or tear on the region can take an extended amount of time to heal, if at all.

For patients undergoing knee arthroscopy for debridement, also have the option to have the microfracture procedure done to enhance cartilage regeneration in focal lesions in the joint. The procedure has shown that small fractures to the subchondral bone can recruit mesenchymal stem cells and growth factors to the defect and regenerate the fibrocartilage without compromising the stability of the subchondral plate [3]. These fractures can be achieved by using multiple tools, including but not limited to K-wires, nonfracture subchondral drills, or awls to achieve the necessary bone bleeding for healing factor recruitment [3].

The rehabilitation protocol for this knee arthroscopy microfracture procedure, originally advocated by Steadman, was focused on protecting the forming clot and varied length-wise from 2 to 8 weeks depending on fracture location for non-weight bearing status [3]. Studies have shown that the unloading of joints has harmful effects on cartilage, especially when trying to heal [3]. This disruption in natural healing from unloading is due to the lack of physiological signaling for chondrocytes to produce cartilage, via proteoglycan and type II collagen, when undergoing mechanical forces [3]. With this in mind, we will explore the application of early weight-bearing activity in patients who received a microfracture procedure via subchondral drill during knee arthroscopy.

## 2. Case

This patient is a middle-aged female who presented to the clinic with chronic left knee pain. X-rays revealed no evidence of fractures or dislocation and intact medial and lateral compartments, as well as intact meniscus with mild edema in Hoffa's fat pad. Magnetic resonance imaging (MRI) revealed severe patellofemoral chondrosis and impingement due to fat pad edema. MRI also suggested intact menisci and ligaments. The patient had no previous surgical intervention on the left side.

The patient was instructed that physical therapy with activity modification and NSAID use could be beneficial for her left knee patellofemoral chondromalacia. After her participation in therapy, the patient felt no relief in her symptoms and continued to have significant patellofemoral crepitus. After discussing different treatment modalities, as well as risks and benefits of each path, the patient decided to proceed with a left knee arthroscopy with chondroplasty, microfracture, and possible lateral retinaculum lengthening.

Under anesthesia, an examination revealed full range of motion with no in-

stability. An anterolateral portal was established and under direct visualization an anteromedial portal was established on the left knee. Arthroscopy demonstrated no chondromalacia and no meniscal tear in the lateral or medial compartments. The ACL and PCL were intact. There were grade 3 and 4 changes to the lateral trochlea and grade 4 changes in the lateral patellar facet. The patella showed significant lateral tracking but lacked significant lateral retinaculum tightness.

The choice to perform microfractures via subchondral drill to the trochlea and patella in the area of the grade 4 cartilage defect was accepted, but there was no need for lateral retinaculum lengthening due to lack of tightness and lateral patellar tilt. Due to the patient's maltracking she may require a tibial tubercle osteotomy in the future.

After being returned to weight bearing status immediately after surgery and given home exercise to increase strength and range of motion in the joint. Home exercises consisted of activities such as: stretches to increase range of motion, one legged squatting and general leg strengthening, as well as focal vastus medialis oblique exercises. The patient then returned to the office 4 months later. The patient reported some moderate sharp pain on the anterior knee with weather changes, but overall exhibits improvement in symptoms and excellent range of motion. The patient demonstrated no patellar ligament pain upon palpation or pain with patellar grinding. The rest of the patient physical exam was normal, and she had no effusion in the joint or difficulties with movement. The patient was encouraged with the status of her knee and was able to return to her normal baseline status before the pain escalated, pre surgical intervention. Future treatment options were discussed with the patient if symptoms returned with a tibial tubercle osteotomy to offload the patellofemoral joint or hyaluronic acid injections. The patient was advised to follow up in three months to recheck symptoms. After three additional months the patient exhibited no further exacerbation of symptoms and has a normal physical exam. At this time, the patient has no need for injections or follow-up procedures and has been advised to return to the clinic as needed.

### 3. Discussion

This case exhibits the success that can be obtained with early weight bearing following the subchondral drill microfracture procedure during knee arthroscopy. A recent study evaluated 18 programs from 155 academic orthopedic programs in the United States [4]. A total of 44 protocols were analyzed, 17 of which were recommending immediate postoperative bracing for femoral condyle lesions and another 17 for patellofemoral lesions [4]. The average time to permission of weight bearing as tolerated was 6.1 weeks for femoral condyle lesions and 3.7 weeks for patellofemoral lesions [4]. This study among others, demonstrate the variability present in the current rehabilitation protocol for microfractures.

With patients like this case, some surgeons would recommend up to 8 weeks

of, non or moderate weight bearing activity, in an effort to protect the fibrin clot that forms after the procedure. This clot, which will eventually be replaced by the mesenchymal cells and growth factors necessary to heal the defect with fibrocartilage, might not need this amount of protection. During this procedure, the fracture occurs around stable cartilage. The use of micro-fracturing, calls for focal lesions, not diffuse. This use in focal lesions allows for the fracture to be surrounded by normal healthy cartilage, which protects it from the shear forces of joint unloading by the margins of the defect [1].

Patients that undergo multiple weeks of limited weight bearing activity easily develop muscle weakness. The vastus medialis oblique (VMO), a quadriceps muscle, in particular can be affected by inactivity. This muscle works in conjunction with the other quadriceps muscles to engage the patella tendon in leg extension. When the vastus lateralis, the muscle that pulls the patella from the lateral position is out of balance with the VMO, patellar maltracking can become an issue and only worsen patellofemoral chondral degradation [5]. Early activity post microfracture can help mitigate the development of VMO weakness and worsening patellar mal tracking. Studies have found that patients that have undergone various knee arthroscopy procedures can still show quadriceps weakening up to six months out and often require extensive rehabilitation [6]. Early rehabilitation and activity can mitigate the weakened muscles associated with the mechanical forces of knee movement.

#### **4. Conclusion**

With the potential benefits and low risk of early weight-bearing following microfracture on focal lesions via knee arthroscopy, physicians should consider implementing more aggressive rehabilitation platforms for their patients. With the current variability of post microfracture weight-bearing recommendations, a more inclusive study should be done on this topic with a vast number of participants to make the findings more generalizable. The distinction should be made with the type of instrument used to do the fracture as well as the size and grade of the lesions when evaluating results. This patient presented with left knee patellofemoral chondrosis and underwent microfractures to the trochlea and patella in the area of the grade 4 cartilage defect via a subchondral drill. The patient was able to be put on an early weight-bearing protocol and showed improvement during her follow-up appointment 4 months later. This case, like many others, should lead us to further develop our recommendations for patients receiving similar treatment.

#### **Consent**

The patient's consent was received written and orally for the creation of this case report.

#### **Conflicts of Interest**

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- [1] Single Care Team (2022) Arthritis Statistics 2022. [https://www.singlecare.com/blog/news/arthritis-statistics/#:~:text=62%25%20of%20people%20with%20osteoarthritis,\(Arthritis%20Foundation%2C%202019\).%20Published%20January%202020,%202022.%20Accessed%20March%2025,%202022](https://www.singlecare.com/blog/news/arthritis-statistics/#:~:text=62%25%20of%20people%20with%20osteoarthritis,(Arthritis%20Foundation%2C%202019).%20Published%20January%202020,%202022.%20Accessed%20March%2025,%202022)
- [2] Chang, L.-R., Marston, G. and Martin, A. (2021) Anatomy, Cartilage. In: *StatPearls*, StatPearls Publishing, Treasure Island (FL). <https://www.ncbi.nlm.nih.gov/books/NBK532964/>
- [3] Jain, D., Belay, E.S., Anderson, J.A., Garrett, W.E. and Lau, B.C. (2021) Are Weightbearing Restrictions Required after Microfracture for Isolated Chondral Lesions of the Knee? A Review of the Basic Science and Clinical Literature. *Sports Health*, **13**, 111-115. <https://doi.org/10.1177/1941738120938662>
- [4] Crowley, S.G., Swindell, H.W., Saltzman, B.M., Ahmad, C.S., Popkin, C.A. and Trofa, D.P. (2021) Rehabilitation Variability Following Femoral Condyle and Patellofemoral Microfracture Surgery of the Knee. *Cartilage*, **13**, 1801S-1813S. <https://doi.org/10.1177/19476035211025818>
- [5] Chang, W.D., Huang, W.S. and Lai, P.T. (2015) Muscle Activation of Vastus Medialis Oblique and Vastus Lateralis in Sling-Based Exercises in Patients with Patellofemoral Pain Syndrome: A Cross-Over Study. *Evidence-Based Complementary and Alternative Medicine*, **2015**, Article ID: 740315. <https://doi.org/10.1155/2015/740315>
- [6] Casartelli, N.C., Item-Glatthorn, J.F., Friesenbichler, B., Bizzini, M., Salzmann, G.M. and Maffiuletti, N.A. (2019) Quadriceps Neuromuscular Impairments after Arthroscopic Knee Surgery: Comparison between Procedures. *Journal of Clinical Medicine*, **8**, Article 1881. <https://doi.org/10.3390/jcm8111881>