

BioPoly[®] RS Knee Case Report

Functional outcomes at 5 years after treatment of a femoral condyle chondral lesion with a novel permanent defect replacement implant (BioPoly[®] RS Partial Resurfacing Knee): a case report

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CASE REPORT

A 47-year-old female reported for consultation with complaints of pain in the medial aspect of the knee. The patient was an otherwise healthy individual with a BMI of 22 and no concomitant health problems, and was active in recreational sports such as running and skiing prior to experiencing knee problems. With the gradual, non-traumatic onset of knee pain approximately 6 years prior, her activity decreased to a sedentary level and she was managing pain with analgesia.

Diagnostic imaging and arthroscopy within the prior 12 months confirmed a chondral lesion (ICRS Grade 3D) of the medial condyle in an otherwise healthy knee. The meniscus appeared intact and the tibial cartilage appeared normal; however, the patella was shown to have a small (5 mm diameter) grade 2 lesion on the medial facet. Unsuccessful attempts to treat the condyle lesion over the prior 12 months included arthroscopic debridement with microfracture and viscosupplementation. Due to the size of the lesion and lack of arthritic progression in the joint, treatment with unicompartmental arthroplasty was avoided in favor of partial hemiarthroplasty using a novel focal defect replacement implant.

At surgery, the joint was evaluated under arthroscopy which confirmed a 15-17 mm diameter chondral lesion (ICRS Grade 3D) of the medial condyle. The tibia, meniscus, and ligaments were normal, and the Grade 2 patella lesion remained. In order to deliver the partial hemiarthroplasty implant (BioPoly[®] RS Partial Resurfacing Knee Implant, 15 mm size), a defect bed was created using specially designed instruments to accommodate the implant and, subsequently, the implant was press-fit into place as shown in Figure 1. Concomitantly, the patella lesion was microfractured and the joint was closed.



Figure 1. BioPoly[®] RS Knee Implant fit into patient's femoral condyle

The patient participated in a post-operative rehabilitation program which involved immediate weight bearing on the knee as tolerated with crutches for support. She was cycling at 4 weeks and participating in resistance training at 7 weeks post-op.

OUTCOME

At 6, 12 and 18 months post-op, the condyle lesion was pain free and the patient was functioning at a pre-injury activity level, participating in cycling and exercising at the gym. At 24 months, the patient continued to be active, however, at a slightly lower Tegner level, likely due to a pre-existing patella lesion that is not responding favorably to the microfracture treatment.

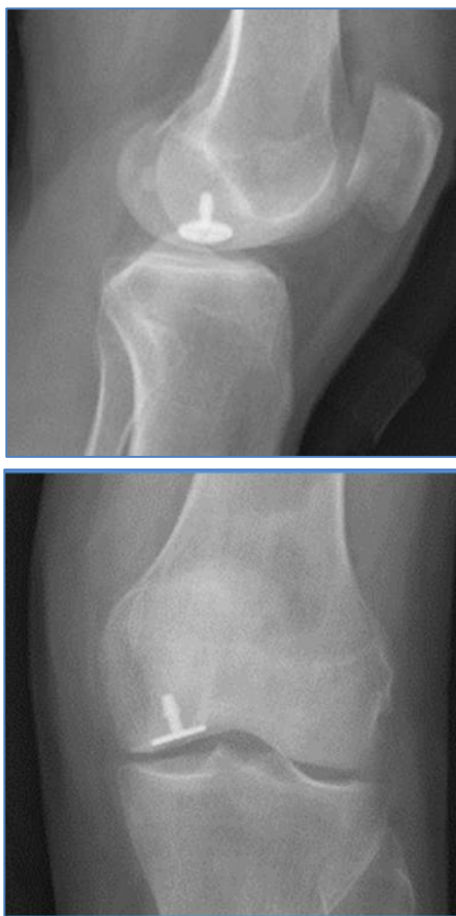


Figure 2: Partial hemiarthroplasty patient's post-operative radiographs at 24 months

The Tegner level returned to pre-injury levels at 60 months. It should be noted that the patient received a 15 mm BioPoly RS Partial Resurfacing Patella Implant which likely helped to alleviate pain due to the patella lesion. Radiographs taken at both 24 and 60 months, shown in Figure 2 and Figure 3 respectively, revealed a stable implant with no peri-implant radio-translucencies or device migration. Additionally, an image taken from arthroscopy during the BioPoly® RS Patella Implant surgery just prior to 60 months showed no signs of wear on the opposing cartilage surface of the femoral implant. The image from the arthroscopy is shown in Figure 4.



Figure 3: Partial hemiarthroplasty patient's post-operative radiographs at 60 months

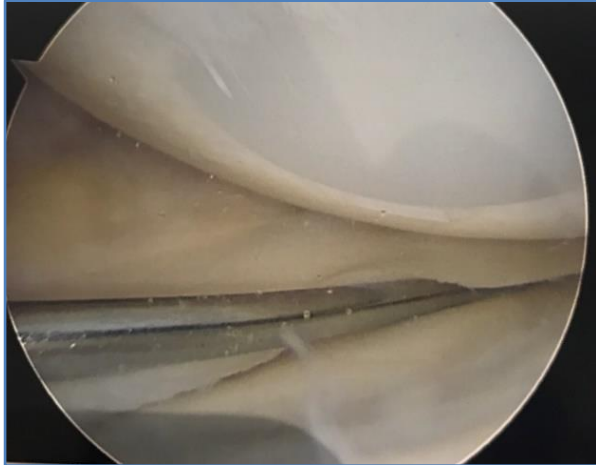


Figure 4: Image taken during scope at patient's BioPoly® RS Patella implant surgery (approximately 58 months after initial surgery)

The patient's recovery was remarkably rapid, as the activity, pain, and quality of life were reestablished by 6 months post-op and continued throughout the 60 months follow-up. As displayed in Figure 3, the patient had virtually regained her pre-injury activity level as early as 6 months, as measured by the Tegner activity score and was participating in recreational sports at that time. Preoperatively, the knee quality of life (KOOS subscore) revealed extreme knee problems which by 6 months post-op had increased to 100, indicating no knee problems. Although 6 months was the first formal time point for data collection, the patient was virtually pain free with increased activity by 6 weeks after surgery and has been extremely satisfied with her surgery.

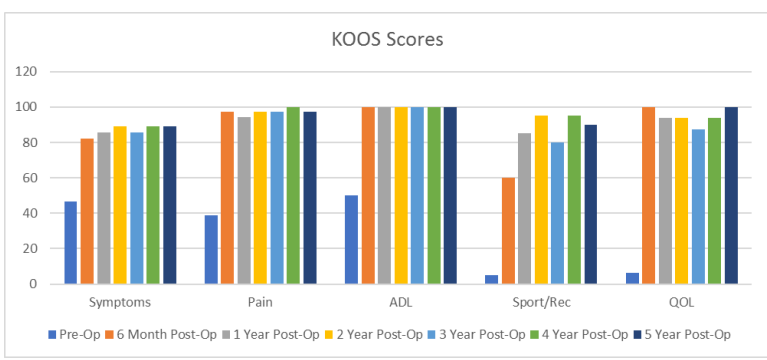
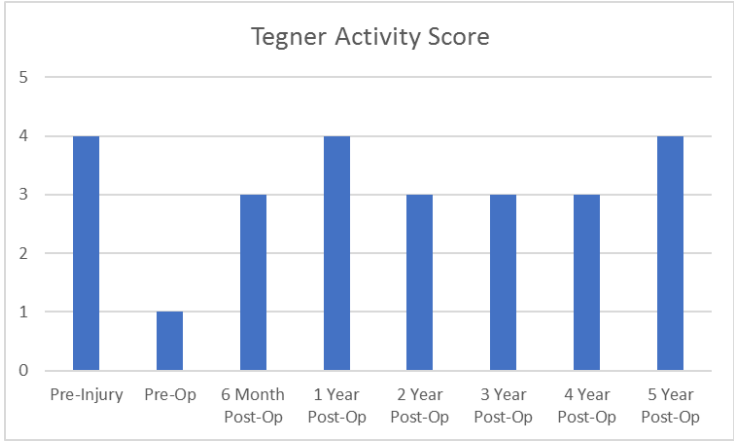


Figure 5: Partial hemiarthroplasty patient's Tegner and KOOS scores

DISCUSSION

Partial hemiarthroplasty is a practical treatment for those patients with focal chondral defects of the femoral condyles and no other major joint pathology. The indications for this treatment specify that the lesions must be in the weight bearing region of the condyles, must be circumscribed by normal or nearly normal cartilage, with no kissing lesion on the tibia. Thus, the lesion should be identified and treated early before significant arthritic progression occurs in the compartment. For patients fitting these criteria, partial hemiarthroplasty is efficacious due to its bone conserving nature, and the biocompatibility of the implant. The implant used to treat this patient, the BioPoly® RS Partial Resurfacing Knee Implant (BioPoly LLC, Fort Wayne, IN, USA), incorporates the joint lubricant hyaluronan into compression molded UHMWPE. Because minimal underlying

bone is removed along with the diseased portion of the cartilage and the remaining soft tissue of the knee remains unaltered, the patient's joint biomechanics are unaffected which allows for a rapid recovery and presumably long lasting outcomes. Additionally, the hyaluronic acid incorporated in the implant results in a very biocompatible and cartilage-friendly material that allow the surrounding and opposing cartilage to be preserved. The UHMWPE base material provides a robust polymeric structure that is capable of carrying anatomical loads immediately. The conservation of natural biomechanics along with cartilage preservation and load carrying capability provides a pathway to a long term stable knee. These

material characteristics may even allow this robust implant to be efficacious in knees that have concomitant pathologies and treatments (i.e. partial meniscectomy, minor malalignment, ACL deficiency, etc.). The patient described in this report is a study of this scenario, as she has experienced early successful outcomes which were stable over at least the first 60 months of treatment. Early outcomes are promising, yet further studies are needed to evaluate the long-term effectiveness of the partial hemiarthroplasty in the femoral condyles.