

Case report

Flexion contracture due to cyclops lesion after bicruciate-retaining total knee arthroplasty

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ABSTRACT

Flexion contracture may develop after total knee arthroplasty (TKA) and is usually associated with soft tissue contracture in the posterior compartment or hamstrings. A cyclops lesion is a soft tissue mass which can form in the anterior compartment usually after anterior cruciate ligament reconstruction and has been observed after bicruciate-retaining TKA. We have treated a patient who developed progressive loss of full extension from 0° to 20° after bicruciate-retaining TKA. A large fibrous tissue mass (cyclops lesion) was identified in the anterior compartment during arthrotomy 1 year after TKA. Excision of the mass resulted in complete resolution of the flexion contracture.

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Introduction

Cyclops lesion is a term used to describe an intra-articular fibroproliferative nodule which impinges in the femoral notch blocking full extension. It was first described by Jackson and Schafer [1] in association with anterior cruciate ligament (ACL) reconstruction. They coined the term “cyclops lesion” to describe the arthrofibrotic nodule emanating from the anterolateral base of the ACL graft after reconstruction and noted an audible and palpable clunk with terminal extension in addition to loss of full extension. More recently, the post-traumatic cyclops lesion after ACL injury in the absence of surgical procedure [2–4] has been described. Moderate (5°–10°) flexion contracture after bicruciate-retaining (BCR) total knee arthroplasty (TKA) in association with a cyclops lesion [5] has also been described. These manifestations suggest that trauma to the ACL may be the inciting stimulus for nodule formation. In this report, we describe the development of a relatively large flexion contracture (20°) resulting from a cyclops after BCR TKA. The

flexion contracture increased progressively postoperatively at a rate of approximately 5° every 3 months and resolved completely after removal of the soft tissue lesion.

Case history

Our patient is an active 71-year-old female and avid skier who experienced several years of left knee pain limiting activity. She is 65 inches tall and weighs 175 pounds; body mass index 29.1. She had multiple steroid injections which were of diminishing efficacy and had participated in 3 months of guided physical therapy with no significant improvement. Three months prior to presentation in our clinic, she had undergone arthroscopic debridement, partial medial meniscectomy, and removal of multiple loose bodies. At the time of that procedure, it was noted that she had diffuse arthritic changes, worst in the medial compartment, documented as full thickness cartilage lesion; the anterior and posterior cruciate ligaments were noted to be intact and normal appearing. Due to ongoing pain and activity limitation, she was subsequently indicated for a BCR TKA. Preoperative knee examination demonstrated range of motion (ROM) of 0°–120° with no significant laxity. Preoperative imaging is shown in Figure 1a–c. After providing informed consent, she underwent TKA with a cemented BCR prosthesis (Journey II XR; Smith and Nephew, Memphis TN) shown in Figure 2a–c. At the patient's 2 and 6-week postoperative clinic visits she was able to achieve full extension. She presented back to clinic at 5 months postoperatively complaining of stiffness

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Figure 1. (a-c) Preoperative radiographs of the left knee.

and pain with activity and was noted to have a flexion contracture of 10° . She was started on an intensive physical therapy program aimed at achieving full extension and was seen in clinic at 1 month intervals. Despite 3 months of full participation in the targeted and guided therapy program, her flexion contracture worsened to 15° . During this time the patient participated actively in physical therapy and a home exercise program of extension stretching in an effort to regain full extension of the knee. The patient was offered surgical intervention to address the contracture at this time; however, she opted to continue with physical therapy. After 3 more months, nearly 1 year postoperatively, her flexion contracture had progressed to 20° . The decision was made with the patient to proceed with open debridement and possible revision of components as appropriate. Examination under anesthesia demonstrated passive ROM from 20° to 120° . The previous anterior skin incision was used and a standard medial parapatellar arthrotomy was performed. A large anterior arthrofibrotic nodule was immediately encountered (Fig. 3). The nodule was noted to be originating from the anterolateral base of the ACL and visibly impinged in the femoral notch with extension. It measured approximately 2.5 cm in width, 3 cm in height, and protruded approximately 1 cm anteriorly. This cyclops lesion was carefully debrided, paying special attention to protect the ACL fibers. After nodule excision, full extension was easily achieved (Fig. 4). The 9-mm polyethylene inserts were removed. Trialing with 8 mm, 0° inserts demonstrated full ROM, excellent stability with a slightly tighter extension gap; therefore, 8 mm, 2° inserts were selected to ensure appropriate balance throughout flexion and extension. At her 2-week postoperative visit she had maintained full extension and at her 6-month follow-up her ROM was noted to be 0° – 130° both passively and actively. She ambulates without

support and performs all activities of daily living including biking 5–6 miles at a time.

Discussion

Arthrofibrosis after TKA is a debilitating postoperative complication and a significant cause for failure [6]. In the United States, 10% of TKA revisions within 5 years have been attributed to postoperative arthrofibrotic changes [7]. Specifically, the loss of extension can be particularly debilitating as only a small loss in extension (as little as 5°) increases energy consumption and places significantly increased strain on the extensor mechanism and musculature [6,8,9]. Flexion contracture which develops after TKA in which full extension is achieved during surgery, is generally attributed to scar tissue formation in the posterior compartment.

Several postoperative factors have been identified as contributors to arthrofibrosis after surgical procedures and include poor patient motivation, poor pain tolerance, immobility, delayed start, or lack of compliance with rehabilitation program [8,10]. Arthrofibrosis after TKA has incidence recorded from 1% to 13% [6,11–15]. The wide variation in reported incidence is likely due to the fact that there is no defined criterion; however, with regard to loss of extension, most consider greater than 10° – 15° flexion contracture to be arthrofibrosis [6,8,13].

In our case, lack of extension was associated with the development of an anterior soft tissue mass which caused impingement in the anterior compartment. The flexion contracture does not appear to be related to any soft tissue contracture in the posterior compartment, as evidenced by its complete correction after excision of the cyclops lesion which was confined to the anterior compartment. The progressive development of the postoperative flexion

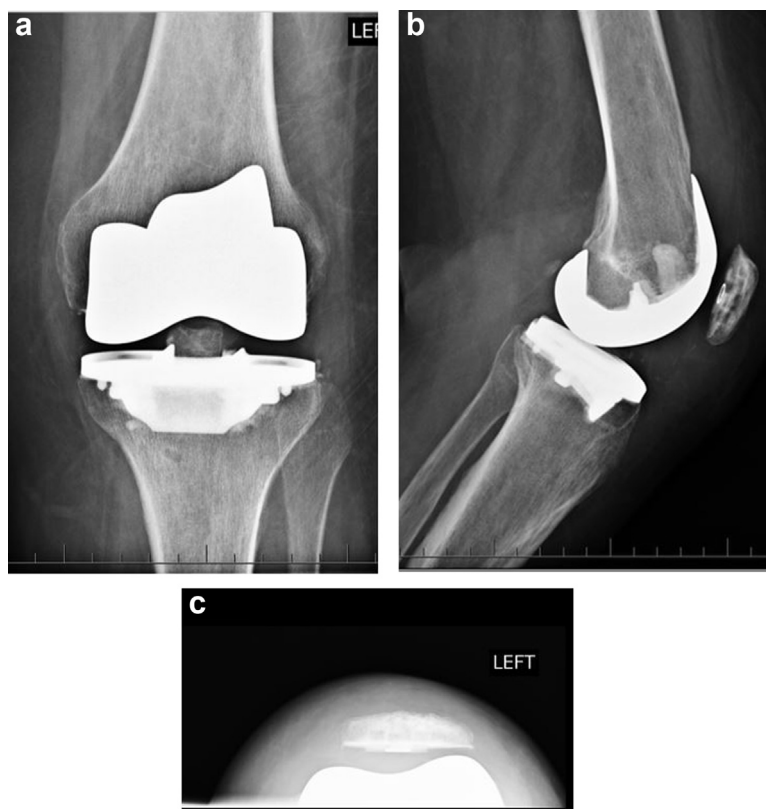


Figure 2. (a-c) Immediate postoperative radiographs of the left knee with bicruciate-retaining implants in place.

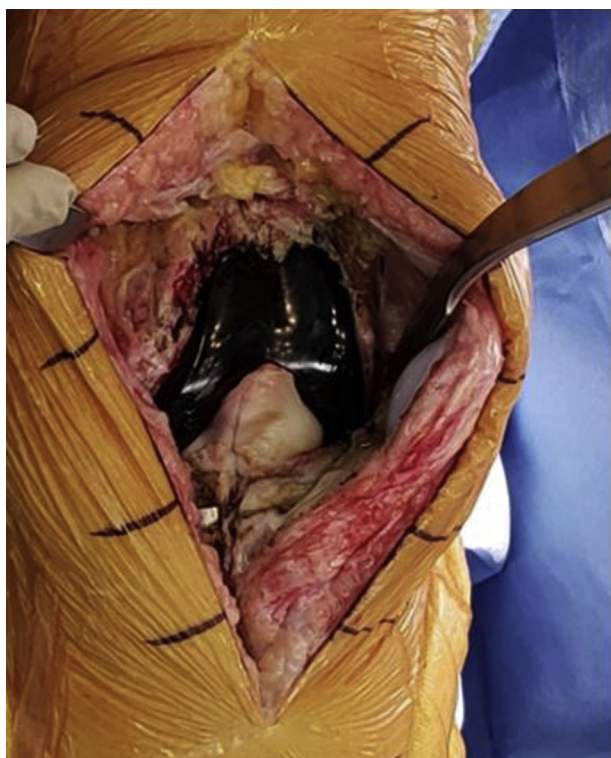


Figure 3. An intraoperative view after exposure of the knee demonstrates a large soft tissue mass (cyclops lesion) covering the ACL.

contracture of approximately 5° every 3 months over 1 year, suggests that the mass was continually enlarging during this time. The cyclops lesion as described by Jackson and Schafer in 1990 represents a focal fibroproliferation emanating off of the anterolateral tibial insertion of the ACL graft. As the knee goes from a flexed position into extension, the nodule impinges in the femoral notch providing a firm and painful endpoint which limits extension. In both “cruciate retaining” and “posterior stabilized” total knee implant designs, the ACL is sacrificed, and therefore a cyclops-type lesion is not possible. With BCR implants, the ACL is spared and is therefore a potential source to contribute to postoperative extension loss in the form of a cyclops lesion.

The case report by Klaassen and Aikins describes 3 cases of cyclops lesions in 2 patients, all of which were with the Biomet-Zimmer XP implant and all of which had 5° – 10° flexion contractures presenting from 3 to 6 months after primary TKA. Approximate lesion dimensions given in that report were 1.5 cm in both height and width and extending anteriorly 1 cm. The lesion in our case was larger in width (2.5 cm) and height (3 cm) and extended anteriorly by the same 1 cm. Our case suggests that a flexion contracture that develops postoperatively and increases progressively in the postoperative period after BCR TKA can represent a cyclops lesion which causes a large (20°) flexion contracture and the contracture can be corrected completely by excision of the lesion alone.

Summary

Cyclops lesion should be considered as a cause for lack of full extension in patients with BCR implant design. This is particularly



Figure 4. After excision of the soft tissue mass the knee was easily fully extended.

true for patients who were able to achieve full extension early postoperatively but experienced a later loss of full extension. In cases where a cyclops lesion is suspected, continued physical therapy may not improve their ROM, and a surgical intervention should be considered.

References

- [1] Jackson DW, Schaefer RK. Cyclops syndrome: loss of extension following intra-articular anterior cruciate ligament reconstruction. *Arthroscopy* 1990;6(3):171.
- [2] McMahon PJ, Dettling JR, Yocum LA, Glousman RE. The cyclops lesion: a cause of diminished knee extension after rupture of the anterior cruciate ligament. *Arthroscopy* 1999;15(7):757.
- [3] Nakagawa T, Hiraoka H, Fukuda A, Matsubara T, Nakayama S, Nakamura K. Symptomatic cyclops lesion after rupture of the anteromedial bundle of the anterior cruciate ligament. *J Orthop Sci* 2006;11(5):537.
- [4] Runyan BR, Bancroft LW, Peterson JJ, Kransdorf MJ, Berquist TH, Ortiguera CJ. Cyclops lesions that occur in the absence of prior anterior ligament reconstruction. *Radiographics* 2007;27(6):e26.
- [5] Klaassen MA, Aikins JL. The cyclops lesion after bicruciate-retaining total knee replacement. *Arthroplasty Today* 2017;3(4):242.
- [6] Cheuy VA, Foran JRH, Paxton RJ, Bade MJ, Zeni JA, Stevens-Lapsley JE. Arthrofibrosis associated with total knee arthroplasty. *J Arthroplasty* 2017;32(8):2604.
- [7] Schroer WC, Berend KR, Lombardi AV, et al. Why are total knees failing today? Etiology of total knee revision in 2010 and 2011. *J Arthroplasty* 2013;28(8):116.
- [8] Magit D, Wolff A, Sutton K, Medvecky MJ. Arthrofibrosis of the knee. *J Am Acad Orthop Surg* 2007;15(11):682.
- [9] Perry J, Antonelli D, Ford W. Analysis of knee-joint forces during flexed-knee stance. *J Bone Joint Surg Am* 1975;57(7):961.
- [10] Vun SH, Shields DW, Sen A, Shareef S, Sinha S, Campbell AC. A national questionnaire survey on knee manipulation following total knee arthroplasty. *J Orthop* 2015;12(4):193.
- [11] Donaldson JR, Tudor F, Gollish J. Revision surgery for the stiff total knee arthroplasty. *Bone Joint J* 2016;98-B(5):622.
- [12] Manrique J, Gomez MM, Parvizi J. Stiffness after total knee arthroplasty. *J Knee Surg* 2015;28(02):119.
- [13] Kalson NS, Borthwick LA, Mann DA, et al. International consensus on the definition and classification of fibrosis of the knee joint. *Bone Joint J* 2016;98-B(11):1479.
- [14] Yercan HS, Sugun TS, Bussiere C, Selmi TAS, Davies A, Neyret P. Stiffness after total knee arthroplasty: prevalence, management and outcomes. *Knee* 2006;13(2):111.
- [15] Desai AS, Karmegam A, Dramis A, Board TN, Raut V. Manipulation for stiffness following total knee arthroplasty: when and how often to do it? *Eur J Orthop Surg Traumatol* 2014;24(7):1291.