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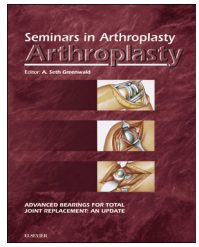

A contemporary bicruciate total knee arthroplasty

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ABSTRACT

Bicruciate retaining total knee arthroplasty dates back to the 1970s. The polycentric knee and the duocondylar spared the cruciate ligaments but led to early failures and loss of fixation. Designing surgeons excised the cruciates in order to facilitate the surgical procedure and improve the clinical results. Ultimately, the posterior cruciate sparing and substituting designs dominated the market. Most total knees are now anterior cruciate ligament deficient and 15–20% of patients are not satisfied with their surgical result. Bicruciate sparing total knee arthroplasties are now returning to the market and may afford improved results and satisfaction.

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1. Introduction

Bicruciate ligament retaining (BCR) total knee arthroplasty (TKA) dates to the early 1970s and in the 1980s both Townley [1] and Cloutier [2] developed designs that reported results that were similar to those of the standard posterior stabilized (PS) [3,4] and posterior cruciate retaining (CR) [5,6] total knees. Both authors published their results but the other designs remained more popular and surgeons were concerned about the failures of the geometric total knee [7–9]. In all, 15–20% of patients with TKAs are not satisfied with their results [10,11]. This may be a product of inappropriate expectations and compromised pre-operative counseling or the present prostheses may still require improved kinematics and design [12–15]. Preservation of both of the cruciate ligaments certainly improves the kinematics of the knee and may lead to better proprioception and patient satisfaction [16–18]. The surgical procedure is slightly more demanding than the cruciate sparing and cruciate substituting procedures [19,20]. Long-term follow up of Townley's knee design was encouraging [21]. However, the early results of one new design are presently questionable and there is certainly need for improvement [22,23].

2. Materials and methods

This article will review the surgical technique for a new BCR knee design that has been 8 years in development and has just come to the market with a limited release dating back to March, 2016. The indications for the procedure are presently very limited in order to preserve precise surgical technique and to maximize the benefit to the patient. Both cruciate ligaments must be intact; the deformity should not exceed 10° in any given plane; the range of motion must be at least 120° before surgery; the BMI should be less than 33. No inflammatory knees should be considered.

3. The operation

The arthrotomy is performed in the standard manner without any attempt to limit the exposure. The author uses a

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Figure 1 – The distal femoral cut is completed using an intramedullary referencing instrument.

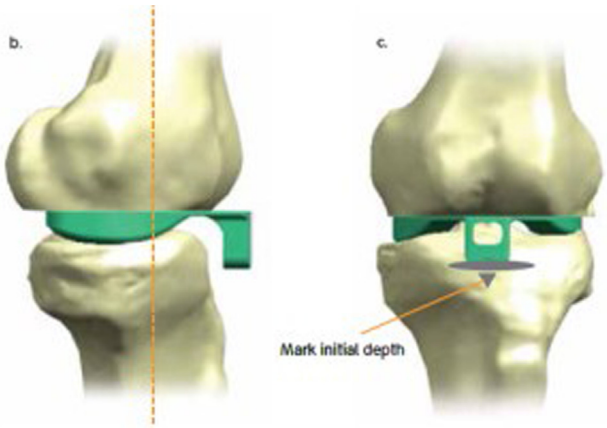

Figure 2 – An anatomically designed spacer block is used to confirm that the distal femoral resection will allow full extension of the knee.

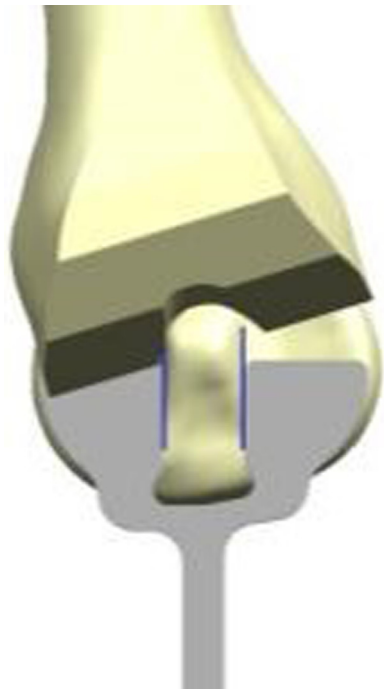

Figure 4 – The rotation of the tibial bone island cut is determined with relationship to the anatomy of the proximal anterior cortical surfaces.

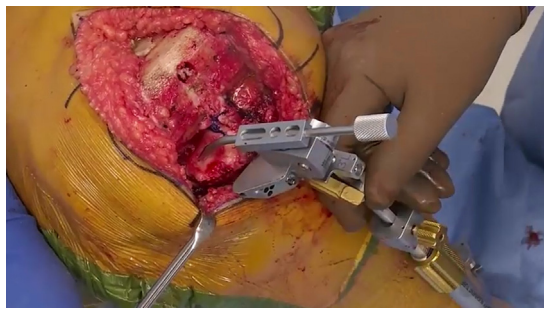

Figure 5 – The tibial depth guide measures 8 mm on the medial side and 11 mm on the lateral.

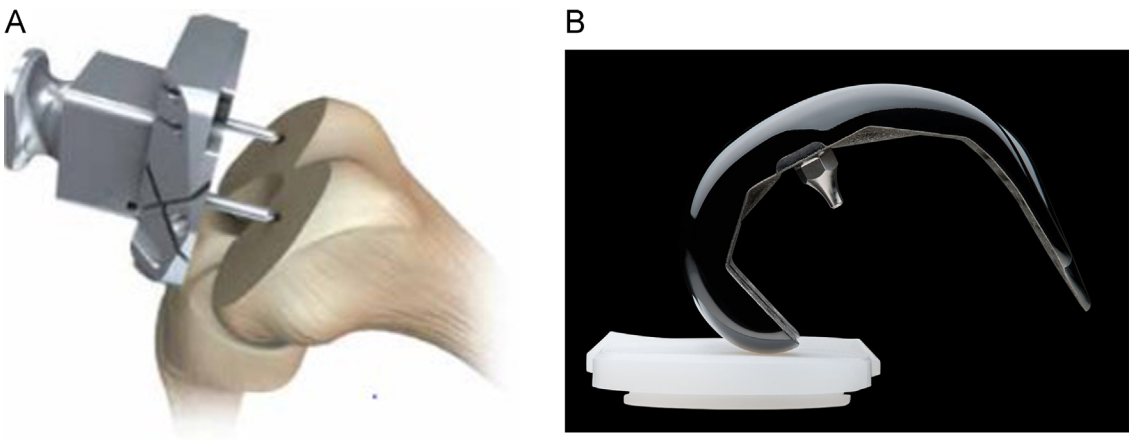

Figure 3 – (A) The femoral finishing block includes five cuts to allow for the posterior upswept femoral resection. (B) The lateral view of the femur shows the posterior upswept femoral condyle design.

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