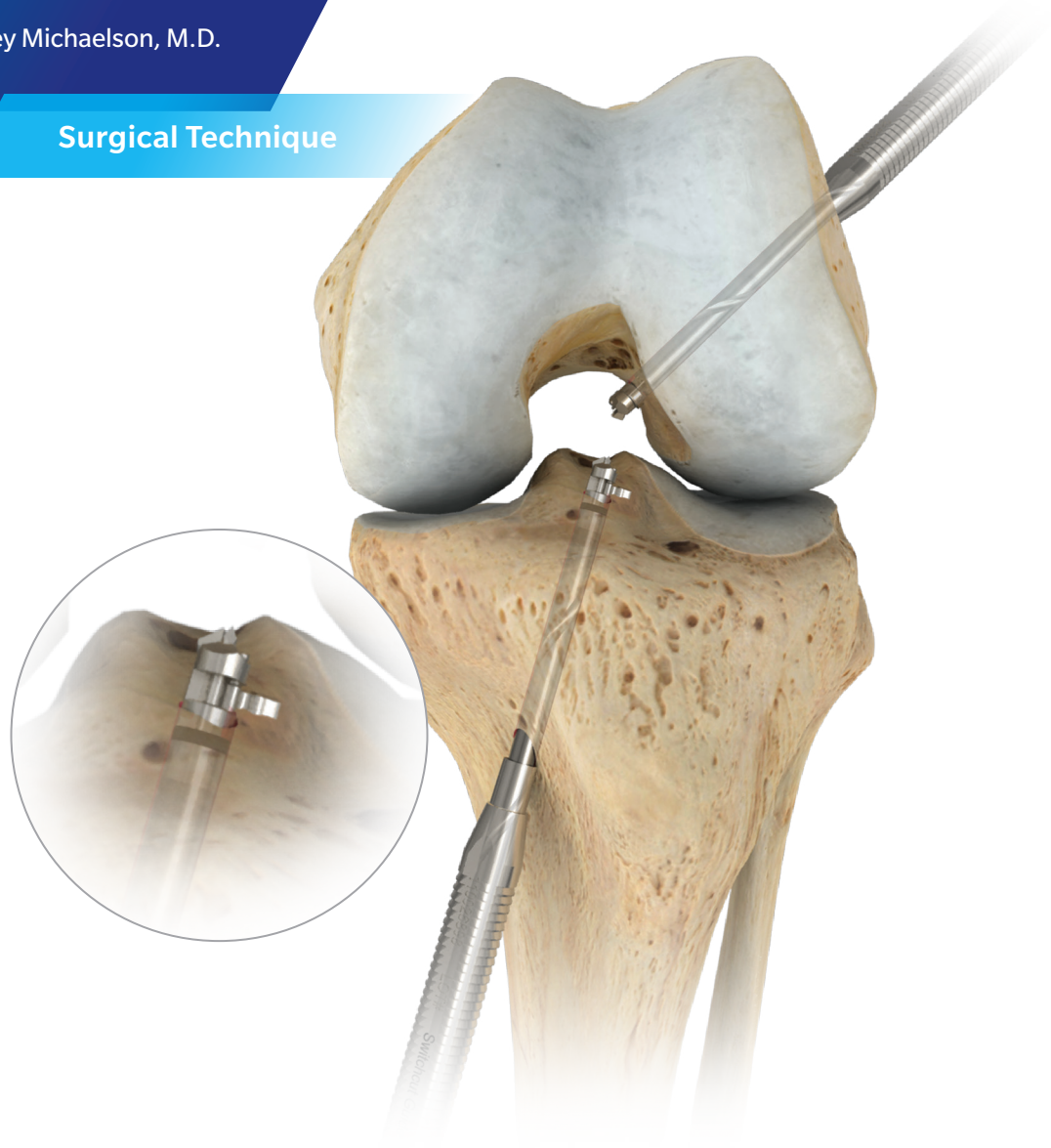


# SwitchCut™ Reaming System for ACL Reconstruction

Surgical Protocol by Jefferey Michaelson, M.D.

## Surgical Technique





## Table of Contents

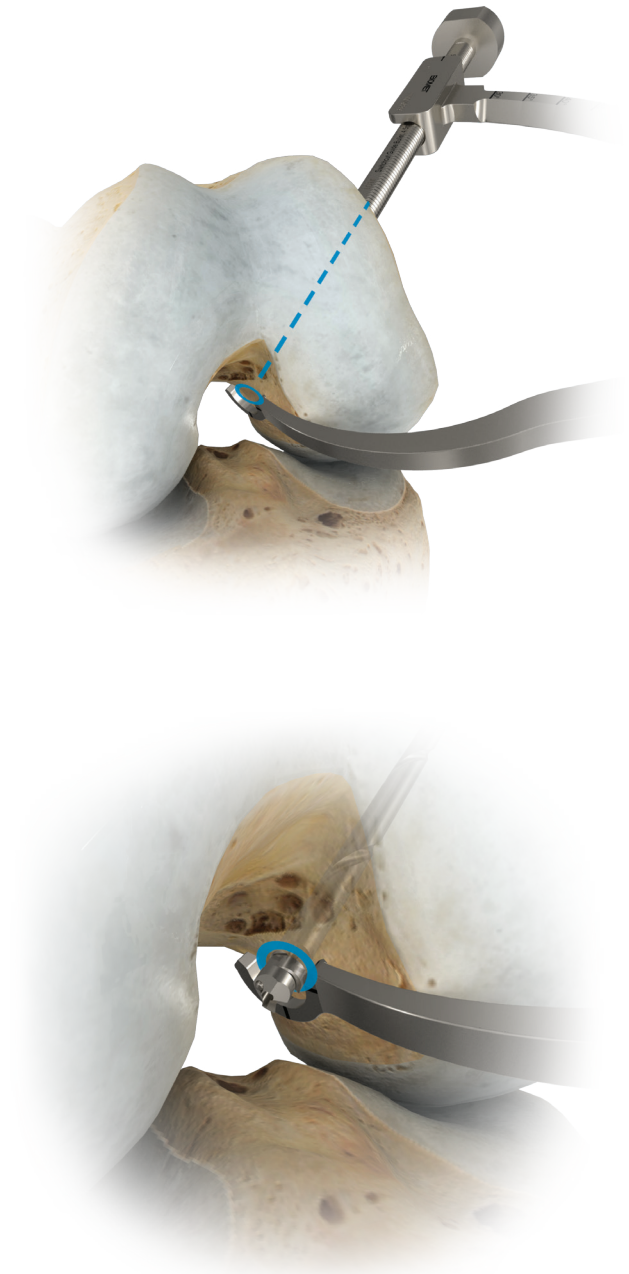
SwitchCut Reaming System for ACL Reconstruction .....	2
Femoral Tunnel Preparation: Insert the SwitchCut Side Specific Guide & Bullet.....	3
Create a Femoral Tunnel with the SwitchCut Reamer .....	4
Ream the Femoral Socket .....	6
Shuttle the Nitinol Loop Passer .....	7
Tibial Tunnel Preparation.....	9
Ream the Tibial Tunnel.....	9
Retrieval and Removal of the Nitinol Loop Passer .....	10
Final Femoral and Tibial Implant Fixation .....	10
Ordering Information .....	11
Indications for Use .....	12

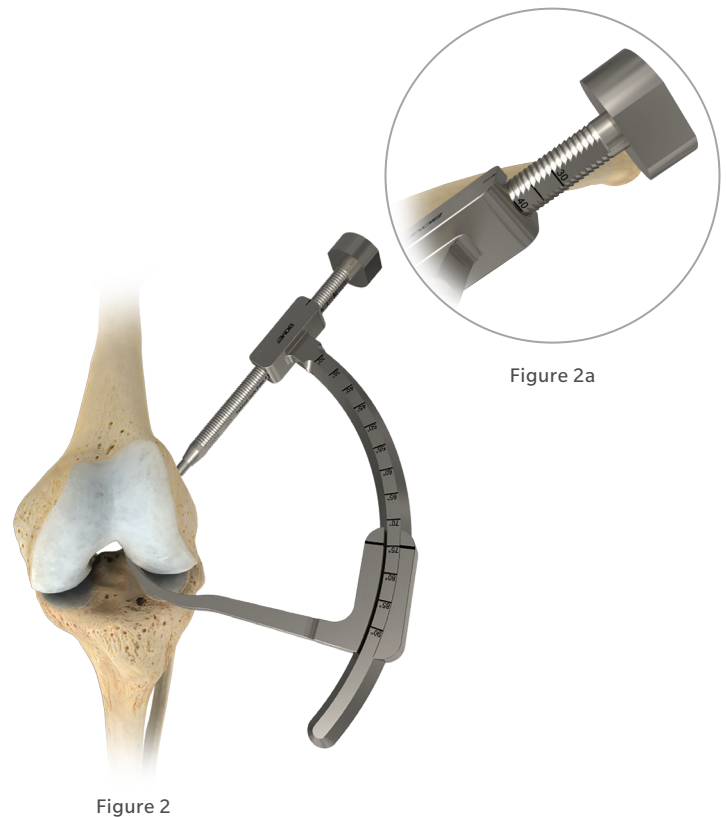
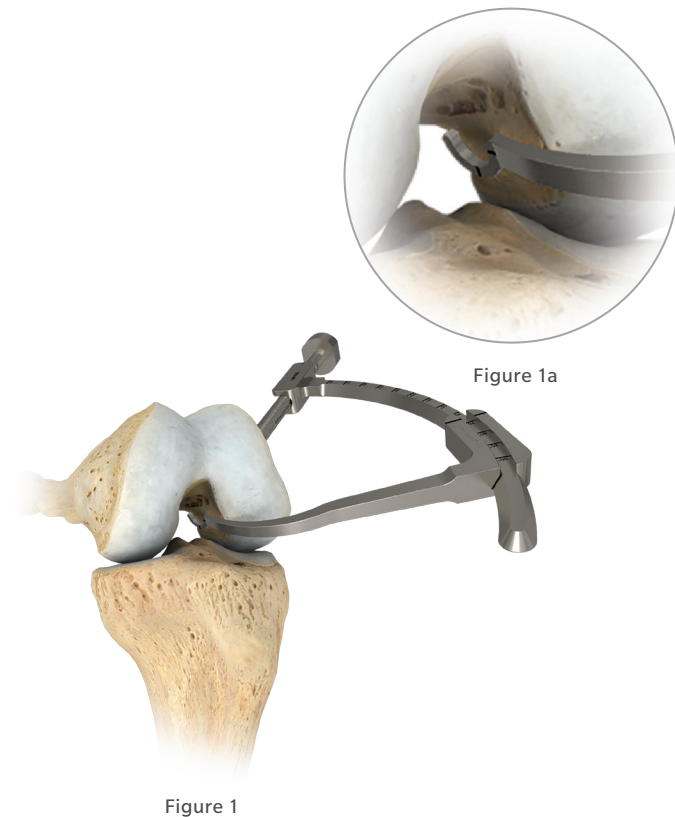
The consulting surgeons at Zimmer Biomet Sports Medicine have spent years developing the concept of the I.D.E.A.L.™ Femoral Tibial Placement Philosophy as it relates to the ACL femoral footprint. Evidence suggests that the I.D.E.A.L. femoral tunnel position should:

- 1) replicate the most **Isometric**<sup>1,2,3</sup> fibers within the native ACL,
- 2) be localized in the **Direct fiber**<sup>4</sup> subsection of the ACL origin based on histology,
- 3) be placed **Equidistantly**<sup>3,6,7,8,9</sup> from the bottom and top of the notch with a tunnel backwall that is 1–2 mm thick and **Eccentrically**<sup>5</sup> located high and deep within the footprint,
- 4) be **Anatomic**<sup>4,10</sup> in that the ACL graft is within the native ACL origin, and
- 5) achieve a **Low tension**-flexion<sup>2,3,6</sup> pattern in the ACL graft that replicates the tension-flexion behavior of the native ACL.

The SwitchCut Reamer is a powerful tool in recreating the appropriate position for ACL tunnel placement. The reamer and guide provide the flexibility for the I.D.E.A.L. placement, and are independent of the tibial tunnel and medial portal. The curved shape of the guide allows the ability to encircle the I.D.E.A.L. position and confirm placement prior to drilling the socket. It also allows the opportunity to observe the anatomic landmarks on the lateral aspect of the notch from the medial portal with an unobstructed view.

The SwitchCut Reamer is another tool in the Zimmer Biomet Sports Medicine ligament reconstruction system allowing for patient care and flexibility to the operating surgeon.





## Femoral Tunnel Preparation

### Insert the SwitchCut Side Specific Guide & Bullet

Insert the side specific (Right or Left) SwitchCut Femoral guide into the joint space, keeping in mind that the crescent shape tip of the femoral guide has an outer diameter of 12 mm and an inner diameter of 8 mm (Figure 1).

Insert the bullet to the lateral thigh to make an indentation in the skin. Pull back on the bullet to make a small skin incision, and then advance the bullet down to the lateral cortex (Figure 2). Note the length of the femoral tunnel on the bullet and guide system to make certain there is adequate length before proceeding with the SwitchCut reamer (Figure 2a).

**Note:** When placing the bullet into the SwitchCut femoral guide, orient the teeth on the bullet toward the ratchet mechanism on the SwitchCut guide body.



Figure 3

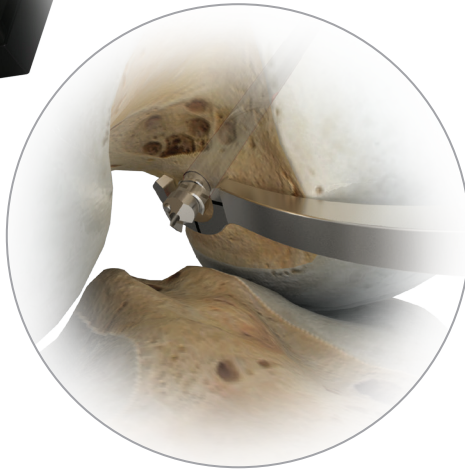


Figure 3a



Figure 4

## Create a Femoral Tunnel with the SwitchCut Reamer

Ream in a clockwise forward direction through the lateral cortex into the joint space (Figures 3 & 3a).

Once the SwitchCut tip has penetrated the entrance of the joint, as shown in Figure 3a, then rotate the bullet 90°. Remove the SwitchCut guide from the joint space, leaving the bullet in place (Figure 4).

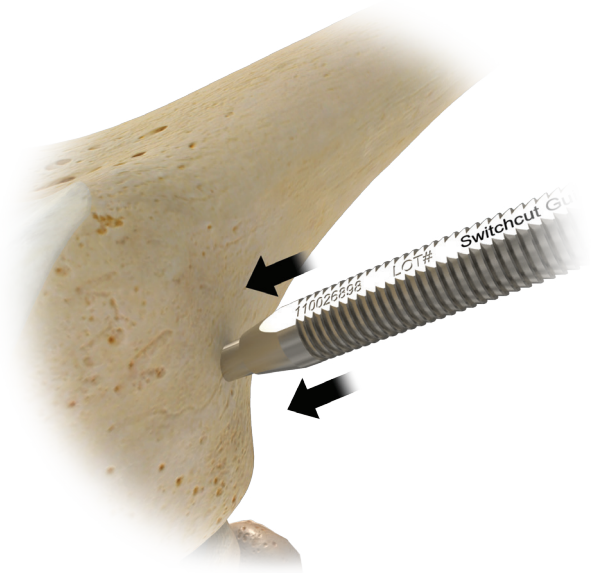


Figure 5



Figure 6

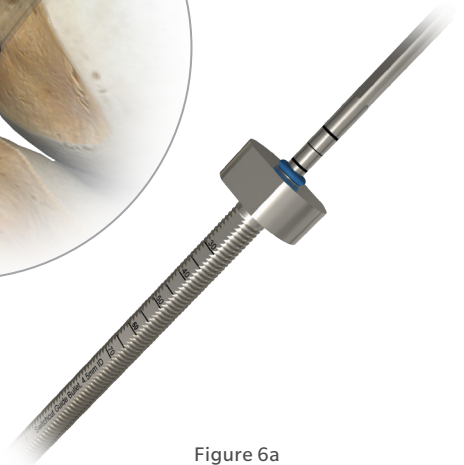


Figure 6a

### Create a Femoral Tunnel with the SwitchCut Reamer (cont.)

Use a mallet to gently tap the bullet into the lateral cortex bone until it bottoms out on the positive stop (Figure 5).

Advance the tip of the SwitchCut reamer to the bold black line. This will zero out the SwitchCut reamer (Figure 6). Once the black etched line is aligned with the intra-articular entrance, slide the O-ring to the back of the bullet (Figure 6a).



Figure 7

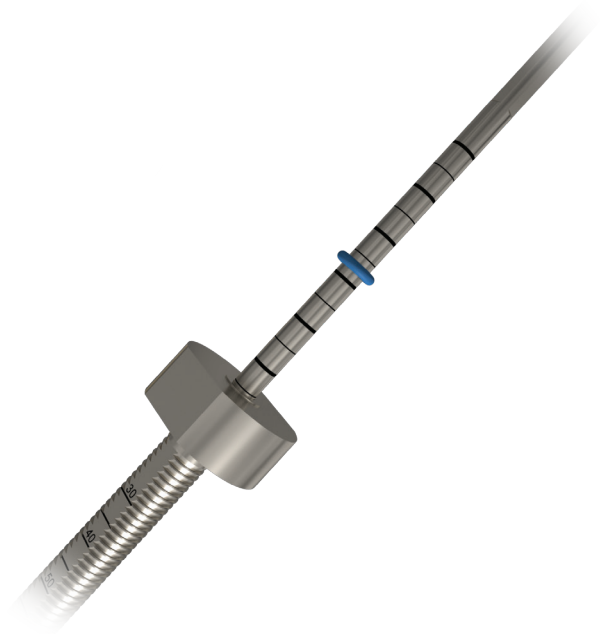


Figure 7a

## Ream the Femoral Socket

Ream in a counterclockwise (reverse) direction to drill the femoral socket. The arm on the SwitchCut reamer will automatically deploy as soon as it contacts bone (Figure 7). Ensure the drill is running at a maximum counterclockwise speed and maintain a constant and slow retro reaming motion. While retro reaming, count the etch marks on the SwitchCut reamer to determine the femoral socket depth, knowing that each etch line represents 5 mm (Figure 7a).

If desired, retro-ream until the SwitchCut reamer bottoms out on the bullet tip, which will leave a 7 mm bone bridge. **Do NOT continue to ream once the reamer makes contact with the bullet, as this may cause the tip of the reamer to break.** Then disconnect the Jacobs® Chuck from the SwitchCut reamer.



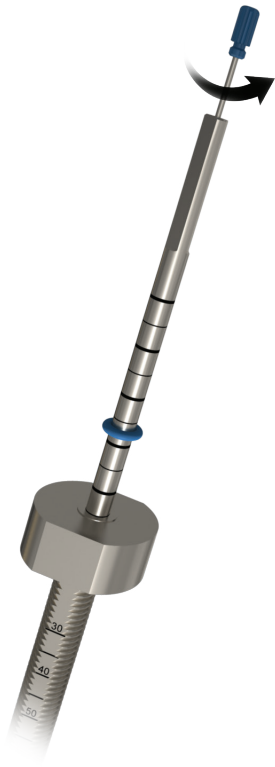


Figure 8



Figure 8a

### Shuttle the Nitinol Loop Passer

Remove the blue handled k-wire by twisting counterclockwise (reverse) (Figure 8) and pass the Nitinol loop passer, kite side first, down the SwitchCut reamer as shown (Figure 8a).

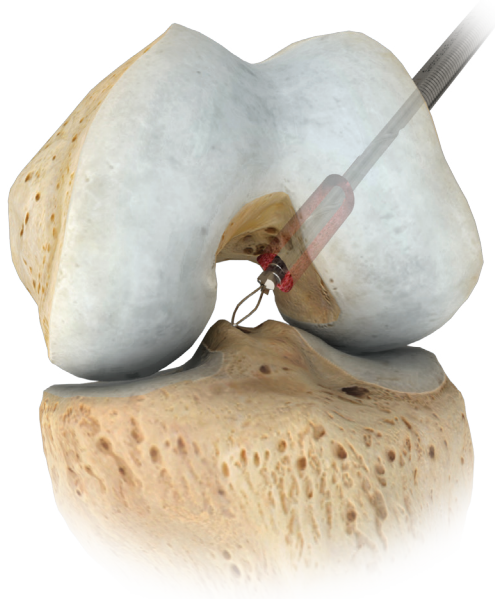


Figure 9

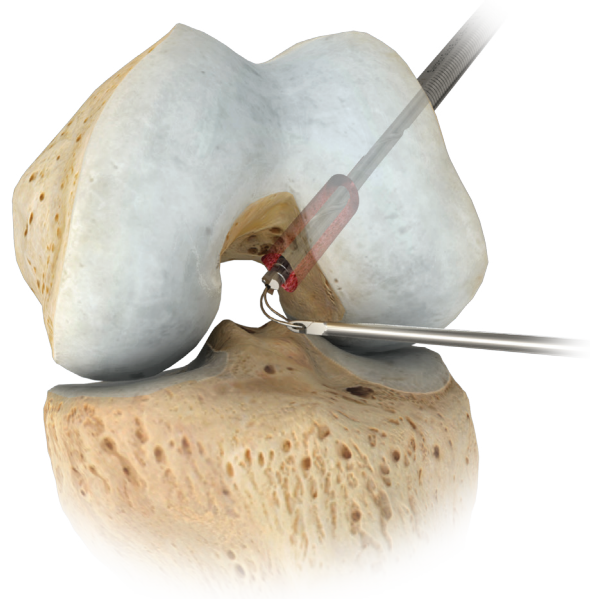


Figure 9a

### Shuttle the Nitinol Loop Passer (cont.)

Pass the Nitinol loop passer until it is seen in the joint space. Use a suture retriever to pull the loop passer out of the joint space (Figures 9 and 9a).

ⓘ **Note:** Once the loop passer is out of the joint space, gently remove the SwitchCut reamer by hand with a clockwise twisting motion. When the SwitchCut reamer has been withdrawn, bring both ends of the Nitinol wire together and clamp them using a hemostat.



Figure 10

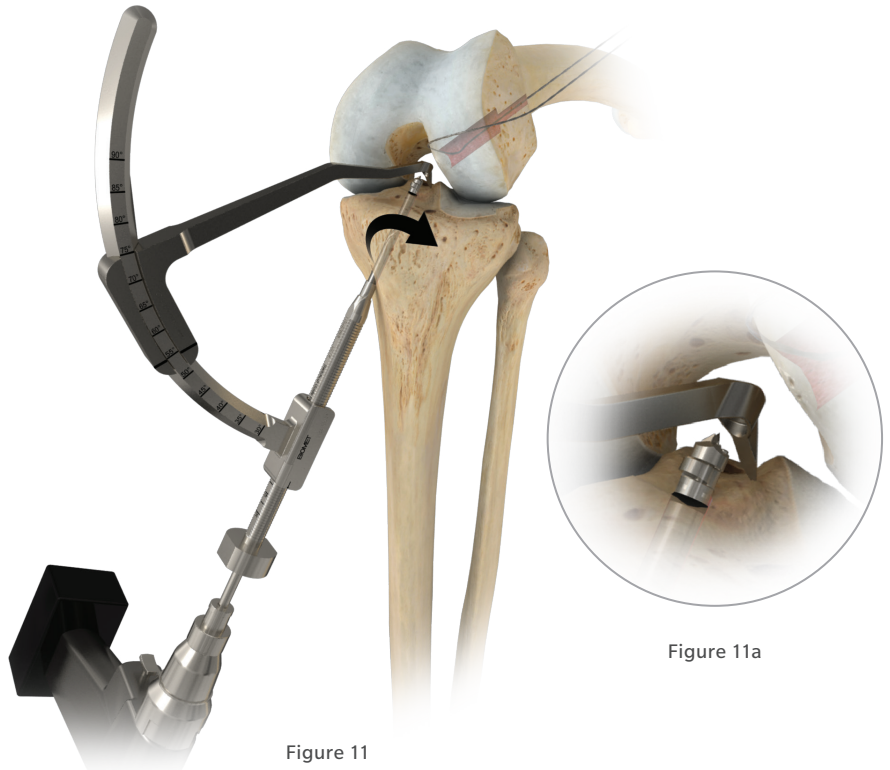


Figure 11

Figure 11a

## Tibial Tunnel Preparation

- ⓘ **Note:** If using the same sized SwitchCut reamer on the tibia, re-insert and thread the blue handled k-wire back into reamer.

## Ream the Tibial Tunnel

Insert the tibial SwitchCut guide into the joint space and center the tip on the desired position within the anatomic tibial footprint (Figure 10).

Ream in a clockwise direction through the lateral cortex into the joint space until the SwitchCut reamer hits the elbow of the tibial guide (Figures 11 and 11a). Rotate the bullet 90° and remove the tibial guide from the joint space.

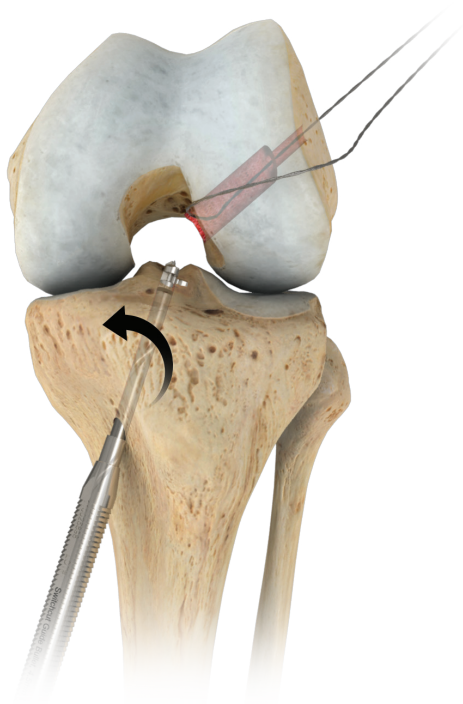


Figure 12

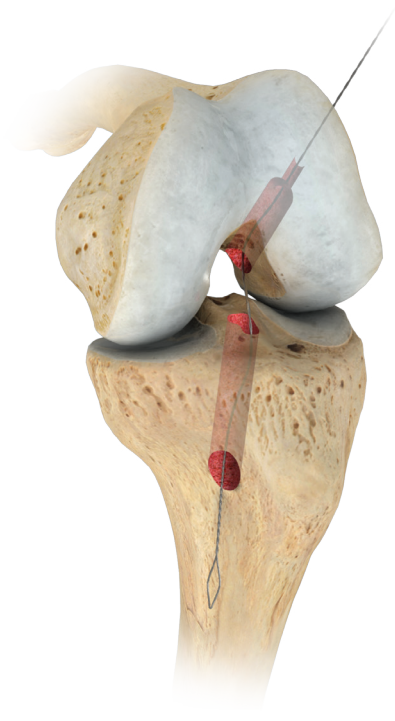


Figure 13

### Ream the Tibial Tunnel (cont.)

Ream in a counterclockwise (reverse) direction to drill the tibial tunnel. The arm on the SwitchCut reamer will automatically deploy as soon as it contacts bone (Figure 12). Ensure the drill is running at a maximum counterclockwise speed and maintain a constant and slow retro reaming motion.

ⓘ **Note:** If necessary, use a rasp, rongeur, or impingement rod to clean up the distal tibial cortical hole.

### Retrieval and Removal of Nitinol Loop Passer

After creating the tibial tunnel, retrieve the Nitinol loop passer from the joint space and pull the Nitinol loop passer through the tibial tunnel for passing of the implant (Figure 13).

### Final Femoral and Tibial Implant Fixation

Reference the ToggleLoc™ Fixation Device surgical technique for femoral fixation (0384.2-GLBL) and reference the TunneLoc® Tibial Fixation surgical technique for tibial fixation (0387.1-GLBL).

## Ordering Information

Part Number	Description	Size
110026884	Nitinol Loop Passer	–
110026898	SwitchCut Guide Bullet	4.5 mm ID
110026902	SwitchCut Guide Bullet	6.0 mm ID
110026899	SwitchCut Universal Guide Body	–
110026900	SwitchCut Femoral Guide Arm Right	–
110026901	SwitchCut Femoral Guide Arm Left	–
110026903	SwitchCut Tibial Guide Arm	–
110027674	SwitchCut Reamer w/ Nitinol Passers	4.5 x 6.0 mm
110027675		4.5 x 6.5 mm
110027676		4.5 x 7.0 mm
110027677		4.5 x 7.5 mm
110027678		4.5 x 8.0 mm
110027679		4.5 x 8.5 mm
110027680		4.5 x 9.0 mm
110027681		4.5 x 9.5 mm
110027682		4.5 x 10.0 mm
110027684		6.0 x 11.0 mm
110027686	6.0 x 12.0 mm	
110026911	SwitchCut Caddy	
110026904	Centering Sleeve	2.4 mm

## Indications for Use

### SwitchCut Reamer

#### INTENDED USE

The SwitchCut Reamer is intended for creating stepped tunnels and/or undercuts in bone for orthopedic reconstruction surgeries.

#### CONTRAINDICATIONS

The SwitchCut Reamer is NOT intended for use where one or more of the following conditions exist:

- Anatomic conditions requiring a bend radius.
- Use of device in patients with any known allergies or reactions to stainless steel and Nitinol.
- Physical conditions that would retard healing, such as blood supply limitation and infection.
- Conditions which tend to limit the patient's ability or willingness to follow instructions during the healing period.

### ACL/PCL Guide System

#### INTENDED USE

The ACL/PCL Guide System is intended to guide the SwitchCut reamer while creating graft tunnels during Anterior Cruciate Ligament (ACL) and Posterior Cruciate Ligament (PCL) reconstruction surgeries.

#### CONTRAINDICATIONS

The ACL/PCL Guide System for SwitchCut Reamer is NOT intended for use where one or more of the following conditions exist:

- Anatomic conditions requiring bend radius.
- Insufficient quantity or quality of cortical bone for fixation.
- Use of device in patients with any known allergies or reactions to stainless steel and Nitinol.
- Physical conditions that would retard healing, such as blood supply limitation and infection.
- Conditions which tend to limit the patient's ability or willingness to follow instructions during the healing period.



## References

1. Giron, Francesco: Femoral Attachment of the Anterior Cruciate Ligament. *Knee Surg Sports Traumatol Arthrosc* (2006) 14: 250-256.
2. Zavras, T. D.; Race, A.; and Amis, A. A.: The Effect of Femoral Attachment Location on Anterior Cruciate Ligament Reconstruction: Graft Tension Patterns and Restoration of Normal Anterior-Posterior Laxity Patterns. *Knee Surg Sports Traumatol Arthrosc*, 13(2): 92-100, 2005.
3. Simmons, R.; Howell, S. M.; and Hull, M. L.: Effect of the Angle of the Femoral and Tibial Tunnels in the Coronal Plane and Incremental Excision of the Posterior Cruciate Ligament on Tension of an Anterior Cruciate Ligament Graft: An *in vitro* Study. *J Bone Joint Surg Am*, 85-A(6): 1018-29, 2003.
4. Sasaki, Norihiro; Ishibashi, Yasuyuki ; Tsuda, Eiichi: Femoral Insertion of the Anterior Cruciate Ligament: Discrepancy Between Macroscopic and Histological Observations. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, Vol 28, No 8 (August), 2012: pp 1135-1146.
5. Howell, S.M.; Gittins, M.E.; Gottlieb, J.E.; Traina, S.M.; and Zoellner, T.M.: The Relationship between the Angle of the Tibial Tunnel in the Coronal Plane and Loss of Flexion and Anterior Laxity after Anterior Cruciate Ligament Reconstruction. *American Journal of Sports Medicine*, 29(5): 2001, pp 567-74.
6. Markolf, K. L.; Park, S.; Jackson, S. R.; and McAllister, D. R.: Anterior-Posterior and Rotatory Stability of Single and Double-Bundle Anterior Cruciate Ligament Reconstructions. *J Bone Joint Surg Am*, 91(1): 107-18, 2009.
7. Markolf, K. L.; Park, S.; Jackson, S. R.; and McAllister, D. R.: Contributions of the Posterolateral Bundle of the Anterior Cruciate Ligament to Anterior-Posterior Knee Laxity and Ligament Forces. *Arthroscopy. The Journal of Arthroscopic and Related Surgery*, VOL 24, No 7 (July), 2008: pp 805-809.
8. Markolf, K. L.; Park, S.; Jackson, S. R.; and McAllister, D. R.: A Comparison of 11 O'clock Versus Oblique Femoral Tunnels in the Anterior Cruciate Ligament-Reconstructed Knee. *The American Journal of Sports Medicine*, Vol. 38, No. 5.
9. Rahr-Wagner, L. R.: Increased Risk of Revision After Anteromedial Compared With Transtibial Drilling of the Femoral Tunnel During Primary Anterior Cruciate Ligament Reconstruction. Results from the Danish Knee Ligament Reconstruction Register. *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, 29(1); (January), 2013: pp 98-105.
10. Morgan, Joseph A.: Femoral Tunnel Malposition in ACL Revision Reconstruction. *J Knee Surg*. 2012 November; 25(5): 361-368.

This material is intended for health care professionals and the Zimmer Biomet sales force only. Distribution to any other recipient is prohibited. All content herein is protected by copyright, trademarks and other intellectual property rights owned by or licensed to Zimmer Biomet or its affiliates unless otherwise indicated. This material must not be redistributed, duplicated or disclosed, in whole or in part, without the express written consent of Zimmer Biomet.

Check for country product clearances and reference product specific instructions for use. For complete product information, including indications, contraindications, warnings, precautions, and potential adverse effects, see the package insert, and visit [www.zimmerbiomet.com](http://www.zimmerbiomet.com) or contact your local Zimmer Biomet representative.

\*Zimmer Biomet does not practice medicine. This technique was developed in conjunction with [a] health care professional[s]. This document is intended for surgeons and is not intended for laypersons. Each surgeon should exercise his or her own independent judgment in the diagnosis and treatment of an individual patient, and this information does not purport to replace the comprehensive training surgeons have received. As with all surgical procedures, the technique used in each case will depend on the surgeon's medical judgment as the best treatment for each patient. Results will vary based on health, weight, activity and other variables. Not all patients are candidates for this product and/or procedure. Caution: Federal (USA) law restricts this device to sale by or on the order of a surgeon. Rx only.

The I.D.E.A.L. positioning philosophy was prepared by a licensed health care professional. Zimmer Biomet does not practice medicine and does not recommend any particular positioning for use on a specific patient.

Jacobs is a registered trademark of the Apex Brands, Inc.  
Zimmer Biomet is the legal manufacturer of the SwitchCut Caddy.

©2017 Zimmer Biomet

**Distributor**  
Biomet Sports Medicine  
56 East Bell Drive  
P.O. Box 587  
Warsaw, Indiana 46581  
USA

 **Legal Manufacturer**  
T.A.G. Medical Products  
Corporation LTD  
Kibbutz Gaaton 2513000  
Israel  
Tel: +972-4-9858400  
Fax: +972-4-9858404



0180.1-GLBL-en-REV0517

[www.biomet.com](http://www.biomet.com)



CE mark on a surgical technique is not valid unless there is a CE mark on the product label.