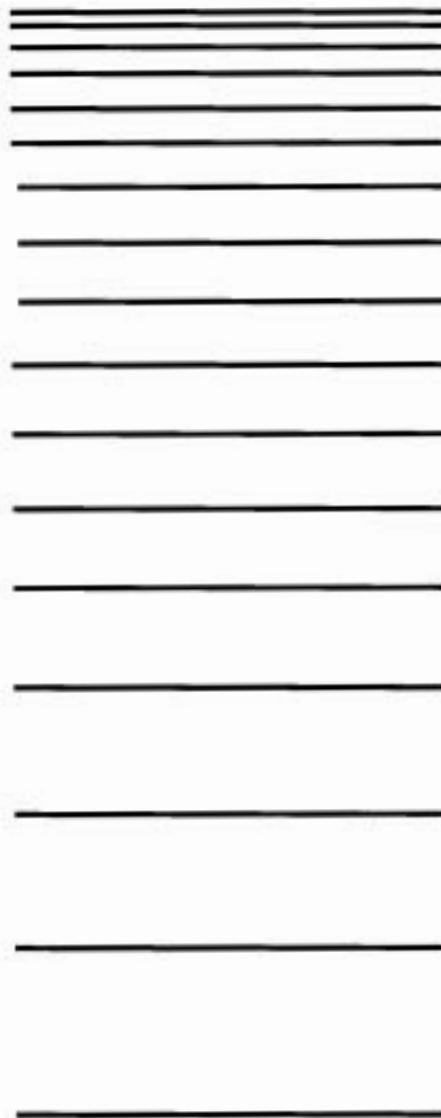


**Smith+Nephew**

TECHNIQUE FOR  
ACL RECONSTRUCTION  
WITH ACUFEX® DIRECTOR  
DRILL GUIDE AND  
ENDOBUTTON® CL



**ACUFEX®**

**DYONICS®**

# TECHNIQUE FOR ACL RECONSTRUCTION USING THE ACUFEX DIRECTOR DRILL GUIDE AND ENDOBUTTON® CL

## TABLE OF CONTENTS:

Introduction	1
Notch Preparation	2
Tibial Tunnel Location	3
Notch Assessment	4
Tibial Tunnel Drilling	5
Femoral Tunnel Location	6
Femoral Tunnel Drilling	6
Graft Preparation	8
Graft Passage	11
Graft Tensioning	13
Tibial Fixation	13
Appendix A	14
Appendix B	15
Technical Notes	18

## INTRODUCTION

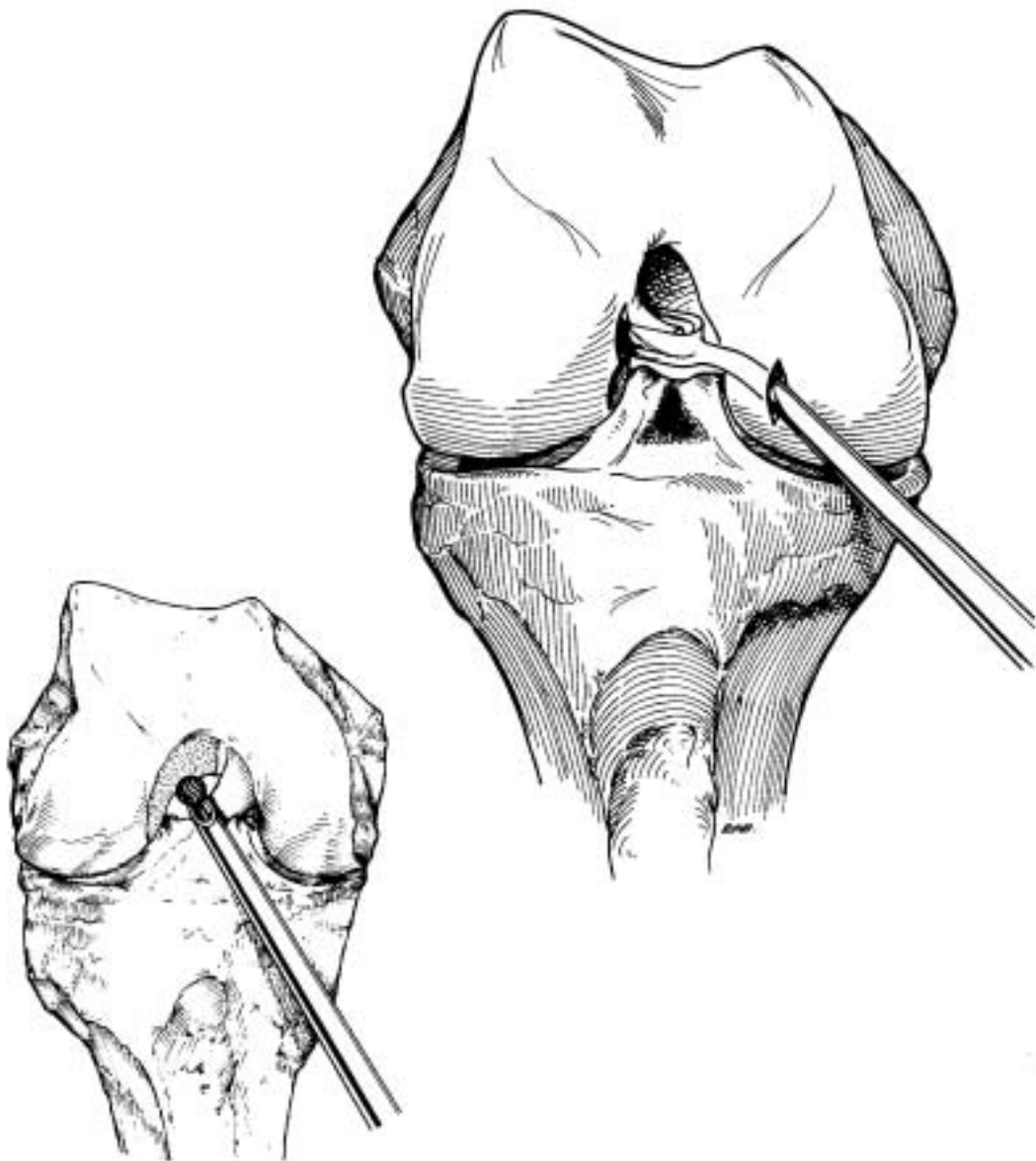
Since Acufex® introduced endoscopic ACL reconstruction 10 years ago, the technique has steadily grown. Surgical exposure and precision have been facilitated. Reduction in surgical morbidity has been achieved and excellent stability following ACL reconstruction has become standard. The new Acufex Director System advances the simplicity and precision of endoscopic ACL reconstruction. New enhancements include:

- **Acufex Director Guide** achieves maximum rigidity, accuracy and simplicity with one hand operation.
- **Anti-Impingement Device** simplifies monitoring of the intrachondral notch prior to the creation of the tibial tunnel.
- **2 - 5 and 3 - 9 offset drill guides** facilitate precise guide pin placement.
- **Endoscopic Femoral Aimer with 3 or 4mm offset** optimizes femoral positioning for semitendinosus constructs.
- **EndoButton® CL** consistently provides the strongest and most versatile endoscopic femoral fixation utilizing soft tissue grafts.
- **NotchMaster™ Curette** facilitates removal of bone and soft tissue from the notch during notchplasty.

## NOTCH PREPARATION

Perform appropriate notchplasty using the *NotchMaster*<sup>TM</sup> curette or *NotchBlaster*<sup>®</sup> burr.

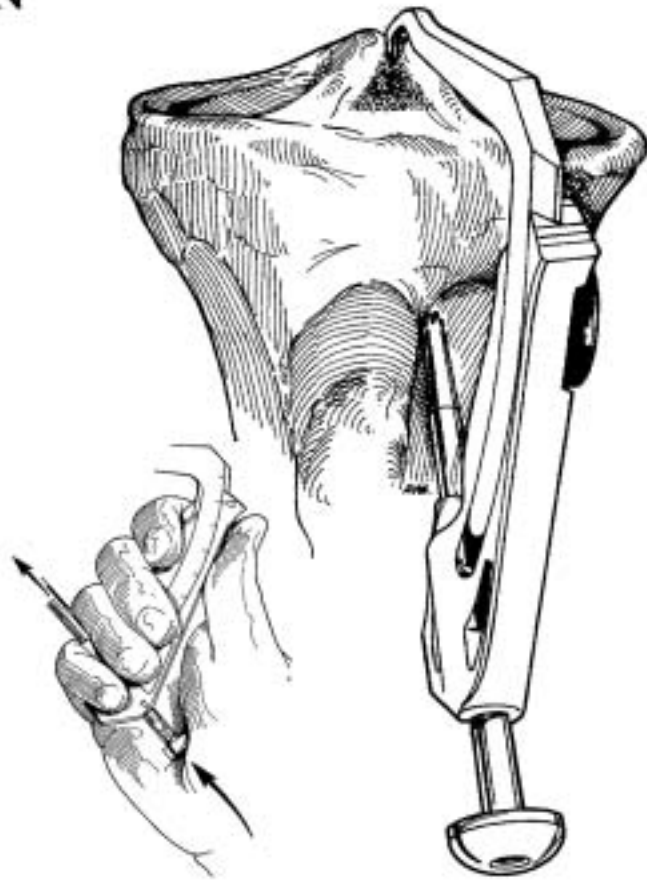
Autografts typically require 2mm clearance. The proximal outlet of the notch should not be enlarged, rather it is carefully identified with the knee at 90° flexion.



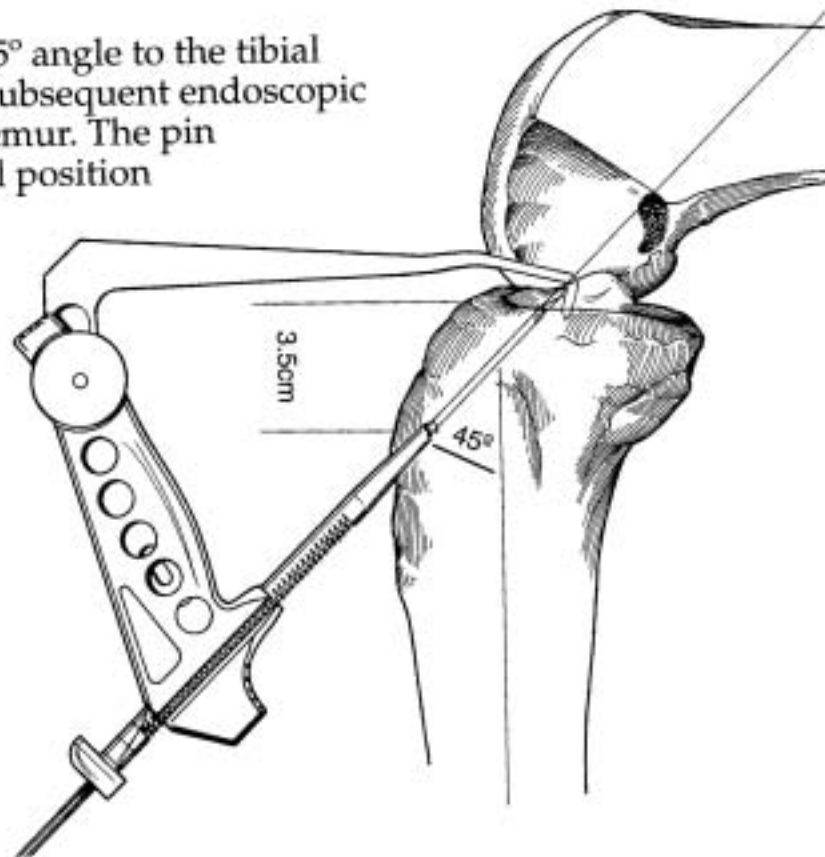
## TIBIAL TUNNEL LOCATION

The tibial guide is aimed from a point 3 – 4cm distal to the joint line while hugging the tibial tubercle. The tip of the elbow aimer is placed in the posterior fibers of the ACL footprint as shown.

The technique can be performed with one hand.



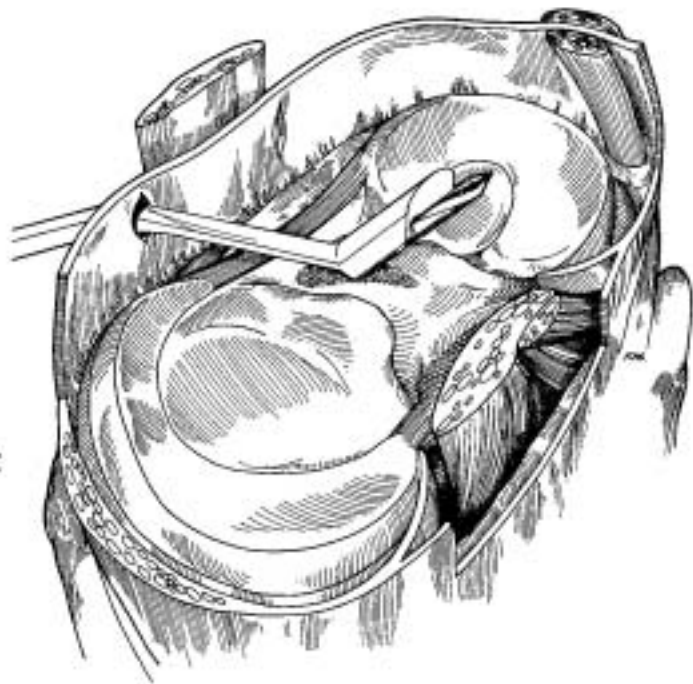
Pin placement at a 45° angle to the tibial shaft is optimal for subsequent endoscopic positioning on the femur. The pin advances to a central position within the ACL footprint



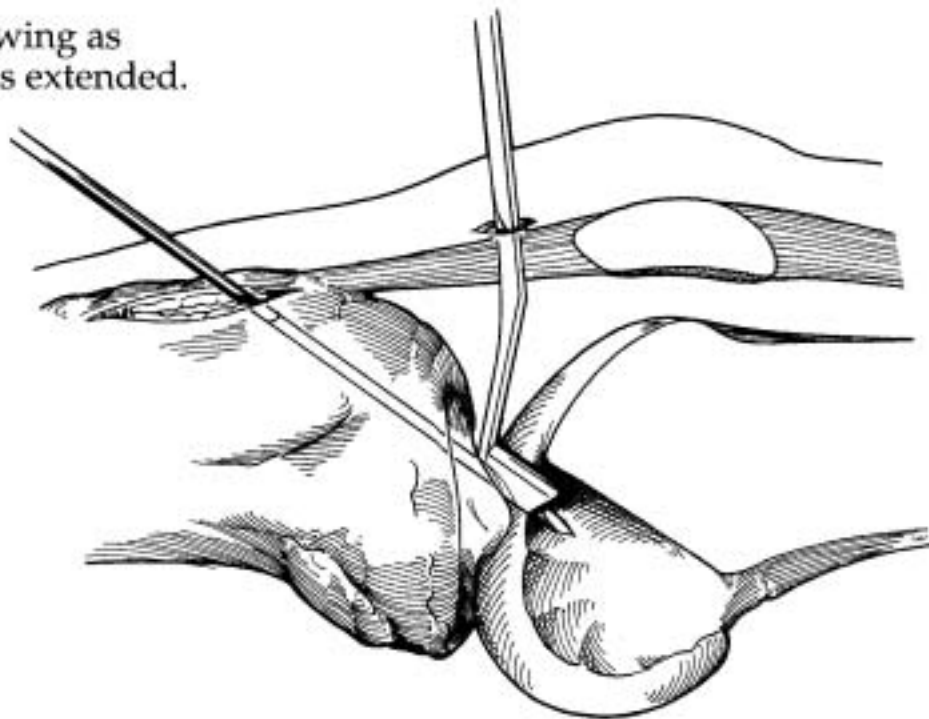
## NOTCH ASSESSMENT

Notch assessment is correctly performed before drilling the tibial tunnel. The Drill Tip Guide wire is advanced into the joint and then assessed by:

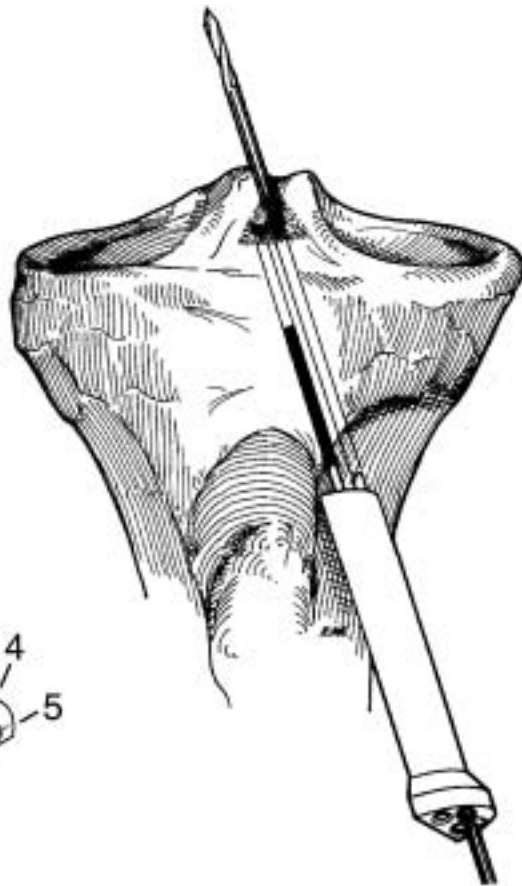
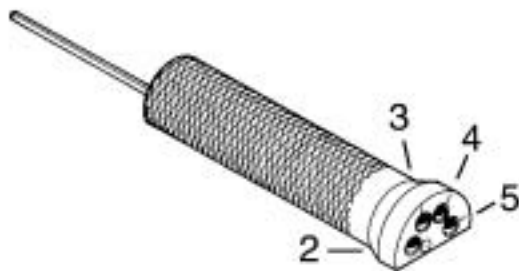
- a) placing the Anti-Impingement Device over the guide wire...



- b) while viewing as the knee is extended.

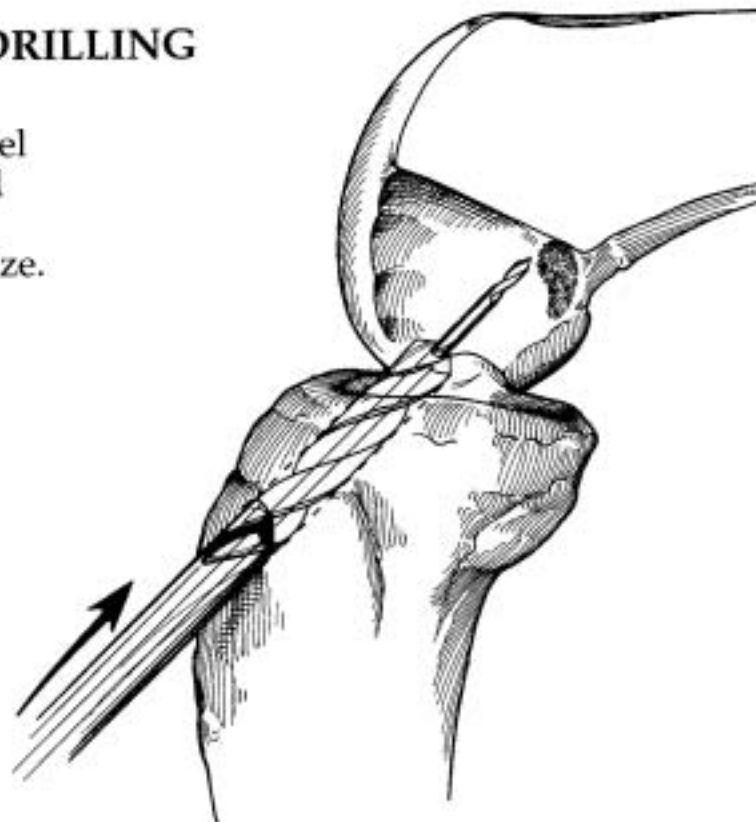


If the guide wire is sub-optimally positioned, it is then repositioned using the 2 - 5mm Offset Drill Guide.



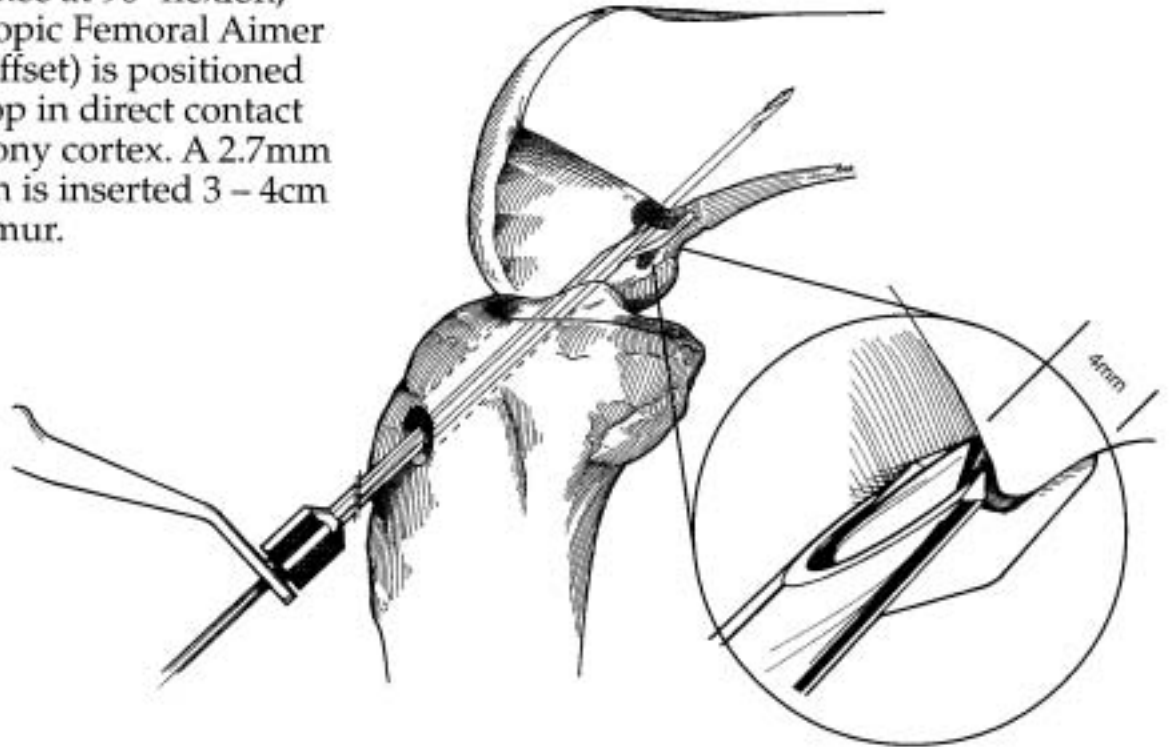
## TIBIAL TUNNEL DRILLING

Drilling the tibial tunnel necessitates a standard cannulated drill bit which matches graft size.



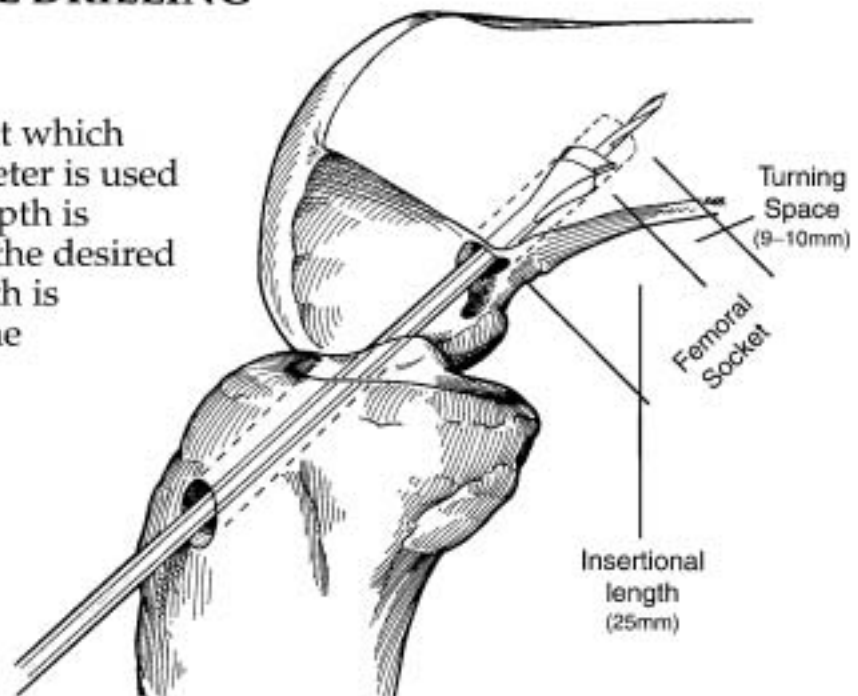
## FEMORAL TUNNEL LOCATION

With the knee at 90° flexion, an Endoscopic Femoral Aimer (3 - 4mm offset) is positioned over-the-top in direct contact with the bony cortex. A 2.7mm Passing Pin is inserted 3 - 4cm into the femur.

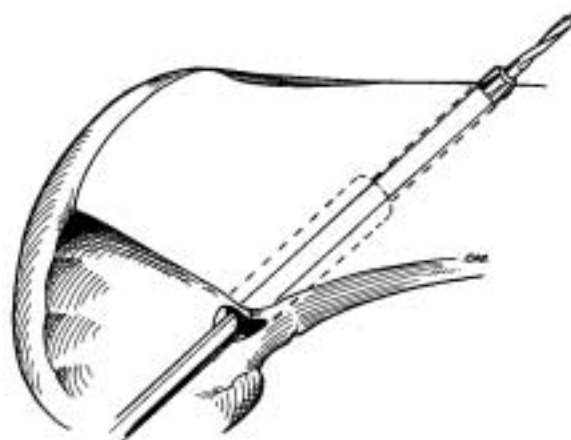


## FEMORAL TUNNEL DRILLING

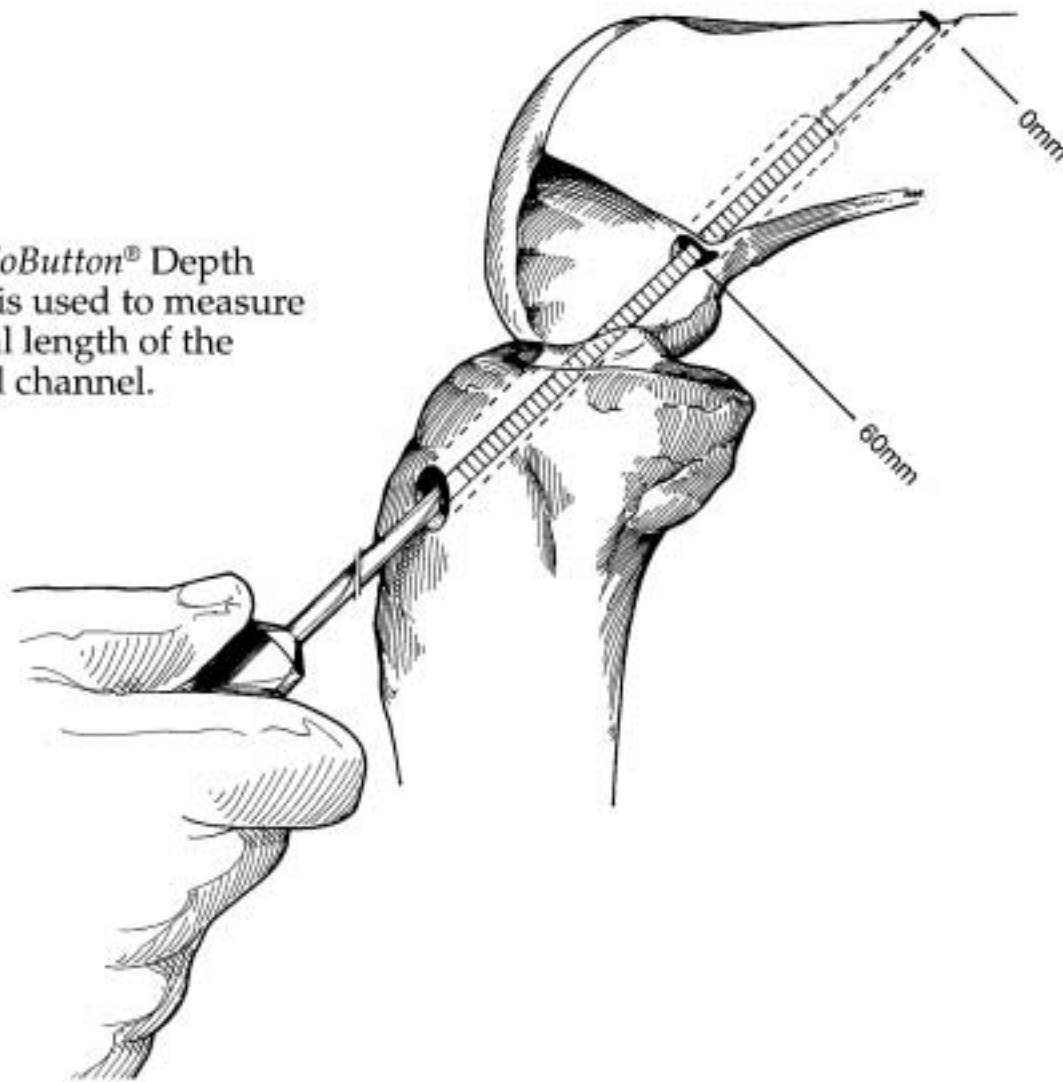
The Endoscopic Drill bit which matches the graft diameter is used to produce a socket. Depth is regulated according to the desired insertional length. Depth is 9-10mm greater than the desired graft insertion, to allow *EndoButton*<sup>®</sup> rotation.



The knee should now be flexed at least 90°. A 2.7mm Passing Pin and a 4.5mm Endoscopic Drill are used to produce the passing channel.



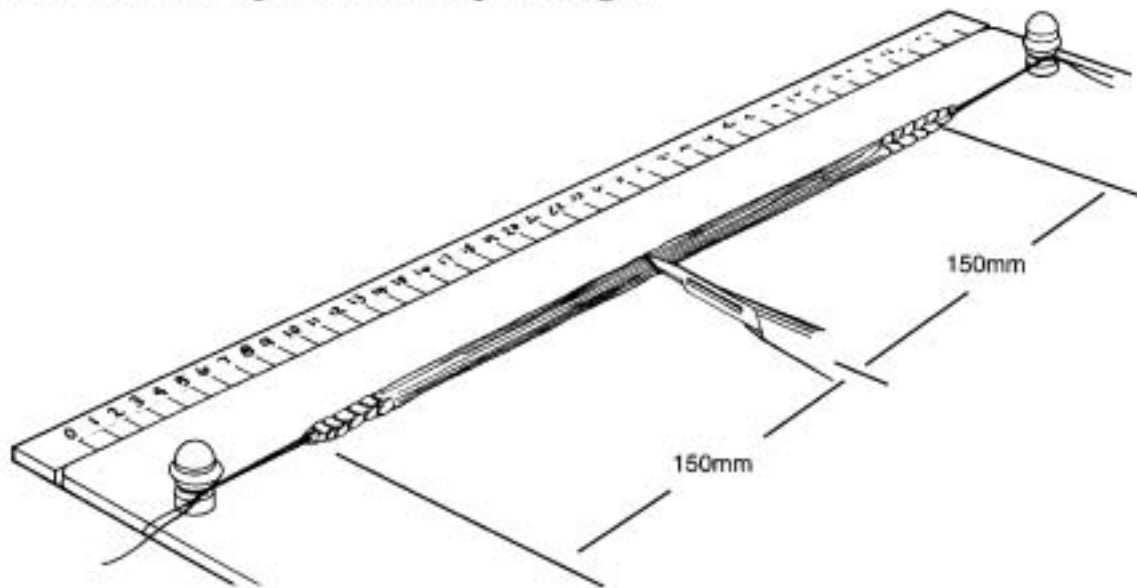
An *EndoButton*® Depth Gauge is used to measure the total length of the femoral channel.



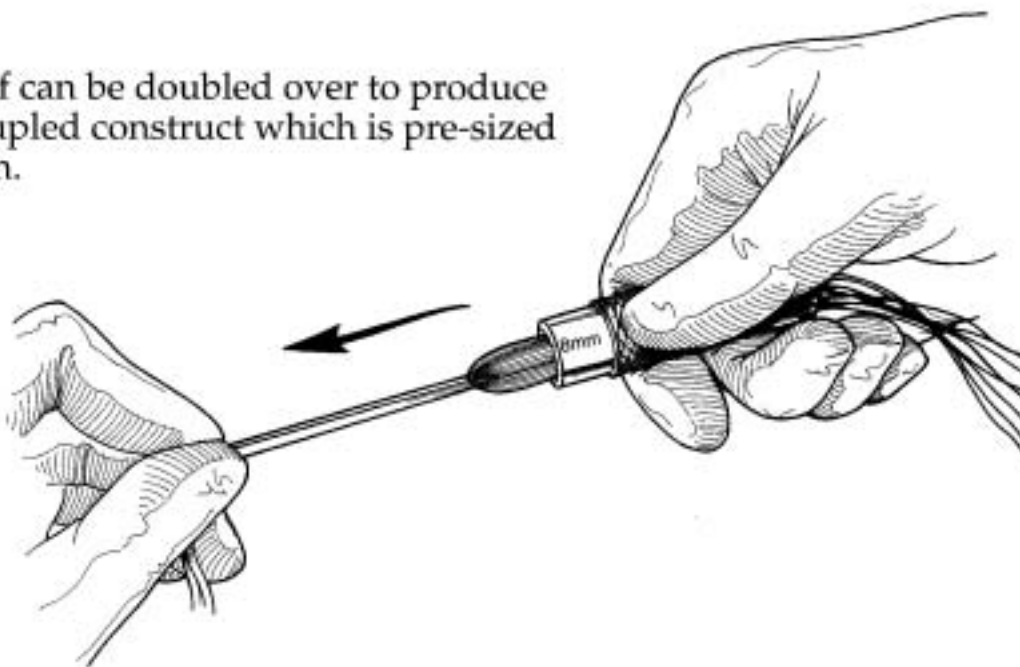


## GRAFT PREPARATION

Working on the *GraftMaster*<sup>®</sup>, the semitendinosus graft can be cut into 2 portions of equal length.

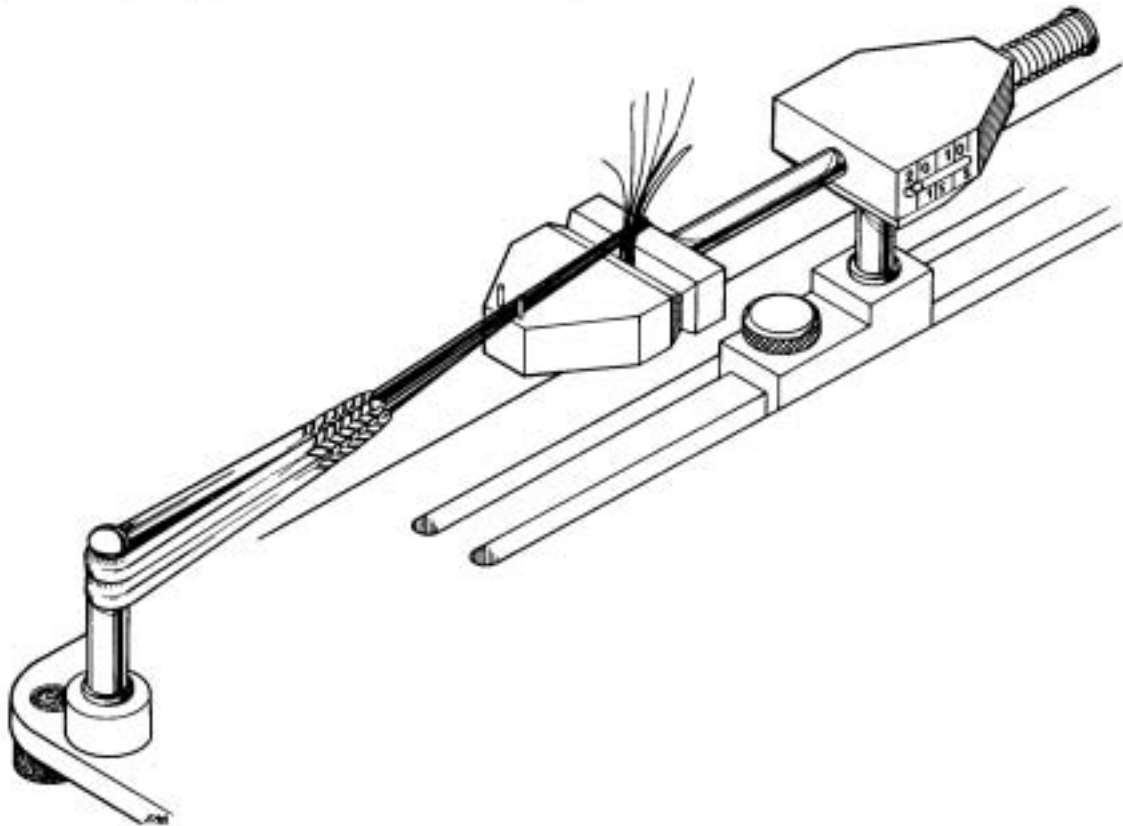


Each half can be doubled over to produce a quadrupled construct which is pre-sized as shown.



If desired, pretensioning may be standardized by placing the graft construct around the Tensioning Post, utilizing the Tensiometer.

(Usually 20 pounds for 10 minutes)



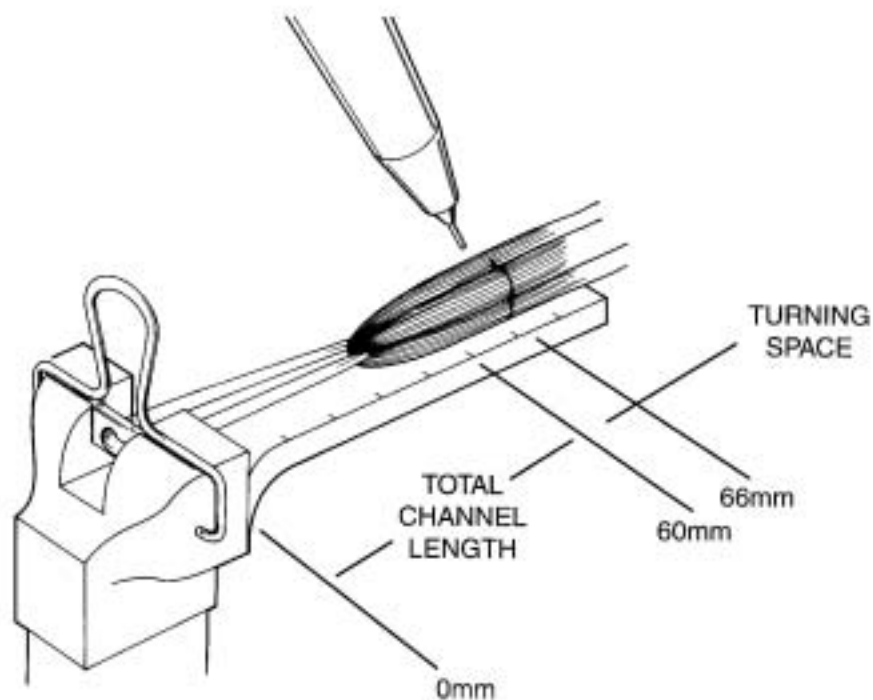
## ENDOBUTTON® CL SIZING

The *EndoButton* CL length is determined by the difference between the total femoral channel length and the desired femoral graft insertion length. If this falls between two *EndoButton* CL sizes, "round off" to the closer size.

Note: The *EndoButton* CL is currently available in 5mm increments. If the required size falls outside the available range or if the *EndoButton* CL is not available, see Appendix A.

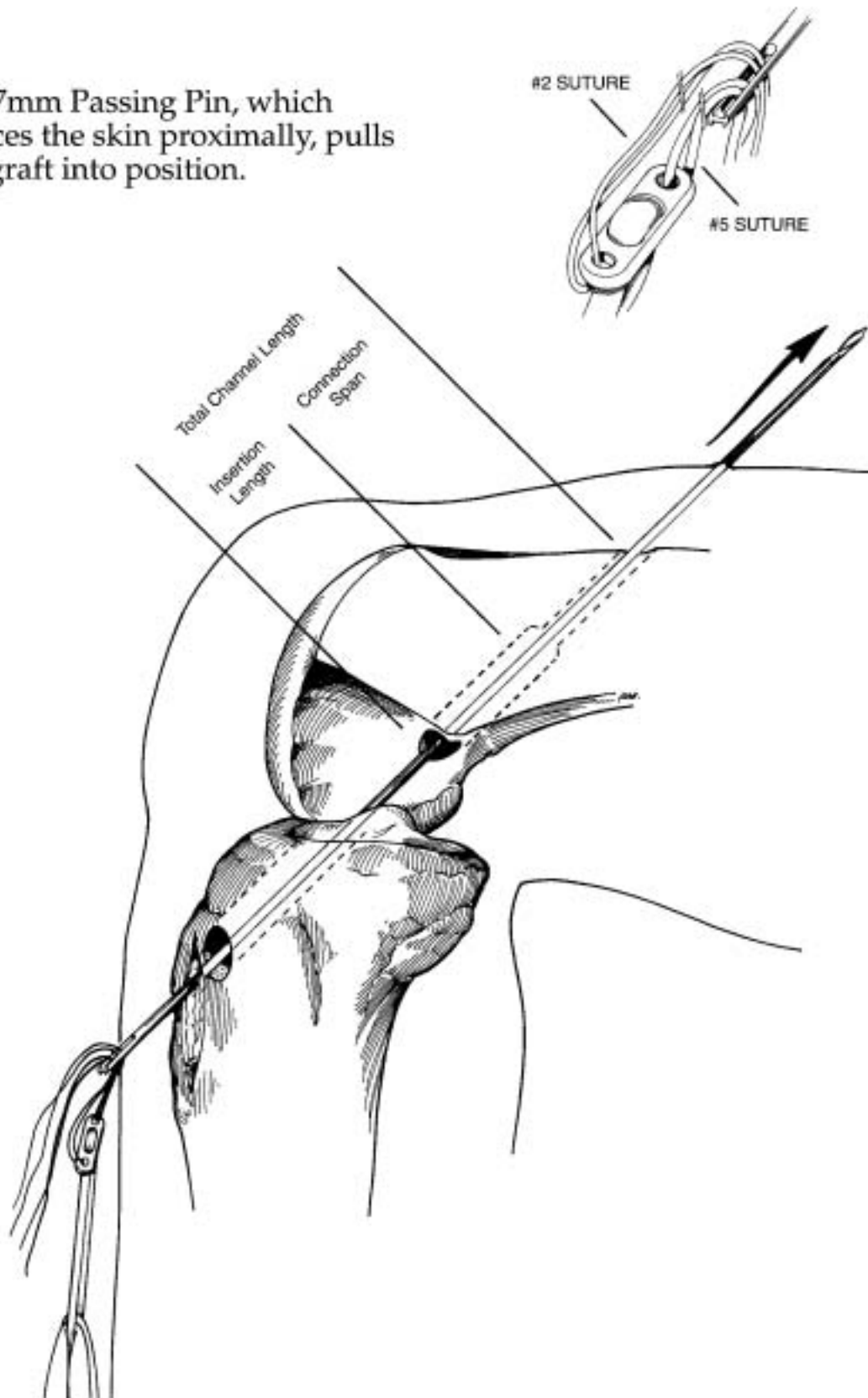
The grafts are passed through the continuous loop and the construct is loaded into the *EndoButton* Holder.

A line is placed on the graft 6mm distal to the total channel length. This will indicate the rotation point for the *EndoButton* CL.



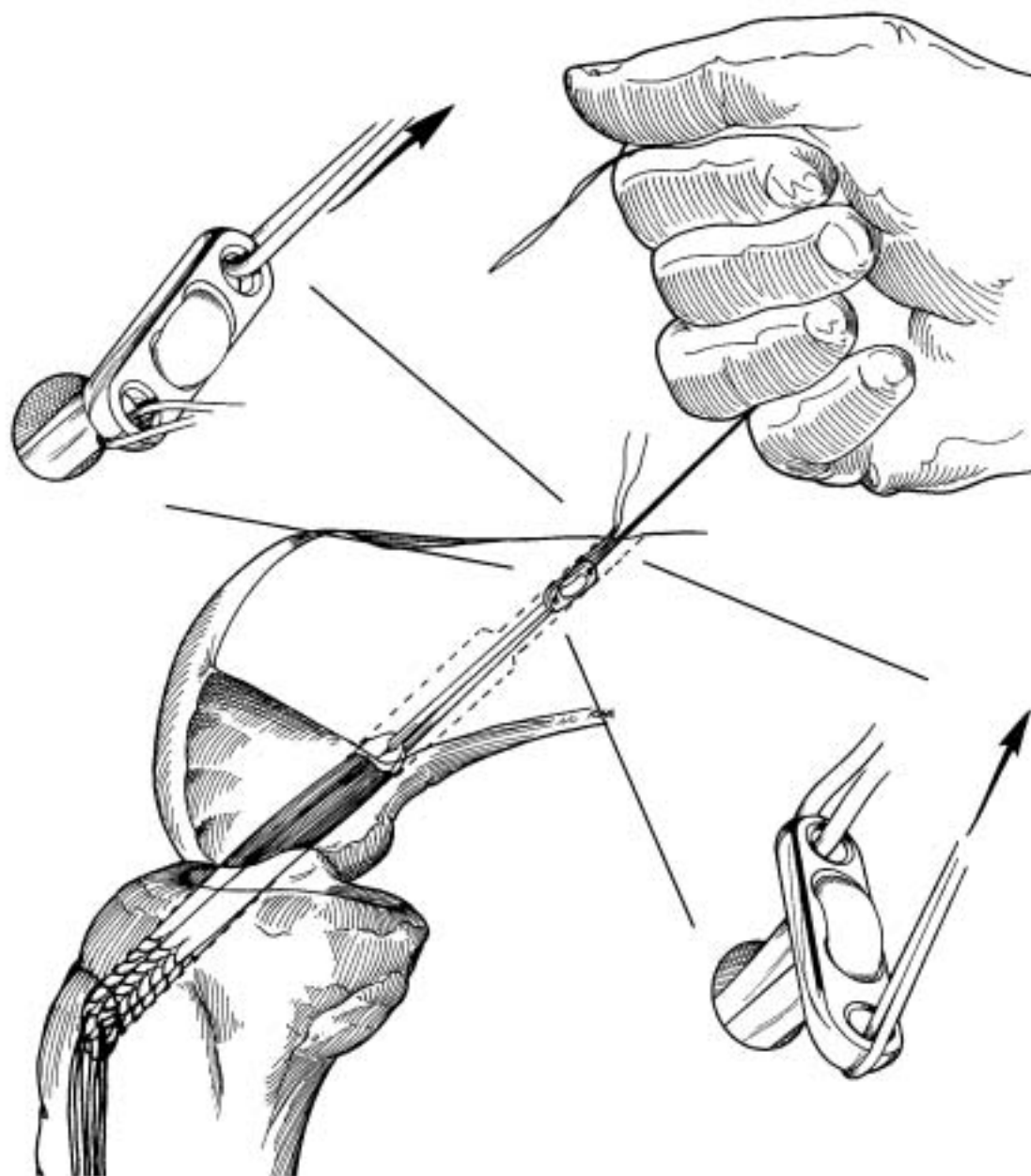
## GRAFT PASSAGE

A 2.7mm Passing Pin, which pierces the skin proximally, pulls the graft into position.



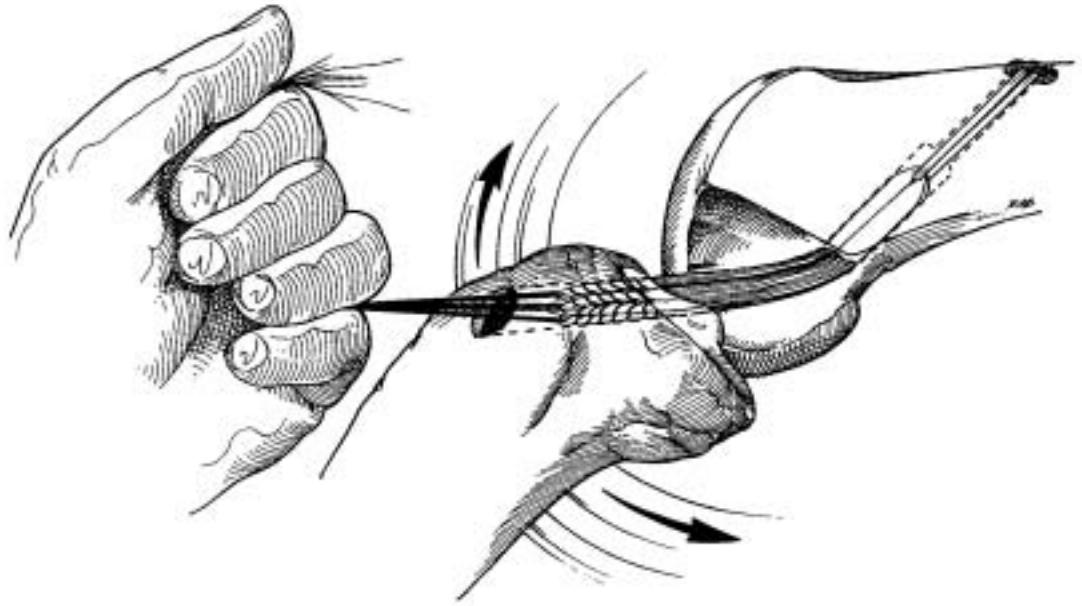
When the marking line reaches the internal femoral aperture, the trailing #2 suture is then pulled to deploy the *EndoButton*® CL on the external cortex.

As the graft is pulled distal, the marking line retreats 6mm and *EndoButton* CL deployment is confirmed.



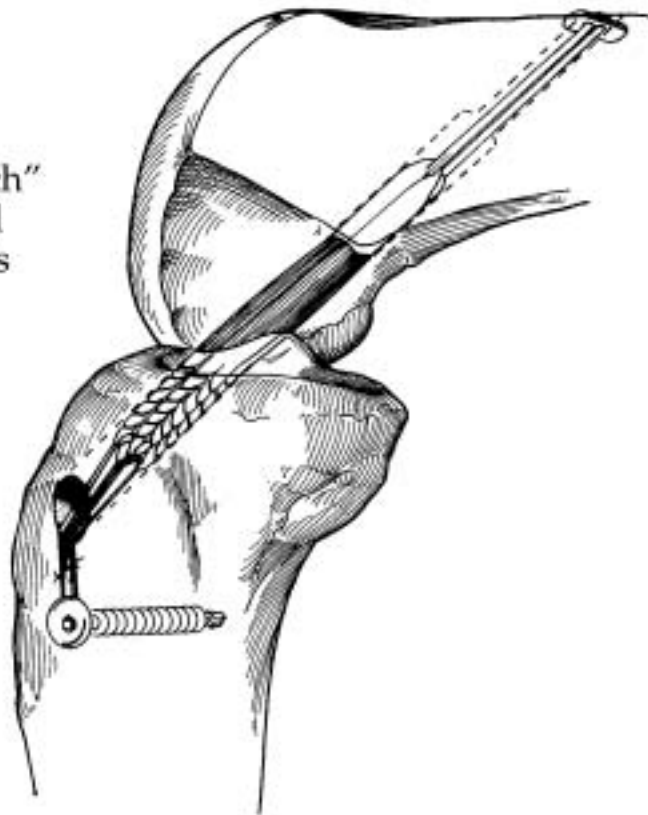
## GRAFT TENSIONING

Pretensioning can be performed by cycling the knee through a range of motion prior to tibial fixation.



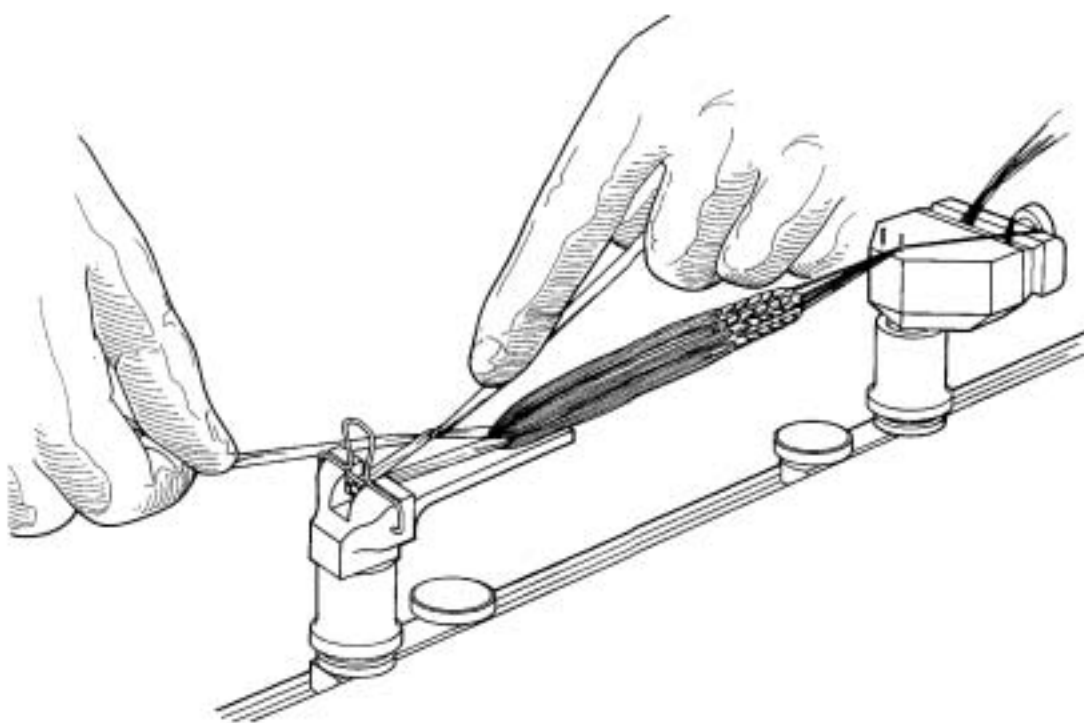
## TIBIAL FIXATION

The distally oriented “whip stitch” sutures are firmly tensioned and then tied around a suture post as shown or alternatively around a Suture Washer. Knotting is usually achieved at 20 - 30° of knee flexion.



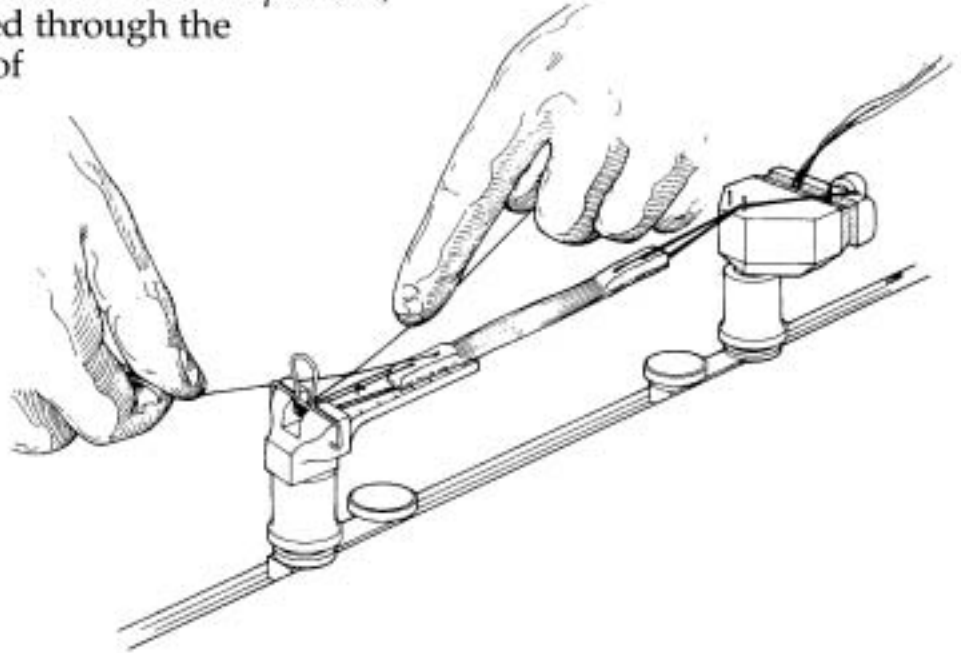
## APPENDIX A – ENDOBUTTON® TECHNIQUE (WITH KNOTTED CONNECTOR)

Utilizing the *EndoButton* Holder the *EndoButton* Tape is attached. A doubled surgeon's knot is used. The *EndoButton* Tape length plus the insertion length combine to equal the total channel length.

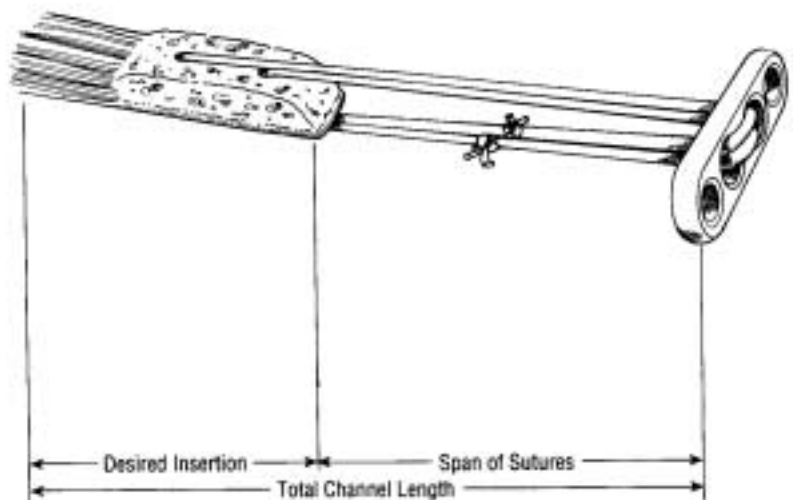


## APPENDIX B – PATELLAR TENDON GRAFT PREPARATION AND TECHNIQUE WITH ENDOBUTTON®

Utilizing the *GraftMaster® ACL Prep Board*, the graft is attached through the two central holes of the *EndoButton®*.

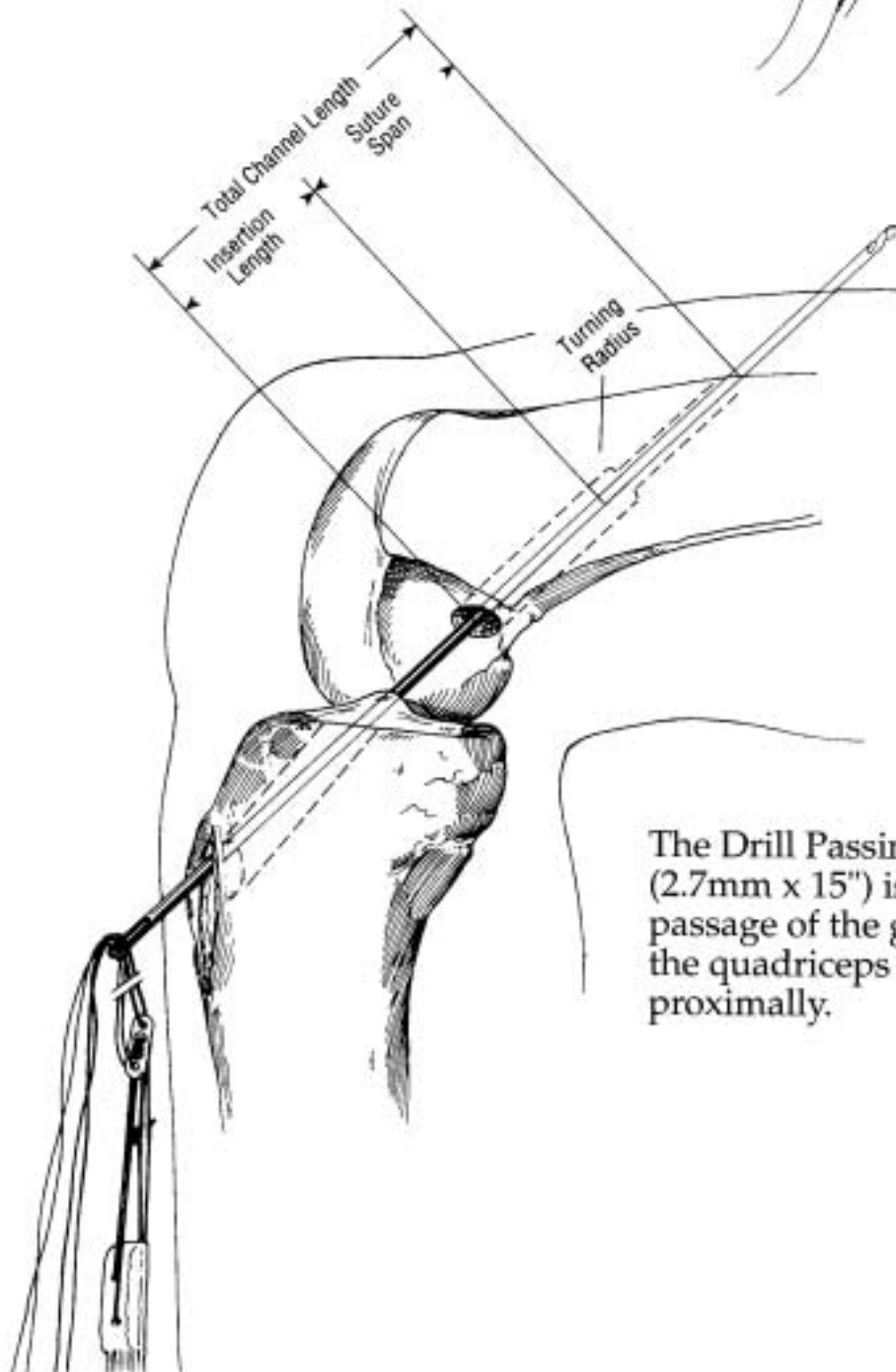


#5 sutures, or 4mm–6mm wide polyester tape, can be used to connect the *EndoButton* to the bone block. The desired length of the graft insertion added to the span of the sutures must equal the total channel length.



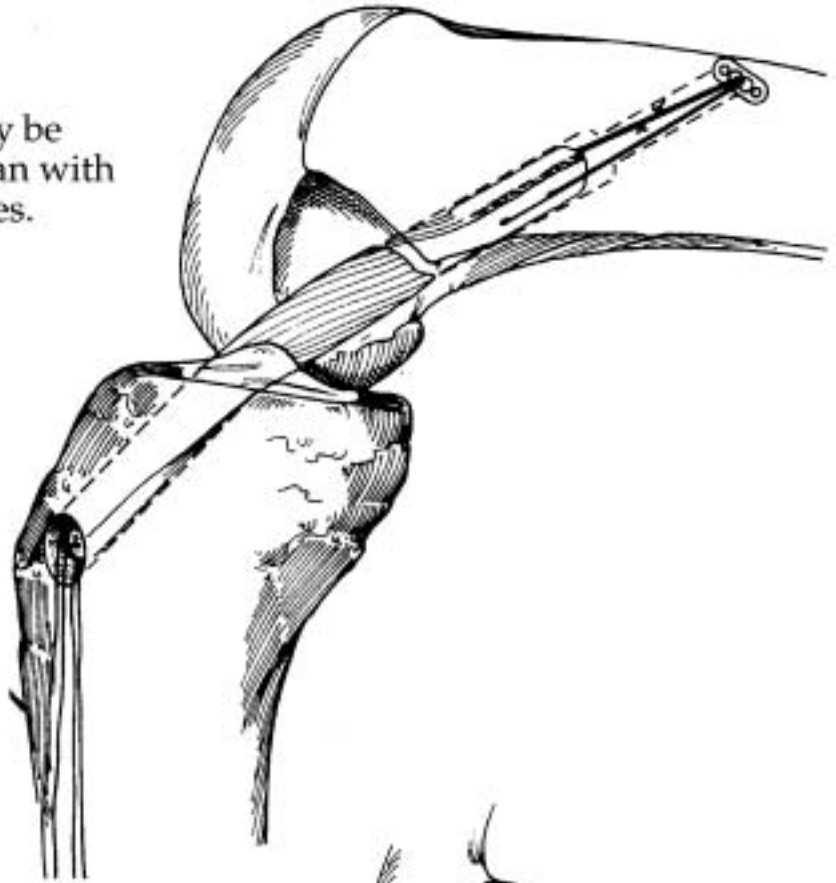


A #5 suture is used to lead and pass the *EndoButton*<sup>®</sup>. A trailing #2 suture is later used to rotate the *EndoButton* as it exits the anterolateral femoral cortex.

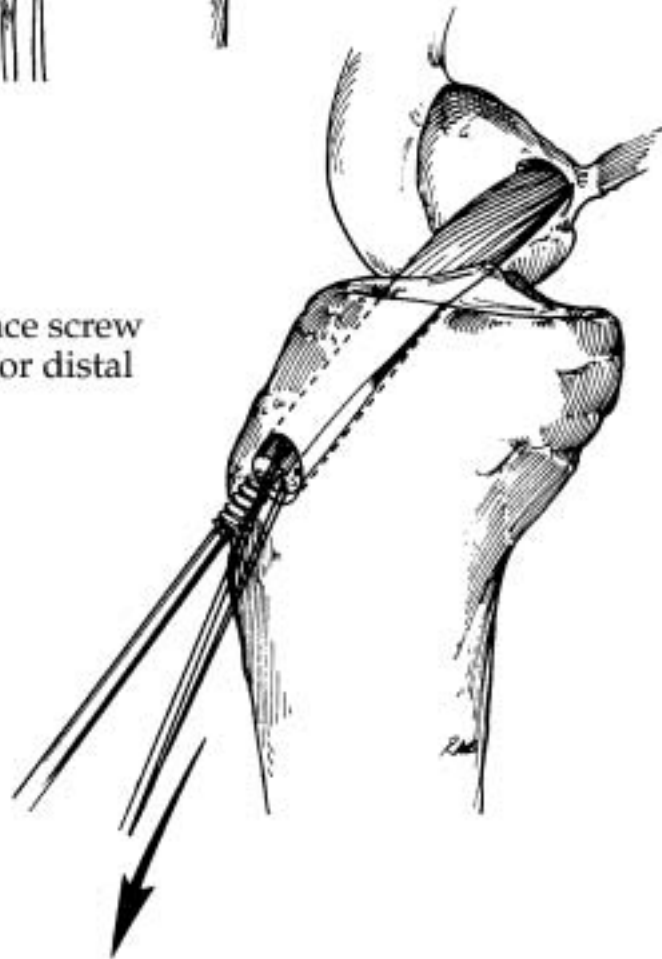


The Drill Passing Pin (2.7mm x 15") is used for passage of the graft, piercing the quadriceps and skin proximally.

A patellar tendon graft may be seated more proximally than with other endoscopic techniques. Drilling perforation of the posterior cortex does not compromise the fixation.



An interference screw can be used for distal fixation.

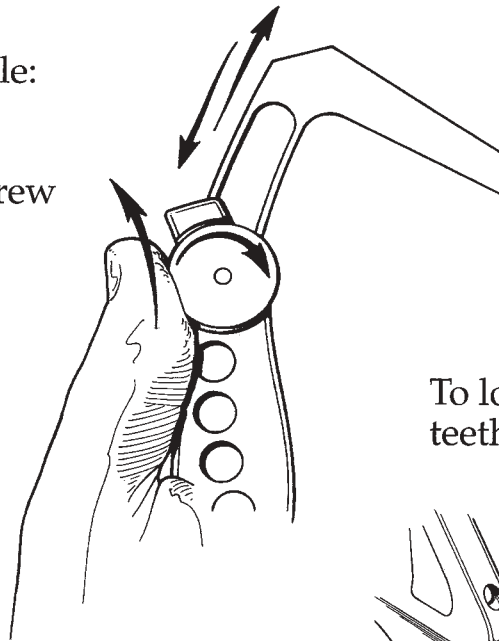


## TECHNICAL NOTES

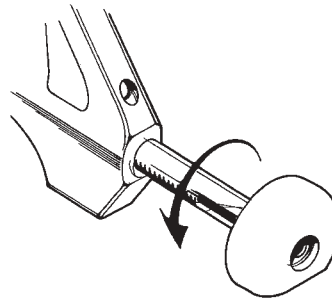
- Drilling perforation of the posterior cortex does not compromise graft fixation and may optimize femoral graft placement.
- Patellar tendon grafts may be seated more proximally with *EndoButton*<sup>®</sup>, eliminating graft protrusion from the tibial tunnel.
- Bi-socket femoral tunnels may be used with soft tissue grafts to better reproduce the anatomy of the original ACL.

To adjust guide angle:

- Hold upright
- Set angle
- Tighten thumbscrew



To lock bullet,  
teeth must face down:



EndoButton<sup>®</sup> is covered by one or more of the following U.S. Patent numbers:  
5,306,301; 5,645,588; other patents pending.

Acufex<sup>®</sup>, EndoButton<sup>®</sup>, GraftMaster<sup>®</sup>, NotchMaster<sup>™</sup>, NotchBlaster<sup>®</sup>, are trademarks  
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