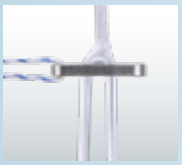
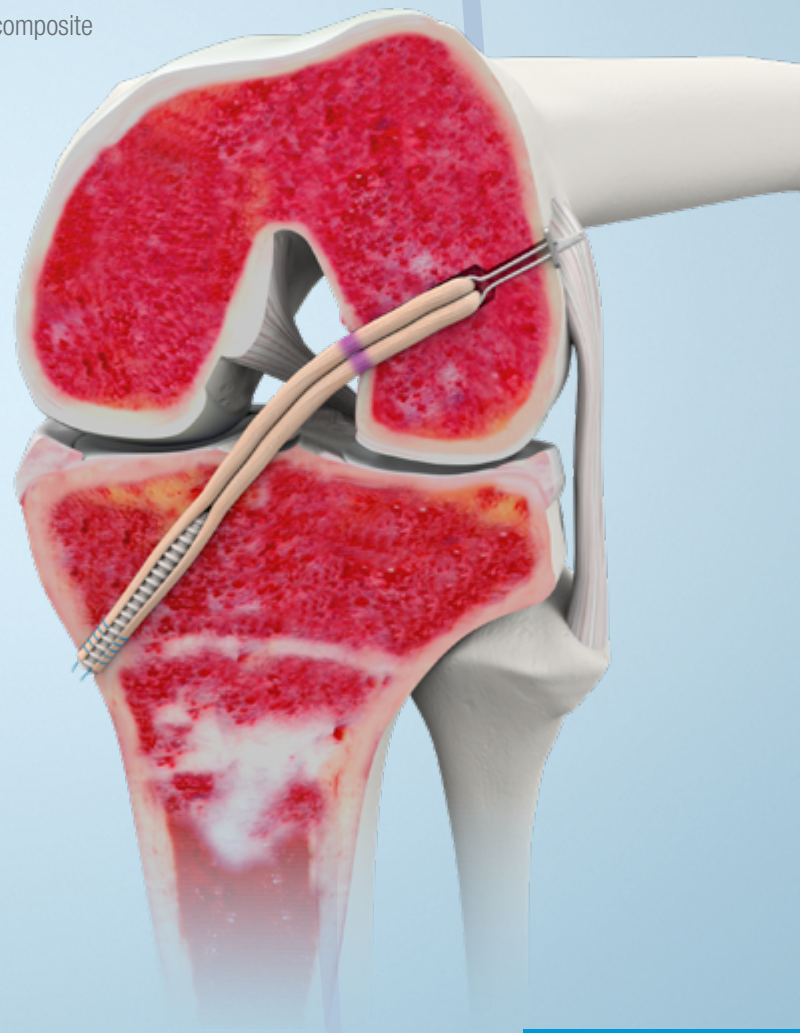
Soft Tissue Anatomic ACL Reconstruction

Using the Infinity™ Knee System

As the newest addition to CONMED's Knee Preservation System, the Infinity™ System introduces suspensory fixation for the femur, biocomposite interference screws for the tibia, and a modular drill guide system.

CONMED's modular knee system is a complete platform designed to provide versatility, procedural efficiency, and an easier day in the OR.





Technique featured by
Tim Spalding, FRCS Orth
University Hospitals Coventry Warwickshire NHS Trust, UK
Honorary Associate Professor, Warwick Medical School, University of Warwick

In Partnership with:
mtfbiologics

CONMED SURGICAL TECHNIQUE

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Using the Infinity™ Knee System

MTF ADVANTAGE
No Terminal Radiation
No Harsh Chemicals
Over 9 million grafts distributed

Introduction by Tim Spalding, FRCS Orth

ACL Reconstruction is facilitated by tibia-independent femoral tunnel drilling to achieve an anatomic replication of the native ACL. Anatomic femoral tunnel positioning can result in shorter femoral tunnels.[1]

The world's first adjustable, reversible loop button

Designed for optimal patient outcomes, the Infinity™ Femoral Adjustable Loop Button has no minimal loop length, allowing for maximum graft fill in the tunnel.

By simply pulling on the reversible button tab, the Infinity™ Adjustable Loop allows surgeons to lengthen the graft loop and reposition the graft within the tunnels, after initial tensioning of the graft in the femoral tunnel. The adjustable length loop allows maximal utilization of femoral tunnel depth with excellent biomechanical fixation.

This surgical technique details ACL reconstruction using autograft hamstring tendons, including the following combinations, as determined by surgeon preference.

- **Four-strand Semitendinosus and Gracilis Tendons**
- **Four-strand Semitendinosus Graft**
- **Multiple (5/6 strand) Graft combinations using Semi–tendinosus and Gracilis**

This technique also applies to allograft soft tissue tendons when folded over the Infinity™ Femoral Adjustable Loop Button.

- **Semitendinosus Tendon**
- **Gracilis Tendon**
- **Tibialis Anterior Tendon**
- **Tibialis Posterior Tendon**
- **Peroneal Tendons**

In Partnership with: mtfbiologics

CONMED Provides High-Quality Tissue in Partnership with MTF Biologics

MTF Biologics has some of the most stringent donor selection criteria of any tissue bank in the world, helping ensure tissue of the highest quality.

[1] Lee S-S, Seo I-W, Cho M-S, Shin Y-S (2020) Comparison of femoral tunnel length and obliquity of anatomic versus nonanatomic anterior cruciate ligament reconstruction: A meta-analysis. PLoS ONE 15(3): e0230497. https://doi.org/10.1371/journal.pone.0230497

GRAFT PREPARATION

1. **Using the GraFix® Graft Preparation Table,** attach the Infinity™ Femoral Adjustable Loop Button's pre-loaded card holder using the soft tissue clamp. If graft tensioning is preferred, the suture tails can be attached to the GraFix® Suture Tensioner, positioned opposite the Femoral Button on the Grafix® Graft Preparation Table.

2. **Harvest the required hamstring graft** to allow preparation of the preferred construct. Usually, 22cm of graft is required to allow the graft tails to fill the tibial tunnel.

   The folded diameter of the graft should be recognized as acceptable, as the final graft diameter is important to the success of ACL reconstruction.

   NOTE:
   Graft augmentation may be required if the folded diameter of the hamstring graft is too small.

3. **Four-strand graft construct:** Pass one end of each graft through the Infinity™ Femoral Button's adjustable loop until the construct is positioned in the middle of the loop.

4. **Whipstitch each end of the construct together** to allow for better handling.

5. **Remove the construct and Infinity™ Femoral Adjustable Loop Button** from the pre-loaded card holder and measure the diameter of the graft, recording the femoral and tibial end diameters to determine the required graft tunnel size.

6. **Place the construct in a bowl and wrap** in a Vancomycin soaked dressing to minimize risk of infection.

GRAFIX® GRAFT PREPARATION TABLE

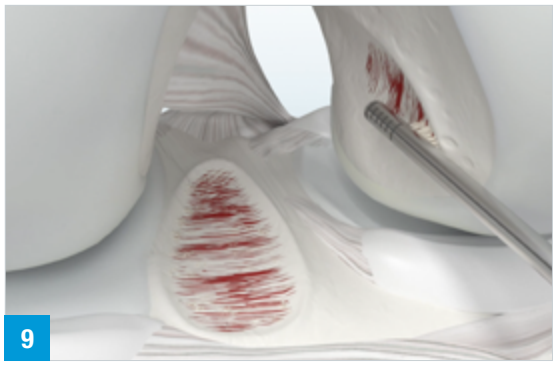
PORTAL PLACEMENT

7. **Lateral Portal:** Create a standard lateral working portal.

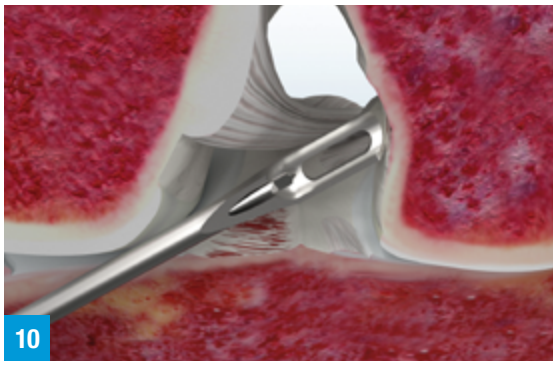
8. **Medial Portal:** If using the Infinity™ Anteromedial Guide, a lower medial portal is required. This can be used for all medial access or can be created as an accessory portal using a higher medial portal next to the patella tendon for knee preparation and viewing of the femoral ACL anatomy. ■

CONMED SURGICAL TECHNIQUE

FEMORAL TUNNEL PREPARATION AND DRILLING



Debride remnant tissue and prepare the femoral ACL's femoral footprint.



Front load the Infinity™ Spade Tip Guide Pin (3.5mm) onto the appropriately oriented and sized Infinity™ Anteromedial Guide.

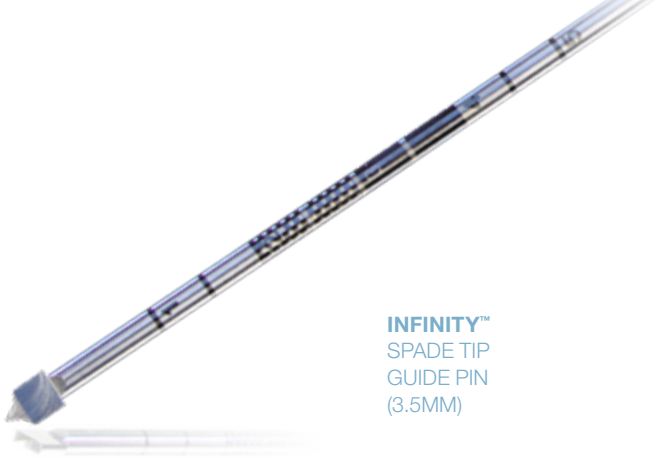
Pass the Guide through the anteromedial portal, appropriately widened to accommodate the guide and later drill.

NOTE:
The Infinity™ Anteromedial Guide's offset preserves the backwall while the semi-bullseye tip allows for visualization of the tunnel footprint. DO NOT use the device's offset to leverage or pry against bone.

Infinity™ Anteromedial Guides Offset Reference Chart			
Desired Tunnel Diameter	Recommended Guide	Offset from Backwall	Semi-Bullseye Diameter Reference
10mm	Infinity™ Anteromedial Guide (9/10, 7.0mm Offset)	2.0mm	Outer Diameter: **10.0mm**
9mm	Infinity™ Anteromedial Guide (9/10, 7.0mm Offset)	2.5mm	Outer Diameter: **10.0mm**
8mm	Infinity™ Anteromedial Guide (7/8, 6.0mm Offset)	2.0mm	Outer Diameter: **8.0mm**
7mm	Infinity™ Anteromedial Guide (7/8, 6.0mm Offset)	2.5mm	Outer Diameter: **8.0mm**

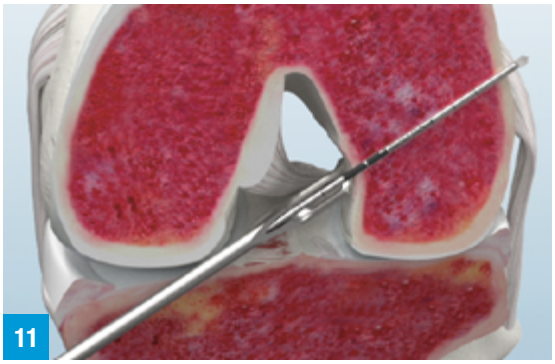
NOTE: If not using the Infinity™ Anteromedial Guide, the preferred tunnel position can be marked with the EDGE™ Radiofrequency System or awl and used to guide the Infinity™ Spade Tip Guide Pin into place.

FEMORAL TUNNEL PREPARATION AND DRILLING

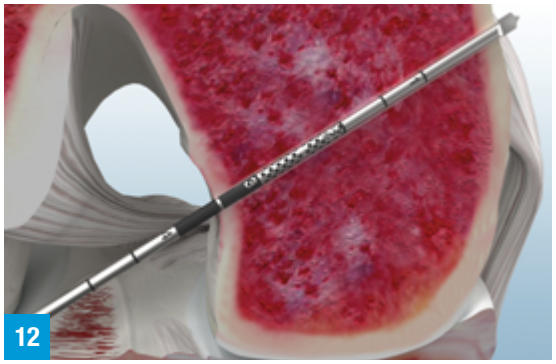


INFINITY™
SPADE TIP
GUIDE PIN
(3.5MM)

Soft Tissue Anatomic **ACL Reconstruction** Using the Infinity™ Knee System



Using the Hall® MicroFree® Mini-Driver with the Pin Driver attachment, place the leg in hyperflexion and advance the Infinity™ Spade Tip Guide Pin to the outside of the lateral femoral condyle.

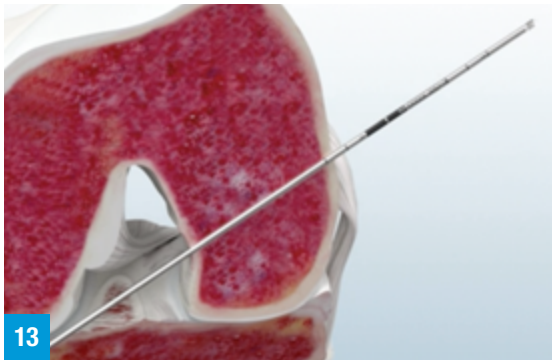


After the Infinity™ Spade Tip Guide Pin has advanced through the condyle, but before advancing the pin through skin, pull back on the Guide Pin to reference femoral aperture-to-cortex length.

HALL® MICROFREE®
MINI-DRIVER

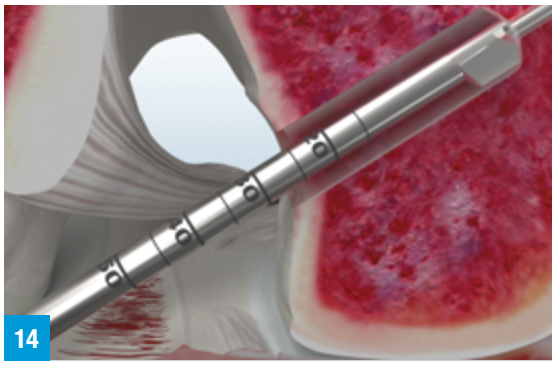
CONMED SURGICAL TECHNIQUE

FEMORAL TUNNEL PREPARATION AND DRILLING

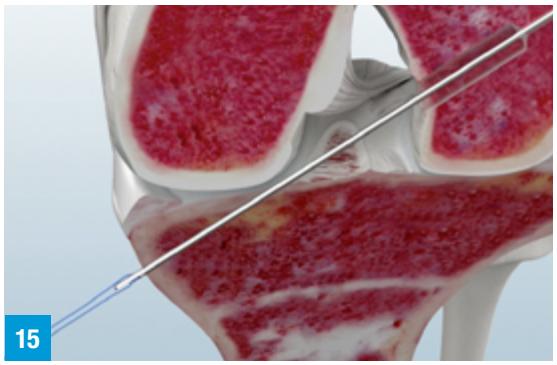


After noting the femoral aperture-to-cortex length, advance the Infinity™ Spade Tip Guide Pin to the skin.

Make a small stab incision to allow atraumatic passage of the Infinity™ Spade Tip Guide Pin through the skin.



Ream the femoral graft tunnel to the appropriate depth, using a low-profile Sentinel® Reamer.

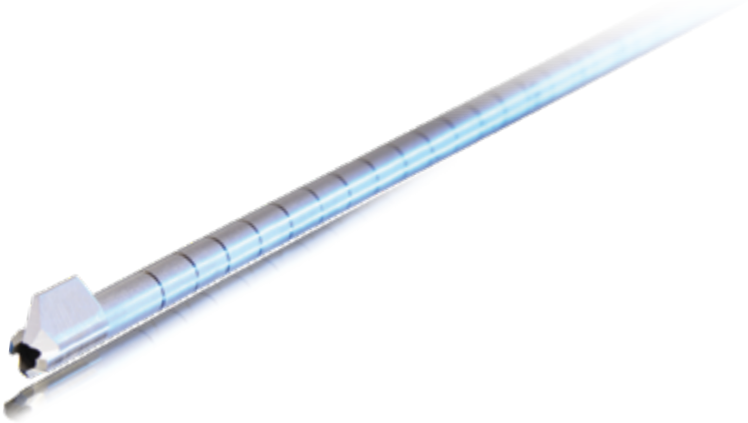


Load the center of a passing suture through the distal eyelet of the Guide Pin.

Retrieve the tails to the outside of the lateral femoral condyle, holding the loop outside the knee.

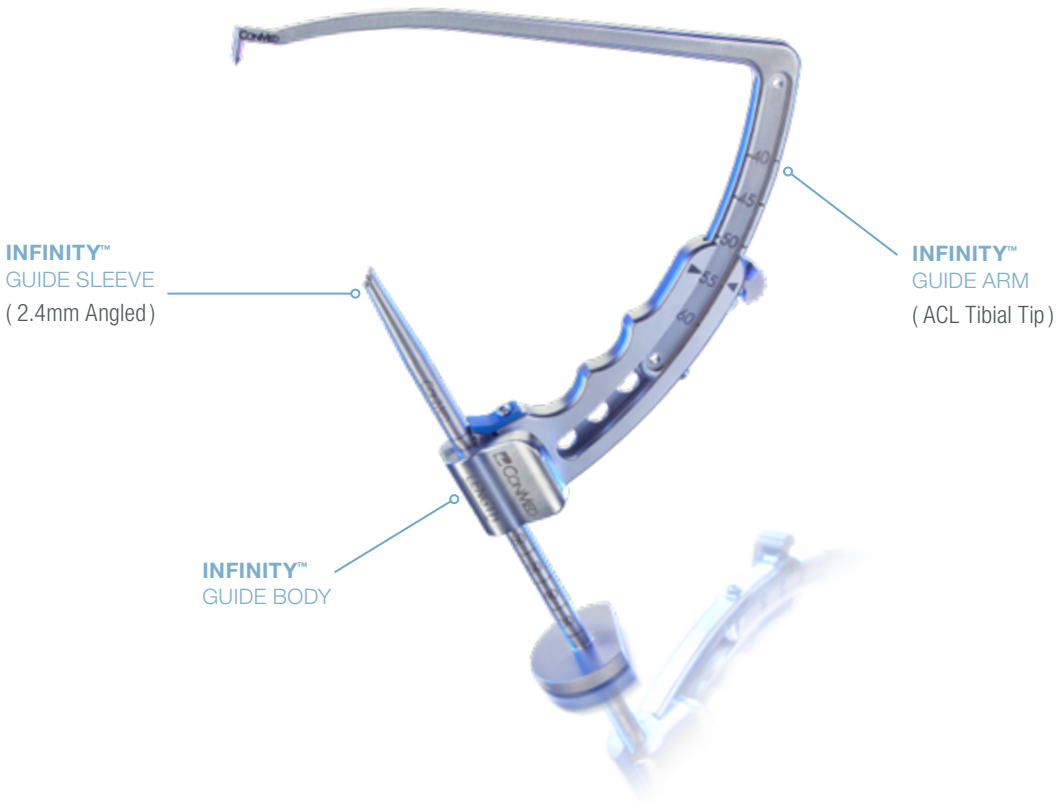
Bring the knee back to 90º and remove debris from the joint with the shaver, inspecting the tunnel position. ■

SENTINEL®
REAMER



ConMed

Soft Tissue Anatomic **ACL Reconstruction** Using the Infinity™ Knee System



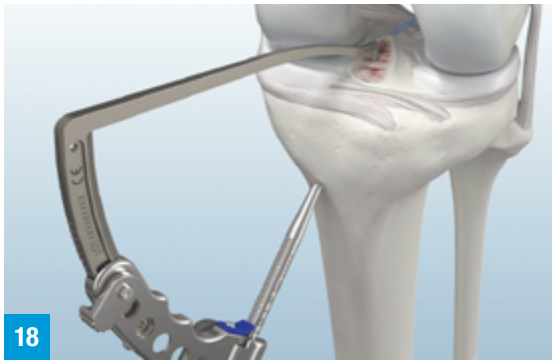
16 **Assemble the Infinity™ Modular Guide System** using the Infinity™ ACL Tibial Elbow or ACL Tip Guide Arm and the 2.4mm Angled or Straight Infinity™ Guide Sleeve.

NOTE:
It is recommended to initially set the Infinity™ Modular Guide System at 55° for tibial drilling.

17 **Introduce the Infinity™ Guide Arm** through the anteromedial portal and locate the tibial ACL footprint. ■

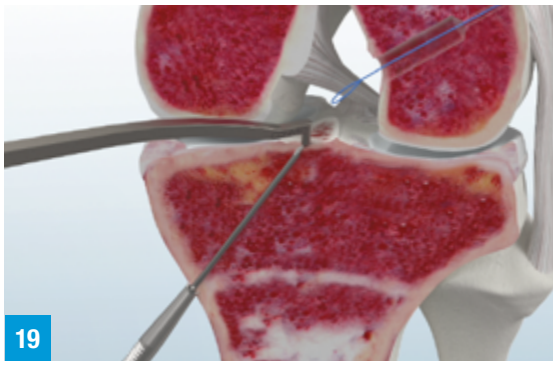
CONMED SURGICAL TECHNIQUE

TIBIAL TUNNEL PREPARATION AND DRILLING



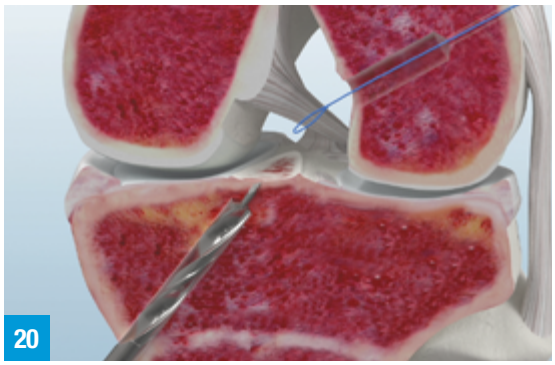
Advance the Infinity™ Guide Sleeve to bone. Fixate in place by engaging 2-3 clicks of the ratchet feature.

NOTE:
Do not over tension/ratchet the Infinity™ Guide Sleeve against bone as this could impact tunnel trajectory.



Under direct visualization, advance a 2.4mm guide pin, through the tibia until the pin tip is exposed within the joint.

Remove the Guide System from the field.

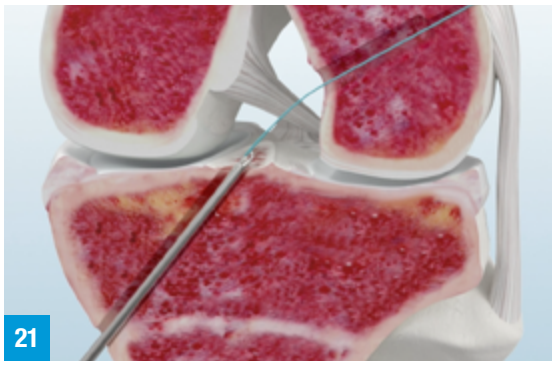


Under direct visualization, advance a Constant Diameter Reamer until the reamer tip is exposed within the joint.

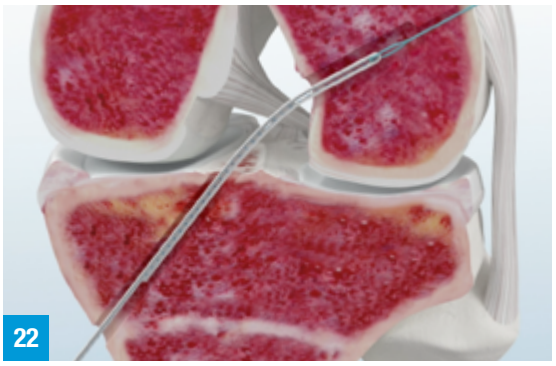
NOTE:
Avoidance of roof or sidewall impingement can be checked according to surgeon preference by bringing the knee into extension with the guide pin in place, or visualizing the notch through the tunnel with the arthroscope, with the knee in hyperextension.

CONSTANT DIAMETER
REAMERS

Soft Tissue Anatomic **ACL Reconstruction**
Using the Infinity™ Knee System



Retrieve the femoral passing suture through the tibial tunnel.



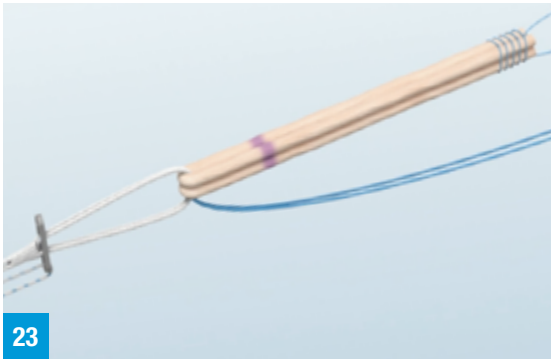
Load both the white/blue lead suture and the white tensioning sutures of the Infinity™ Femoral Adjustable Loop Button through the passing suture. Pull the sutures outside of the lateral femoral cortex.

ALLOGRAFT
TENDONS

In Partnership with:
mtfbiologics

CONMED SURGICAL TECHNIQUE

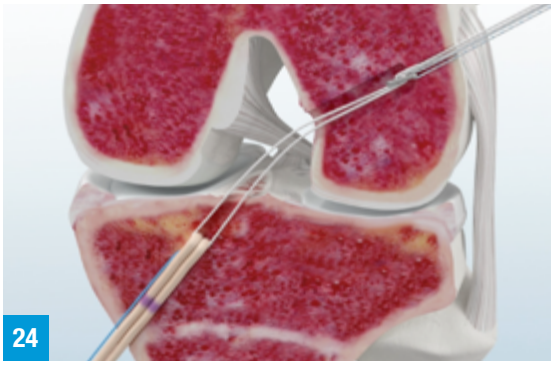
GRAFT PASSING AND FIXATION



Marking of the graft construct is required.

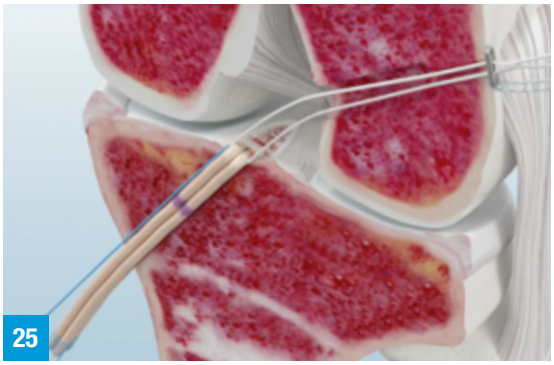
Mark the Infinity™ Femoral Button's adjustable loop to correspond to the femoral aperture-to-cortex length. (Marked as measured from the button: often 35–40mm).

Mark the graft to correspond to the drilled graft tunnel length (often 15-20mm).

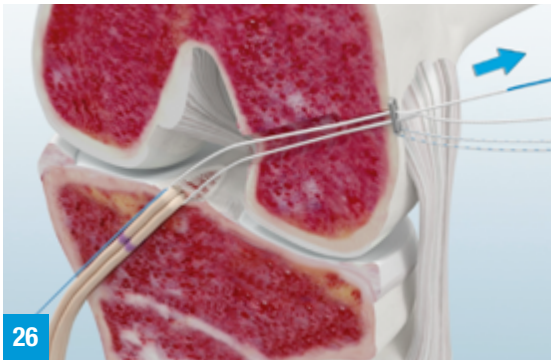


Pull tension on white/blue lead sutures to advance the Infinity™ Femoral Adjustable Loop Button to the outside of the lateral femoral condyle, simultaneously removing slack from the white tensioning sutures.

NOTE:
With the scope in the anteromedial portal, directly visualize the button advancing through and out of the femoral tunnel to avoid suture bunching. The pre-placed mark on the sutures should be at the entrance of the femoral tunnel.



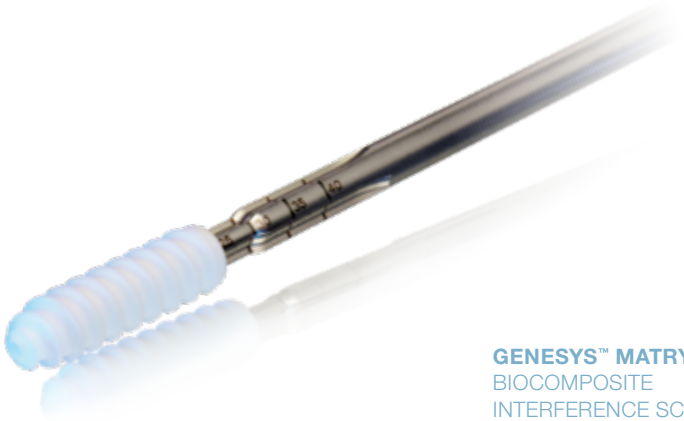
Once the Infinity™ Femoral Adjustable Loop Button has been passed outside of the lateral femoral cortex, apply distal tension on the graft to confirm the button has seated properly.



Identify the white tensioning suture with the BLUE suture tail to advance graft into the joint.

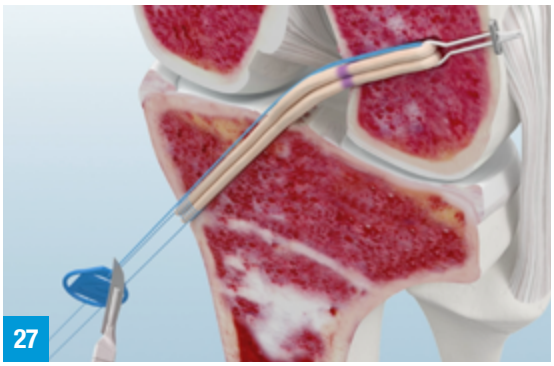
Hold firm distal tension on the graft and pull ONLY the white suture with the BLUE suture tail until the graft is fully seated in the femoral tunnel.

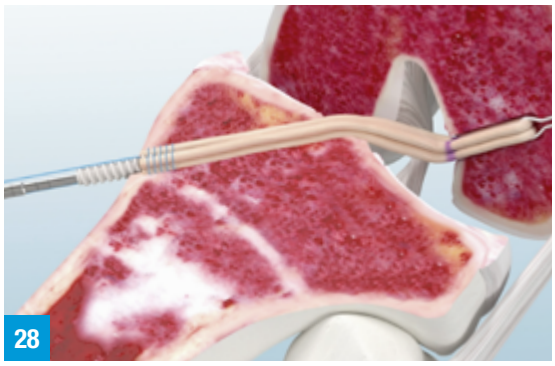
NOTE:
The pre-placed mark on the graft should be at the entrance of the femoral tunnel. ■



GENESYS™ MATRYX®
BIOCOMPOSITE
INTERFERENCE SCREW

Soft Tissue Anatomic **ACL Reconstruction** Using the Infinity™ Knee System





Remove the Reversible Button Tap, if graft position is satisfactory. Cut one strand and carefully withdraw.

This step must be undertaken BEFORE insertion of the tibial screw.

TIP:
If graft re-alignment is required, pull the blue reversible button tab to lengthen one of the femoral graft loops.

With one loop lengthened, cycle tension between the white tensioning suture WITHOUT the blue suture tail and the distal tails of the graft.

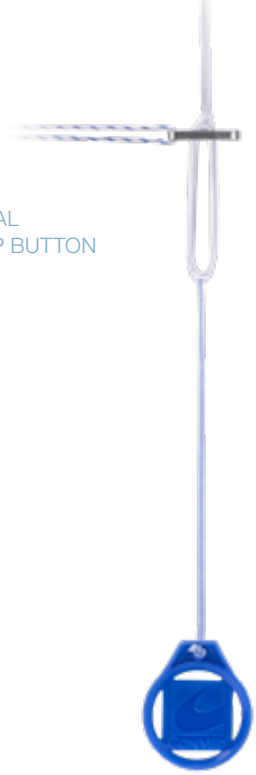
NOTE:
Once the graft position has been reversed, reposition the graft by following: "Graft Passing – Step 24".

Tibial Fixation: Cycle the knee to remove any graft displacement (usually a minimum of 10 cycles) and fixate with a GENESYS™ Matryx® Biocomposite Interference Screw with the knee at 10° of flexion.

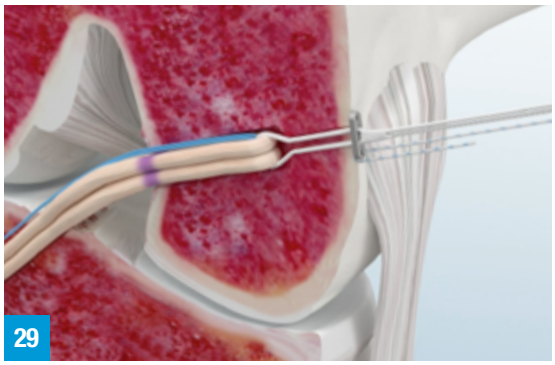
NOTE:
Surgeon preference determines the position of fixation. It is important NOT to over-capture the knee if there is any 'indrawing' of the graft in full hyper-extension noted on cycling the knee.

CONMED SURGICAL TECHNIQUE

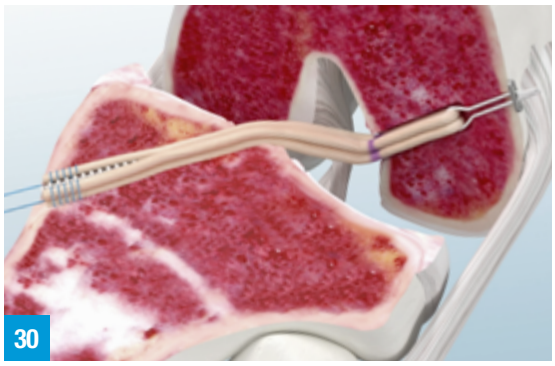
CLOSING THE REPAIR



INFINITY™ FEMORAL
ADJUSTABLE LOOP BUTTON



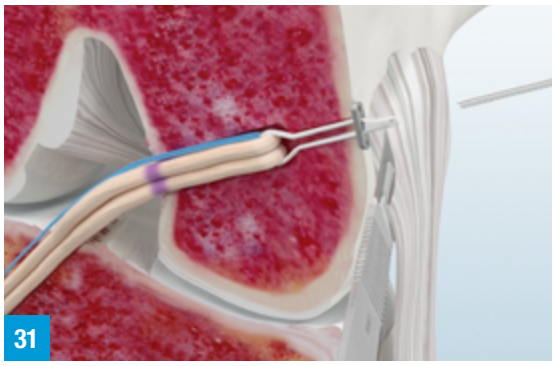
Pull one strand of the Infinity™ Femoral Adjustable Free Loop Button's white/blue lead suture to remove from the field.



Overhand knots can be tied over the Femoral Button, but are not required. Cut the Femoral Button's white tensioning sutures at the skin level.

NOTE:
Care should be taken to prevent cutting into or below the friction lock. A marking pen can be used during graft prep to highlight the locking mechanism.

DO NOT use an arthroscopic suture cutter to cut blindly.



Trim any graft and sutures protruding from the tibial tunnel and close incisions.

Tim Spalding, FRCS Orth*

University Hospitals Coventry Warwickshire NHS Trust, UK Honorary Associate Professor, Warwick Medical School, University of Warwick.

Tim Spalding, FRCS is a Consultant Orthopedic Surgeon based at the University Hospitals Coventry Warwickshire NHS Trust.

He completed a fellowship in knee and sports surgery in Toronto, Canada in 1995 and has been specializing in knee surgery since that time.

Mr. Spalding's interests cover the range of knee surgery including arthroscopic anterior and posterior cruciate ligament reconstruction, osteotomy, articular cartilage repair and meniscal surgery including repair and meniscal allograft transplantation.

He is actively involved with research and teaching both nationally and internationally.

Most recently he is one of the lead developers of the UK National Ligament Registry dedicated to analyzing and improving the outcome of Anterior Cruciate ligament reconstruction.

- **Mr. Spalding is President of the ACL Study Group and co-chair of the European Allograft Initiative studying and promoting the place of allografts in joint reconstruction.**

CONMED SURGICAL TECHNIQUE

* Mr. Tim Spalding is a paid CONMED consultant.

ORDERING INFORMATION

HALL® POWERED INSTRUMENTS

Hall® MicroFree® Mini-Driver ... PRO8500SB

Hall® Large Lithium Battery, 31.2 Volt L3000LG

Hall® Small Lithium Battery, 13.2 Volt L3000SM

1/4" (6.35mm) Jacobs Chuck Multi-Purpose Attachment PRO2041

1/4" (6.35mm) Jacobs Chuck Multi-Purpose Attachment, Chuck Key 5044-999-52

AO/Trinkle Quick-Connect Drill Attachment PRO2029

To order any of the Infinity™ Knee System products, Interference Screws, Instrumentation, and Accessories, please call CONMED Customer Service at: (US) **1-866-4CONMED** or (Global) **727-214-3000**.

For additional information on the Infinity™ Knee System and other CONMED products, please visit: **www.CONMED.com/Infinity**

BIOCOMPOSITE **GENESYS™ MATRYX®** INTERFERENCE SCREWS

7.0mm x 20mm 237020M5
7.0mm x 25mm 237025M5
7.0mm x 30mm 237030M5

8.0mm x 20mm 238020M5
8.0mm x 25mm 238025M5
8.0mm x 30mm 238030M5
8.0mm x 35mm 238035M5

9.0mm x 20mm 239020M5
9.0mm x 25mm 239025M5
9.0mm x 30mm 239030M5
9.0mm x 35mm 239035M5

10.0mm x 20mm 231020M5
10.0mm x 25mm 231025M5
10.0mm x 30mm 231030M5
10.0mm x 35mm 231035M5

Additional Biocomposite GENESYS™ Matryx® Interference Screw sizes are available.

GENESYS™ MATRYX® INTERFERENCE SCREW INSTRUMENTATION

Tri-Lobe Driver, 7.0-11.0mm, Fixed DFS70
Tri-Lobe Driver, 7.0-11.0mm, Short Modular DMS70
Tri-Lobe Driver, 7.0-11.0mm, Extended Length Modular C8716

Twist Drill w/Stop, 2mm 8733

Tap, 7.0-8.0mm, Fixed..... TFS70
Tap, 7.0-8.0mm, Short Modular TMS70
Tap, 7.0-8.0mm, Extended Length Modular..... D8607

Tap, 9.0-10.0mm, Fixed TFS90
Tap, 9.0-10.0mm, Short Modular TMS90
Tap, 9.0-10.0mm, Extended Length Modular D8609

Universal Driver, Modular Ratcheting Handle D8640

Hyperflex Guide Wire, 14" x 0.045" dia. C8006
For use with 7mm-11mm screws

Additional GENESYS™ Matryx® Interference Screw Instrumentation is available.

ORDERING INFORMATION

CONSTANT DIAMETER REAMERS (FOR TIBIAL REAMING)

8.0mm Reamer	CD080
8.5mm Reamer	CD085
9.0mm Reamer	CD090
9.5mm Reamer	CD095
10.0mm Reamer	CD100
10.5mm Reamer	CD105
11.0mm Reamer	CD110
12.0mm Reamer	CD120-1

Additional Constant Diameter Reamer sizes are available.

SENTINEL® MONO-FLUTED DRILL BITS (FOR FEMORAL REAMING)

8.0mm Reamer	S8580
8.5mm Reamer	S8585
9.0mm Reamer	S8590
9.5mm Reamer	S8595
10.0mm Reamer	S8510
10.5mm Reamer	S85105
11.0mm Reamer	S8511
11.5mm Reamer	S85115
12.0mm Reamer	S8512

Additional Sentinel® Mono-Fluted Drill Bit sizes are available.

INFINITY™ FEMORAL FIXATION

Infinity™ Femoral Adjustable Loop Button	KFB035
Infinity™ Adjustable Loop Button Cradle	KFB135

INFINITY™ GUIDE ARMS, GUIDE SLEEVES AND GUIDE BODY

Infinity™ ACL Tibial Tip Guide Arm	KTT100
Infinity™ ACL Tibial Elbow Guide Arm	KTE100
Infinity™ ACL Tibial Footprint Guide Arm	KTA100
Infinity™ Guide Sleeve, Straight	KTS124
Infinity™ Guide Sleeve, Angled	KTS224
Infinity™ Guide Body	KGB100

INFINITY™ ANTEROMEDIAL GUIDES

Infinity™ Anteromedial Guide, Left, 7.0/8.0mm	KBL178
Infinity™ Anteromedial Guide, Left, 9.0/10.0mm	KBL191
Infinity™ Anteromedial Guide, Right, 7.0/8.0mm	KBR178
Infinity™ Anteromedial Guide, Left, 9.0/10.0mm	KBR191

INFINITY™ ACCESSORIES AND OTHER INSTRUMENTATION

Infinity™ Suture Shuttle	KSP100
Infinity™ Spade Tip Guide Pin, 3.5mm	KGP035
Anatomic ACL Disposable Kit	8820
#2 Hi-Fi® Suture, 12/Box, Two 40" Strands, Blue and White-Black Co-braid, No Needle	H6200
#2 Hi-Fi® Suture, SutureLoop ACL Whipstitch Device, Straight Needle	HL200
#2 Hi-Fi® SutureLoop ACL Whipstitch Device, Curved Needle	HL201
#0 Hi-Fi® Suture, 12/Box, Single 36" Strand, White-Blue Co-Braid C-4 .5", Tapered Needle	H5300
Suture Handle	HDL-CLT
EL Depth Probe	21.1001EL
Bullseye® Femoral Footprint Ruler	RL1000

GRAFT PREPARATION SYSTEM

Graft Preparation Table	PS8820
Slide Lock (2 Recommended)	PS8821
Soft Tissue Graft Clamp	PS8822
Suture Holder Clamp	PS8823
Tension Clamp	PS8824
Scraping Board	PS8830
Graft Sizing Block	PS8832

To order Allograft Tissue, please call MTF Customer Service at: (US) **800-433-6576** or (Global) **732-661-0202**.

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ALLOGRAFT TENDON

	FREEZE-DRIED	FROZEN
Anterior Tibialis Tendon, >/= 20cm Length	400335	430335
Posterior Tibialis Tendon, >/= 22cm Length	400340	430340
Peroneus Longus Tendon , >/= 22cm Length	400356	430345
Semitendinosus Tendon, >/= 26cm Length	400260	430350
Semitendinosus Tendon, < 26cm Length	400355	430355
Gracilis Tendon, >/= 20cm Length	400301	430300

Available with folded diameter measurements.

Soft Tissue Anatomic Reconstruction

CONMED Corporation
11311 Concept Blvd.
Largo, Florida 33773

Toll Free: 1-866-4CONMED
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