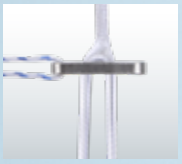
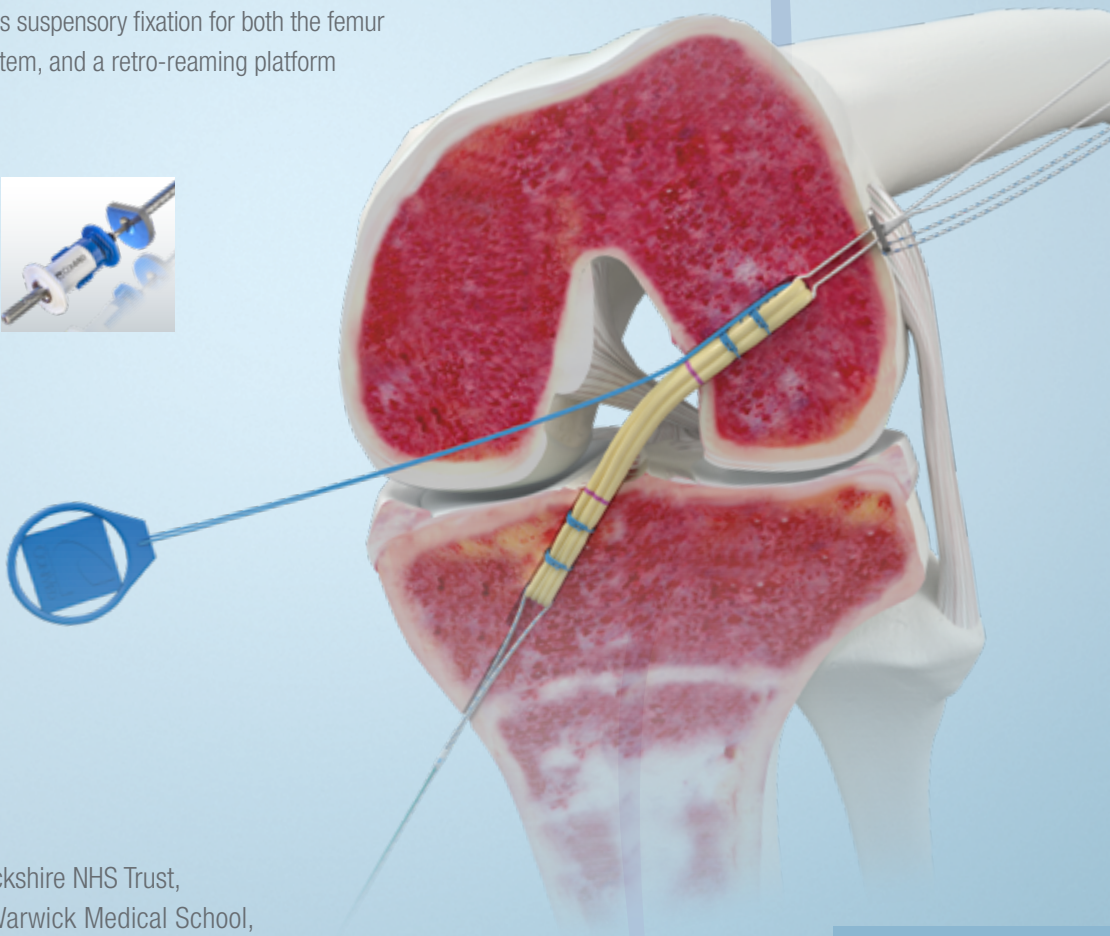
All-Inside ACL Reconstruction with a Quadruple Folded Graft

Using the Infinity™ Knee System

A comprehensive guide to All-Inside ACL Reconstruction using the versatile Infinity™ Knee System. As the newest addition to CONMED's Knee Preservation System, this Modular System introduces suspensory fixation for both the femur and the tibia, a modular drill guide system, and a retro-reaming platform with simple actuation.





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:
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CONMED SURGICAL TECHNIQUE

All-Inside ACL Reconstruction with a Quadruple Folded Graft

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 using an all-inside approach involves closed socket tunnels to achieve an anatomic replication of the native ACL.

This minimally invasive approach requires minimal bone removal and small skin incisions making this an ideal technique for ACL reconstruction. All-Inside ACL procedures utilize a retro-grade drilling technique and a button construct for suspensory fixation on both the femur and the tibia.

CONMED partnered with a team of the world's most renowned knee surgeons to create the CONMED Knee Surgeon Design Team and develop products that overcome the challenges surgeons face in the OR every day.

The result is the Infinity™ Knee System, a complete system designed to provide versatility, procedural efficiency, and an easier day in the OR. ■

In Partnership with: mtfbiologics

CONMED Provides High-Quality Tissue in Partnership with MTF Biologics

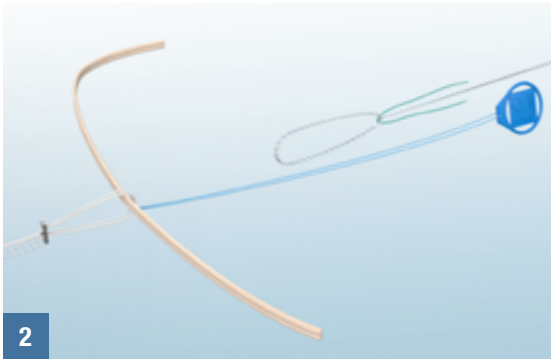
MTF Biologics has some of the most stringent donor selection criteria of any tissue bank in the world, helping ensure tissue of the highest quality.

CONMED SURGICAL TECHNIQUE

QUADRUPLE FOLDED GRAFT PREPARATION

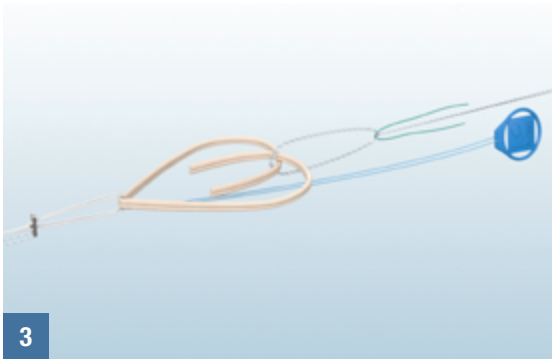
All-Inside Reconstruction with a Quadruple Folded Graft Using the Infinity™ Knee System

1 **Using the GraFix® Graft Preparation Table:** Attach the Infinity™ Femoral Adjustable Loop Button and Infinity™ Adjustable Free Loop's pre-loaded card holder using soft tissue clamps. Both device's graft loops should be facing towards each other.



Pass one end of the graft through the Infinity™ Femoral Button's graft loop until the graft loop is positioned in the middle of the graft.

NOTE:
Use a soft tissue graft approximately 28cm in total length.

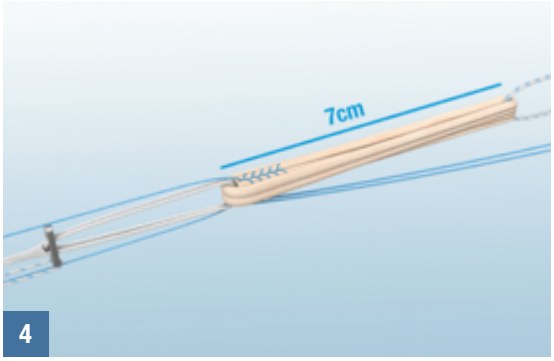


From the bottom up, pass one tail of the graft through the Infinity™ Adjustable Free Loop.

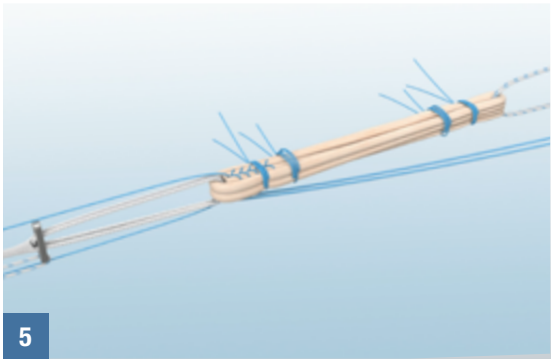
From the top down, pass the other tail of the graft through the Infinity™ Adjustable Free Loop.

GRAFIX™ GRAFT PREPARATION TABLE

QUADRUPLE FOLDED GRAFT PREPARATION

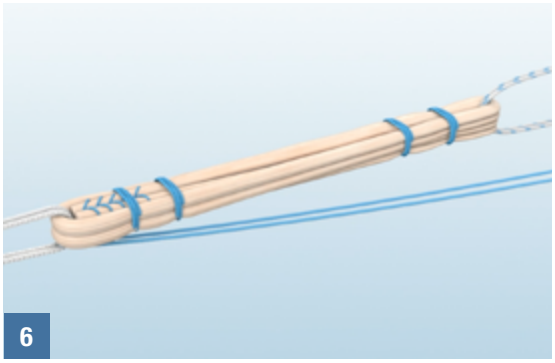


Ensure the quadruple folded graft construct's tails are equalized. Apply slight tension to the soft tissue clamps to create a graft construct length of 7cm.



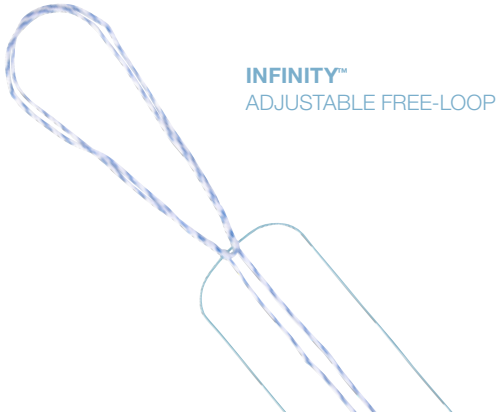
Once the initial construct length has been set, use #0 Hi-Fi® Suture to create barrel stitches on each side of the graft to secure the graft limb's into place.

NOTE:
Confirm all four graft limbs have been captured by the barrel stitches to ensure construct integrity. Ensure knots are buried within the graft construct.



Place the graft construct under final tension by pulling the two soft tissue clamps away from each other. Record final graft length for later femur and tibia socket preparation.

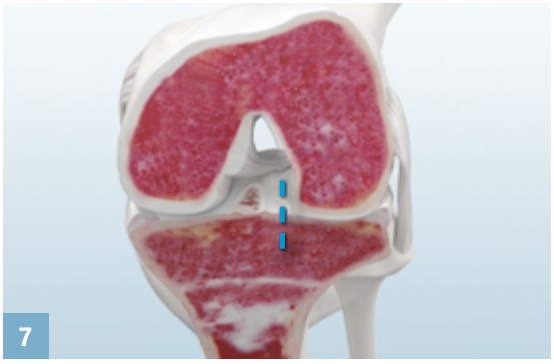
NOTE:
Using closed graft sizers, record the diameter of both the femoral and tibial graft ends in preparation for the required femur and tibia socket dimensions. ■



INFINITY™
ADJUSTABLE FREE-LOOP

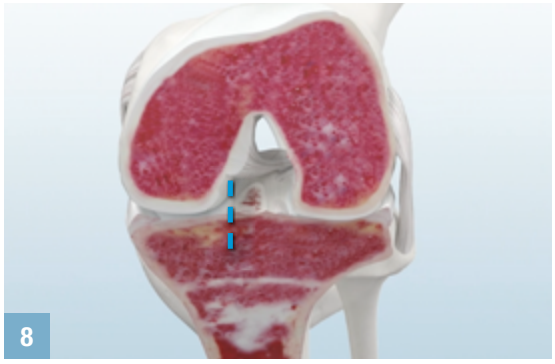
CONMED SURGICAL TECHNIQUE

All-Inside Reconstruction with a Quadruple Folded Graft Using the Infinity™ Knee System



Create a lateral portal on the lateral border of the patella tendon. This portal should allow the Infinity™ Femoral Footprint Guide Arm the most direct access to the femoral ACL footprint.

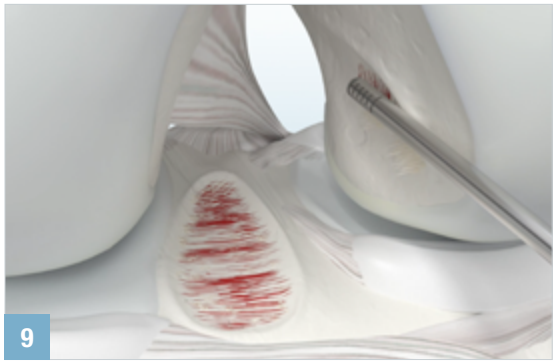
NOTE:
The portal should be slightly larger than a typical visualization portal to allow for the Infinity™ Guide Arm's footprint to pass easily.



Create a medial portal to allow for an adequate view of the tibial ACL footprint and for insertion of the graft. ■

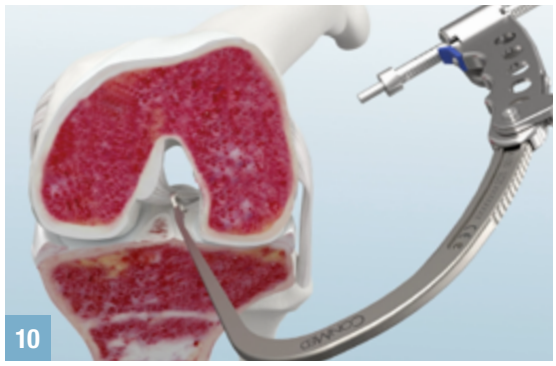
INFINITY™
MODULAR
GUIDE SYSTEM

FEMORAL SOCKET PREPARATION AND DRILLING



Debride the femoral ACL footprint.
Allow for adequate visualization of the anatomy.

NOTE:
Notchplasty may be required to allow the Infinity™ Femoral Footprint Guide Arm to reach around the lateral femoral condyle.



Place the Infinity™ Guide Arm in the joint through the anterolateral portal. Center the guide on the femoral ACL footprint.

As the outer diameter of the Guide Arm's footprint is 10mm, position the footprint 1.5-2mm from the backwall to ensure the backwall is maintained.

NOTE:
Setting the Infinity™ Guide Arm to an angle between 90°-95° is recommended.

Advance the 3.5mm Infinity™ All-Inside Guide Sleeve with the ratchet mode disengaged to the skin. Make an incision and continue to advance the Guide Sleeve's tip against bone.

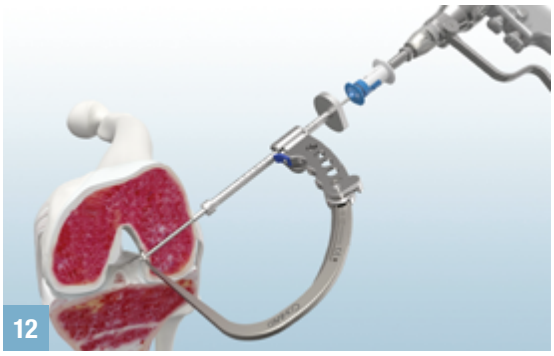
Rotate the Infinity™ Guide Sleeve so the ratchet function is engaged and advance the Infinity™ Guide Sleeve against bone using 2-3 ratchet clicks.

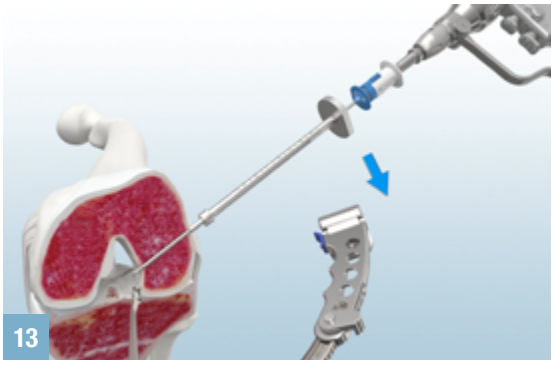
NOTE:
DO NOT over tension/ratchet the Infinity™ Guide Sleeve against bone as this could impact tunnel trajectory.

FEMORAL SOCKET PREPARATION AND DRILLING

AO/ TRINKLE
QUICK CONNECT

All-Inside Reconstruction with a Quadruple Folded Graft
Using the Infinity™ Knee System





Attach the Infinity™ Retro-Reamer to an AO/ Trinkle Quick Connect attachment (PRO2029) and Hall® MicroFree® Mini-Driver. Set the power handpiece in the "Drill" setting and advance the reamer at full speed in "forward."

NOTE:
Ensure the Infinity™ Retro-Reamer and Hall® Power handpiece are kept in line with the Infinity™ Guide Sleeve's trajectory. Dropping of the hand while reaming can impact tunnel trajectory.

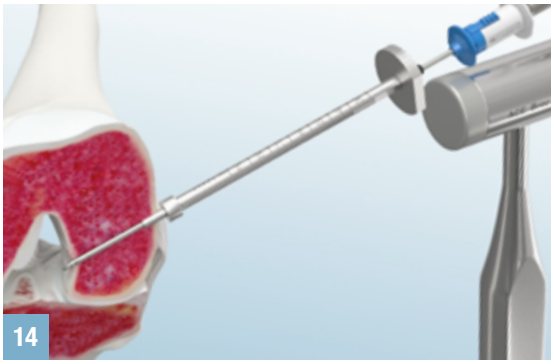
DO NOT force the Infinity™ Retro-Reamer through the cortex as this can cause skiving and impact tunnel trajectory.

TIP:
If the PRO2029 is not available, a ¼" (6.35mm) Jacob's Chuck attachment (PRO2041) can be used.

Once the Infinity™ Retro-Reamer is exposed within the joint, remove the Infinity™ Guide Body and Infinity™ Guide Arm from the joint.

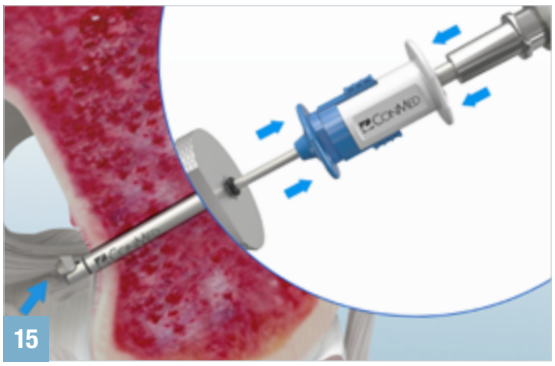
HALL® MICROFREE®
MINI-DRIVER

FEMORAL SOCKET PREPARATION AND DRILLING



Using a mallet, advance the Infinity™ Guide Sleeve's distal tip into bone until the positive stop of the sleeve contacts the bone.

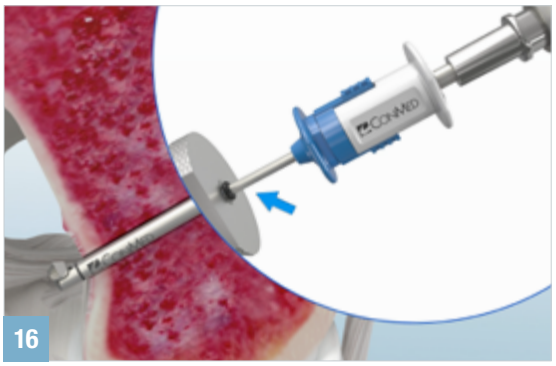
NOTE:
When fully impacted, the distal tip will provide a 9mm cortical bone bridge.



Confirm arthroscopic visualization of the Infinity™ Retro-Reamer's distal laser mark within the notch.

Squeeze the blue and white actuation caps together to flip into retro-grade reaming mode. Confirm the Infinity™ Retro-Reamer flipped properly by checking that the cutting blade is perpendicular to the shaft.

NOTE:
Prior to retro-grade reaming, rotate the device 360° to ensure blade rotates freely without contacting bone.



Slide the black O-ring down the shaft of the Infinity™ Retro-Reamer until it is flush with the top of the Infinity™ Guide Sleeve. This allows the graft socket length to be referenced while retro-grade reaming.

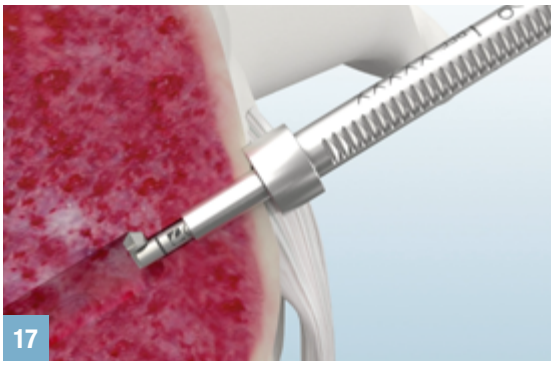
INFINITY™
RETRO-REAMERS

CONMED SURGICAL TECHNIQUE

FEMORAL SOCKET PREPARATION AND DRILLING

INFINITY™
SUTURE SHUTTLE

All-Inside Reconstruction with a Quadruple Folded Graft Using the Infinity™ Knee System



Set the Hall® MicroFree® Mini-Driver in the "Drill" setting**.** Run the Infinity™ Retro-Reamer in "forward" at full speed, away from the femoral aperture.

Gently pull the Infinity™ Retro-Reamer back against bone. As it draws back against the femur, reference the space created between the black O-ring and the Infinity™ Guide Sleeve. This represents the femoral graft socket length.

NOTE:
The Infinity™ Retro-Reamer's reference marks are in increments of 5mm.

TIP:
While retro-grade reaming, ensure sufficient graft socket length to prevent the bottoming out of graft.

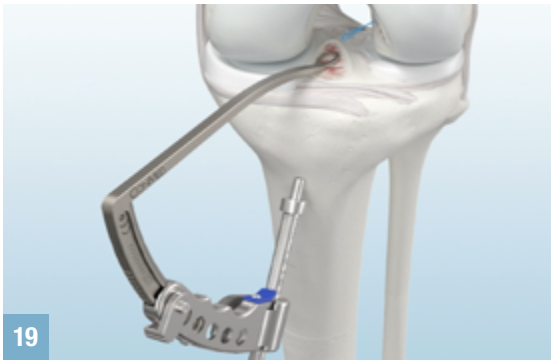
Once the desired graft socket length is achieved, carefully advance the Infinity™ Retro-Reamer's tip back into the joint, once desired graft socket length is achieved. Under direct visualization, pinch the distal ends of the blue side tabs to flip the Infinity™ Retro-Reamer back to the in-line position. Remove the device from the joint.

Load the loop end of a passing suture on the Infinity™ Suture Shuttle's nitinol loop and pass down the Infinity™ Guide Sleeve. Using a grasper, retrieve the passing suture.

Remove the Infinity™ Guide Sleeve from the field and the Suture Shuttle from the joint. Ensure the passing suture's tails remain on the outside of the knee.

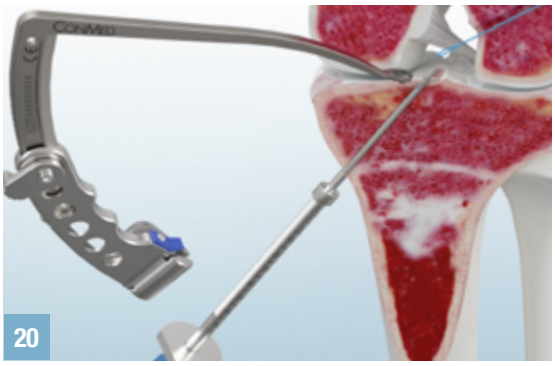
NOTE:
Using two different color passing sutures to differentiate between femoral and tibial sutures during graft passage is recommended. ■

TIBIAL SOCKET PREPARATION AND DRILLING



Remove remnant tissue to prepare tibial insertion site. Insert the Infinity™ ACL Tibial Footprint Guide Arm through the medial portal and center over the ACL footprint. Advance the 3.5mm Infinity™ All-Inside Guide Sleeve to the skin, with the ratchet mode disengaged. Make incision and continue to advance the Guide Sleeve's tip against bone.

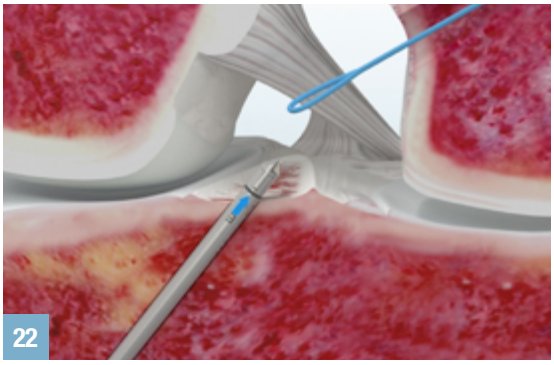
Rotate the Infinity™ All-Inside Guide Sleeve to engage ratchet function. Advance Guide Sleeve against bone with 2-3 ratchet clicks.



Attach the Infinity™ Retro-Reamer to an AO/Trinkle Quick Connect attachment (PRO2029) and the Hall® MicroFree® Mini-Driver. Set the drill in the "Drill" setting. Advance the Infinity™ Retro-Reamer in "forward" at full speed.

Once the Infinity Retro-Reamer is exposed within the joint, remove the Infinity™ Guide Body and Infinity™ Guide Arm.

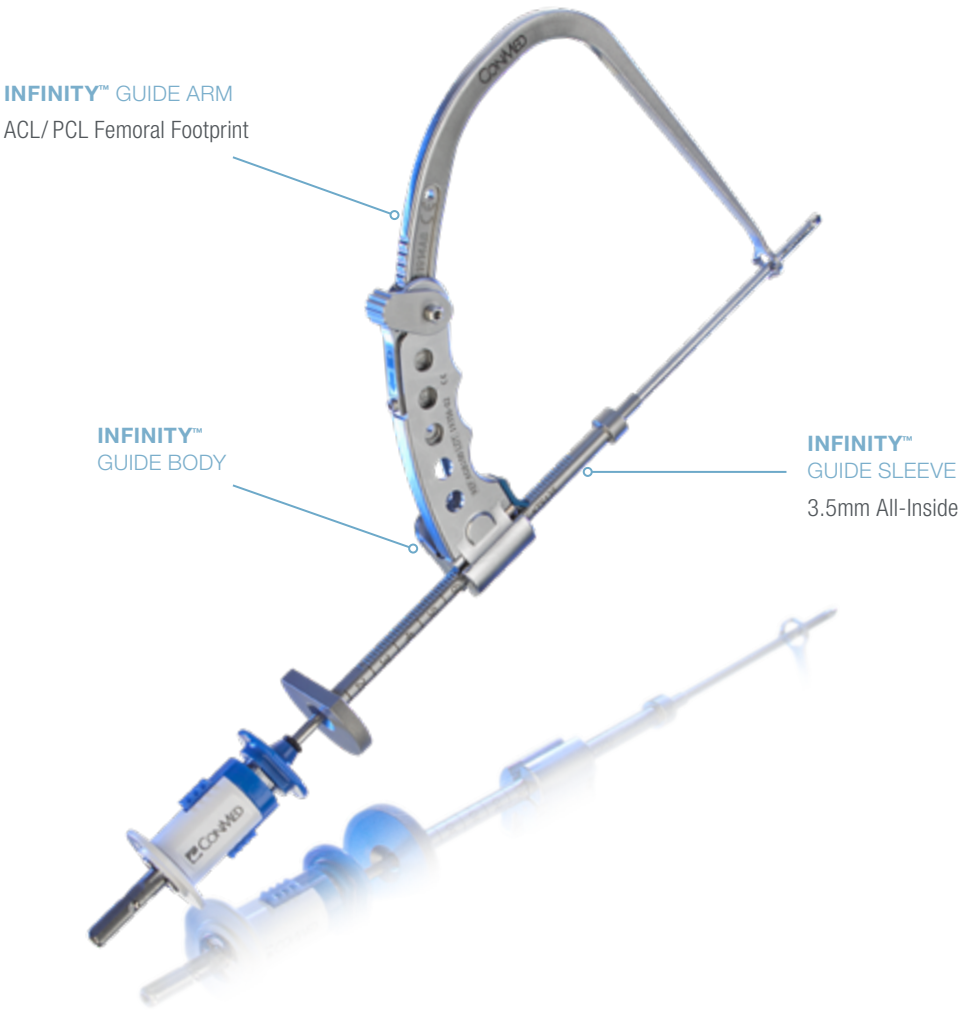
Tap the Infinity™ Guide Sleeve's distal tip into bone using a mallet until the positive stop of the sleeve contacts the bone. Advancing the Infinity™ Guide Sleeve's tip into bone preserves 9mm of the tibial cortex.



Confirm arthroscopic visualization of the Infinity™ Retro-Reamer's distal laser mark within the joint. ■

CONMED SURGICAL TECHNIQUE

All-Inside **ACL Reconstruction** with a Quadruple Folded Graft
Using the Infinity™ Knee System



Infinity™ Modular Guide System

The Infinity™ Modular Guide System is an all-in-one solution that's designed to allow multiple procedures and techniques with one comprehensive platform. ■

TIBIAL TUNNEL PREPARATION AND DRILLING

23 **Squeeze the blue and white actuation caps together** to flip the Infinity™ Retro-Reamer into retro-grade reaming mode. Check the cutting blade is perpendicular to the shaft to confirm the Infinity™ Retro-Reamer has flipped properly.

TIP: Prior to retro-grade reaming, rotate the device 360º to ensure the blade can rotate freely without contacting bone.

24 **To reference the graft socket length while retro-grade reaming**, slide the black O-ring down the shaft of the Infinity™ Retro-Reamer until it's flush with the top of the Infinity™ Guide Sleeve.

25 **Run the reamer in the "Drill" setting in "forward" at full speed.** Gently pull the Infinity™ Retro-Reamer back against the tibial plateau.

Note the distance created between the black O-ring and the Infinity™ Guide Sleeve as the Infinity™ Retro-Reamer advances back against the tibia. This can be used to reference the tibial graft socket length.

26 **Disconnect the Infinity™ Retro-Reamer from the Quick-Connect.** Once desired graft socket length is achieved, advance the reamer's tip back into the joint.

Under direct visualization, pinch distal ends of the blue side tabs to flip the Infinity™ Retro-Reamer back to the in- line position. Remove the device from the joint while maintaining the Infinity™ Guide Sleeve in place.

27 **Load the loop end of a passing suture** on the Infinity™ Suture Shuttle's nitinol loop and pass through the Infinity™ Guide Sleeve. Using a grasper, retrieve the passing suture's loop through the medial portal.

Remove the Infinity™ Guide Sleeve from the field and then remove the Infinity™ Suture Shuttle from the joint, ensuring the passing suture's tails remain on the outside of the knee.

GRAFT POSITIONING AND FIXATION

28 **To prevent a tissue bridge during graft passage,** use a grasper through the anteromedial portal to simultaneously retrieve both femoral and tibial passing suture's loops.

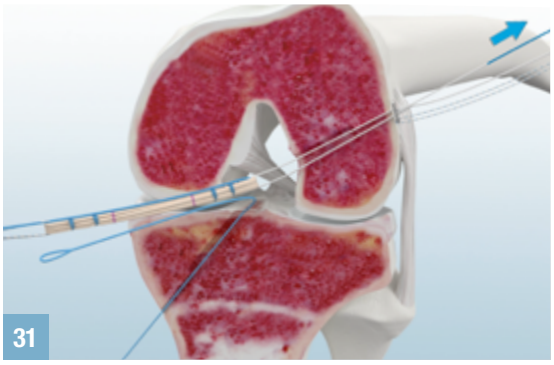
29 **Femoral Graft Passage:** Load the white/blue lead sutures and white tensioning sutures of the Infinity™ Femoral Adjustable Loop Button through the femoral passing loop. Pull sutures outside of the lateral femoral cortex.

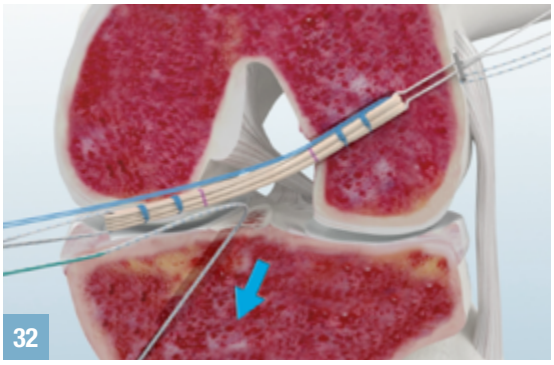
30 **To advance the Infinity™ Femoral Button** to the outside of the lateral femoral condyle, pull tension on the white/blue lead sutures while simultaneously removing slack from white tensioning sutures. Apply distal tension on the graft to confirm the button is properly seated onto the femoral cortex.

TIP:
Under direct arthroscopic visualization, watch the Infinity™ Femoral Adjustable Loop Button advance through and out of the femoral tunnel to avoid suture bunching within the graft socket.

INFINITY™ STANDARD
TIBIAL BUTTON

All-Inside Reconstruction with a Quadruple Folded Graft Using the Infinity™ Knee System





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

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

For Tibial Graft Passage: Load the white/blue tails of the Infinity™ Femoral Adjustable Free Loop Button and the green tails of the locking suture on the tibial passing suture. Then pull out of the tibial tunnel.

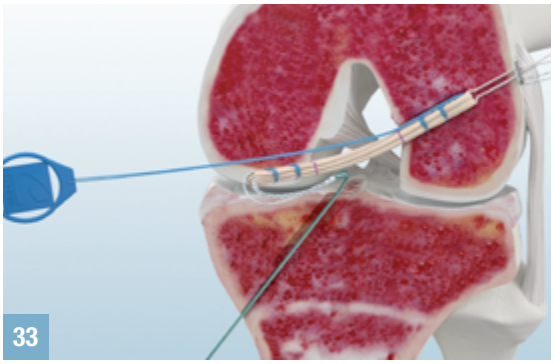
NOTE:
Take care not remove the green locking suture from the Infinity™ Femoral Adjustable Free Loop Button until graft passing is complete.

The blue reversible button tab should remain outside of the anteromedial portal.

ALLOGRAFT
TENDONS

In Partnership with:
mtfbiologics

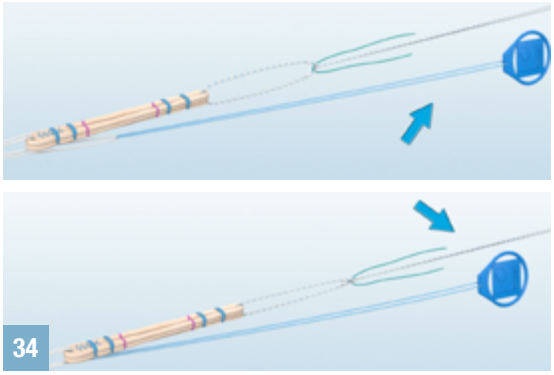
GRAFT POSITIONING AND FIXATION



Apply distal tension to the Infinity™ Adjustable Free Loop to pull the graft into the tibial graft socket.

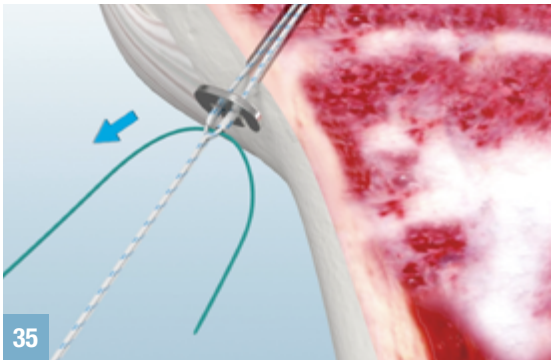
NOTE:
An arthroscopic probe can be used to help guide the graft down the tibial graft socket.

TIP:
Before applying the Infinity™ Standard Tibial Button and tensioning the free loop, cycle the knee to ensure proper femoral graft tension is achieved. Confirm there is no excessive tension while the knee is in full hyper-extension.

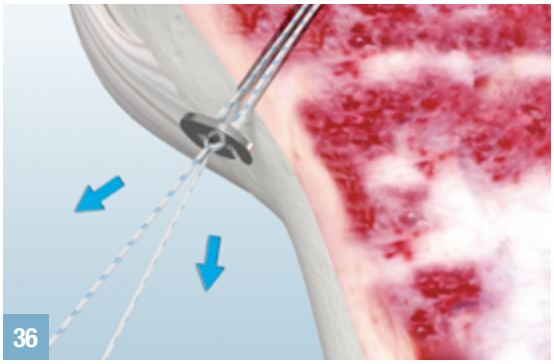


If graft re-alignment is required, pull the blue reversible button tab and lengthen one of the femoral graft loops. With one loop lengthened, cycle tension between the white tensioning suture WITHOUT the blue suture tail and the distal tails of the Free Loop.

Once graft position has been reversed, reposition the graft by following "Graft Passing – Step 31."

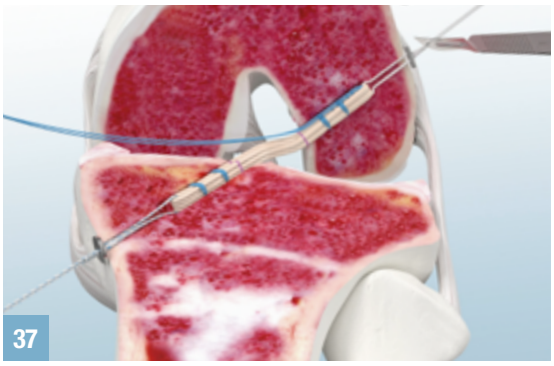


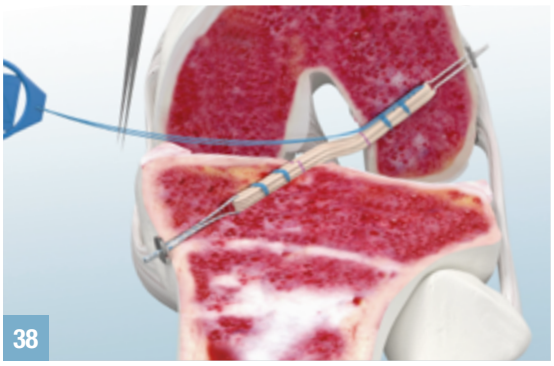
Carefully load the Infinity™ Standard Tibial Button onto the Free Loop with the open cleats positioned downward and the centering bulb towards the tibia. When ready to tension the Free Loop, remove the green locking suture.



To tension the Infinity™ Standard Tibial Button over the 3.5mm tunnel, alternate pulling each suture tail of the Free Loop. Tension graft in full extension to avoid over capture of the knee.

All-Inside Reconstruction with a Quadruple Folded Graft Using the Infinity™ Knee System





Pull one strand of the Infinity™ Femoral Adjustable 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.

Tie five overhand knots over the Infinity™ Tibial Button and remove remaining Free Loop suture.

Cut one strand of the blue reversible button tab and remove from the joint.

INFINITY™ FEMORAL
ADJUSTABLE LOOP BUTTON

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.

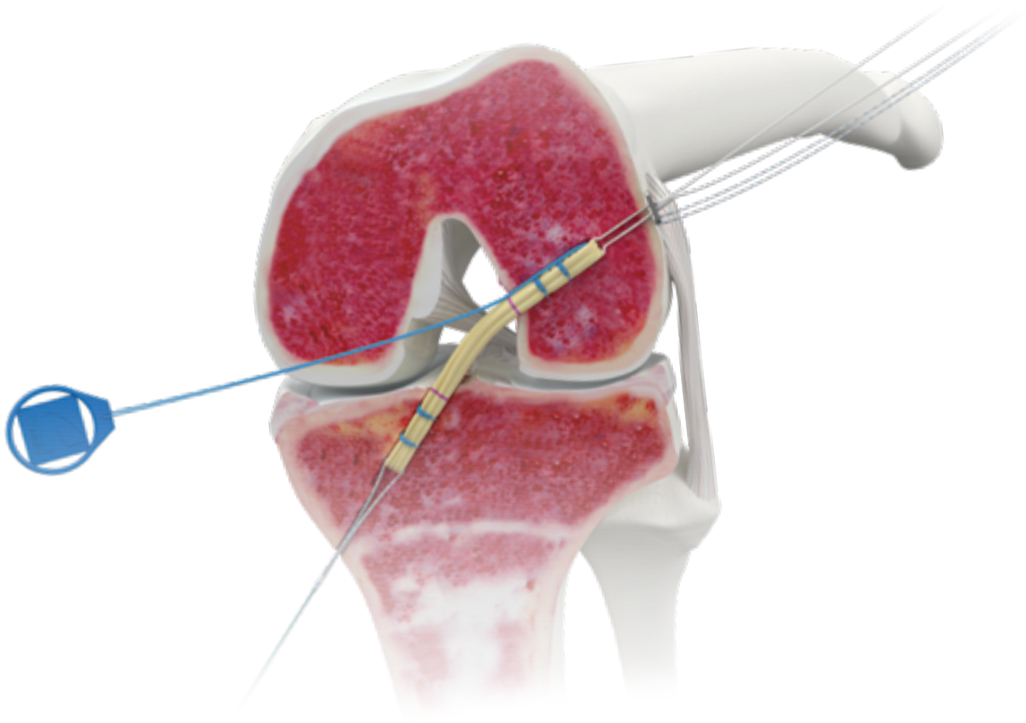
Mr. Spalding's interests cover the range of knee surgery including arthroscopic anterior and posterior cruciate ligament reconstruction, osteotomy, articular cartilage repair and meniscal surgery including repair and meniscal allograft transplantation.

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.

* Mr. Tim Spalding is a paid CONMED consultant.



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ORDERING INFORMATION

To order any of our Hall® Powered Instruments, the Infinity™ Modular Knee System, instrumentation, and other accessories, please call CONMED Customer Service at: (US) **1-866-4CONMED** or (Global) **727-214-3000**.

INFINITY™ RETRO-REAMERS

6.0mm Retro-Reamer	KRR060
6.5mm Retro-Reamer	KRR065
7.0mm Retro-Reamer	KRR070
7.5mm Retro-Reamer	KRR075
8.0mm Retro-Reamer	KRR080
8.5mm Retro-Reamer	KRR085
9.0mm Retro-Reamer	KRR090
9.5mm Retro-Reamer	KRR095
10.0mm Retro-Reamer	KRR100
11.0mm Retro-Reamer	KRR110
12.0mm Retro-Reamer	KRR120

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

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

FEMORAL FIXATION

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

TIBIAL FIXATION

Infinity™ Adjustable Free Loop	KFL100
Infinity™ Standard Tibial Button (14mm)	KTB014
Infinity™ Large Tibial Button (17mm)	KTB017

INFINITY™ GUIDE ARMS, GUIDE SLEEVES AND GUIDE BODY

Infinity™ ACL Tibial Tip Guide Arm	KTT100
Infinity™ ACL Tibial Elbow Guide Arm	KTE100
Infinity™ ACL/PCL Femoral Footprint Guide Arm	KFA100
Infinity™ ACL Tibial Footprint Guide Arm	KTA100
Infinity™ Guide Sleeve, Straight	KTS124
Infinity™ Guide Sleeve, Angled	KTS224
Infinity™ Guide Sleeve, All-Inside	KTS135
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
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

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

All-Inside ACL Reconstruction
with a Quadruple Folded Graft

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Largo, Florida 33773

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International: 727-214-3000

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