Volume 15, Number 1

SCOPE THIS OUT

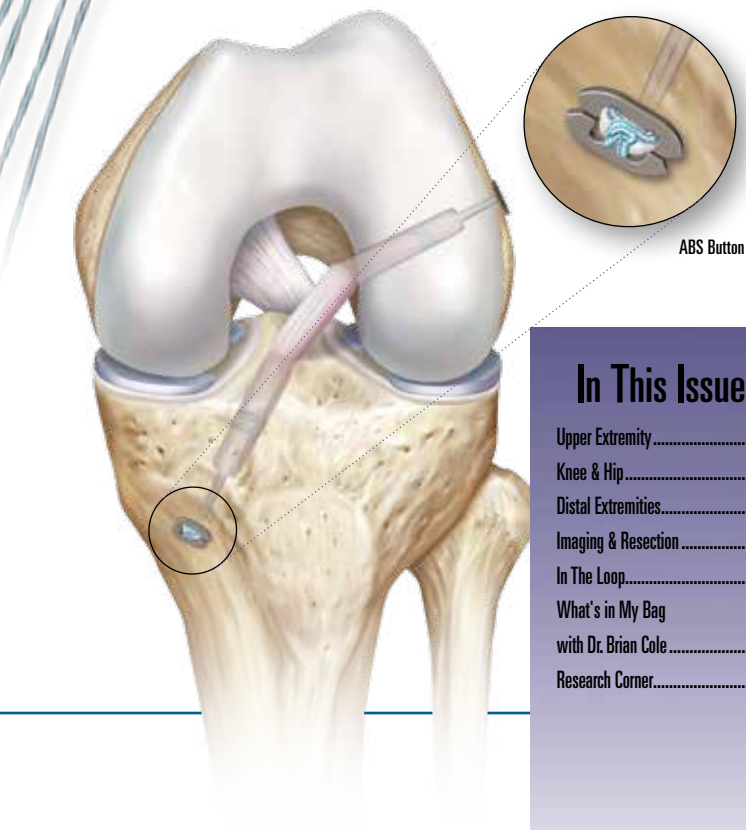
A Technical Pearls Newsletter for Arthroscopists

Allograft GraftLink

The Allograft GraftLink is a preconstructed allograft tendon designed to be used with the GraftLink All-inside ACL technique and TightRope implants. It was precisely assembled according to Arthrex specifications by trained tissue technicians to ensure the presutured construct meets the requirements of the GraftLink technique to allow for an anatomic, minimally invasive, and reproducible ACL reconstruction.

Allograft GraftLink Benefits:

- Minimal graft preparation time
- Pre-assembled with #2 FiberWire
- Sterile (10^{-6} Sterility Assurance Level)
- Presized to GraftLink All-inside specifications
- Use with GraftLink All-inside ACL technique
- Preloaded with passing sutures to facilitate loading with ACL TightRope implants



ABS Button

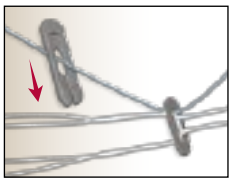
New TightRope Button Options

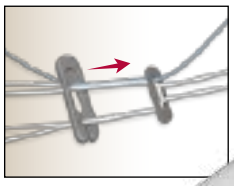
The family of TightRope products has continued to expand giving surgeons a wide array of options for a variety of ACL reconstruction techniques. The 14 mm TightRope ABS Button and TightRope Button Extender give surgeons the ability to create larger footprints compared to the original TightRope and ABS buttons – resulting in additional cortical fixation.

In addition to creating more button-to-bone contact, the 14 mm TightRope ABS Button also allows surgeons to pass a GraftLink through a full tibial tunnel and attach the button over the full-sized drill hole.

14 mm TightRope ABS Button

The TightRope ABS 14 mm Button comes packed sterile and can be used with the TightRope ABS implant.

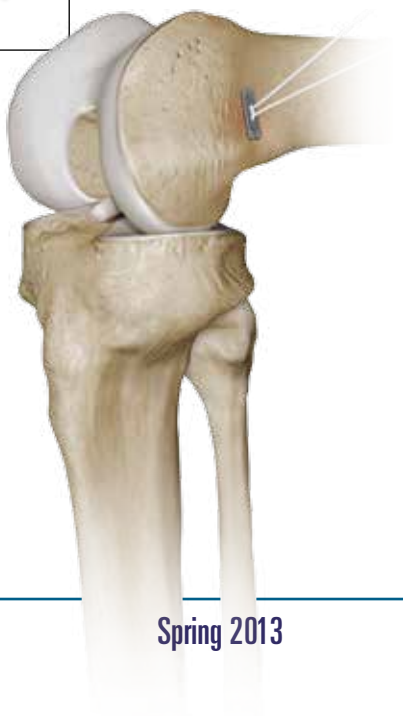




TightRope Button Extender

The TightRope Button Extender creates a large 20 mm x 5 mm footprint that maximizes button-to-bone contact against the cortex. An original TightRope or TightRope RT button attaches to it by fitting into its recessed section. A Button Extender is ideal for accidental cortical "blow-outs", revisions, and full tunnels. The minimum tunnel size to pass the Button Extender is 5 mm and it can be used over tunnels as large as 11 mm.

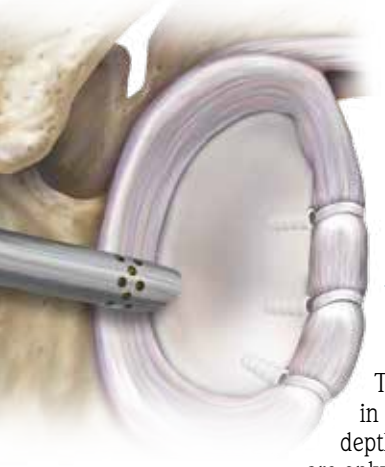
The TightRope Button Extender comes packed sterile and can be used with ACL TightRope, ACL TightRope RT, ACL TightRope DB, or BTB TightRope.



In This Issue

PRODUCT INFO

Upper Extremity

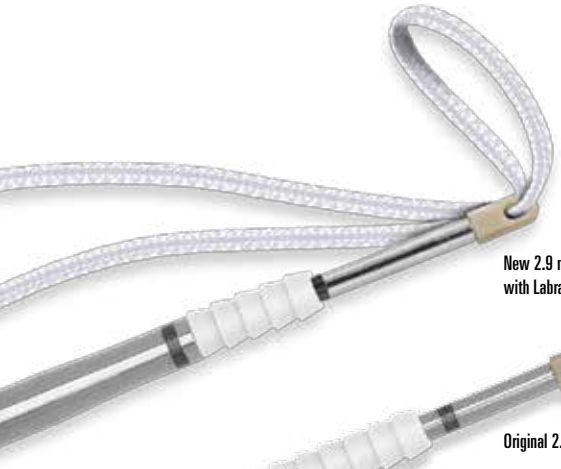


NEW Short 2.9 mm PushLocks with LabralTape for Knotless Instability Repair

The 2.9 mm PushLocks are now available in a shorter length to minimize the drill depth to preserve bone. These new implants are only 12.5 mm long and offer 32 lbf of ultimate pull-out strength. New LabralTape provides an excellent suture option and is 37%* more resistant to tissue pull-through, in a cadaver model, when compared to #2 suture. These innovative anchors, combined with our unique FiberWire configurations, offer the best possible knotless options to recreate the patient's anatomy.

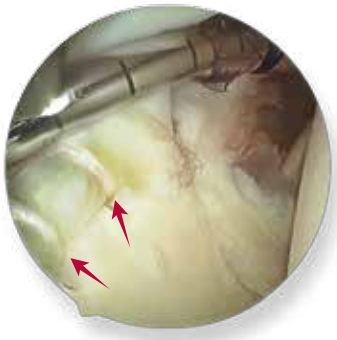
"I use LabralTape with short 2.9 mm PushLocks for my knotless instability repairs. The wide, low profile suture design of LabralTape helps create a secure labral repair. This overall knotless construct eliminates the potential for knot impingement and articular cartilage damage on all of my patients."

- James Bradley, M.D.



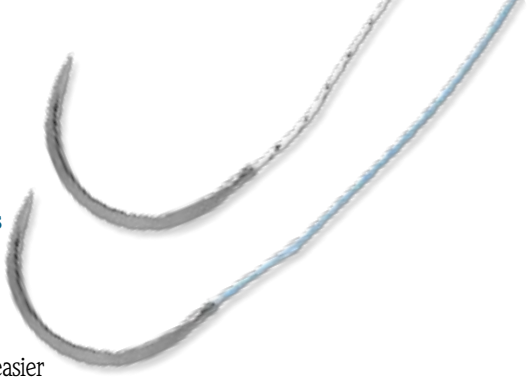
New 2.9 mm x 12.5 mm – AR-2923BC with LabralTape

Original 2.9 mm x 15.5 mm – AR-1923BC



SLAP Repair w/LabralTape

**data on file*

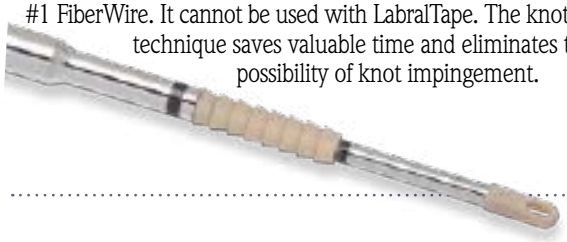


#2 TigerWire and #2 FiberWire with Reverse Cutting Needles

Managing multiple sutures during open procedures, including shoulder, hip, and knee arthroplasty, is made easier with two distinct suture colors. This offering includes a TigerWire and a FiberWire that are 38" long with a ½" Reverse Cutting Needle attached to one end. The reverse cutting needle design is more resistant to suture cutting through tissue because the sharp edge of the needle is opposite to the direction of tension on the tied suture. These sutures are conveniently packaged together to help with suture management and procedure efficiency.

2.4 mm PEEK PushLock for Knotless Instability Repair

The small diameter and short length of the 2.4 mm x 14 mm PEEK PushLock help preserve glenoid bone by minimizing the size of the bone socket. The new anchor is designed for simple and secure arthroscopic glenohumeral joint instability repair like the clinically proven 2.9 mm PushLock. The eyelet of the new anchor is smaller than on the 2.9 mm PushLock and is intended to be used with #1 FiberWire. It cannot be used with LabralTape. The knotless technique saves valuable time and eliminates the possibility of knot impingement.

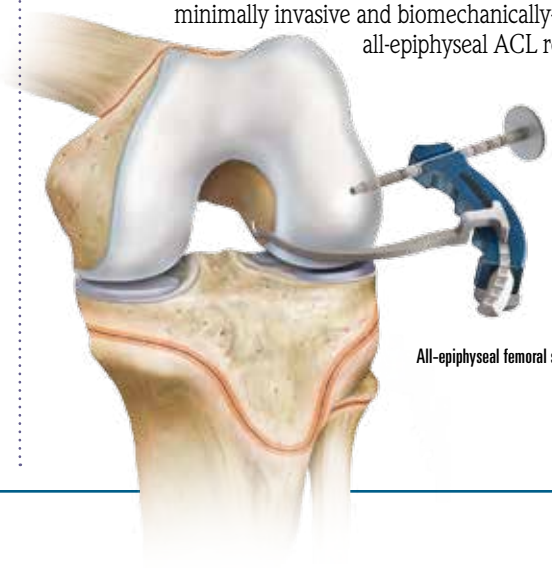


PRODUCT INFO

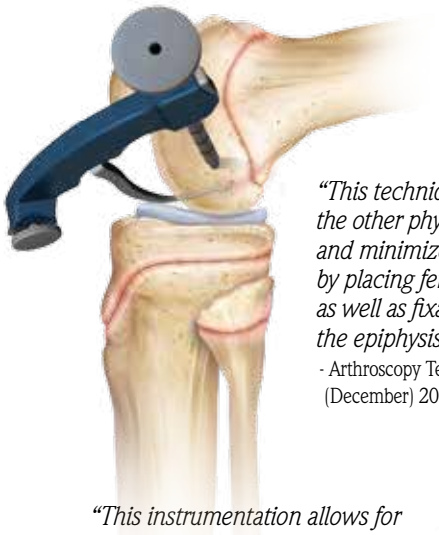
Knee and Hip

GraftLink All-Inside, All-Epiphyseal ACL Reconstruction

Staying true to the RetroConstruction product line, these unique small angle marking hooks allow surgeons to perform the most anatomic, minimally invasive and biomechanically-sound, all-inside, all-epiphyseal ACL reconstruction.



All-epiphyseal femoral socket preparation



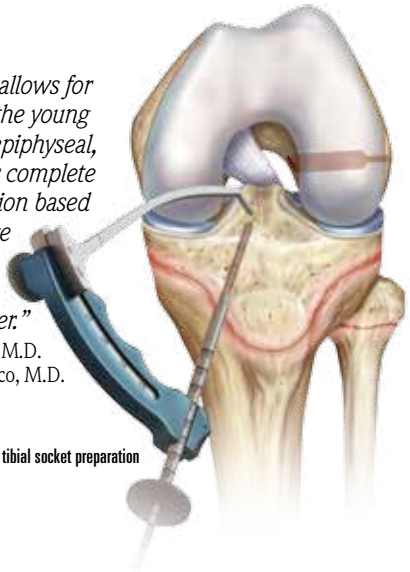
All-epiphyseal femoral socket preparation

"This technique restores better than the other physeal-sparing techniques and minimizes the risk of physeal injury by placing femoral and tibial sockets, as well as fixation, exclusively within the epiphysis."

- Arthroscopy Techniques, Vol.1, No. 2 (December) 2012: pp e231-e239.

"This instrumentation allows for versatility in treating the young athlete with either an all-epiphyseal, partial transephyseal or complete transephyseal reconstruction based upon their skeletal age and the potential for further growth in a safe and effective manner."

- Daniel W. Green, M.D. and Frank A. Cordasco, M.D.

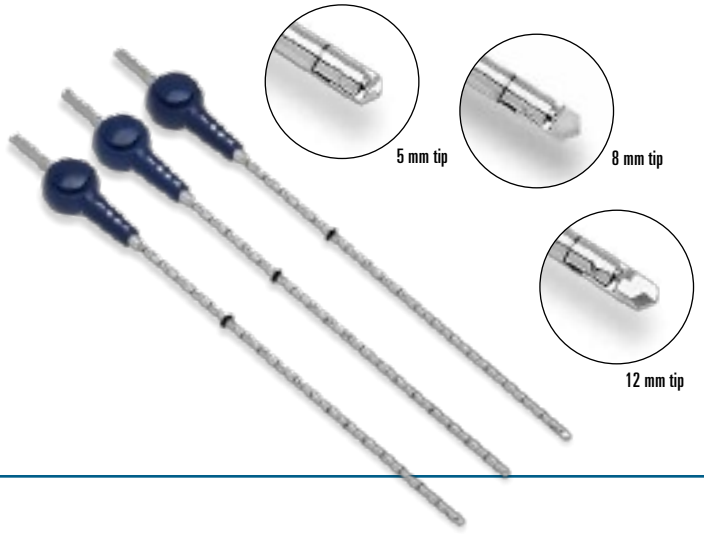


All-epiphyseal tibial socket preparation

NEW unique small marking hooks available soon

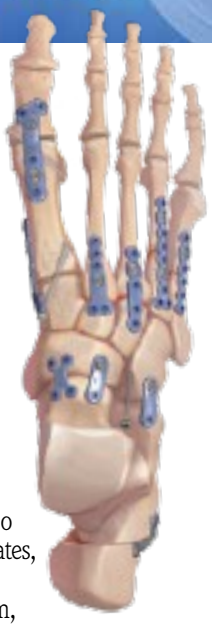
Short FlipCutter II

The FlipCutter has revolutionized retrodrilling with its unique ability to act as a guide pin and a drill, all in one. This has helped surgeons create clean, anatomic sockets with reproducible results. Due to surgeon feedback, Arthrex has released a shorter version of the FlipCutter II that is 3.54" shorter than the original version. The shorter design decreases overall working length which may decrease inadvertent bending of the pin during drilling, facilitates usage with smaller patients and is easier to use with a C-arm. The Short FlipCutter II is used with the 3.5 mm pre-drill pin and Stepped Drill Sleeve and is available from 5-12 mm sizes.



Hip Distractor Update

The Hip Distraction System is an advanced traction and limb positioning system that attaches to all major OR beds via Clark Rail Adapters. It is simple and straightforward for one person to assemble in seven easy steps. Both leg spars provide precisely-controlled, lower-extremity positioning and traction over the unique perineal post system to facilitate pelvic balancing and safe distraction. The novel foot attachments provide multi-direction stability of the calf, foot and ankle under traction to prevent heel lift. They can be detached and controlled during the procedure to check hip range-of-motion after osteoplasty, soft tissue re-attachment and reconstruction procedures. All of the components of the HDS disassemble and store neatly and securely on a rolling storage cart.



Comprehensive Foot System

This new plating system combines many of our current midfoot, forefoot and hindfoot plate and screw systems into one set. The set is divided into 2.4/3.0 mm and 3.5/4.0 mm modules for convenience. It houses the new Metatarsal Plates, TMT Plates, X-Plates, and our newly revised H-Plates. Also included in the set are the Lapidus Plates, Lisfranc Plates, Opening Wedge, and MTP Plates. The set includes locking and nonlocking options for 2.4 mm, 3.0 mm, 3.5 mm, and 4.0 mm screws along with 3.0 mm and 4.0 mm cannulated screws. Because all the components are presented together, the surgeon has the flexibility of choosing the ideal plate for any need. In addition, the new Mini Joint Distractor offers greater flexibility for joint preparation, visualization, and intraoperative compression of the fracture or fusion site.

*Internal*Brace~ Ligament Augmentation Repair Kit for Spring Ligament Repair

In addition to being used for the anterior talofibular ligament, the *Internal*Brace Ligament Augmentation may also be used to repair the spring ligament. The spring ligament repair would be an augment to a stage 3 flatfoot repair.

The FiberTape acts as a bridge, and parallels the ligament, adding needed support for the ligament to heal in the normal anatomic position. It also has the ability to obtain better correction and possibly eliminates the need for other extra-articular corrective procedures.

The *Internal*Brace offers the surgeon and patient many benefits. This construct may also offer resistance against future injury, while providing some joint protection against instability and associated arthritis.

PRODUCT INFO
Imaging & Resection

NuBOOM Ultra . . .
A Nu Way of Thinking about OR Integration

NuBOOM Ultra is an innovative, cost-effective, integrated OR system installed in 24 hours. The system provides true 1080p video imaging displayed on four HD LED monitors, easily routes digital images from a variety of sources (video, PACS, C-arm and US images) controlled through an intuitive touch panel and also allows for live video streaming from authorized remote viewers. NuBOOM's open architecture design ensures flexible, customizable support of end-user needs, which extends system utility for years.

"The big advantage was the short downtime in OR time (24 hours) and the reassurance that all the assembled components had been pre-tested prior to installation. This made the final switch-on and testing seamlessly easy. Once installed, the extra space in the OR that had been freed up by the NuBOOM configuration allowed for unencumbered movement of patient beds and set-up trollies. Although initially apprehensive about the integration of all the "high tech" gadgetry, its operation was surprising easily and very user-friendly. The final "oh my gosh" was the superb, almost revolutionary, quality of the image on monitors that could be effortlessly moved around making viewing on multiple screens for arthroscopic shoulder surgery so convenient. Without a doubt, the picture quality, white balance and field of view of the Synergy system in conjunction with the ULTRA has improved my surgical technique and shortened OR time to the benefit my patients."

– Mark Ferguson MD, Johannesburg, South Africa: mark@portsortho.co.za

"During hip arthroscopy, the NuBOOM arthroscopy tower allows me to see the fluoroscopy image on one monitor, the MRI images on another, the patient's x-rays on a third monitor and still have a large, high definition monitor dedicated to the arthroscopy images – giving me all the patient's medical information in one place, without having to leave their side during surgery. Unprecedented technology involving arthroscopic surgery has reached new heights . . . with the NuBOOM System from Arthrex."

– Mauricio F. Herrera, MD, Miami, Florida: info@herrerasportsmedicine.com

DICOM Compatible Synergy^{HD3}

The 1.3 version software brings DICOM compatibility to the Synergy^{HD3} platform. The DICOM formatted images can be stored directly to a facility's PACS for archiving and reviewing purposes. The software also allows a modality worklist to be pulled from the PACS to import patient information into the Synergy^{HD3} console. Both functions increase the usability of the system.

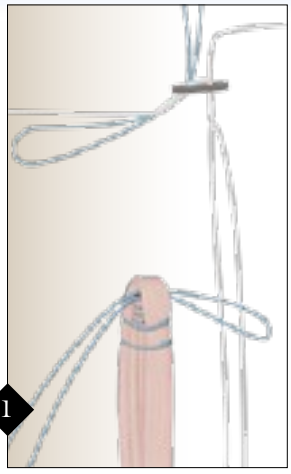
Synergy^{HD3} Physician iPad App

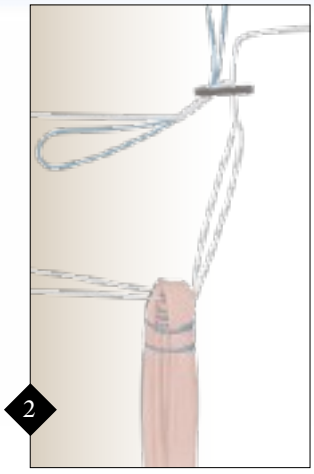
Synergy Updates

More updates have been made to the Synergy^{HD3} ArthrexSurgeon iPad application. Version 1.3 is released on the app store, so you will see it on your iPad updates. New features include improved searching capabilities of the case list, import and attach PDF documents to emailed reports, print functionality directly from the app, the ability to label images in emailed reports and import and play video clips captured during the case. No system on the market allows for a more professional patient presentation than the Synergy^{HD3} iPad ArthrexSurgeon app.

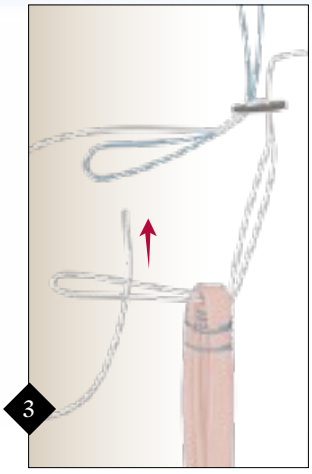
IN THE Loop...

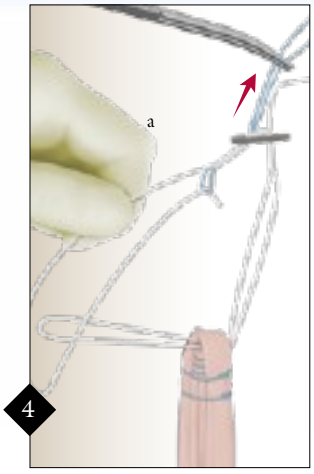
Allograft GraftLink
– Loading of the femoral graft end with BTB TightRope





The BTB TightRope, an open loop construct, is used on the femoral side of the graft. Remove the needle from the BTB TightRope loop by cutting the Nitinol wire loop. Unfold the blue passing suture of the femoral end of the GraftLink construct, exposing a loop and two tails. Drop the loop of the BTB TightRope into the blue loop of the passing suture (1). Pull the tails of the passing suture to pass the TightRope loop through the graft (2).





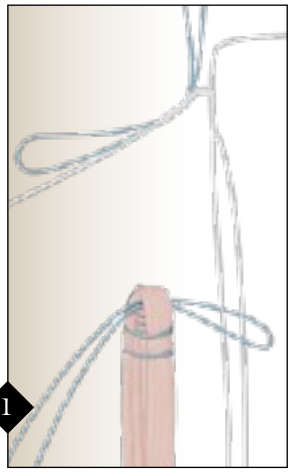
Pass the free end of the TightRope implant through the TightRope loop (3).

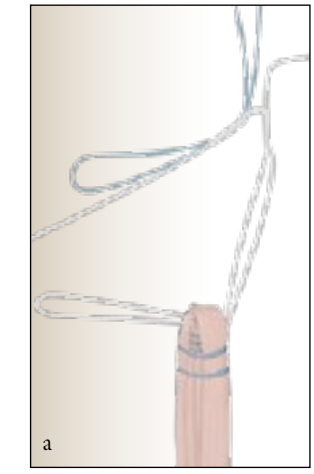
Pass about 2 cm of the free end of the implant through the blue passing suture. While holding the white suture in place, pull proximally on the tails of the blue passing loop until the free end is pinched against the splice of the implant (this will prevent disassembly during passing).

Grip the fixed end of the suture (a) with the left hand. Using a clamp, pull proximally on the blue tails to pass the free end of the implant through the splice and through the TightRope button.

Once passed, adjust the loop lengths so that they are equal with the loop connection near the apex of the graft.

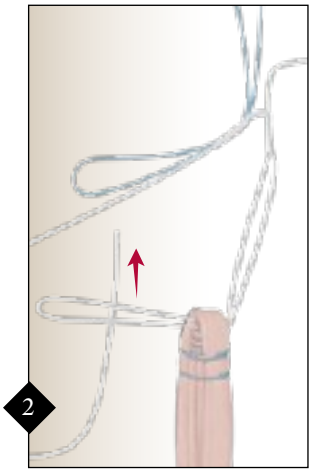
– Loading of the tibial graft end with Open TightRope ABS

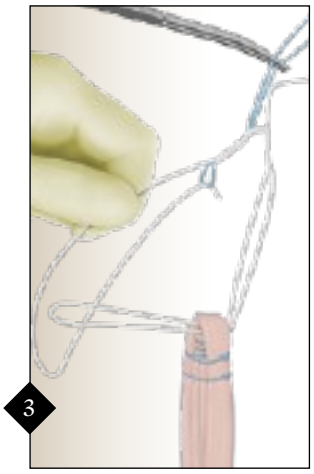




An Open TightRope ABS (Attachable Button System) is used for tibial fixation and loaded onto the graft in similar fashion as the BTB TightRope.

Unfold the blue passing suture of the tibial end of the GraftLink construct, exposing a loop and two tails. Drop the loop of the TightRope into the blue loop of the passing suture (1). Pull the tails of the passing suture to pass the TightRope loop through the graft (a).





Pass the free end of the TightRope implant through the TightRope loop (2).

Pass about 2 cm of the free end of the implant through the blue passing suture. While holding the white suture in place, pull proximally on the tails of the blue passing loop until the free end is pinched against the splice of the implant (this will prevent disassembly during passing).

Grip the fixed end of the suture (a) with the left hand. Using a clamp, pull proximally on the blue tails to pass the free end of the implant through the splice.

What's in My Bag?

Featuring Brian Cole, M.D.

Orthopedics, Department of Anatomy & Cell Biology
Section Head, Cartilage Restoration Center at Rush
Division of Sports Medicine, Rush University Medical Center

BioCartilage

Q. Why do you feel it is important to augment the microfracture procedure?

A. Several new technologies have focused on improving the outcomes of microfracture beyond what we have seen in the literature. Unfortunately, the regulatory burden that nonallograft and biologic therapies must overcome has virtually halted the emergence of new solutions for cartilage repair. There are more than 125,000 microfracture procedures performed annually, yet the results remain mixed and often, short-lived. Thus, harnessing the relative simplicity of microfracture and promoting stem cell recruitment with the addition of a bioactive scaffold provides a legitimate opportunity to improve outcomes for our patients.

Q. What intrigued you about utilizing a technology that doesn't contain live cells and instead functions purely as a scaffold?

A. Microfracture, when technically well performed, has profound potential. The technique requires that we create vertical walls surrounding the defect in an effort to help the defect better "shoulder the load". Completely eliminating the calcified layer is also critical to promote the development of adherent, robust fibrocartilaginous repair tissue. Atraumatic perforations created by the PowerPick minimize the "fracture" component (and the associated negative impact that otherwise occurs with the biology of fracture healing with stiffening of the subchondral plate), provide anchor points for fibrocartilage repair tissue, and access to mesenchymal stem cells (MSCs) within the bone marrow. BioCartilage is a conductive scaffold with natural cartilage proteins native to articular cartilage with the added advantage of an inductive effect through active proteins and the addition of PRP. Ample *in vitro* and early *in vivo* evidence exists supporting the positive effects of these substrates both individually and collectively.

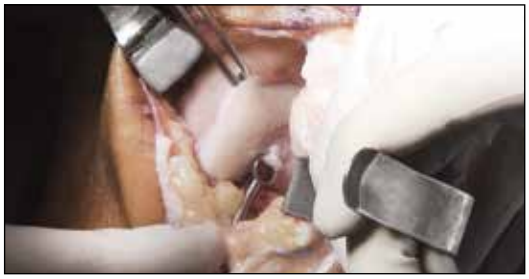
Q. When would you utilize BioCartilage over other types of cartilage procedures?

A. The optimal-sized defect, treated first-line with microfracture, typically includes small to medium-sized defects. BioCartilage as an adjunct to microfracture makes intuitive sense given the variable results of microfracture alone. Osteochondral allograft transplantation remains an excellent option when the subchondral bone is involved, especially for larger defects.

Q. Do you come across lesions that you didn't expect to treat where BioCartilage has been utilized?

A. Before BioCartilage, there were really no "off-the-shelf" options to treat cartilage defects. Clinicians should always be aware of the possibility that a cartilage defect will be appreciated at the time of arthroscopy and that it might be determined to be the source of the patient's symptoms, despite it not being objectively appreciated from preoperative assessments (i.e., MRI, prior surgical findings, etc). Thus, having a relatively low-cost, arthroscopic option with an extended shelf-life (five years) is appealing, as long as the patient is adequately consented preoperatively.

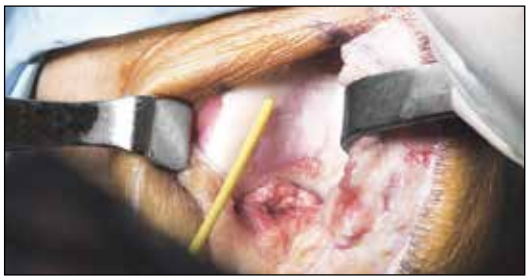
Treatment of Trochlear Defect with BioCartilage



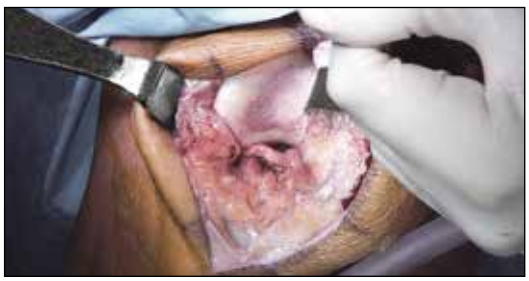
Debride defect to a stable border

Perform bone marrow stimulation procedure

Apply BioCartilage into the prepared defect



Drip fibrin over the BioCartilage material

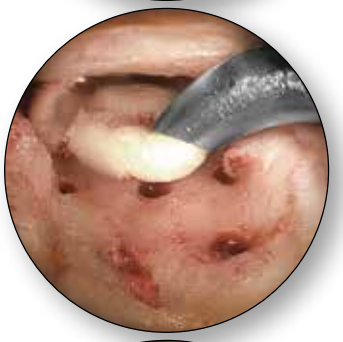


Allow fibrin to set before closing

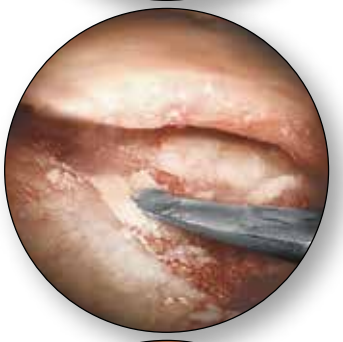
Treatment of Tibial Plateau Defect with BioCartilage

Debride defect to a stable border

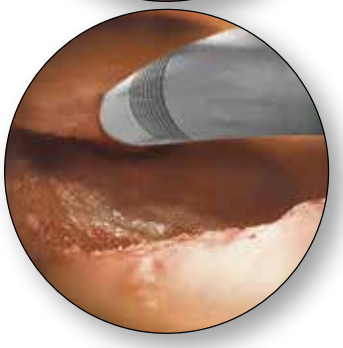
Utilize PowerPick and prepare bony surface or defect



Injection of BioCartilage into the prepared defect



Level BioCartilage to where it is slightly recessed



Apply fibrin and allow to set

Q. When performing a BioCartilage procedure, are there any technique pearls you really focus on?

A. Our experience in large animal studies and initial clinical utilization of BioCartilage has helped to identify several pearls. A #15 scalpel is used to delineate the defect in the initial preparation of the vertical wall. A small ring curette and arthroscopic basket is useful for further delineation. It is critical to violate and remove the calcified layer without macroscopically disrupting the subchondral plate. The objective is to get the bone to "pink-up" following complete preparation. An arthroscopic shaver on forward or reverse is also useful for this purpose. Switching portals to better access different portions of the lesion is important. I prefer the PowerPick over standard arthroscopic awls as it creates a uniform diameter hole that is less atraumatic and minimizes crack propagation at the edges of the hole. When mixing the micronized allograft cartilage with PRP, we recommend a 1:1 ratio. However, if the paste is too dry or difficult to eject from the delivery needle, it is occasionally helpful to add a very small amount of additional PRP to improve the handling properties. The bed of the defect should be as dry as possible; using a cannula to pass neuropatties or Q-tip type swabs along the base of the defect to dry it is helpful. Placing the patient in some degree of Trendelenberg during positioning can eliminate the effects of gravity. It is best to underfill the defect slightly to avoid contact with opposing surfaces. Prior to fibrin glue placement, it is helpful to dry the surrounding native articular cartilage edges. Finally, when applying the fibrin glue, only add enough to the construct to make it flush with the surrounding articular surface rather than leaving it proud. Wait a full 5–7 minutes before ranging the joint. Use a sharp instrument (scalpel, basket hand instrument) to get rid of excess fibrin that is not relevant to the final construct.

Q. When you use BioCartilage, does your post-op rehab protocol change?

A. I generally follow standard protocols described for microfracture surgery. I will, however, place the patient in a knee immobilizer locked in extension and wait a few days before beginning CPM to allow MSC's and bone marrow elements to fully infiltrate the BioCartilage mixture and form a stable, resilient clot. Notably, I recommend heel touch weight-bearing for most tibiofemoral lesions without the use of a brace. For patellofemoral lesions, I allow full weight-bearing in a brace. I encourage CPM if available for a total of 6 hours per day for at least 6 weeks. I restrict higher degrees of flexion initially for patellofemoral lesions, but allow full range for tibiofemoral lesions. Total weight-bearing protection for tibiofemoral lesions ranges from 6–8 weeks.

Q. It is understood that this product is very new with limited, longer term clinical follow-up. Can you comment on the outcomes you have seen so far with the patients you have treated?

A. Admittedly, the clinical follow-up is short with most of our initial patients at between 6 and 12 months postoperatively. The postoperative MRIs have been interesting with most defects showing complete retention of the mixture at approximately 1 month postoperative evaluation. The other finding is that the subchondral bone has considerably less edema than what we traditionally see following microfracture alone. It is possible that some of these findings are due to use of the PowerPick device rather than standard microfracture awls. I have had no adverse events in my patients to date. Clinically, they are doing as well or better than our microfracture patients have done and further clinical follow-up with direct comparisons of these techniques will elucidate the specific differences. Notably, early results from our equine study suggests improved macroscopic appearance for defects treated with BioCartilage compared to microfracture alone. We remain optimistic to this methodology and hope that it will result in improved clinical outcomes for our patients.

Research Corner

Glenohumeral Suture Anchor Repair Evolution

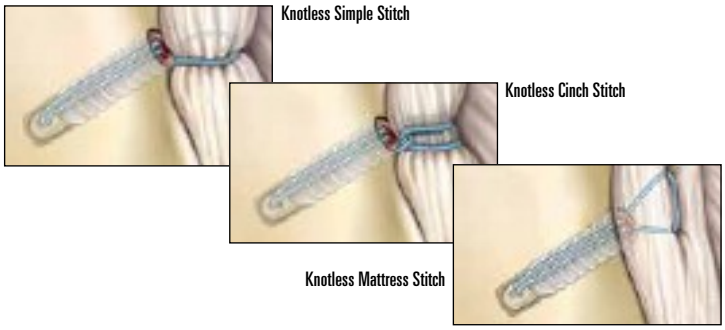
Suture anchors have overwhelmingly become the most accepted form of fixation for arthroscopic shoulder stabilization for recurrent glenohumeral instability. The availability of a wide variety of implant sizes, suture configurations, absorbable and nonabsorbable materials, along with new designs which have optimized fixation strength – have led to efficient techniques and improved clinical outcomes. The advent of high strength FiberWire suture, along with smaller and stronger anchor designs, have led to an era of more reliable and simplified anchors. Knotless PushLock anchors have been effectively repairing labral tears for over seven years and have several published studies verifying their clinical efficacy and ability to restore labral height similar to that of knot tying anchors.[1]

While many surgeons have converted to knotless anchors for glenohumeral repair, the majority continue to utilize knot-tying suture anchors. The ability to percutaneously implant a knot-tying anchor through a spear for inferior glenoid placement has led many to "zone-specific" repair with inferior placed SutureTaks and superior PushLocks. Studies show that knotless PushLock anchors can achieve similar initial fixation strength to knot-tying anchors for type II SLAP repairs, while eliminating knots that can abrade the undersurface of the rotator cuff or biceps.[2,3]

Knot-tying anchors are proven to effectively repair labral tears, but the long-term effects of the knot stacks may exhibit future patient issues. In a recent study, it was found that labral repair knots tied towards the capsule can migrate towards the glenoid after surgery from motion in the shoulder.[4] As the knots shift towards the glenoid, they can rub between the glenoid and humeral head loosening the knot or damaging the articular cartilage.[4]

Movement-induced knot

The knotless PushLock anchors minimize potential issues from bulky knot stacks and allow for a variety of suturing techniques. The small size and short drill holes of these anchors helps conserve bone, while offering secure BioComposite anchor fixation.



1. Cole, Slabaugh, Friel, Wang, *Restoring the labral height for treatment of Bankart lesions: A comparison of suture anchor constructs.* Arthroscopy 2010;26:587-591.
2. ElAttrache, Tibone, LeeUggen, Wei, Glousman, *Biomechanical comparison of knotless anchor repair versus simple suture repair for type II SLAP lesions.* Arthroscopy 2009;25:1085-1092.
3. ElAttrache, Dines, *Horizontal Mattress with a Knotless Anchor to Better Recreate the Normal Superior Labrum Anatomy.* Arthroscopy 2008; 24:1422-1425
4. Sae Hoon Kim, M.D., Ph.D., Ronald B. Crater, M.D., D.P.T., and Alan R. Hargens, Ph.D., *Movement-Induced Knot Migration after Anterior Stabilization in the Shoulder.* Arthroscopy 2013 (in press).

STO Featured Product Information

TightRope ABS Button	AR-1588TB
14 mm TightRope ABS Button	AR-1588TB-1
Button Extender	AR-1589RT
BioComposite PushLock, 2.9 mm x 15.5 mm	AR-2923BC
BioComposite PushLock, 2.9 mm x 12.5 mm	AR-1923BC
#2 FiberWire w/Reverse Cutting Needles	AR-7217
#2 TigerWire w/Reverse Cutting Needles	AR-7217T
2.4 mm PEEK PushLock	AR-2922PS
Drill for 2.4 mm PushLock	AR-2922D-24-1
#1 FiberWire (blue)	AR-7216
Pin Tip Tibial Marking Hook for RetroConstruction ACL Guide, small angle	AR-1510GTS
Footprint Femoral ACL Guide, small angle, right	AR-1510FRS
Footprint Femoral ACL Guide, small angle, left	AR-1510FLS
Short FlipCutters II, 5 mm – 12 mm	AR-1204AS-50 – 120
Hip Distractor System	AR-6529S
Comprehensive Foot System	AR-8950S
*Internal*Brace Ligament Repair Augmentation Kit	AR-1678-CP
Synergy^{HD3} Console	AR-3200 0001
Synergy^{HD3} Camera Head	AR-3210 0001
BTB TightRope	AR-1588BTB
Open TightRope ABS	AR-1588TN-1
BioCartilage	1850 *(Miami Tissue Bank)*
PowerPick, 30°	AR-8150PP-30
PowerPick, 45°	AR-8150PP-45

For more information or to order, contact your Arthrex representative or call Customer Service at 800-934-4404.

Scope This Out is an informational newsletter designed to educate orthopaedic surgeons on state-of-the-art surgical procedures and "pearls" to assist in improving surgical skills. This newsletter is published quarterly by Arthrex, Inc., exclusively for the orthopaedic surgeon community.

For more information or comments regarding the content of this newsletter, contact us at our Corporate Headquarters:
Arthrex, Inc.
1370 Creekside Boulevard
Naples, Florida 34108 USA
Phone: (800) 933-7001
Fax: (239) 598-5534
Email: information@arthrex.com

Eastern Hemisphere offices are located in Germany, France, England, Austria, Belgium, Sweden, Switzerland, The Netherlands, Denmark, Poland, Japan, and Korea.

Additional information is available on our website at www.arthrex.com.