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Sports Medicine

CONMED LINVATEC SPORTS MEDICINE NEWS AND PRODUCT INFORMATION

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Clinical Focus

Meetings and Workshops

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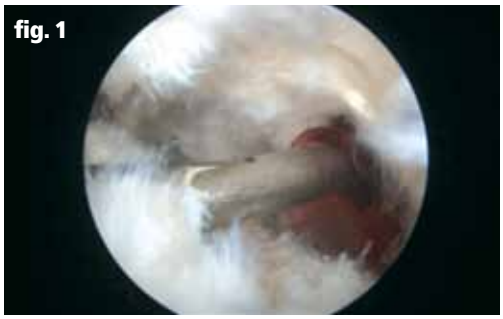
Linvatec SRS Shoulder Restoration System Technique Summary

John Randle, M.D., Newmarket, Ontario, Canada

The Linvatec Shoulder Restoration System is a versatile line of anchors that can be used for single row, double row or transosseous equivalent repair of torn rotator cuff tendons. I think that the transosseous repair of simple tendon tears is a reliable and reproducible technique for managing tears that are easily mobilizable to the greater tuberosity. I wouldn't recommend this technique for complex tears that are not easily mobilized to the greater tuberosity.

An assessment is first performed evaluating the various intra-articular structures. Most debridement of the joint, in all but the most remote corners can be performed through the tear in the tendon. I don't routinely create a second intra-articular portal for assessment unless reconstruction is required.

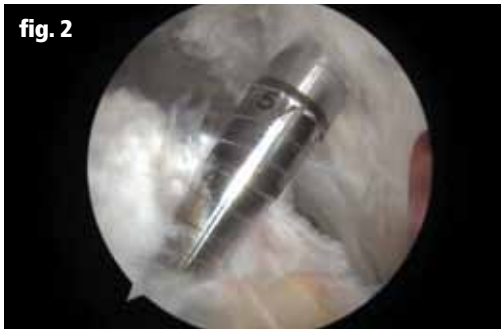
Intra-articular assessment and/or treatment is completed, the scope is moved to the subacromial space and a bursectomy is performed followed by a decompression and AC joint excision if necessary. The mobility of the torn tendon is then evaluated with a grasper **(fig. 1)**. Providing it is easily mobilizable to the greater tuberosity, it is classified as a Simple tear and can be appropriately repaired using the following repair technique.



My preferred anchors will be the 5.5mm CrossFT™ and the 3.5mm PopLok™. Both are PEEK anchors offering excellent fixation and long term biological stability while permitting accurate MRI assessment of the shoulder, if required post-operatively.

I view the repair from the posterior portal and use the lateral portal as my working portal. I tend to work from anterior to posterior as I find that the posterior anchor or passed sutures will make visualization of the anterior anchor/sutures difficult.

Once the greater tuberosity is debrided of soft tissues , I plan the insertion of the medial row of anchors using a spinal needle. I like to place the anchors 2-3mm from the articular margin and near the anterior and posterior extent of the tear. The CrossFT Universal Punch is then inserted. Through a 3mm "stab" incision, the placement of which was determined by the aforementioned spinal needle localization technique **(fig. 2)**. This small incision will function as my "anchor portal". Using separate anchor portals ensures orderly suture management during the repair.



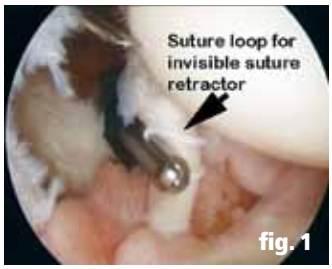
Once both double loaded CrossFT anchors are placed along the medial row **(fig. 3),** I choose individual suture strands of the same colour and pass them through the edge of the tear in a horizontal mattress configuration. Using different colours for the anterior and the posterior pairs also aids with suture management. Once each of the paired sutures is tied and removed out their respective

Continued on page 5…

Proximal Biceps Tenodesis Technique Featuring the G-Loop

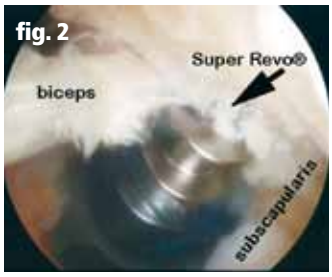
Stephen J. Snyder M.D., Van Nuys, CA

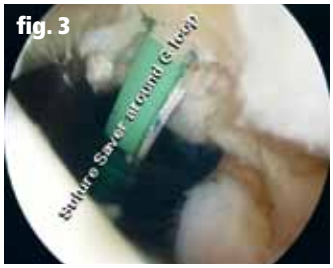
The scope is placed in the posterior portal and a complete diagnostic evaluation of the joint is performed. A blue 7mm Dry-Doc® cannula is inserted into the anterior joint just superior to the subscapularis tendon. The "invisible retractor" is placed around the biceps tendon **(fig. 1)**. A strand of #2 Ethibond (or equivalent suture) is passed through the Dry-Doc and placed above the biceps tendon using a small grasping clamp. The clamp is maneuvered below the biceps and the suture is clamped and removed into the Dry-Doc thus forming a loop around the tendon. A 16 gauge spinal needle is passed into the shoulder via a lateral mid-acromial puncture at a point near the midpoint of the attachment of the rotator cuff as close as possible to the bone attachment. A Super Shuttle Relay™ is inserted into the needle and retrieved into the Dry-Doc with the grasping clamp passing above the biceps. The Shuttle is loaded with both limbs of the suture and the Shuttle is pulled back through the joint carrying the suture out the skin laterally. By gently pulling on the suture ends, the loop is directed to the top of the biceps tendon. Traction on the loop will retract the biceps in a posterior-lateral direction facilitating visualization of the anchor target. A hemostat fixed to suture outside the skin will maintain retraction when needed without need for hand traction.



The soft tissue is debrided from the humeral bone near the inferior aspect of the biceps groove at the apex of the triangle formed by the biceps and the subscapularis tendon. It is very important to clean the bone lateral to the articular cartilage to ensure clear visualization of the target. If necessary, a 70 degree scope can be used. A ring curette may be used along with an electrosurgical tool (a special cutting tip would be very helpful) and a shaver. I would not recommend using a burr since the bone is not dense in this area and anchor fixation may be compromised.

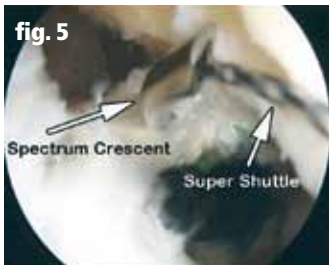
A small "starter" hole is created in the target spot using a small bone punch similar to a mini Revo® punch. The Super Revo anchor loaded with the G-loop of Hi-Fi® suture is inserted and aligned so that the loop side of the eyelet faces the direction of the biceps **(fig. 2)**. The screwdriver is removed and the sutures are tested to ensure they are not twisted. A green Suture Saver is passed over the loop strand and clamped inside the Dry-Doc **(fig. 3)**. A spinal needle is passed into the joint 1 cm inferior to the Dry-Doc cannula to locate the position for the "Suture Control Cannula." A small nick is made in the skin and the SCC is inserted. The Super Shuttle™ is passed through the SCC and retrieved into the blue Dry-Doc on the inferior side (subscap side) of the anchor taking care to avoid crossing over the suture or Suture Saver **(fig. 4)**. The Super Shuttle is loaded with the two free tails of suture outside of the Dry-Doc and carried back into the joint and into the SCC by retracting the opposite end of the Super Shuttle.





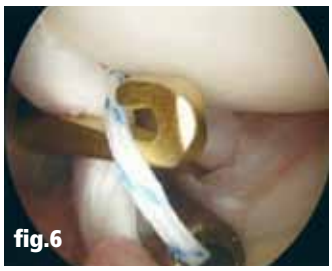
The sutures are tested by releasing the clamp on the Suture Saver and observing the suture exiting the anchor to be certain it moves smoothly through the anchor eyelet with no twists. A hemostat is then placed back on the Suture Saver as well as on the ends of the suture outside of the SCC. The "invisible retractor" is temporarily released to allow the biceps to resume its normal position.

A Linvatec Spectrum Crescent suture hook is inserted into the Dry-Doc cannula and passed through the biceps tendon as far laterally as feasible **(fig. 5)**. Half of the length of the Super Shuttle is passed into the joint and the Crescent hook is removed. The Super Shuttle is retrieved into the Dry-Doc using a loop-tip grasper. It is retrieved on the inferior or subscapularis side near the anchor. Care is taken to avoid crossing the grasper around the loop suture in the Suture Saver.



The Suture Saver is removed and a leader suture is threaded into the loop. The lead suture is loaded into the Super Shuttle eyelet and it is carried down the Dry-Doc and through the biceps and back out the Dry-Doc. The clamp is removed from outside the Suture Control Cannula. The sutures are gently pulled to test for free sliding through the anchor eyelet. The green Suture Saver is placed back over the looped suture and clamped. The tip of the SCC is maneuvered into the joint carrying the two sutures into position for easy retrieval.

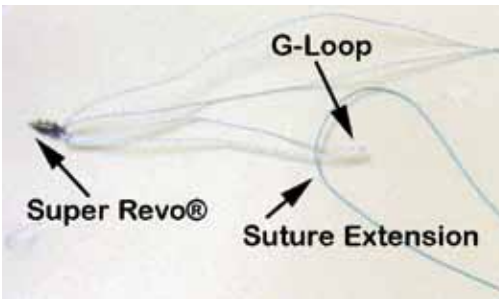
One of the sutures is retrieved from the SCC using a crochet hook above the biceps and the other is retrieved below the biceps and each is carried into the Dry-Doc **(fig.6)**. The Suture Saver is removed and the sutures are tested again to test for ease of sliding movement through the eyelet.



A racking hitch is formed on the loop end of the suture by folding it back on itself and passing both free limbs through the loop thus created. The hitch is tightened removing all slack. The hitch is advanced into the Dry-Doc by gently pulling on the two free ends of the suture. It often works best to alternately pull one tail a few centimeters and then the other. The hitch is observed as it reaches the biceps and the tendon is secured to the anchor **(fig. 7)**.

A half hitch suture loop is placed on the suture tails outside the Dry-Doc and advanced into the cannula and secured on the hitch. A second hitch is placed to finish the knot.

The suture tails are cut. The biceps tendon is cut 1cm medial from the hitch and the stump is removed with a shaver **(fig. 8)**.



SRS: Shoulder Restoration System

Bob Adikes, Senior Product Manager – Sports Medicine

The Shoulder Restoration System from ConMed Linvatec is a comprehensive shoulder system for rotator cuff repair that supports multiple techniques, produces secure repair constructs, and provides optimal tensioning leading to superior clinical outcomes.

This innovative system allows for intra-operative flexibility granting the surgeon access to choose from any of the most advanced rotator cuff techniques and procedures.

The SRS system is comprised of several components including two fully threaded anchors (CrossFT™ and Super Revo®/ThRevo®-FT), in 4 various sizes and material compositions, with multiple suture configurations. Also included in the system is a state-of-the-art knotless suture anchor called PopLok™. It is available in multiple sizes and suture configurations, affording ease of use second to none. All anchors channel growth factors to the repair site due to the cannulation of the anchor. In addition to redefining the suture anchor market, ConMed Linvatec is also revolutionizing the instrumentation segment of the market. Once again focusing on its commitment to innovation, a more efficient method for pilot hole creation was developed, providing even more options to access, address, and repair shoulder pathology in the rotator cuff. The new instrumentation, exclusive to ConMed Linvatec, simultaneously enhances fixation, reduces fractures to bone, and saves valuable OR time.

CrossFT™ Suture Anchors:

Clinical use	Single row, Double row, Medial row of TOE
Features	Fully Threaded/ Dual Threads
Pull-out	475N (avg)*
Diameter (Cat. No.)	4.5mm (CFP-4502 & CFP-4503), 5.5mm (CFP-5502 & CFP-5503), 6.5mm (CFP-6502 & CFP-6503),
Material	PEEK
Sutures	2 and 3 strands of Hi-Fi®
Technique	Create hole, screw-in anchor

*In-house test performed on high-density composite synthetic bone.

Super Revo®-FT and ThRevo®-FT Suture Anchors:

Clinical use	Single row, Double row, Medial row of TOE
Features	Fully Threaded, Self-Tapping
Pull-out	439N (avg.)*
Diameter (Ca. No.)	5.0mm Super Revo-FT (CF6140H) ThRevo-FT (CF6160H)
Material	Titanium
Sutures	2 and 3 Hi-Fi® Sutures
Technique	Screw directly into bone

PopLok™ Suture Anchors:

Clinical use	Single row, all knotless TOE, lateral row of TOE
Features	Knotless, sub-cortical wings, individual suture tensioning and suture locks within the anchor
Pull-out	140N (avg.)*
Diameter (Cat. No.)	3.5mm (CKP-3500 & CKP-3501) 4.5mm (CKP-4500 & CKP-4502)
Material	PEEK
Sutures	2/3 and 4 suture limbs
Technique	Load sutures, create pilot hole, insert into pilot hole, tension sutures, deploy

SRS Surgeon testimonials

"I like both anchors quite a bit. The sutures slide and tied well on the CrossFt. The PopLok anchor fulfills all the characteristics that I would look for in a lateral row anchor because the suture locks in the anchor itself, it is smaller than others on the market and there is no metal."

Chris Jones, M.D., Colorado Springs, CO

"I like the PopLok because you are able to tension the sutures more effectively than the PushLok and Versalok."

Lyndon Gross, M.D.,Ph.D., St Louis, MO

Minimizing Retraction For Single Incision Distal Biceps Repair

Mark H. Field, M.D., Baton Rouge, LA

Arthroscopic suture management and knot tying used to minimize retraction of vulnerable neurovascular structures during open biceps repair.

Technique:

A 3cm. incision is made transversely, approximately one cm. distal to the distal elbow crease, volar at the elbow and centered over the biceps tendon. With the arm supinated and the elbow at 30 degrees blunt dissection and digital evaluation can palpate the bicipital tuberosity of the radius as well as retrieve the distal biceps stump in early repairs. With a deep single blade speculum shaped retractor placed distally, a small window can be created to the bicipital tuberosity so that a large straight curette can be used to clean the bicipital tuberosity of any soft tissue and prepare bone while protecting deep vascular structures. Once this has been completed two 2–3mm. ConMed Linvatec MiniMite® anchors are placed by drilling 6 to 8mm. apart in a longitudinal fashion covering the native attachment of the distal biceps tendon. The drill holes are placed at the position where the bicipital tuberosity meets the shaft of the radius and directed towards center canal ensuring safe placement of implants.

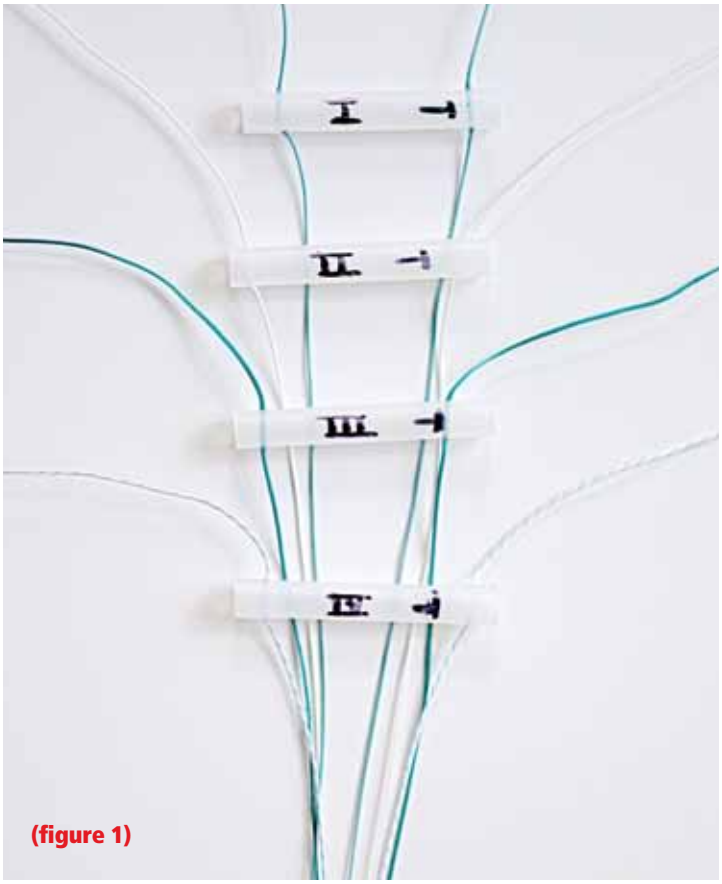
After irrigation of the drill holes anchors are placed double loaded with Hi-Fi® suture. The distal anchor is placed first after sutures are positioned in a modified spinal needle cover allowing a simple way to manage and tie sutures later **(figure 1)**. All the sutures can be passed through the biceps outside of the wound. This simplifies an otherwise difficult step and minimizes retraction on the neurovascular structures. Finally, a Field knot **(figure 2)** or other low profile sliding/locking knot of choice is used to fix the tendon to bone. Using an arthroscopic knot pusher and an arthroscopic suture cutter simplifies this step and requires almost no retraction. As the most proximal knot is passed first, all the other sutures are gently advanced to manage suture. Then the other sutures are tied in a similar fashion from proximal to distal to get four-point fixation of the tendon to the radial tuberosity. Using the radial suture as the knot's post stitch places the knots in the best position during forearm pronation.

Our Experience:

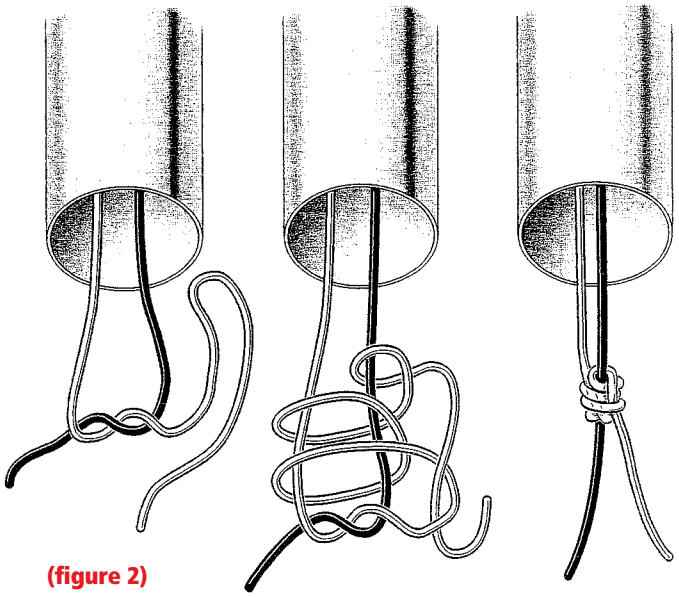
Between June of 2005 and November of 2008, twenty consecutive distal biceps were repaired by the author using this technique. The time until surgery ranged between six days and seven weeks. We were able to achieve full extension after repair intraoperatively in all twenty cases.

A retrospective review of the medical records did not demonstrate any neurovascular complication, infection, wound problem, failure of repair or second surgery. No preoperative motion was lost by any patient undergoing this procedure and all were discharged from the clinic four to six months following their surgery to resume full activity.

** This same technique is used for our open proximal biceps tenodesis as well.



(figure 1)



(figure 2)
The Field Knot

Linvatec SRS Shoulder Restoration…
continued from page 1

anchor portal, the second suture from each CrossFT™ anchor is removed. Be certain you are happy with your medial row repair before pulling these sutures out as the medial row is the only trans-tendinous fixation the repair will ultimately have **(fig. 4)**.

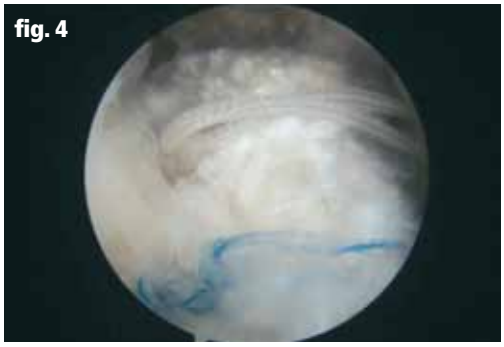


fig. 4

The lateral row is accomplished using PopLok anchors and serves to compress the tendon against the tuberosity providing a larger contact area to promote tendon healing. I retrieve the anterior most suture from each CrossFT out the lateral working portal. I then have my assistant externally rotate the shoulder to facilitate easier placement of the anterior anchor. Similarly, internal rotation allows placement of the posterior PopLok . There are a couple of other ways I simplify the insertion of the PopLok anchors. I ensure that the area of insertion is free of bursa to improve visualization of the pilot hole. Furthermore, before inserting the PopLok punch I will load my PopLok anchor and use a pair of needle drivers or a haemostat to effectively suspend the loaded PopLok outside the working portal. Having the loaded anchor ready ensures that I don't have to look away from the pilot hole once the punch is removed. If despite these maneuvers, finding the hole is difficult I don't hesitate to re-insert the punch into the original pilot hole. Lastly, always insert the PopLok with your fingers beneath the deployment trigger to prevent accidental premature deployment of the anchor.

Once the anterior most PopLok is inserted, the individual suture strands are tensioned, the anchor deployed, the insertion handle removed and the sutures cut. The process is repeated with the posterior most suture strands from the medial row **(fig.5)**. Once completed, the repair has a characteristic appearance of crossed sutures making an hourglass shape in an AP direction **(fig. 6)**.

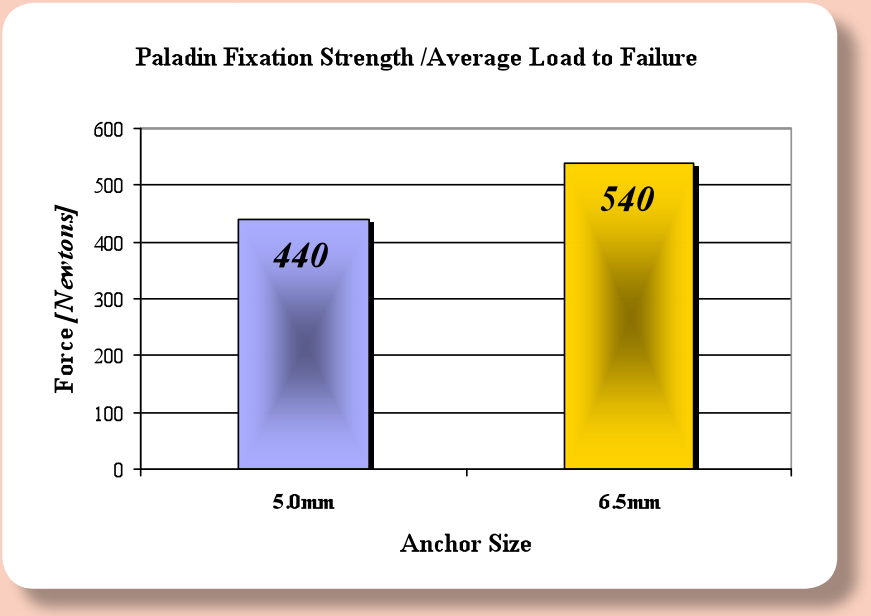
I view the final repair from the posterior and lateral portals ensuring good compression across the tendon and appropriate placement of the anchors. I will also view the repair from the articular side. I want to confirm that the medial row has compressed the tendon along the articular margin of the greater tuberosity. If not, the repair is likely to fail. It might in fact, be a good idea to confirm the medial row compression from the articular side after the horizontal mattress stitches are tied and before the second suture from each double loaded anchor is removed.


fig. 5


fig. 6

PALADIN™
ROTATOR CUFF ANCHOR

ConMed Linvatec is pleased to announce the release of the Paladin Rotator Cuff Suture Anchor System. The Paladin™ Suture Anchors are 5.0mm and 6.5mm diameter screw-in implants manufactured from ConMed Linvatec's patented Self Reinforced 96L/4D Poly Lactic Acid. This product capitalizes on the Material Advantage that is exclusive to ConMed Linvatec. The implant is pre-loaded on a disposable driver and is pre-threaded with two strands of #2 Hi-Fi® high-strength sutures. The combination of high pullout strength and ideal bioabsorbable characteristics in two different sizes will make the Paladin anchor an ideal choice for all rotator cuff procedures. The innovative self-drilling tap was designed to minimize insertion steps and allow the surgeon to eliminate drilling a pilot hole, making this a two-step technique.



In-house test performed on high-density composite synthetic bone.

2009 CONMED LINVATEC MEETING SCHEDULE

July 9th – 11th	**AOSSM Annual Meeting, Keystone, CO***
July 14th – 15th	**Mexico/Central America Knee & Shoulder Workshop, Santa Barbara, CA**
July 24th – 25th	**AAOS/ASES Shoulder Course (OLC)***
August 9th	**AOSSM Shoulder Course (OLC)***
August 20th	**Rotator Cuff Repair Symposium, Hawaii***
August 21st – 23rd	**Asian Pacific Arthroscopy Workshop, Hawaii***
August 27th – 29th	**AANA Residents Course (OLC)***
September 3rd – 4th	**Shoulder Arthroscopy Workshop, Santiago, Chile***
September 17th – 18th	**Latin America Knee & Shoulder Arthroscopy Workshop, Largo, Florida***
September 18th – 20th	**AANA Shoulder Workshop (OLC)***
September 28th – 30th	**Middle East Knee and Shoulder Arthroscopy Workshop, Largo, Florida***
October 2nd – 3rd	**AANA Shoulder Workshop (OLC)***
October 15th – 16th	**European Knee and Shoulder Arthroscopy Workshop, Largo, Florida***
November 5th – 7th	**Shoulder Controversies (Nottage) Napa, California***
November 9th – 10th	**Brazil Knee & Shoulder Arthroscopy Workshop, Largo, Florida***
November 19th – 21st	**Arthroscopy Association of North America Fall Meeting, Palm Desert, CA***
December 3rd – 6th	**AANA Senior Residents and Fellows (OLC)***
December 5th – 7th	**Clearwater Innovative Arthroscopy Course***

*The Shoulder Restoration System will be featured at all these meetings and workshops

2009 CONMED LINVATEC SPONSORED SRS WORKSHOPS

August 29th	**Shoulder Arthroscopy Workshop, San Francisco, CA**
September 10th	**Shoulder Arthroscopy Workshop, Houston, TX**
September 12th	**Shoulder Arthroscopy Workshop, Colorado Springs, CO**
September 26th	**Shoulder Arthroscopy Workshop, Largo, FL**
October 10th	**Shoulder Arthroscopy Workshop, New York, NY**
October 24th	**Shoulder Arthroscopy Workshop, Santa Barbara, CA**

Each individual one day course will cover the following topics:

> Didactic session addressing new advances and technologies in double-row and trans-osseous equivalent repair techniques.

> Hands-on cadaver session featuring the Shoulder Restoration System for arthroscopic rotator cuff repair.

For additional information about these educational courses please contact Audrey Herzner at (727) 399-5454 or aherzner@linvatec.com

Call for Submissions:

Do you have some tips or pearls on how to perform a particular procedure? Perhaps you have an interesting case study you would like to share with your colleagues. If so, please send us your submission and we will follow up with you regarding inclusion in the next ConMed Linvatec Sports Medicine Newsletter!

Please e-mail all submissions to **badikes@linvatec.com** or call (727) 399-5174 with any questions or comments.