

ABG CLINICAL roundtable

Quill SRS Increases Efficiency and Enhances Wound Closure

By Wendy Lewis, Contributing Editor

A group of leading aesthetic and reconstructive plastic surgeons convened to share their knowledge and experience with Quill™ Self-Retaining System (SRS) (Angiotech, Reading, Penn.), an innovative knot-less wound closure system that increases efficiency and enhances wound closure. The Quill SRS represents a revolutionary technology in wound closure made possible by bi-directional fixation within the wound. Its patented design allows the surgeon to begin closure at the midpoint of the wound and suture in two directions from the midpoint. Barbs within the Quill SRS distribute tension across the wound and eliminate the need for knots. This highly efficient, knot-less system can save significant procedural time in the operating room while also enhancing wound closure.

Launched in January 2007, Quill SRS reinforces Angiotech's long-term commitment to create a global portfolio of innovative products designed to benefit surgeons and optimize patient outcomes. The mission of this roundtable discussion is to highlight the evolution of this novel technology, which represents a significant advance in wound closure technology.

Editor's Note:

The following clinical roundtable was moderated by Malcolm D. Paul, M.D., clinical professor of surgery at the Aesthetic and Plastic Surgery Institute, University of



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California, Irvine. The plastic surgeons represented are early users of Quill SRS. Their collective experience was explored to determine the best range of procedures where Quill SRS may be applied to enhance tissue approximation, optimize patient outcomes and maximize efficiency by saving operating time and costs.

What benefits do you see with Quill SRS over conventional sutures?

Daniel Mills, M.D., F.A.C.S. – Plastic surgeons are able to produce good scars because we take the time to put all of the different layers together and take the tension off the wound. The only way to take tension off the skin is to put the deep layers together. Some surgical specialties tend to close wounds by using one big suture or just closing the skin with staples, rather than doing a multi-layer closure, without reducing tension on the wound, which often results in unpredictable scars.



Daniel Mills, M.D., F.A.C.S.

Associate Clinical Professor of Plastic and Reconstructive Surgery
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Dennis J. Hurwitz, M.D., F.A.C.S. – The tissue handling quality is equal to or better than any other skin, subcutaneous tissue closure device because there is an adherence of the material as it goes

"This is a revolutionary product in suturing, and will allow surgeons in all specialties to take advantage of the benefits."

CLINICAL BENEFITS OF QUILL SRS

■ Increases efficiency by:

- Eliminating the need to tie knots
- Facilitating the use of a continuous suturing technique in place of interrupted sutures in a deep layered closure

■ Enhances wound closure by:

- Distributing tension within the wound
- Facilitating closure of difficult wounds
- Minimizing wound gaping over time
- Potentially improving cosmesis

■ Easy to adopt and use

through, which allows you to secure one edge of the wound to the other as you go along, obviating the need for tying knots, and allowing precise approximation of the tissues.

Philippe A. Capraro, M.D. – This is a revolutionary product in suturing, and will allow surgeons in all specialties to take advantage of the benefits. I am using the Quill SRS in every face, breast and body case I do. I am meticulous with my closures, and in the past I used to do a four to five layer closure for abdominoplasties. The advantage is that I saw very few open wound complications. With Quill SRS, I have cut this down to a three layer closure. With some of the anterior abdominal fascia closures I generally do a two layer closure – interrupted, followed by running. If I need more tightening, I'll do a transverse or oblique tightening of the anterior abdominal fascia with Quill SRS. I basically finish up my skin closure by using Quill sutures. Before, I would do another two to three layers of closures to the skin.

Joseph P. Hunstad, M.D., F.A.C.S. – The ability to use the device without having to tie a knot is helpful, particularly at the ends of the incision where the knot is a frequent spot of suture splitting or extra fullness. There is also significant time savings, particularly if an incision requires a number of deep dermal sutures that can be lessened or occasionally eliminated. For example, if you compare Quill to a basic intercuticular suture, they are about the same. When we can reduce the number of deep dermal sutures or eliminate them in an abdominoplasty procedure, we can reduce the time by as much as one-half to two-thirds.

Scott R. Miller, M.D., F.A.C.S. – The more even distribution of the closure tension along the length of the wound, rather than being held by a few points is a substantial advantage. You still close the fascial areas, but you don't need as many of the deep dermals as you would otherwise, which creates less potential for suture splitting and saves a lot of time."

In what procedures have you found Quill SRS especially beneficial and why?

Dr. Mills – For any place where it will hold the tension for you, Quill SRS has been very helpful. It doesn't give, so you pull up and set the tension and you don't have to hold it. The barbs actually hold the tension for you. The majority of the places I use it are for body incisions, mastopexies, breast reductions, tummy tucks, thigh lifts, body lifts and brachioplasties. It has been most effective for platysmal bands in a face-lift and the abdominal wall in a tummy tuck.

Dr. Hurwitz – Brachioplasty and vertical thigh-plasty are the operations in which Quill SRS has a virtually unique benefit because the subcutaneous fascia is poorly developed in these incision lines and the placement of horizontal as opposed to vertical suturing in a running fashion gathers the tissues far more efficiently, quickly and securely than any other material. My two-layer closure in the deep subcutaneous and dermis with



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Clinical Professor of Plastic Surgery
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“My two layer closure in the deep subcutaneous and dermis with Quill is far more secure, with less bunching of the tissues and it appears to produce even improved scarring.”

Quill is far more secure, with less bunching of the tissues and it appears to produce even improved scarring. It can also work in place of purse string applications.

Dr. Capraro – Quill SRS is ideal in any area where you want to hold tension. For example, submental application, tightening the Superficial Muscular Aponeurotic System (SMAS), and open forehead lifts. I also use it for all my Transverse Rectus Abdominis Myocutaneous (TRAM) flaps, latissimus dorsi flaps and for expanders with implants. Almost all of the plastic surgeons at my hospital are using Quill for breast reconstruction.



Philippe A. Capraro, M.D.
Plastic and Reconstructive Surgeon
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Dr. Hunstad – My practice is 50% body contouring, including breast surgery, tummy tucks and body lifts. I have not used the Quill in facial aesthetic surgery yet. I enjoy using it for the periareolar approach for a purse string mastopexy and T-incision mastopexy, especially because there is no need to tie a knot.

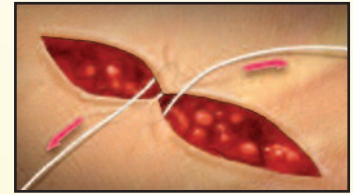
Dr. Miller – The Quill SRS is most beneficial in tummy tucks because you have a big incision. I close all of the fascia, and would traditionally do a lot of deep dermal sutures prior to my subcuticular closure. Quill allows fewer deep dermals to be placed, yet still ultimately reduces the tension on the closure. I also use them for application of the rectus muscles in a double layer rather than single layer, and each bite is holding its own tension. You are not relying on the one knot at the beginning and the one knot at the end. It comes together like a zipper. I am using Quill SRS effectively to close the vertical incision in mastopexy and breast reduction cases, as well as for the occasional brachioplasty I do. I use the cog sutures with straight and curved needles for adjunctive deep tissue support in facial procedures. It offers a way to get cheek elevation without doing as much surgery.

What do you see as the benefits of Quill SRS in deeper layers?

Dr. Mills – The best application is when you want to set tension on a particular suture, for example when I am doing the application of the muscles in a tummy tuck. I used to have to hold tension all the time. Now the tension is set, and you can just go onto the next suture.

Dr. Hurwitz – I have found over the last nine months of regular usage in all my body contouring, breast reduction and mastopexy cases, that it allows for a secure closure in the deeper layers. At the same time, running the stitch instead of interrupted closure with knots on each stitch eliminates my concern about making too tight of a closure, as can occur in an interrupted suture with a knot. We often see spotty tissue fat necrosis along the wound margins, which is due in part to a constricting, high-tension closure.

Dr. Capraro – Quill SRS allows you to control tension because of the barbs and allows you to avoid putting in any knots, which minimizes palpable knots and also splitting knots for the patient. I think it can be applicable to virtually all surgical procedures, including general surgery.



Superficial wound closure,
bi-directional



Quill SRS

"The biggest benefits of Quill SRS, as I see it, are being able to go faster in the deeper layers, and you can also facilitate closure in the superficial layers."



Pre-operative revisional abdominoplasty



One month post-operative



Two months post-operative

Photos courtesy of Daniel Mills, M.D., F.A.C.S.

Dr. Hunstad – I do not have experience using Quill in the deeper layers. I am still using interrupted sutures in the deeper layers. There is a potential advantage to using these in a running fashion to replace interrupted deep sutures.

Dr. Paul – The biggest benefits of Quill SRS, as I see it, are being able to go faster in the deeper layers, and you can also facilitate closure in the superficial layers by combining a subcutaneous closure with a deep dermal closure with one strand.

Can you describe your experience with Quill SRS in distributing tension?

Dr. Mills – Plastic surgeons have traditionally used polydioxane sutures (PDS) because you get a longer hold. You will have 80% of tensile strength at eight weeks. If you don't hold tension off the wound and the suture dissolves in one or two weeks, the wound will get wider, resulting in a wider scar. Traditionally, I have always used PDS and have run a subcuticular prolene. I also often put absorbable sutures in the deep dermis in a tummy tuck. Quill SRS, because it has barbs, is actually using PDO (a poly-lactic acid derivative), so it holds the tension off for about six to eight weeks.

Dr. Capraro – Quill SRS distributes the tension evenly throughout the entire incision, which is a tremendous plus. The little cogs that the suture has are like having miniature knots and they are distributed evenly as you put them in. It holds the wound together much better than using knotted sutures. For the breast, I use Quill 0 PDO to cinch the areola in a circumferential fashion.

Dr. Hunstad – Interrupted sutures place tension at various points along an incision, whereas Quill SRS can place tension across the incision evenly. If you can eliminate individual points of high tension in exchange for uniform tension across the incision line, there could be less likelihood of incision line separation, or ischemia.



Joseph P. Hunstad, M.D., F.A.C.S.
Aesthetic Plastic Surgeon
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Where have you found the greatest time savings with Quill SRS and why?

Dr. Mills – With PDS, I would have to put in a single suture about every 8 mm. Now I can use a deep dermal suture every 2-3 cm. The barbs with the Quill SRS actually tighten it up in-between, continuously, just like the deep dermal sutures used to do. Quill SRS has freed up my nursing staff's time because there are no sutures to be removed, which also limits the time patients spend in the office. The direct economic benefits of Quill SRS are operating room time savings, and staff time during the post-operative phase.

Dr. Hurwitz – Clearly the time savings is most significant with total body lifts where there are extensive incisions to be closed in multiple anatomic regions.

“We have definitely been impressed with the scars at three months and six months. I would attribute this to the multiple points of hold and tension distribution.”

Dr. Capraro – For body lifts, where there is a belt like incision going all around, Quill SRS can save me several hours in these long cases.

Dr. Hunstad – Although I have not tried this yet, I think it would be useful in my bra line backlift procedure as well. In this technique we are lifting the lower back up and the upper back down, tightening the entire back and the sides all the way to the lateral aspect of the inframammary fold and under the arm as well. This is a similar type of incision as the posterior portion of a body lift, so Quill would lend itself well to this technique.

Dr. Miller – Closure of tummy tucks offers the most time savings in my practice. On a big tummy tuck, it may save me 15 to 20 minutes to close when there is a lot of sewing.



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Are you seeing better cosmesis with Quill SRS than with sutures?

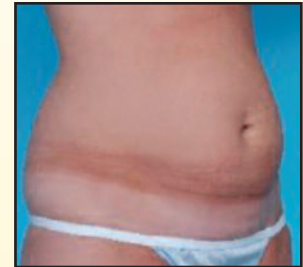
Dr. Mills – My longest experience is six months out. I am still evaluating the Quill SRS next to my usual routine. It is definitely faster, but I want to make sure the quality stays the same. My old method also included taking the tension off, but I would have to put in more interrupted sutures which took more time. If I can get the same results without sacrificing quality and still save time, that would be a huge improvement. So far, in 50 cases, it is as least as good as my previous method. I can see benefits for OB/GYNs, general surgeons and orthopedic surgeons because they have not typically been taking tension off their wound closures. For non-plastic surgeons, they may see a monumental improvement in scar quality.

Dr. Hurwitz – Proper placement of this running stitch results in a broader pull further from the wound edge that leaves less tension for the dermal closure and still minimal puckering due to that pull, so it looks good early on and does not appear to go through the prolonged thick scarring stage that I have seen previously. Scar quality is so variable that it is hard to be sure, but in my early experience, I have uniformly seen better scars in areas that have been problematic such as the arms and inner thighs.

Dr. Capraro – I am seeing equivalent results in terms of cosmesis, but the time savings is substantial.

Dr. Hunstad – I did not begin using Quill specifically to enhance cosmesis. The main advantages for me are the opportunity to save time, decrease the number of sutures used in a wound and to eliminate a knot.

Dr. Miller – At this point, we have definitely been impressed with the scars at three months and six months. I would attribute this to the multiple points of hold and tension distribution. Scar assessment at one year is still pending.



Pre-operative abdominoplasty



One month post-operative



Four months post-operative

Photos courtesy of Daniel Mills, M.D., F.A.C.S.

"In general, Quill SRS is easy to use, and if you have a physician's assistant (PA) or resident helping you, they can pick it up easily as well."



59 year old female
before Tx



59 year old female one month
after Quill 3-0 PDO for mid-
line neck and Quill 1 PDO for
posterior platysmaplasty

Photos courtesy of
Malcolm D. Paul, M.D., F.A.C.S.

Can you provide some suggestions for colleagues who are just beginning to use Quill SRS?

Dr. Mills – You want to approximate, not strangulate. Be kind to the tissues and they'll be kind to you. If you put too much tension or you strangulate, the wound will not turn out as well. The key is to take the tension off with approximation. If you set the tension as tight as you can, you may end up with too much tension, which can cause wound healing problems because you are strangulating the tissues. You need to be careful not to cause it to be too bunched.

Dr. Hurwitz – To be comfortable with Quill SRS, a surgeon must line up the closure ahead of time with either staples or towel clips and be prepared to place a running stitch. Surgeons who cut as they go and take little pieces off and make multiple adjustments will not easily adapt to the running Quill approach. Beginning surgeons may feel more comfortable occasionally placing an interrupted large suture of their choice along the way before they are confident that Quill SRS will hold a high tension closure without further assistance.

Dr. Capraro – In general, Quill SRS is easy to use, and if you have a physician's assistant (PA) or resident helping you, they can pick it up easily as well. You have to be very careful not to go too superficial. As one approaches the dermis, a smaller diameter suture such as a 2-0 is more appropriate and will eliminate the concern about wound healing that can occur when larger diameter sutures are used close to the superficial dermis. On the skin level, I have seen some surgeons stack the sutures in the reverse direction; hence one gets a greater concentration of sutures and barbs in a small area which can cause more splitting. Personally, I think Quill SRS is meant to allow closure of adjacent layers with one suture due to the barb technology.

Dr. Hunstad – When a surgeon begins to use the Quill SRS, they should continue to use the deep dermal and deeper sutures as you normally would. Gain experience with using the product first and reduce the number of buried sutures as you see fit. For non-plastic surgeons normally closing a skin edge with staples, they can feel comfortable using this as an intercuticular suture and achieving a superior wound closure.

Dr. Miller – When you are starting, take your first bite from outside the skin inward and then run internally, and then do the same thing going the other direction. In other words, you should start in the center of the incision and work to each side. This allows removal of the suture after two weeks, if desired, simply by cutting it in the center and then pulling the two free ends. I have also moved away from closing the inframammary incision of a breast lift or reduction with Quill SRS. Because of the mobility patients have after surgery it causes a shearing force which can cause the formation of blisters. I have not seen this in tummy tucks, nor have I seen it in my vertical or circumareolar breast incisions.

“There are many obvious advantages to the Quill SRS which include the absence of knots, which traditionally leads to more splitting, but another less obvious advantage is how it can grab tissue at a distance without strangulating it.”

Dr. Paul – It is also important to remember that if you are selecting a suture, it functions at one level less than the number would indicate. For example, a 2-0 will function as a 3-0 because the barbs decrease the tensile strength of the suture by one number. If you would normally use a size 2-0 suture, use a size 0 Quill, etc.

Are there any new developments that you would like to see with Quill SRS?

Dr. Mills – I believe that Angiotech is coming out with new sutures all the time to improve the adaptability and the areas that we can use Quill SRS. Currently sutures are available that meet a variety of tissue needs based upon diameter of suture and size of needles. Around the nipple areola complex, it would be helpful to have a 4-0 that would also be more applicable to face-lifts in a smaller diameter. I am looking forward to the introduction of new models with even more versatility.

Dr. Hurwitz – There are many obvious advantages to the Quill SRS which include the absence of knots, which traditionally leads to more splitting, but another less obvious advantage is how it can grab tissue at a distance without strangulating it. It appears to me that we could use larger needles to grab greater volumes of tissue to have not only immediate healing, but a prolonged appropriate contour to our closures. Until now, some patients over time have gotten a depression along the closure due to what I believe is a pull-through of the tissues which is like a thinning out in the center as one would see in a taffy pull. A larger needle may very well improve the delayed contour issue, especially in thicker areas such as the buttocks and hips where we see this pull-through phenomena.

Dr. Capraro – The product is undergoing some fine-tuning. The length of the suture is not long enough in most circumstances. For example, for an abdominoplasty you need to use three to four sutures which increases the cost. When you take it out of the package, it has too much memory and can be somewhat stiff. Needle size and thickness is not always appropriate for the specific procedure that you are doing, which can be challenging for surgeons not accustomed to working with thicker needles. Furthermore, 50% of the cogs go in one direction and 50% of the cogs go in the opposite direction. As plastic surgeons, we are trained to suture towards oneself. Because of this I feel the device should be constructed in such a manner that most of the cogs are oriented in one direction. The techniques and products are presently in their infancy and will surely be refined. I believe Angiotech has done a magnificent job in instructing surgeons how to properly utilize and effectively get the most out of this product.

Dr. Hunstad – I too would like to see smaller diameter needles and sutures for working on thinner tissues and more delicate areas, such as the face and the arms. I would also like to have the barbs extend all the way to the needle so that surgeons who are skillful sewers can utilize the entire length of the barbed suture all the way to the end, without having to start a new suture. Longer barb length would also be beneficial because we would need



60 year old female
before Tx



60 year old female two
months after Quill 3-0 PDO for
midline neck and Quill 1 PDO
for posterior platysmaplasty

Photos courtesy of
Malcolm D. Paul, M.D., F.A.C.S.

Quill SRS is a revolutionary method for soft tissue approximation.



68 year old female before Tx



68 year old female eight months after Quill 3-0 PDO for midline neck and Quill 1 PDO for posterior platysmaplasty

Photos courtesy of Malcolm D. Paul, M.D., F.A.C.S.

less sutures. Also longer sutures for longer incisions such as abdominoplasty, brachioplasty and body lifting would offer benefits.

Dr. Miller – With the multiple points of hold that Quill SRS provides, we probably don't need as large a diameter for many of these procedures. I was closing my tummy tucks with a 0 Quill, and now I am closing them with a 2-0. The benefits include: less material to absorb so there is less tissue reaction and a much more pliable and workable product. For muscle application, I was using #2 PDO, I also tried the polypropylene and found it too stiff to work with, so I went back to using #1 PDO which is working great for me in a double layer application.

Moderator's Comments: In summary, Quill SRS is a revolutionary method for soft tissue approximation. The benefits include: no need for knot tying, which reduces the incidence of sequelae and complications related to the knots; no need for a third hand to follow the surgeon due to the locking of the barbs; even distribution of tension which may diminish the incidence of tissue ischemia; ability to close high tension wounds with the barbed suture configuration with a potential decrease in tissue ischemia; ability to close multiple layers with fewer sutures; less time required for wound closure; and the possibility of better quality and appearance of scars. The applications cross the full spectrum of surgical specialties and sub-specialties.

Editor's Note: The information in this document represents the opinions and experiences of the physicians interviewed. Individual results may vary and depend on many factors. For further information about Quill SRS Technology please refer to the instructions for use included with the product or visit www.quills.com.

Disclosure: Malcolm D. Paul, M.D., F.A.C.S. is a paid consultant for Surgical Specialties Corporation and Angiotech Pharmaceuticals, Inc.

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