Quill

THE BARBED
SUTURE PIONEER

Quill Publication Index
OBGYN Surgery

PREMIER SURGICAL

Accessible Support, Advancing Surgery

SUPPORTING
SURGEONS
ALWAYS

1. **QUILL™ SELF-RETAINING SYSTEM.** GREENBERG, JA. REVIEWS IN OBSTETRICS AND GYNECOLOGY. 2008; 1(4):201-202.

*"**The Quill™ Self-Retaining System** is a brand new product with a very limited clinical track record. Theoretically and in vitro, it has revolutionary potential as a surgical suture product, but it needs testing in clinical trials. That said, it is US Food and Drug Administration approved as "substantially equivalent" to PDS II synthetic absorbable suture (Ethicon) for the indication of "soft tissue approximation where use of an absorbable suture is appropriate." This is an exciting product."*

2. **THE USE OF BIDIRECTIONAL BARBED SUTURE IN LAPAROSCOPIC MYOMECTOMY AND TOTAL LAPAROSCOPIC HYSTERECTOMY.** GREENBERG JA, EINARSSON JI. JOURNAL OF NIMALLY INVASIVE GYNECOLOGY. 2008; 15:621-623.

*"**Abstract.** Bidirectional barbed suture is a new design that incorporates tiny barbs spaced evenly along the length of the suture cut facing in opposite directions from the midpoint. Unlike the smooth-textured traditional suture, the bidirectional barbs on this new product introduce a new paradigm in which wound tension is evenly distributed across the length of the suture line rather than at the knotted end. No knots are required with bidirectional barbed suture. We present a small case series with bidirectional barbed suture to close myometrial defects in laparoscopic myomectomies and vaginal cuffs in total laparoscopic hysterectomies. On the basis of our early experience, we are optimistic that this new suture material is a potentially valuable tool for gynecologic surgeons."*

3. **BARBED SUTURE, NOW IN THE TOOLBOX OF MINIMALLY INVASIVE GYN SURGERY.** EINARSSON JI, GREENBERG JA. OBG MANAGEMENT. 2009; 21(9): 39-41.

*"**Barbed suture is a relatively new technology** that has the potential to greatly facilitate laparoscopic suturing. Two barbed sutures, each a different type, are available, or soon will be: the Quill bidirectional barbed suture … the V-Loc 180 unidirectional barbed suture… The anchoring of bidirectional barbed suture resists migration and can be conceptualized as a 'continuous interrupted' suture without knots; it has been shown to have tissue-holding performance that is at least equal to knot-anchored suture."*

4. **TOTAL LAPAROSCOPIC HYSTERECTOMY: 10 STEPS TOWARD A SUCCESSFUL PROCEDURE.** EINARSSON JI, SUZUKI Y. REVIEWS IN OBSTETRICS AND GYNECOLOGY. 2009; 2(1): 57-64.

*"**Summary.** Total laparoscopic hysterectomy is a safe and effective procedure for women needing hysterectomy. We enjoy a high operative volume and perform approximately 200 laparoscopic hysterectomy cases annually with a conversion rate of 1 in every 400 cases. The 10 steps described herein are not meant to be an absolute truth, but rather a true and tested method that has served us well to safely accomplish this procedure."*

5. **ADVANCES IN SUTURE MATERIAL FOR OBSTETRIC AND GYNECOLOGIC SURGERY.** GREENBERG JI, CLARK RM. REVIEWS OBSTETRICS AND GYNECOLOGY. 2009; 2(3): 146-158.

*"**This review discusses the** wound healing process and the biomechanical properties of currently available suture materials to better understand how to choose suture material in obstetrics and gynecology."*

6. **TOTAL LAPAROSCOPIC HYSTERECTOMY WITH SINGLE-PORT ACCESS WITHOUT VAGINAL SURGERY.** LANGEBREKKE A, QVIGSTAD E. JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY. 2009; 16(5): 609-11.

*"**In conclusion, single-access total laparoscopic** hysterectomy, with laparoscopic suturing of the cuff, is feasible, with decreased morbidity and improved cosmetic results. The use of self-retaining sutures without knot tying makes the procedure easier, with potential for time savings."*

7. **USE OF BIDIRECTIONAL BARBED SUTURE IN LAPAROSCOPIC MYOMECTOMY: EVALUATION OF PERIOPERATIVE OUTCOMES, SAFETY, AND EFFICACY.** CHAVAN N, EINARSSON J, SUZUKI Y, JONSDOTTIR G, VELINGA T, GREENBERG J. JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY. (2010) 18, 92–95.

"*Furthermore, a recent randomized clinical trial comparing hysterotomy closure time using unidirectional barbed suture vs traditional suture found a significantly shorter hysterotomy closure time with unidirectional barbed suture, which is consistent with our findings. In conclusion, use of bidirectional barbed suture for hysterotomy closure significantly shortens total operating time during laparoscopic myomectomy and, in our experience, greatly facilitates laparoscopic closure of the hysterotomy site."*

8. **BIDIRECTIONAL BARBED SUTURE: AN EVALUATION OF SAFETY AND CLINICAL OUTCOMES.** EINARSSON J, VELLINGA T, TWIJNSTRA A, CHAVAN N, SUZUKI Y, GREENBERG J. JOURNAL OF THE SOCIETY OF LAPAROENDOSCOPIC SURGEONS. (2010)14:381–385.

*"**Conclusion.** We have demonstrated that bidirectional-barbed suture can be used safely and effectively for laparoscopic suturing when laparoscopic cuff closure and laparoscopic hysterotomy closure are being performed. Based on our experience, we believe that the further development and incorporation of this suture material into clinical practice should be actively explored."*

9. **SINGLE-INCISION LAPAROSCOPIC MYOMECTOMY.** EINARSSON JI. JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY. MAY 2010; 37(3): 371-3.

*"**Abstract.** Single-incisions laparoscopic myomectomy is a feasible operation even in the presence of a transmural uterine myoma. The most challenging step of the operation is greatly facilitated by using bidirectional barbed sutures because no knots are required and excellent tension is maintained throughout the hysterectomy closure site. Prospective studies are urgently needed to fully evaluate potential benefits of single-incision laparoscopic surgery."*

10. **LAPAROSCOPIC MYOMECTOMY: 8 PEARLS.** EINARSSON JI. OBG MANAGEMENT, MARCH 2010; 22(3): 49-62.

*"**Myomectomy is the surgery of choice** for women who have symptomatic fibroids and who wish to retain their uterus. And laparoscopic myomectomy is preferable to the abdominal approach in many ways, offering:*

- *faster recovery*
- *a shorter hospital stay*

• diminished blood loss
• decreased adhesion formation
• a comparable or higher rate of pregnancy.

Nevertheless, laparoscopic myomectomy is a technically challenging procedure with surgeon-specific limitations. The biggest challenge: appropriately suturing the hysterotomy site. In this article, I share my experience with laparoscopic myomectomy and offer 8 pearls that may contribute to a successful outcome."

11. USE OF A BIDIRECTIONAL BARBED SUTURE IN ROBOT-ASSISTED SACROCOLPOPEXY. JOURNAL OF ROBOTIC SURGERY. GHOMI A, ASKARI R. EPUBLISHED MAY 8TH, 2010

"Abstract. *Abdominal sacrocolpopexy is an effective and durable surgical procedure that is conventionally reserved for management of vaginal vault prolapse. With the avail- ability of robotic technology in recent years, sacrocolpopexy has become more commonly performed in a minimally invasive fashion. Peritoneal closure can be a tedious and time-consuming step in robot-assisted sacrocolpopexy. We describe a novel technique utilizing a bidirectional barbed suture to re-approximate the peritoneum in robot-assisted sacrocolpopexy, making the procedure more time efficient."*

12. HYSTERECTOMY CLOSURE USING BARBED SUTURE – AN EVOLUTION OF OUR TECHNIQUE. EINARSSON, JI, GREENBERG JA. OB/GYN, BRIGHAM AND WOMEN'S HOSPITAL, BOSTON, MA. FEMALE PELVIC MEDICINE & RECONSTRUCTIVE SURGERY. 2010; MAR/APRIL 16(2):S42-S43.

*"**Video 9. Objective:** The purpose of this video is to demonstrate our novel technique for hysterectomy clusre using bidirectional barbed sutures. We will briefly demonstrate our original technique and then show the efficient use of this material to close a hysterectomy defect without the need to tie knots."*
*"**Conclusion:** The use of barbed suture greatly facilitates hysterectomy closure at the time of a laparoscopic myomectomy. We believe that the further integration of barbed suture into the armamentarium of the gynecologic surgeon is inevitable."*

13. THE USE OF BARBED SUTURES IN OBSTETRICS AND GYNECOLOGY. GREENBERG J. REVIEWS IN OBSTETRICS AND GYNECOLOGY. 2010;3(3):82-91.

"*Summary.* *Barbed suture is a relatively new but exciting addition to the variety of suture materials. As experience grows with barbed sutures, more applications for its use will likely arise. Obstetric and gynecologic surgeons who are interested in choosing the best materials for their operations should benefit from better understanding the underlying principles of wound healing and suture material biomechanics, and may discover many advantages to the use of barbed suture."*

14. COMPARATIVE STUDY OF A BARBED SUTURE, POLIGLECAPRONE, AND STAPLER IN PFANNENSTIEL INCISIONS PERFORMED FOR BENIGN GYNECOLOGIC PROCEDURES: A RANDOMIZED TRIAL. NAKI M, API O, ACIOGLU H, OZKAN S, KARS B, UNAL O. ACTA OBSTETRICIA ET GYNECOLOGICA. 2010.

"This study confirms *that the three different methods of surgical wound closure used had a comparable outcome except for a better result for sutures compared to the stapler method in terms of patient*

*satisfaction scores in the days after the operation. Barbed suture technology merits further investigations in wider study samples.***"**

15. **DECREASED INCIDENCE OF VAGINAL CUFF DEHISCENCE AFTER LAPAROSCOPIC CLOSURE WITH BIDIRECTIONAL BARBED SUTURE.** SIEDHOFF M, YUNKER A, STEEGE J. JOURNAL OF MINIMALLY INVASIVE GYNECOLOGY. 2011. MAR-APR;18(2):218-23

"Conclusion: *Dehiscence of the vaginal cuff after laparoscopic closure is a rare but important complication in gynecologic surgery. Use of bidirectional barbed suture eliminated the problem in our first year of experience with the technique. We also observed a decreased incidence of other common problems of the vaginal cuff. This method is easy to learn and inexpensive and does not require advanced skills such as laparoscopic knot-tying."*

16. **A COMPARISON OF BARBED AND SMOOTH SUTURES IN PREGNANT EWE CESAREAN SECTIONS.** GREENBERG J, OXFORD C, VONNAHME K. AMERICAN JOURNAL OF OBSTETRICS & GYNECOLOGY. JAN 2011. S327-S328.

"Objective: *To determine the adequacy of barbed and smooth suture materials for the closure of the uterus and rectus fascia in pregnant ewes."*

17. **A COMPARISON OF BARBED AND SMOOTH SUTURES FOR OVINE CESAREAN DELIVERY.** GREENBERG JA, WALDEN S, HAMMER CM, GRAZUL-BILSKA AT, VONNAHME KA. INTERNATIONAL JOURNAL OF GYNECOLOGY AND OBSTETRICS. 2011; 113: 215-217.

"Objective: *To determine the adequacy of barbed and smooth sutures for closing the uterus and fascia in pregnant ewes."*
"Conclusion: *In a small pilot study, absorbable knotless barbed suture was adequate and equivalent to absorbable knotted smooth suture for closing the uterus following ovine cesarean delivery. On the rectus fascia, however, sutures—whether barbed or smooth—with lower tensile strength resulted in fascial dehiscence."*

18. **LAPAROSCOPIC MYOMECTOMY WITH AQUADISSECTION AND BARBED SUTURES.** MODI R. J GYNEC ENDOSC SURG 2011; 2:47-52.

"Abstract: *The objective of this study was to evaluate the efficacy of aquadissection technique to reduce the blood loss in myomectomy and to assess the benefits and feasibility of the use of barbed suture for myometrial defect closure."*
*"**Conclusion:*** *Aquadissection technique for myomectomy is effective in markedly reducing blood loss during surgery. It reduces the time taken for myomectomy. It shortens the recovery time. It also ensures better wound healing postoperatively. The use of barbed sutures decreases the total time taken for myometrial defect closure."*

19. **SHORT-TERM RESULTS OF ROBOTIC SACROCOLPOPEXY USING THE QUILL SRS BI-DIRECTIONAL POLYDIOXANONE (PDO) SUTURE.** STUBBS JT. JOURNAL OF ROBOTIC SURGERY (2011) 5:259-265.

"In this small series of *a limited follow-up, when used in robotic sacrocolpopexy, the Quill SRS polydioxanone (PDO) suture provided a safe and reliable fixation of an Amid type I polypropylene mesh*

to the vagina, which in turn resulted in excellent anatomic success in the short term with rare complications."

20. BIDIRECTIONAL BARBED SUTURE IN GYNECOLOGICAL LAPAROSCOPY. EINARSSON JI. UNIVERSITY OF ICELAND, FACULTY OF MEDICINE, SCHOOL OF HEALTH SCIENCES PHD THESIS. JUNE 2013.

*"**Introduction**: Bidirectional barbed suture introduces a new paradigm in laparoscopic suturing. The aim of this study was to evaluate clinical outcomes with usage of barbed suture among our patient."*
*"**Discussion**: Bidirectional barbed suture appears to be safe and effective for use in gynecologic laparoscopy. The use of bidirectional barbed suture facilitates laparoscopic suturing and appears to shorten operating times."*

21. SURGICAL STAPLES COMPARED WITH SUBCUTICULAR SUTURE FOR SKIN CLOSURE AFTER CESAREAN DELIVERY: A RANDOMIZED CONTROLLED TRIAL. FIGUEROA D, JAUK VC, SZYCHOWSKI JM, GARNER R, BIGGIO JR, ANDREWS WW, HAUTH J, TITA ATN. CENTER OF WOMEN'S REPRODUCTIVE HEALTH, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, AND THE DEPARTMENT OF BIOSTATISTICS, UNIVERSITY OF ALABAMA AT BIRMINGHAM, BIRMINGHAM, ALABAMA. JOURNAL OF THE AMERICAN COLLEGE OF OBSTETRICS & GYNECOLOGY. 2013; 121(1).

*"**Objective:** To compare the risk of cesarean wound disruption or infection after closure with [percutaneous metal] staples compared with subcuticular suture."*
*"**Conclusions:** [Percutaneous metal] staples closure compared with suture is associated with significantly increased composite wound morbidity after cesarean delivery."*

22. BIDIRECTIONAL BARBED SUTURE IN LAPAROSCOPIC MYOMECTOMY: CLINICAL FEATURES. ARDOVINO M, CASTALDI MA, FRATERNALI F, ARDOVINO I, COLACURCI N, SIGNORIELLO G, COBELLIS L. JOURNAL OF LAPAROENDOSCOPIC & ADVANCED SURGICAL TECHNIQUES. 2013; 23(12): 1006-1010.

"Conclusions: In the context of the literature, this study serves to demonstrate that the bidirectional barbed suture can be used safely and effectively for laparoscopic suturing, and in particular in repairing a uterine wall defect after LM. Based on our experience, we believe that the further development and incorporation of this suture into clinical practice should be actively explored.

23. THE ROLE OF KNOTLESS BARBED SUTURE IN GYNECOLOGIC SURGERY: SYSTEMATIC REVIEW AND META-ANALYSIS. IAVAZZO C, MAMAIS I, GKEGKES ID. SURGICAL INNOVATION. 2014: 1-12.

*"**Conclusion:** In conclusion, the use of this novel suture material can revolutionize the way laparoscopic or robotic operations are performed. The lack of knots, the equal distribution of tissue strength, the secure approximation of tissues, and the reduction of operation time are the principle advantages of barbed sutures. Nevertheless, final conclusions could not be reached without the existence of studies with higher methodological quality and numbers which can offer a more careful evaluation of this innovative product. Advancements in materials used in minimally invasive techniques are welcome. As this type of suture is widely used now, well-organized randomized control trials of higher methodological quality are necessary and could compare suturing advantages, postoperative outcomes, and female or male dyspareunia."*

24. **BARBED SUTURE IN MINIMALLY INVASIVE HYSTERECTOMY: A SYSTEMATIC REVIEW AND META-ANALYSIS.** BOGLIOLO S, MUSACCHI V, DOMINONI M, CASSANI C, GAGGERO CR, DE SILVESTRI A, GARDELLA B, SPINILLO A. ARCHIVES OF GYNECOLOGY AND OBSTETRICS. 2015; 292:489-497.

*"**Conclusions:** Barbed Suture is safe and well tolerated as traditional sutures and is associated with reduced operative time of laparoscopic vaginal vault closure."*

25. **DRAMATICALLY REDUCED INCIDENCE OF VAGINAL CUFF DEHISCENCE IN GYNECOLOGIC PATIENTS UNDERGOING ENDOSCOPIC CLOSURE WITH BARBED SUTURES: A RETROSPECTIVE COHORT STUDY.** RETTENMAIER MA, ABAID LN, BROWN JV, MENDIVIL AA, LOPEZ KL, GOLDSTEIN BH. INTERNATIONAL JOURNAL OF SURGERY. 2015; 19: 27-30.

*"**Conclusion:** Vaginal cuff separation subsequent to laparoscopic closure is a rare occurrence. While our incidence of VCD was low and comparable to other reported rates in the literature, we did not observe any cases of VCD following laparoscopic hysterectomy performed with barbed suture closure."*