



Quill Publication Index

Orthopedic Surgery



SUPPORTING
SURGEONS
ALWAYS

1. **TOTAL KNEE ARTHROPLASTY CLOSURE WITH BARBED SUTURE.** EICKMANN T, QUANE E. J. OF KNEE SURGERY, 2010;23:16368.

“Based on a retrospective analysis of 178 TKAs performed by a single surgeon between January 2007 and September 2008, surgeries performed using bidirectional barbed absorbable sutures for running closure of the retinacular and subcutaneous layers were significantly faster than those performed with conventional absorbable sutures for interrupted closure of these layers, with no detrimental clinical effects.”

2. **KNEE ARTHROTOMY REPAIR WITH A CONTINUOUS BARBED SUTURE.** VAKIL J, O'REILLY M. ET AL. JOURNAL OF ARTHROPLASTY, 2010.

“We compared knee arthrotomy closures using interrupted biodegradable sutures and running bidirectionally barbed sutures in cadaveric specimens subjected to cyclic loading. During the initial 2000 flexion cycles, both groups maintained closure and no suture ruptured. Suture throws were then sequentially cut to weaken the repairs, and the knees were cyclically flexed after each cut. Both types of suture repairs survived the cutting of the first throw or stitch and subsequent cyclical testing. However, there was a significant difference in the repairs after multiple cuts.”

3. **A COMPARISON OF WOUND CLOSURE TECHNIQUES FOR TOTAL KNEE ARTHROPLASTY.** EGGERS M, FANG L, LIONBERGER D. JOURNAL OF ARTHROPLASTY. DEC 26(8): 1251-8.E1-4. EPUB 2011 APR 29.

“Four wound closure techniques for total knee arthroplasty were compared in a prospective, randomized, controlled, institutional review board–approved study with 75 subjects. The study compared tissue adhesives, stapling, and suturing with respect to procedure time and cost, together with functional and clinical outcome.”

4. **PERIOPERATIVE CLOSURE-RELATED COMPLICATION RATES AND COST ANALYSIS OF BARBED SUTURE FOR CLOSURE IN TKA.** GILILLAND J, ANDERSON L, SUN LG, ERICKSON J, PETERS C. CORR. SEPT. 28, 2011.

“Results: Average estimated closure time was 2.3 minutes shorter with the use of barbed suture. The total closure cost was similar between the groups. The closure-related peri-operative complication rates were similar between the groups.”

“Conclusions: Barbed suture is associated with a slightly shorter estimated closure time, although this small difference is of questionable clinical importance. With similar overall cost and no difference in perioperative complications in primary TKA, this closure methodology has led to more widespread use at our institution.”

5. **USE OF A BARBED SUTURE IN THE CLOSURE OF HIP AND KNEE ARTHROPLASTY WOUNDS.** LEVINE B, TING N, DELLA VALLE C. ORTHOSUPERSITE.COM. SEPTEMBER 2011, VOLUME 34, NUMBER 9.

“Recently, a bi-directional, barbed suture has been introduced that affords surgeons the ability to close soft tissue layers in a running fashion without the need for knot tying. The bi-directional nature of the barbs allows for simultaneous closure from the wound center, therefore offsetting the increased cost per

suture by the decreased number of sutures used and the time saved in the operating room to close the incision. Additional potential advantages of using knotless sutures include enhanced biomechanical strength, increased resistance to catastrophic arthrotomy failure, and a more watertight closure."

6. ADVANCING SUTURE TECHNOLOGY: A STITCH IN TIME. LOMBARDI AV, BEREND KR, ADAMS JB. SEMINARS IN ARTHROPLASTY. SEPT 2011. 179-181.

"In summary, early work in the fields of plastic surgery, urology, gynecology, and orthopedic surgery has demonstrated that a barbed knotless suture system can effectively enhance wound closure. Furthermore, it appears that this type of closure is cost-effective not only by virtue of speeding closure in the operating room but also by decreasing the potential for postoperative wound infections."

7. WATER-TIGHT KNEE ARTHROTOMY CLOSURE: COMPARISON OF A NOVEL SINGLE BIDIRECTIONAL BARBED SELF-RETAINING RUNNING SUTURE VS. CONVENTIONAL INTERRUPTED SUTURES. NETT M, CUSHNER F, AVELAR R. JOURNAL OF KNEE SURGERY, 2011 24: 55-60

"In this cadaveric model, a novel bidirectional barbed self-retaining running suture provided a more water-tight knee arthrotomy closure than did standard interrupted sutures. Arthrotomy leakage was minimal when a tight distal arthrotomy closure was ensured. Using a bidirectional barbed suture to close the arthrotomy after TKA may prove to be a viable option that is associated with reduced wound drainage compared with conventional techniques. Future randomized prospective studies are warranted."

8. EVALUATION OF PRIMARY TOTAL KNEE ARTHROPLASTY INCISION CLOSURE WITH THE USE OF CONTINUOUS BIDIRECTIONAL BARBED SUTURE. STEPHENS S, POLITI J, TAYLOR B. SURGICAL TECHNOLOGY INTERNATIONAL XXI, ORTHOPAEDIC SURGERY. #338, P. 1-5. 2011.

"The results of this study demonstrate a significant decrease in operative time with the use of continuous barbed sutures, with no clear increase in postoperative complications requiring a return to surgery. Additionally, we demonstrated a positive correlation between BMI and operative time, demonstrating the need for surgeons to factor this variable into surgery time and difficulty. Bidirectional continuous barbed sutures provide an efficient and safe knee arthrotomy closure that offers a financial benefit in the form of decreased operative time and suture use. We feel barbed sutures offer an intriguing possibility for decreasing operative room time, but longer follow up and prospective studies will be needed to determine the long-term efficacy and results of this closure technique."

9. BACTERIA ADHERE LESS TO BARBED MONOFILAMENT THAN BRAIDED SUTURES IN A CONTAMINATED WOUND MODEL. JOHN R. FOWLER MD, TIFFANY A. PERKINS BS, BETTINA A. BUTTARO PHD, ALLAN L. TRUANT PHD. CLINICAL ORTHOPAEDICS AND RELATED RESEARCH. DOI 10.1007/S11999-012-2593-Z. 28 AUGUST 2012.

"Results: The barbed monofilament suture showed the least bacterial adherence of any suture material tested. Inoculated monofilament and barbed monofilament sutures placed on agar plates had less

bacterial growth than braided suture, whereas antibacterial monofilament and braided sutures showed no growth. Confocal microscopy showed more adherence to braided suture than to the barbed monofilament or monofilament sutures.”

“Conclusions: *Barbed monofilament suture showed similar bacterial adherence properties to standard monofilament suture.”*

10. EXTENSOR MECHANISM REPAIR FAILURE WITH USE OF BIDIRECTIONAL BARBED SUTURE IN TOTAL KNEE ARTHROPLASTY. RUSSELL C. WRIGHT, BS, CRAIG T. GILLIS, BS, Y STEPHAN V. YACOUBIAN, MD, RAYMOND B. RAVEN III, MD, YURI FALKINSTEIN, MD, AND SHAHAN V. YACOUBIAN, MD. THE JOURNAL OF ARTHROPLASTY VOL. 27 NO. 7 2012

“In light of our experience, we advocate that surgeons who continue to feel confident in using the bidirectional barbed suture exercise caution in morbidly obese patients, in patients who may have tissue compromise such as those with autoimmune disorders and diabetes and when a classic medial parapatellar approach is used. This potential complication may be avoided by using a more straight, longitudinal incision in the superior patellar zone and avoiding a horizontal portion of the medial parapatellar approach. Larger studies need to be performed before it is widely accepted as a truly reliable orthopedic surgical device.”

11. BARBED SUTURES FOR ARTHROPLASTY CLOSURE. DOES IT DECREASE THE RISK FOR GLOVE PERFORATION? SCHWARZKOPF R, HADLEY S, WEATHERALL JM, GROSS SC, MARWIN SE. BULLETIN OF THE NYU HOSPITAL FOR JOINT DISEASES. 2012; 70(4): 250-253.

“Conclusion. *Arthroplasty surgeons have a high inherent risk for contamination due to the use of sharp edged instruments and bone ends during surgery. As shown in this prospective study, intraoperative glove perforation occurs with high frequency when both barbed and standard suture techniques are used for closure of the deep fascia. Awareness of this risk may benefit the surgeon when choosing his method and technique for wound closure.”*

12. THE USE OF BARBED SUTURES DURING SCOLIOSIS FUSION WOUND CLOSURE: A QUALITY IMPROVEMENT ANALYSIS. ALFRED MANSOUR, MD, RYAN BALLARD, PA-C, SUMEET GARG, MD, DAVID BAULESH, BA, AND MARK ERICKSON, MD. (CHILDRENS HOSPITAL OF COLORADO / UNIV. OF COLORADO). JOURNAL OF PEDIATRIC ORTHOPEDICS. VOLUME 33, NUMBER 8, DECEMBER, 2013.

“Conclusions: *Barbed suture closure of spinal fusion incisions results in a 40% reduction in closure time, resulting in an \$884.60 decrease in hospital charges related to operating room time. This may represent significant yearly cost savings in a high-volume spine fusion center and warrants further investigation comparing patient-related outcomes..”*

“Significance: *This quality improvement analysis provides preliminary economic justification for using barbed suture for scoliosis fusion wound closure resulting in decreased operating room times and subsequent hospital charges.”*

13. BARBED VERSUS STANDARD SUTURES FOR CLOSURE IN TOTAL KNEE ARTHROPLASTY: A MULTICENTER PROSPECTIVE RANDOMIZED TRIAL. JEREMY GILILLAND MD, LUCAS ANDERSON MD, JACOB BARNEY BS, HUNTER, L. ROSS BS, CHRISTOPHER E. PELT MD, CHRISTOPHER L. PETERS MD (UNIV. OF UTAH, JOINT IMPLANT SURGEONS (OH), SCOTT & WHITE (TX), DUKE UNIVERSITY (NC)). JOURNAL OF ARTHROPLASTY. JUNE, 2014. DOI: 10.1016 / J.ARTH. 2014.01.041

“In conclusion, we found the use of barbed suture was associated with shorter estimated closure time and less cost based both upon cost of suture and combined cost of suture and operating room time. Additionally, there were similar rates and types of perioperative closure-related and a trend toward less needle sticks of surgical staff. Positive experience and improved efficiency with this closure methodology have led to more widespread use at our institutions. Further studies are needed to determine the safety and effectiveness of the widespread use of barbed suture in the multilayered closure of revision arthroplasty and general orthopedics.”

14. BARBED VERSUS TRADITIONAL SUTURES: CLOSURE TIME, COST, AND WOUND RELATED OUTCOMES IN TOTAL JOINT ARTHROPLASTY. E SMITH, MD, P SHUKLA, MD , E MATZKIN, MD (TUFTS MED CENTER; BRIGHAM & WOMENS HOSPITAL). JOURNAL OF ARTHROPLASTY, SPRING, 2014.

“In conclusion, barbed sutures are associated with a decreased time to wound closure following TKA's and THA's and the financial benefit associated with saving time in the operating room is significant. However, barbed sutures were also associated with increased frequency and severity of wound related complications. Some complications conveyed significant morbidity to patients and required additional procedures and months of wound therapy to heal. The poorest wound outcomes were associated with barbed sutures and their use was therefore discontinued by the attending surgeon involved.”

15. BARBED SUTURES IN TOTAL HIP AND KNEE ARTHROPLASTY: WHAT IS THE EVIDENCE? A META-ANALYSIS. BORZIO RW, PIVEDIC R, KAPADIA BH, JAUREGUI JJ, MAHESHWARI AV. INTERNATIONAL ORTHOPAEDICS. 2015; 40: 225-231.

“Conclusions: There is overall consensus in the literature regarding the time savings that can be extrapolated to total cost savings associated with the use of barbed sutures. However, the potential increase in complication rates described by some authors may dissuade surgeons from taking advantage of this apparent cost benefit. In our evaluation of all level I trials, we found no significant increase in major complication rates, and minor complication rates were nearly equivalent between cohorts. Although the specific closure technique utilized is surgeon-dependent, when faster surgical time is a goal, the adult reconstruction surgeon could attempt to utilize this closure technique. Although larger cohort studies must be performed before a final conclusion can be made regarding whether major complication rates differ, current evidence supports the use of these sutures.

16. IS THERE AN ADVANTAGE TO KNOTLESS BARBED SUTURE IN TKA WOUND CLOSURE? A RANDOMIZED TRIAL IN SIMULTANEOUS BILATERAL TKAS. ALEXANDER P. SAH MD. CLINICAL ORTHOPAEDICS AND RELATED RESEARCH. DOI 10.1007/S11999-015-4157-5. 14 JANUARY 2015.

“Conclusions: In this randomized controlled trial, [Sah] found knotless bidirectional barbed suture to be more efficient in terms of closure time and lower in direct operative cost than conventional suture material, while showing no difference in terms of Knee Society knee scores, ROM, or wound appearance with the numbers available. Future studies with larger numbers will be needed to compare overall costs of care and to detect uncommon complications that might arise, although none were observed in this small series.”

17. BARBED VERSUS TRADITIONAL SUTURES FOR WOUND CLOSURE IN KNEE ARTHROPLASTY: A SYSTEMIC REVIEW AND META-ANALYSIS. WEI ZHANG, DETING XUE, HOUFA YIN, HUI XIE, HONGHAI MA, ERMAN CHEN, DONGCAI HU, AND ZHIJUN PAN. SCIENTIFIC REPORTS. DOI: 10.1038/SREP19764. 19 OCTOBER 2015.

“Abstract: Sutures are an increasing focus of research in knee arthroplasty (KA). Whether knotless barbed sutures (KBS) are safe and efficient in KA remains controversial. The objective of our study is to compare the clinical outcomes of KA according to wound closure method: KBS versus knotted traditional sutures (KTS).”

“Conclusions: Based on available evidence, use of KBS in KA leads to shorter operation times and lower total costs. Closure of arthrotomy and subcutaneous and subcuticular tissues by KBS yields similar postoperative function and lower total complication risk when compared with KTS. We thus conclude that KBS is an optimal approach for closure of arthrotomies and subcutaneous and subcuticular tissues in KA. Given the relevant possible biases in our study, adequately powered and better-designed studies with long-term follow-up are required to reach a firmer conclusion.”

18. A MODIFIED STRATEGY USING BARBED SUTURES FOR WOUND CLOSURE IN TOTAL JOINT ARTHROPLASTY: A PROSPECTIVE, RANDOMIZED, DOUBLE-BLIND, SELF-CONTROLLED CLINICAL TRIAL. LI R, NI M, ZHAO J, LI X, ZHANG Z, REN P, XU C, CHEN J. MEDICAL SCIENCE MONITOR. 2018; 24: 8401-8407.

“Conclusions: Barbed suturing was a fast and safe method for wound closure in TJA. We also recommend our modified suturing strategy, especially in countries where operation cost was not associated with operation time.”