Orthopedic Experts Identify Best Practices for Wound Closure & Dressing Management in Total Knee and Total Hip Arthroplasty.

Two 2024 studies published in The Journal of Arthroplasty reported expert consensus from 20 international orthopedic surgeons on intraoperative aspects of optimal wound closure and dressing management strategies.

Ainslie-Garcia, Margaret, et al. "International Delphi Study on Wound Closure and Dressing Management in Joint Arthroplasty: Part 1: Total Knee Arthroplasty." The Journal of arthroplasty 2024;39(4):878-883. doi:10.1016/j.arth.2023.12.032

Ainslie-Garcia, Margaret et al. "International Delphi Study on Wound Closure and Incision Management in Joint Arthroplasty Part 2: Total Hip Arthroplasty." The Journal of arthroplasty. Published online February 5, 2024. doi:10.1016/j.arth.2024.01.047

Conclusion[1,2]

These studies provide an evidence based framework of best practices to establish international standard of care for wound closure and dressing management across total knee arthroplasty (TKA) and total hip arthroplasty (THA).

The panel of experts identified key interventions in both TKA and THA that are most focused on patient safety and improved outcomes, including:

- Use of barbed sutures over non-barbed sutures (lower wound complications, better cosmetic appearances, shorter closing times, and overall cost savings)
- Use of triclosan-coated sutures over non-antimicrobial-coated sutures (lower risks of surgical site infection)
- Use of mesh-adhesives over other skin closure methods (lower wound complications, higher patient satisfaction scores, lower rates of readmission)

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Method[1,2]

The published studies were conducted using the modified Delphi technique, an iterative process used to collect opinions and achieve agreement among a panel of experts.

The iterative process included multiple rounds of evidence review, discussion and consensus development. After 3 rounds of anonymous voting, 40 statements across knee and hip achieved consensus.*

To date, the current standards of care in TKA and THA have been derived with little consensus from the literature and a lack of evidence generated in systematic reviews.

- Relevant evidence complied from consensus studies can serve as a foundation for knowledge and education
- Help to identify important gaps in the existing evidence that require further research

Results

Click on the boxes below to learn more about each product.

Barbed Sutures

- STRATAFIX™ Spiral Knotless Tissue Control Devices
- STRATAFIX™ Symmetric Knotless Tissue Control Device

Triclosan-Coated Sutures

- PLUS Antibacterial Technology

Mesh-Adhesive Dressings

- DERMABOND™ PRINEO™ Skin Closure Systems

*A predetermined threshold of 75% or greater agreement was necessary for a statement to be accepted.

STRATAFIX™ Spiral Knotless Tissue Control Devices
STRATAFIX™ Symmetric PDS™ Plus Knotless Tissue Control Device

Barbed Sutures: TKA

	Consensus Statement[1]	Level of Consensus, % (N/n)
TKA	There appears to be a lower risk of wound complications with barbed sutures compared with interrupted closure with non-barbed sutures for total knee arthroplasty	80% (16/20)
TKA	There are significant closing time reductions with the use of barbed sutures vs interrupted closure with non-barbed sutures for total knee arthroplasty	100% (20/20)
TKA	While barbed sutures may cost more than interrupted closure with non-barbed sutures, closure with barbed sutures saves costs due to faster closing times and reduced operating room time in total knee arthroplasty	85% (17/20)
TKA	There is better cosmesis with barbed sutures versus subcuticular sutures/staples in total knee arthroplasty	90% (18/20)

Barbed Sutures: THA

	Consensus Statement[2]	Level of Consensus, % (N/n)
THA	There are shorter closing times with the use of barbed sutures versus interrupted closure with non-barbed sutures for the closure of the deep fascial layer in total hip arthroplasty	100% (20/20)
THA	While barbed sutures may cost more than interrupted closure with non-barbed sutures, closure with barbed sutures may save costs due to faster closing times and reduced operating room time in total hip arthroplasty	85% (17/20)

☑ STRATAFIX™ provides:

Strength and Security: STRATAFIX™ Knotless Tissue Control Devices provided stronger*, faster†, more secure‡ closure than traditional suturing.[3-7]

Strong hold: With a unique** anchor design, STRATAFIX™ Symmetric PDS™ Plus Knotless Tissue Control Device is the only barbed suture appropriate for high-tension areas, such as fascia.[#3,8]

Faster Closure: With significantly more points of fixation than traditional sutures, STRATAFIX™ Knotless Tissue Control Devices allowed for more consistent tension control over every pass and combined the strength¤ and security‡‡ of interrupted closure with the speed†† of continuous closure.[#3-7]

*Refers to STRATAFIX™ Symmetric PDS™ Plus Knotless Tissue Control Device only. Benchtop assessment using porcine fascia, greater maximum tissue holding strength compared to Looped PDS™ or VICRYL™ interrupted closures (p<0.05). Pre-clinical test data are not necessarily indicative of clinical performance

†Shorter closure time for STRATAFIX™ symmetric polydioxanone Plus compared to interrupted closure (p < 0.001); and STRATAFIX™ Spiral to VICRYL™ (first layer continuous closure, second layer interrupted closure, p<0.001)

‡Benchtop testing in porcine tissue. STRATAFIX™ was better able to maintain optimal tissue approximation when damage to the closure device occurred. (STRATAFIX™ Spiral compared to MONOCRYL™ interrupted and continuous closure and STRATAFIX™ Symmetric PDS™ compared to PDS™ Plus continuous closure). Pre-clinical test data are not necessarily indicative of clinical performance

**Data on File

Based on benchtop testing and clinical effect is unknown

††Comparing STRATAFIX™ symmetric polydioxanone Plus to interrupted closure (p < 0.001); and STRATAFIX™ Spiral to VICRYL™ (first layer continuous closure, second layer interrupted closure, p<0.001)

‡‡Benchtop testing in porcine tissue. Security refers to the ability to maintain optimal tissue approximation when damage to the closure device occurs.

¤Refers to STRATAFIX™ Symmetric PDS™ Plus Knotless Tissue Control Device only. Benchtop assessment using porcine fascia, greater maximum tissue holding strength compared to Looped PDS™ or VICRYL™ interrupted closures (p<0.05).

Triclosan-coated sutures: TKA and THA

	Consensus Statement[1,2]	Level of Consensus, % (N/n)
TKA / THA	Based on the available evidence, triclosan-coated sutures are likely to reduce the risk of surgical site infection in total hip and total knee replacement	95% (19/20)

Coated VICRYL™ Plus Antibacterial (polyglactin 910) Suture inhibits Staphylococcus aureus colonization for a minimum of 7 days†[9]

MONOCRYL™ Plus Antibacterial (poliglecaprone 25) Suture inhibits Staphylococcus aureus for 11 days in vitro†[10]

PDS™ II Plus Antibacterial (polydioxanone) Suture inhibits bacterial colonization for 17 days against Escherichia coli (E. coli) and 23 days against Staphylococcus aureus (S. aureus), when tested in vitro‡[11]

*Triclosan has in vitro activity that inhibits bacterial colonization of the suture. For illustration purposes only.

Triclosan-coated sutures have been shown in multiple meta-analyses to reduce the risk of SSIs by 28%[12-14]

Plus Sutures have been shown in vitro to inhibit bacterial colonization of the suture for 7 days or more‡#[9-11,15]

†Based on benchtop testing and clinical effect is unknown

‡Pre-clinical test data are not necessarily indicative of clinical performance

#The following bacteria have been evaluated: Staphylococcus aureus, Staphylococcus epidermidis, Methicillin-resistant Staphylococcus aureus (MRSA), Methicillin-resistant Staphylococcus epidermidis (MRSE), Escherichia coli, Klebsiella pneumoniae

DERMABOND™ PRINEO™ Skin Closure

Mesh-adhesive dressings: TKA

	Consensus Statement[1]	Level of Consensus, % (N/n)
TKA	Mesh-adhesives or staples are associated with faster closing times compared to subcuticular sutures in total knee arthroplasty	95% (19/20)
TKA	There may be a lower risk of wound complications with mesh-adhesive dressings versus other skin closure methods in total knee arthroplasty	80% (16/20)
TKA	Patients are more satisfied with wound closure using mesh-adhesive compared to staples in total knee arthroplasty	90% (18/20)
TKA	Closure with mesh-adhesives dressings may be associated with decreased rates of readmission compared to skin closure with staples in total knee arthroplasty	95% (19/20)

Mesh-adhesive dressings: THA

	Consensus Statement[2]	Level of Consensus, % (N/n)
THA	There may be a lower rate of wound complications with mesh-adhesives vs silver-impregnated dressings in total hip arthroplasty	80% (16/20)
THA	There is insufficient evidence to determine if mesh-adhesive dressings lead to less wound complications than other dressings in total hip arthroplasty	95% (19/20)

☑ DERMABOND PRINEO provides:

Stronger Closure: Incisions closed with DERMABOND™ PRINEO™ Closure System (22 cm) were significantly stronger when compared with the average strength of staples.* †[16,17]

Reduced SSI Risk: DERMABOND™ PRINEO™ Skin Closure System provided a flexible microbial barrier with 98.43% protection in vitro for 72 hours against organisms commonly responsible for SSIs.# ‡[18]

Better Cosmesis: DERMABOND™ PRINEO™ led to better cosmesis when compared to skin staples.**[19-21] Non-invasive skin closure that distributed tension evenly along the incision.†¤[22]

*Study performed ex vivo. P value = 0.00. Average maximum load at or prior to 3 ± 1 mm gap between the approximated tissues

†Based on benchtop testing and clinical effect is unknown

#Staphylococcus epidermidis, Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa, and Enterococcus faecium.

‡Pre-clinical test data are not necessarily indicative of clinical performance

**Internal US Double-blinded quantitative research study comparing surgeon experience with DERMABOND™ PRINEO™ System and skin staples in total knee arthroplasty. N=83 orthopaedic surgeons. Mean score of 88 vs 40/100; 90% c.l. Fielded June/July 2017.

¤Deep dermal stitches required

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International Delphi Study on Wound Closure and Dressing Management in Joint Arthroplasty Part 1: Total Knee Arthroplasty

International Delphi Study on Wound Closure and Incision Management in Joint Arthroplasty Part 2: Total Hip Arthroplasty

Please refer always to the Instructions for Use / Package Insert that come with the device for the most current and complete instructions.

1. Ainslie-Garcia, Margaret, et al. "International Delphi Study on Wound Closure and Dressing Management in Joint Arthroplasty: Part 1: Total Knee Arthroplasty." The Journal of arthroplasty 2024;39(4):878-883. doi:10.1016/j.arth.2023.12.032. 2. Ainslie-Garcia, Margaret et al. "International Delphi Study on Wound Closure and Incision Management in Joint Arthroplasty Part 2: Total Hip Arthroplasty." The Journal of arthroplasty. Published online February 5, 2024. doi:10.1016/j.arth.2024.01.047 3. Ethicon, 100326296: Time zero tissue holding - Competitive claims comparisons for STRATAFIX Knotless Tissue Control Devices vs various products. 2015. Data on File. (EM_ETH_WOUN_102739, EM_ETH_WOUN_104310, EM_ETH_WOUN_100633) 4. Sundaram K, Warren J, Klika A, Piuzzi N, Mont M, Krebs V. Barbed sutures reduce arthrotomy closure duration compared to interrupted conventional sutures for total knee arthroplasty: a randomized control trial. Musculoskelet Surg. 2020;1-7. (EM_ETH_WOUN_102739, EM_ETH_WOUN_100633) 5. Zayed M, Fouda U, Elsetohy K, Zayed S, Hashem A, Youssef M. Barbed sutures versus conventional sutures for uterine closure at cesarean section; a randomized controlled trial. The journal of maternal-fetal & neonatal medicine. 2017:1-8. (EM_ETH_WOUN_102739, EM_ETH_WOUN_100633) 6. Ethicon, AST-2012-0331. Tissue gapping under tension of porcine cadaveric skin incisions closed with Stratafix Spiral in comparison to Monocryl in both interrupted and continuous stitching patterns. October 2012. Data on File. (EM_ETH_WOUN_102739, EM_ETH_WOUN_100633) 7. Ethicon, AST-2013-0056. Performance Testing of STRATAFIX Symmetric PDS Size2-0 suture device for Tissue Holding Strength with Multiple Incision Defects to Measure Gapping. April 2013. Data on File. (EM_ETH_WOUN_102739, EM_ETH_WOUN_100633) 8. Medtronic, V-Loc 180 Absorbable Wound Closure Device. Instructions for Use. Data on File. (EM_ETH_WOUN_104310) 9. Rothenburger S, Spangler D, Bhende S, Burkely D. In vitro antibacterial evaluation of Coated VICRYL Plus Antibacterial Suture (coated polyglactin 910 with triclosan) using zone of inhibition assays. Surg Infect (Larchmt). 2002;3(Suppl 1):S79-S87. (EM_ETH_WOUN_104183, EM_ETH_WOUN_103741.1) 10. Ming X, Rothenburger S, Yang D. In vitro antibacterial efficacy of MONOCRYL Plus Antibacterial Suture (poliglecaprone 25 with triclosan). Surg Infect (Larchmt). 2007;8(2):201-207. (EM_ETH_WOUN_104181, EM_ETH_WOUN_103741.1) 11. Ming X, Rothenburger S, Nichols M. In vivo and in vitro antibacterial efficacy of PDS™ Plus (polidioxanone with triclosan) Suture. Surg Infect (Larchmt). 2008;9(4):451-457. (EM_ETH_WOUN_104179, EM_ETH_WOUN_103741.1) 12. de Jonge S, Atema J, Solomkin J, Boermeester M, Meta-Analysis and trial sequential analysis of triclosan-coated sutures for the prevention of surgical-site infection. 2017; BJS 104 e118-e133. (EM_ETH_WOUN_103738) 13. Wang Z, Jiang C, Cao Y, Ding Y. Systematic review and meta-analysis of Triclosan-coated sutures for prevention of surgical-site infection. Br J Surgery 2013; 100:465-474. (EM_ETH_WOUN_103738) 14. Edmiston C, Daoud F, Leaper D. Is there an evidence-based argument for embracing an antimicrobial (Triclosan)-coated suture technology to reduce the risk for surgical-site infections? A meta-analysis. Surgery 2013; 154: 89-100. (EM_ETH_WOUN_103738) 15. Storch M, Rothenburger S, Jacinto G. Experimental efficacy study of Coated VICRYL™ Plus Antibacterial Suture in guinea pigs challenged with Staphylococcus aureus. Surg Infect (Larchmt). 2004;5(3):281-288. (EM_ETH_WOUN_103741.1) 16. Ethicon, AST-2014-0246, Study to compare the tissue holding strength of DERMABOND™ PRINEO™ 22 cm Skin Closure System (DP22) to conventional wound closure techniques, September 2014, Data on File. (EM_ETH_WOUN_223348) 17. Ethicon, AST-2012-0290, Study to Compare the tissue holding strength of PRINEO™ skin closure system with conventional wound closure techniques, October 2012, Data on File. (EM_ETH_WOUN_223348) 18. Ethicon, 09TR016 Technical Report: Study Report for In-Vitro Evaluation of the Microbial Barrier Properties of Improved PRINEO™ Skin Closure System. March 2009. Data on File. (EM_ETH_WOUN_103663) 19. Ethicon, 30112017 DERMABOND™ PRINEO™ Claims Report, FINAL – November 2017. Data on File. (EM_ETH_WOUN_101495) 20. Ethicon, DR#25231-1 DERMABOND™ PRINEO™ - Questions asked to surgeons and results tables. July 2017. Data on File. (EM_ETH_WOUN_101495) 21. Ethicon, DR#25231-1 DERMABOND™ PRINEO™ - Questions asked to patients and results tables. July 2017. Data on File. (EM_ETH_WOUN_101495) 22. Ethicon, 100216627 Report for mapping strains in DERMABOND™ PRINEO™ Skin Closure System 22 cm (DP22) Comparative Study, August 2014, Data on File. (EM_ETH_WOUN_100523)

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