

FREE THE KNEE



TOURNIQUET-FREE
TOTAL KNEE
ARTHROPLASTY

Medtronic

TOURNIQUETS ARE NOT BENIGN

Tourniquet usage is common among orthopedic surgeons when performing total knee replacement. However, they are often associated with an increase in soft tissue damage due to high mechanical pressure, and complications resulting in delayed recovery.¹

Using our Aquamantys™ bipolar sealers to reduce blood loss in total knee arthroplasty (TKA) can lead to several patient benefits. By reducing blood loss, your patient can maintain higher hemoglobin levels,² experience reduced drainage,³ have less risk of hemarthrosis,⁴ and lower transfusion rates.³ A tourniquet-free procedure may allow your patient faster recovery time with less post-operative pain.⁵⁻⁷

Aquamantys™ devices use Transcollation™ technology, a combination of radiofrequency (RF) energy and saline that provides hemostatic sealing of soft tissue and bone during surgery.



BENEFITS OF A TOURNIQUET-FREE PROCEDURE

Controlling blood loss can reduce or eliminate the need for a tourniquet in your TKA, potentially leading to the following patient benefits:⁸

- Less pain reported after surgery⁵⁻⁷
- Less swelling and bruising⁸
- Greater range of motion⁵⁻⁷
- Increased satisfaction scores following surgery⁵

Minimizing tourniquet time has also been shown to reduce the risk of some post-operative complications:^{8,9}

- Wound infection
- Nerve injury
- Skin necrosis
- Hematoma (internal pooling of blood)
- Deep vein thrombosis (DVT)

**The technique described here and the associated recommendations are based on the experience of the surgeon. In the final analysis, the preferred treatment is that which, in the healthcare professional's judgment, best addresses the needs of the individual patient.*



TOURNIQUET USE IN TOTAL KNEE ARTHROPLASTY: CLINICAL PUBLICATIONS AND RESULTS

PAIN

Evaluation of pain in bilateral total knee replacement with and without tourniquet; a prospective randomized control trial. Kumar N, Yadav C, Singh S, et al. *Jrnl Clin Ortho & Trauma*. 2015;6(2):85-88.

In this prospective randomized control trial of 30 consecutive simultaneous bilateral total knee arthroplasty patients, thigh pain was evaluated on the first, second, third day & second and six weeks after surgery using the VAS score. There were statistically significant differences in VAS score between the tourniquet and non-tourniquet groups on the first (5.75 vs. 3.95), second (4.4 vs. 2.7), and third (3.35 vs. 2.05) post-operative day. The authors did not find statistically significant differences between the tourniquet and non-tourniquet groups at the second week (1.7 vs. 1.25) and sixth week (1.05 vs. 1) post operatively.

SWELLING AND BRUISING

The effects of a tourniquet used in total knee arthroplasty: a meta analysis. Zhang W, Li N, Chen S, et. al. *J Orthop Surg Res*. 2014;9:13.

In this meta-analysis, Smith and Hing reported a trend toward increased wound hematoma, peroneal nerve palsy, superficial wound healing disorders, blisters, DVT, and PE in tourniquet versus non-tourniquet patients.

COMPLICATIONS

Timing of tourniquet release in knee arthroplasty. Meta-analysis of randomized, controlled trials. Rama KR, Apsingi S, Poovali S, Jetti A. *J Bone Joint Surg Am*. 2007;89(4):699-705.

In this meta-analysis, Rama et al. systematically analyzed eleven randomized, controlled studies involving 872 patients and 893 primary knee arthroplasties. Tourniquet release after closure significantly increased the risk of regional complications, including wound complications, symptomatic deep vein thrombosis, and knee stiffness requiring manipulation ($p=0.006$).

Rate of reoperation due to post-operative complication was 3.1% (9/290) in the late release group in contrast with 0.3% (1/290) in the early release group ($p=0.04$). Complications included wound dehiscence, hematomas, and infections that required drainage and/or debridement and knee stiffness that required manipulation with the patient under anesthesia.

RANGE OF MOTION

Tourniquet use in total knee replacement does not improve fixation but appears to reduce final range of motion. Ledin H, Aspenberg P, Good L. *Acta Orthop*. 2012; 83(5):499-503.

In this study, 50 patients undergoing TKA randomized to cemented TKA with or without tourniquet. Range of motion was measured up to 2 years. Range of motion was 11° more in the non-tourniquet group ($p = 0.001$ at 2 years). Migration as measured by radiostereometric analysis (RSA) which can predict future loosening differed by 0.01 mm (95% CI -0.13 to 0.15). RSA data did not support the use of a tourniquet to improve fixation.

PATIENT SATISFACTION

Faster recovery without the use of a tourniquet in total knee arthroplasty: a randomized study of 70 patients.. Ejaz A, Laursen AC, Kappel A, et al. *Acta Orthop*. 2014;85(4):422-426.

In this study, 70 patients who underwent TKA were randomized into a tourniquet group ($n = 35$) and a non-tourniquet group ($n = 35$). Patients in the non-tourniquet group showed a better outcome in all KOOS (Knee injury and Osteoarthritis Outcome Score (KOOS) subscores and better early knee ROM from surgery to week 8. No difference was detected at the 6- and 12-month follow-ups.

WHAT SURGEONS ARE SAYING

"The implementation of the Aquamantys™ bipolar sealer has been critical in my tourniquet free technique. I have noted less thigh pain, less post operative swelling and easier resumption of flexion activities because of this technique. In my opinion tourniquet free total knee arthroplasty is a game changer for our patients. It is the future of all total knee arthroplasty."

– Dr. Jamie McAtee

"I adopted tourniquet free total knee arthroplasty with the use of the Aquamantys™ bipolar sealer 4 years ago. My patient outcomes have significantly improved with less pain, less swelling, improved wound healing and quicker recovery. This technique has revolutionized the way I perform total knee arthroplasty, as I believe it should be standard of care."

– Dr. Todd Sekundiak

"I have found the Aquamantys™ bipolar sealer to be an excellent compliment to tourniquet free knee replacement. There is nothing physiologic about 30 minutes to an hour of an ischemic extremity. The Aquamantys™ bipolar sealer allows us to perform a thorough control of bleeding more quickly and with much less charring than standard electrocautery. I believe that having a knee joint as dry as possible at the end of the procedure results in less pain and swelling and earlier, easier motion!"

– Dr. Del Schutte

Ordering information

Description	Catalog number
Aquamantys™ Malleable Bipolar Sealer with Light	23-301-1
Aquamantys™ 6.0 Bipolar Sealer	23-112-1
Aquamantys™ 2.3 Bipolar Sealer	23-113-1
AEX™ Generator	40-405-1

Rx only. Refer to product instruction manual/package insert for instructions, warnings, precautions and contraindications.

References

1. Teitsma XM, Van der Hart CP, Feilzer QGB, Moen MH, Tamminga R, et al. (2015) Effect of Tourniquet Application on Postoperative Functional Outcome Following Total Knee Arthroplasty: A Prospective Cohort Study *Orthop Muscular Syst* 4: 190
2. Marulanda GA, Krebs Ve, Bierbaum BE, et al. Hemostasis using a bipolar sealer in primary unilateral total knee arthroplasty. *Am J Orthop*. 2009;38(12):E179-183.
3. Sah A, Dearborn J. Aquamantys bipolar sealer in primary total knee arthroplasty: experience with 3,172 consecutive knee replacements. Poster presentation at American Academy of Orthopaedic Surgeons Annual Meeting 2012; San Francisco, CA.
4. Rosenberg AG. Reducing blood loss in total joint surgery with a saline-coupled bipolar sealing technology. *J Arthroplasty*. 2007;22(4 Suppl 1):82-85.
5. Ejaz A, Laursen AC, Kappel A, et al. Faster recovery without the use of a tourniquet in total knee arthroplasty: a randomized study of 70 patients. *Acta Orthop*. 2014;85(4):422-426.
6. Kumar N, Yadav C, Singh S, et al. Evaluation of pain in bilateral total knee replacement with and without tourniquet; a prospective randomized control trial. *Jrnl Clin Ortho & Trauma*. 2015;6(2):85-88.
7. Ledin H, Aspenberg P, Good L. Tourniquet use in total knee replacement does not improve fixation but appears to reduce final range of motion. *Acta Orthop*. 2012; 83(5):499-503.
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9. Rama K, Apsingi S, Poovali S, Jetli A. Timing of tourniquet release in knee arthroplasty. Meta-analysis of randomized, controlled trials. *J Bone Joint Surg Am*, 2007;89:699-705.

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