

# Iatrogenic bone and soft tissue trauma in robotic-arm assisted total knee arthroplasty compared with conventional jig-based total knee arthroplasty: a prospective cohort study and validation of a new classification system

Babar Kayani, MRCS, MBBS, BSc (Hons), Sujith Konan, MBBS, MD (Res), FRCS (Tr & Orth), Jurek R.T. Pietrzak, MB BCH, FCS(SA)Orth, Fares S. Haddad, FRCS (Ed), Dip Sports Med, FFSEM

## Publication

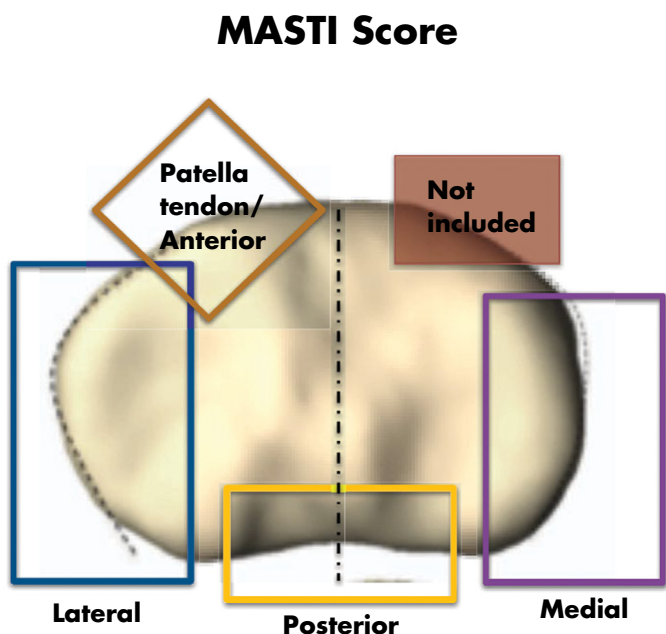
The Journal of Arthroplasty 33 (2018) 1e6

## Goal of study

To compare macroscopic bone and soft tissue injury between robotic-arm assisted total knee arthroplasty (RA-TKA) and conventional jig-based total knee arthroplasty (CJ-TKA) and create a validated classification system for reporting iatrogenic bone and periarticular soft tissue injury after TKA

## Materials and methods

- 30 consecutive CJ-TKAs followed by 30 consecutive RA-TKAs performed by a single surgeon
- Intraoperative photographs of the femur, tibia, and periarticular soft tissues were taken before implantation of prostheses
- 6 blinded fellowship-trained surgeons reviewed the photographs and allocated scores
- Outcomes of the study were used to develop the macroscopic soft tissue injury (MASTI) classification system to grade iatrogenic bone and soft tissue injuries
- Interobserver and Intraobserver validity of the proposed classification system was assessed



**MASTI Score**

Patella tendon/Anterior

Not included

Lateral Anterior Posterior Medial





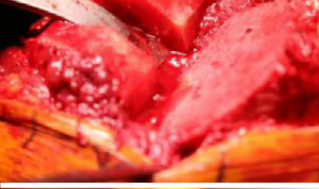

**Soft tissue status in each quadrant**

6. Uninvolved (10 points)
5. Planned soft tissue release (8 points)
4. Soft tissue contusion (7 points)
3. Soft tissue Fibrillation (macroscopic incomplete damage) (5 points)
2. Soft tissue cleavage (3 points)
1. Complete unintentional soft tissue detachment (superficial MCL tear, LCL tear, partial or full patella tendon tear) (0 points)

**Bone quality**

- A. Pristine
- B. Some damage
- C. Severley damaged

**Fig. 1**  
Diagrammatic representation of the macroscopic soft tissue injury (MASTI) score showing tibial

<b>Type 6</b>	Uninvolved soft tissues (10 points)	
<b>Type 5</b>	Planned soft tissue release. Tissues beyond release uninjured (8 points)	
<b>Type 4</b>	Soft tissue confusion. Superficial layer involvement only. No involvement of deeper layers. No fibrillation. (7 points)	
<b>Type 3</b>	Soft tissue fibrillation (macroscopic superficial to partial thickness tissue damage) (5 points)	
<b>Type 2</b>	Soft tissue cleavage (partial to full thickness soft tissue fragmentation) (3 points)	
<b>Type 1</b>	Complete unintentional knee defunctioning due to superficial MCL, LCL injury, partial or complete patella tendon injury	

**ZERO score overall if Type 6 in any zone**

**Fig. 2**  
Intraoperative photographs showing soft tissue injury for each grade of MASTI classification system. No type 6 injuries were observed in this study. LCL, lateral collateral ligament; MCL, medial collateral ligament.

MASTI classification	Description of soft tissue reservation	Points	Description
<b>Grade A</b>	Excellent	>34 points	Iatrogenic injury to only 1 zone with relative soft tissue preservation of the other zones
<b>Grade B</b>	Average	25-33 points	Minimal iatrogenic injury to ≥2 zones with relative soft tissue preservation of the other zones
<b>Grade C</b>	Poor	<24	Significant iatrogenic soft tissue injury to ≥3 zones
<b>Grade D</b>	Defunctioned knee	0	Injury to superficial MCL ± LCL ± extensor mechanism defunctioning the knee

**Table 1**  
Description of the MASTI Classification System.

## Results

**More pristine femoral (p < .05) and tibial (p < .05) bone resection cuts**

**Improved MASTI scores compared to CJ-TKA (p < .05)**

**Reduced medial soft tissue injury in both passively correctible (p < .05) and non-correctible varus deformities (p < .05)**

- High interobserver and intraobserver agreement of the proposed MASTI classification system
- Note: The proposed MASTI classification system is a reproducible grading scheme for describing iatrogenic bone and soft tissue injury in TKA

## Conclusion

- There is reduced bone and periarticular soft tissue injury in patients undergoing RA-TKA compared to CJ-TKA

**References**  
Hampf, E.L., Schell, L.Y., Fuizan, A., Westrich, G., Mont, M.A. Greater iatrogenic soft tissue damage in conventional approach when compared with the robotic-arm assisted approach for total knee arthroplasty. EFORT 2018 annual meeting, Barcelona, Spain. Poster No. 1582, May 30 - June 1, 2018.

A surgeon must always rely on his or her own professional clinical judgment when deciding whether to use a particular product when treating a particular patient. Stryker does not dispense medical advice and recommends that surgeons be trained in the use of any particular product before using it in surgery.

The information presented is intended to demonstrate the breadth of Stryker's product offerings. A surgeon must always refer to the package insert, product label and/or instructions for use before using any of Stryker's products. The products depicted are CE marked according to the Medical Device Directive 93/42/EEC. Products may not be available in all markets because product availability is subject to the regulatory and/or medical practices in individual markets. Please contact your sales representative if you have questions about the availability of products in your area. Stryker Corporation or its divisions or other corporate affiliated entities own, use or have applied for the following trademarks or service marks: Stryker. All other trademarks are trademarks of their respective owners or holders.

This poster is not sponsored by or affiliated with the AAHKS.

MASTI-POS-19\_18874 © 2018 Stryker