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

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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

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

Conclusion
• 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

MASTI classification

<table>
<thead>
<tr>
<th>MASTI classification</th>
<th>Description of soft tissue preservation</th>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade A</td>
<td>Excellent</td>
<td>&gt;34</td>
<td>Intragenic injury to only 1 zone with relative soft tissue preservation of the other zones</td>
</tr>
<tr>
<td>Grade B</td>
<td>Average</td>
<td>25-33</td>
<td>Minimal iatrogenic injury to ≥2 zones with relative soft tissue preservation of the other zones</td>
</tr>
<tr>
<td>Grade C</td>
<td>Poor</td>
<td>&lt;24</td>
<td>Significant iatrogenic soft tissue injury to ≥3 zones</td>
</tr>
<tr>
<td>Grade D</td>
<td>Defunctioned knee</td>
<td>0</td>
<td>Injury to superficial MCL ± LCL ± extensor mechanism functioning the knee</td>
</tr>
</tbody>
</table>

Table 1 Description of the MASTI Classification System

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

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