The Effect of Implant Design on the Incidence of Lateral Release in Primary Total Knee Arthroplasty

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INTRODUCTION:

Issues related to the patella and the extensor mechanism can compromise the outcome of total knee replacement (TKR) and as a group comprise the greatest number of post-op. complications (1-3). A lateral retinacular release is variably used to help centralize the patella in association with TKR. The complications associated with a lateral release include a reduction in short-term extensor strength, osteonecrosis with or without fracture of the patella, skin necrosis and wound breakdown, and early loosening (4-6).

Across the industry, femoral implant design modifications (i.e., geometry, aspect ratio and thickness) have been made in order to categorically reduce peri-prosthetic soft tissue tension and impingement and improve patellar tracking and extensor function. The Scorpio NRG (Stryker; Mahwah, NJ) femoral component has been so modified compared to the original Scorpio (Stryker; Mahwah, NJ) femoral component and incorporates 3 additional femoral component sizes (4, 6, 8) for improved fit. As a measure of reduced soft tissue tension, this study compares the incidence of lateral release for the original Scorpio v. the NRG in a single surgeon series.

METHODS:

As part of an FDA IDE study, 49 Scorpio primary knees were implanted from November 2001 to January 2005. Ninety-six NRG primary knees were subsequently implanted from February 2005 to April 2009 by a single surgeon. The NRG design modifications include a narrower (M-L) and thinner (A-P) anterior flange, an extended patella track, and an anterior cutout on the poly insert. All knees were the PS design. A medial para-patellar approach was used in all cases. All components were cemented and all patellae were resurfaced. The occurrence of a lateral release was determined by review of the operative reports. The incidence in lateral release was compared between the two implants. To elucidate whether this difference was more likely related to component design or the increased sizes, subgroups were compared.

RESULTS:

There were 21 (42%) and 26 (27%) knees in males and 28 (58%) and 70 (73%) knees in females in the Scorpio and NRG groups, respectively. Mean height (66.1 and 65 in.), weight (197 and 189 lbs), and BMI (31.6 and 32) did not different significantly between the Scorpio and the NRG groups. There was no statistically significant difference in the performance of lateral release between the traditional Scorpio and NRG groups. The difference was also statistically significant between the two implant types for the larger size subgroup (intermediate sizes not offered) but not for the smaller size subgroup (intermediate sizes offered).

<table>
<thead>
<tr>
<th></th>
<th>Scorpio (N;%)</th>
<th>NRG (N;%)</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Sizes 3-8</td>
<td>6 (22; 27%)</td>
<td>7 (66; 11%)</td>
<td>0.11</td>
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<tr>
<td>Sizes 9-13</td>
<td>13 (27; 48%)</td>
<td>1 (30; 3%)</td>
<td>0.0003</td>
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<tr>
<td>Total</td>
<td>19 (49; 39%)</td>
<td>8 (96; 8%)</td>
<td>&lt; 0.0001</td>
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There were no statistically significant differences between frequencies of lateral release when comparing smaller sizes to larger sizes.

DISCUSSION:

The relatively high rate (39%) of lateral releases for this surgeon with the Scorpio TKR represents a relatively sensitive test for design modifications. Lateral release was performed significantly less frequently (8%) with the Scorpio NRG. This study indicates that the design modifications of the NRG do result in a reduction of lateral releases. Because of the lack of difference in the lateral release rate in smaller sizes, where intermediate sizes are available for NRG, it appears that the difference in lateral release rate is more likely a result of the physical design modifications and not the increased number of sizes. This conclusion is supported by the lack of differences in lateral release when comparing the smaller sizes to larger sizes. Longer follow-up is needed with the NRG in order to make a fair comparison of clinical outcomes.

REFERENCES:


