

# LEGION<sup>◇</sup> Total Knee System: what does the evidence say for LEGION revision total knee arthroplasty (rTKA)?

## Summary

- LEGION rTKA reduces joint line elevation<sup>1,2</sup> and restores posterior condylar offset (PCO)<sup>1-3</sup>
- LEGION rTKA leads to improvements in range of motion (ROM) compared to pre-rTKA<sup>1,2,4,5</sup>
- Patients report high levels of satisfaction,<sup>4</sup> and significant improvements in patient-reported outcomes following LEGION rTKA<sup>4-7</sup>
- Studies report midterm survivorship with LEGION rTKA comparable to primary TKA<sup>4,8</sup>

A systematic literature review, conducted in October 2020, identified 59 peer-reviewed publications containing LEGION cruciate retaining (CR), posterior stabilised (PS) or revision-specific data, 26 of which were clinical studies relating to LEGION rTKA.<sup>9</sup>

## Restoring the joint line and PCO with LEGION rTKA

### Joint line

Joint line elevation following rTKA is a common problem, which occurs due to loss of bone from the distal femur during revision surgery.<sup>10</sup> Failure to restore the joint line has long since been associated with diminished functional and clinical outcomes,<sup>11,12</sup> decreased ROM<sup>13</sup> and reduced patellofemoral contact forces.<sup>14</sup>

In a retrospective case series, the joint line restoration of LEGION rTKA (n=30) was compared to two other revision systems (PFC<sup>™</sup> Sigma [Depuy, Warsaw, Indiana, USA], n=17; NexGen<sup>™</sup> LCCK [Zimmer, Warsaw, Indiana, USA], n=13).<sup>1</sup> The results showed that the joint line was elevated significantly less with LEGION rTKA than the other two implants (p<0.05; Figure 1).<sup>1</sup> In a separate retrospective review of 43 LEGION rTKAs, Innocenti M, et al. demonstrated that the joint line position was restored to within 2mm of the planned position in 70% of knees.<sup>2</sup>

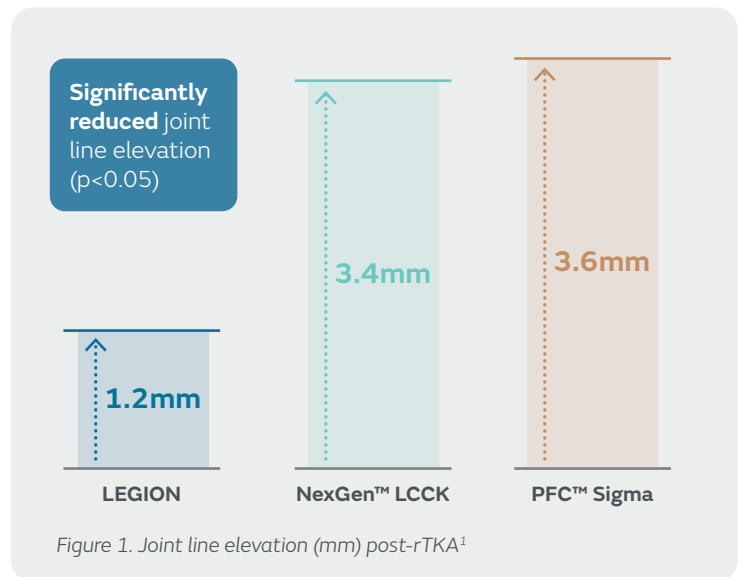


Figure 1. Joint line elevation (mm) post-rTKA<sup>1</sup>

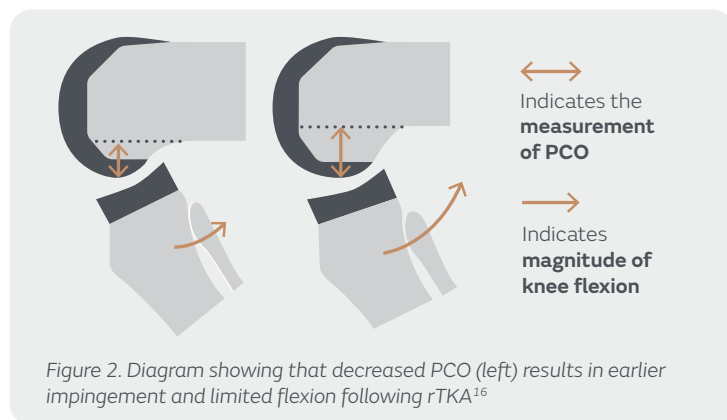


Figure 2. Diagram showing that decreased PCO (left) results in earlier impingement and limited flexion following rTKA<sup>16</sup>

### Posterior condylar offset

Studies suggest that PCO is an independent predictor of functional outcome,<sup>15</sup> which should be restored in order to avoid impingement and maintain maximal flexion (Figure 2).<sup>16</sup>

In a retrospective review of 75 rTKAs, LEGION led to greater postoperative improvements in PCO, relative to preoperative PCO (1.3mm, n=30), compared with PFC<sup>™</sup> Sigma (0.5mm, n=17) and NexGen<sup>™</sup> LCCK (0.8mm, n=13).<sup>1</sup> Lee J, et al. also reported greater PCO with offset stems compared to straight stems.<sup>1</sup> These findings were corroborated by Innocenti M, et al. and Brillhault JM, et al., who demonstrated greater improvements in PCO with LEGION rTKA offset stem compared to straight stems.<sup>2,3</sup>

Clinical evidence demonstrates that LEGION rTKA and the use of femoral offset stems result in limited elevation of the joint line<sup>1,2</sup> and preservation of PCO,<sup>1-3</sup> which may allow for more physiological ROM and joint stability (Figures 1 and 2).

## + Evidence in focus

Table 1. Mean ROM pre- and post-LEGION<sup>®</sup> rTKA

Study	Number of rTKAs	Pre-rTKA ROM	Post-rTKA ROM	p value
Lee J, et al. <sup>1</sup>	30	95°	106°	NR
Innocenti M, et al. <sup>2</sup>	40	54°	108°	NR
Gil-Martínez P, et al. <sup>4</sup>	41	87°	101°	NR
Mufty S, et al. <sup>5</sup>	85	88°	109°	p<0.001

NR = not reported

### Patient outcomes with LEGION rTKA

Revision TKA is a technically challenging procedure associated with a high risk of complications.<sup>18</sup> As many as 30% of patients report being unhappy with their revision joint replacement, with postoperative pain and extensive rehabilitation contributing to this dissatisfaction.<sup>19</sup>

Patient-reported outcomes, including patient satisfaction, following LEGION rTKA have been captured through a number of reporting tools. These include Visual Analogue Scale (VAS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores, Knee Society Scores (KSS) and Oxford Knee Scores (OKS).

#### Patient satisfaction

Gil-Martínez P, et al. and Stockwell KD, et al. both reported ≥75% of patients were satisfied or very satisfied in studies totalling 169 patients following LEGION rTKA using a VAS 10-point or a 5-point Likert scale, in respective studies.<sup>4,8</sup>

Lee J, et al. recorded an 82% improvement in WOMAC score from pre- to post-LEGION rTKA (n=30; 87.8 vs 16.1),<sup>1</sup> with improvements in WOMAC scores known to correlate with high patient satisfaction.<sup>20</sup>

### Range of motion with LEGION rTKA

Postoperative ROM is one of the most important factors influencing patient satisfaction following TKA, as loss of ROM is detrimental to the ability of a patient to perform activities of daily living.<sup>17</sup>

Four clinical studies on LEGION rTKA reported on ROM, and all showed improvements compared with pre-rTKA (Table 1).<sup>1,2,4,5</sup>

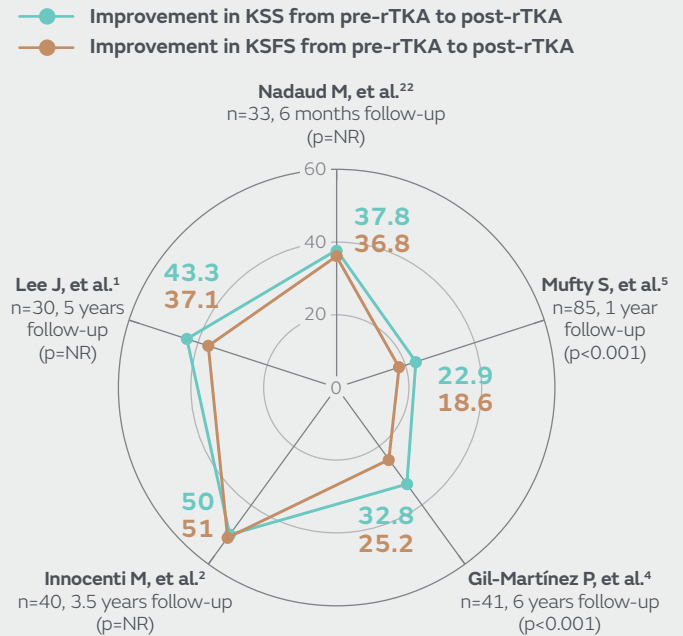


Figure 3. Mean improvement in KSS and KSFS scores from pre-rTKA to post-LEGION rTKA<sup>1,2,4,5,22</sup>

NR = not reported

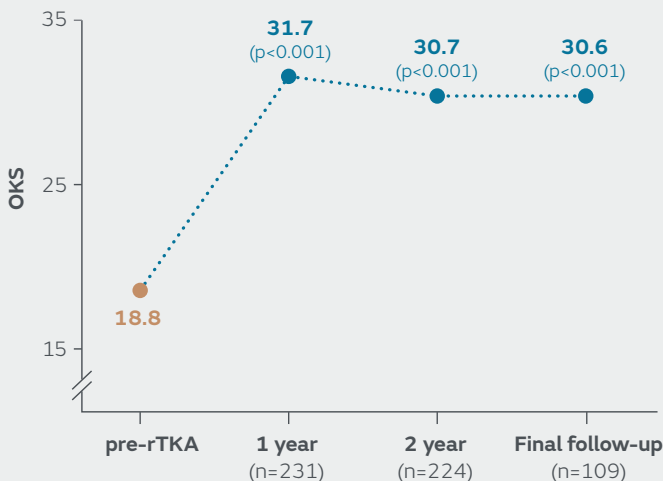


Figure 4. Mean OKS at pre-rTKA and 1-year, 2-year post-rTKA and final follow-up<sup>8</sup>

### Functional outcomes

Pain relief and postoperative functional outcome are two of the most important determinants in achieving patient satisfaction.<sup>21</sup> Five studies reported pre- and post-LEGION rTKA KSS and Knee Society Function Scores (KSFS).<sup>1,2,4,5,22</sup> In 2011, the new KSS system was launched to better characterise patient satisfaction, expectations and functional ability of the current younger, more active TKA population, compared to the original 1989 Knee Society Clinical Rating System.<sup>23</sup> The KSFS is independent of KSS and is wholly patient-reported looking at activities of daily living, sports and recreational activities.<sup>23</sup> In all studies reporting KSS and KSFS, improvements compared to pre-rTKA were recorded (Figure 3).<sup>1,2,4,5,22</sup>

The OKS is a patient-reported outcome tool specifically assessing function and pain following TKA.<sup>24</sup> In a study of 234 LEGION rTKAs, Stockwell KD, et al. reported significant improvements in OKS at 1 year, 2 years and last follow-up (mean 5.1 years), compared to pre-rTKA (p<0.001; Figure 4).<sup>8</sup>

## + Evidence in focus

### Survivorship of LEGION<sup>®</sup> rTKA

Compared with primary TKA survivorship, rTKA has shown less promising results with rates as low as 60%.<sup>19</sup> Two studies report survivorship rates for LEGION rTKA. Gil-Martínez P, et al. reported a survivorship of 95% (n=41; mean follow-up, 6 years; Figure 5), with only two revisions.<sup>4</sup> Stockwell KD, et al. also demonstrated high survivorship with LEGION rTKA, reporting 92.3% survivorship at 5 years (n=109; Figure 5).<sup>8</sup> When compared with other survivorship studies of hybrid fixation rTKA systems, Stockwell KD, et al. reported that LEGION rTKA short- and mid-term survivorship was consistent with or superior to the other rTKA systems.<sup>8</sup>

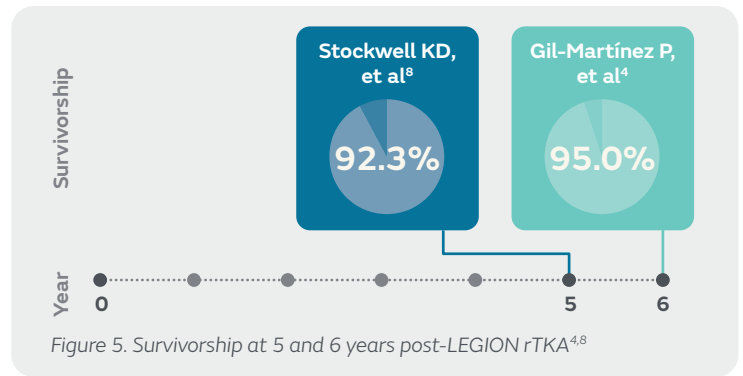


Figure 5. Survivorship at 5 and 6 years post-LEGION rTKA<sup>4,8</sup>

### Conclusion

LEGION rTKA is associated with restoration of the joint line<sup>1,2</sup> and PCO,<sup>1-3</sup> and improvements in both ROM<sup>1,2,4,5</sup> and patient-reported outcomes compared to pre-rTKA.<sup>1,2-8,22</sup> In addition, LEGION rTKA results in high levels of patient satisfaction<sup>4</sup> and demonstrates good mid-term survivorship comparable to that of primary TKA.<sup>4,8</sup>

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