## Impact of Spacer Constraint on Outcomes in Two-Stage Exchange Revision Total Knee Arthroplasty

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## INTRODUCTION:

Two-stage component exchange has long been the gold standard for chronic peri-prosthetic joint infections (PJI) with realcomponent functional articulating spacers becoming overwhelmingly popular. While several studies have evaluated the success of real-component articulating spacers in total knee arthroplasty (TKA), this is the first to specifically compare outcomes for articulating spacers stratified by level of liner constraint. METHODS:

We retrospectively reviewed 103 patients who underwent two-stage revision with articulating spacer after primary TKA at a single academic institution from Jan-2011 to Dec-2023. Cohorts were categorized according to the level of liner constraint: posterior stabilized (PS), cruciate retaining (CR) and varus valgus constrained (VVC). Demographic and clinical outcomes including reoperations for infection and range of motion (ROM) change from preoperatively to postoperatively were collected for all patients for both stage 1 and stage 2. **RESULTS:** 

Out of 103 patients 38 (37%) were in PS. 49 (48%) in CR and 16 (15%) in the VVC group. The Mean operative time was longer for VVC cohort vs both PS and CR for stage 1 (p=0.327) and stage 2 (p=0.004). After Stage 1, VVC cohort demonstrated worse ROM changes compared to PS cohort but better than CR cohort (-11.2 degrees VVC vs. -8.6 degrees PS vs. -12.5 degrees CR, p=0.822). After Stage 2, VVC cohort demonstrated better ROM changes compared to both PS and CR cohorts (p=0.441). Neither ROM change result reached statistical significance. Reoperation rates due to re-infection were highest in the VVC cohort after Stage 1 (12.5% in VVC vs 7.9% and 4.0% in PS and CR groups, respectively, p=0.480). This was also similar for Stage 2 (41.6% in VVC group vs 14.2% and 9.5% in PS and CR, respectively, p=0.025).

## **DISCUSSION AND CONCLUSION:**

Although the constrained group showed greatest improvement in motion and higher reinfection rates over the course of the two-stage exchange period, these differences were not significant across constraint groups. This suggests articulating spacers design in two-stage exchange treatment of PJI can be left to surgeon discretion and consideration of infection tissue viability.

burden. bone soft loss. 
 Brable 2. Stage 1 Clinical Outcomes Stratified by Spacer Constrained

 PS
 CR
 VVC
 P-value

 Mean LOS (days) (range)
 6.5 (2-22)
 4.3 (0-21)
 5.7 (2-17)
 0.016

 Mean Operative Time
 142.8
 153.8
 154.1
 0.327
Table 1. Baseline Characteristics Stratified by Spacer Constrained PS CR VVC P-value 61 (23 - 77) 65 (43 - 83) 0.274 63 (35 - 82) Sex, n (%) Female Male (min) [range] Discharge Disposition, [98.0 -267.0] [92.0 - 197] [62.0 - 244.0] 0.124 23 (60.53) 15 (39.47) 19 (38.78) 30 (61.22) 7 (43.75) 9 (56.25) 0.766 Cace, n (%) White Home ARF 0.108 30 (78.95) 7 (18.42) 1 (2.63) 14 (87.5) 2 (12.5) 26 (68 42) 26 (53.06 8 (50.0 6 (12.24) Black Asian 1 (2.63) 3 (7.89) 9 (18.37) 2 (4.08) 5 (31.25) Astan Other moking Status, n (%) Never Former Current 8 (21.05) 6 (12.24) 2 (12.5) 0.274 0.108 revious non-revisi 10 (26.3) 20 (40.8) 4 (25.0) 7 (43.75) 9 (56.25) 0 18 (47.37) argery, n (%) coperation for Infection 16 (32.65) 25 (51.02) 3 (7.9) 2 (12.5) 0.480 2 (4.0) 
 Resperation for Inflection
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 2 (4 0)
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 0 4

 Pres Stage 1, n (%)
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 1 (2.63) 8 (16.33) 0.822 ASA, n (%) 0.353 1 (2.63) 18 (47.37) 1 (2.04) 0 10 (62.5) 6 (37.5) of Motion SD, Standard deviation 17 (34.69) 31 (63.27) 19 (50.0)

0.482 ed: ASA,

 
 Mean BMI (range)
 33 (22 - 45)
 33 (23 - 52)
 31 (15 - 42)

 PS. Posterior-Stabilized: CR. Cruciate Retaining: VVC, Varus-Valgus-Constrain
rican Society of Ane ologists: BMI Body mass index

Length of stay; ARF, Acute of Motion SD, Standard de

	PS (n = 28)	CR (n = 42)	VVC (n = 12)	P-value
Mean LOS (days) [range]	4.0 [1.1 - 15.0]	2.8 [0.8 - 7.5]	4.1 [1.1 - 11.4]	0.105
Mean Operative Time (min) [range]	130.7 [95.0, 203.0]	159.8 [99.0, 250.0]	169.4 [89.0, 228.0]	0.004
Discharge Disposition, n (%)				0.209
Home	23 (82.1)	37 (88.1)	10 (83.3)	
ARF	3 (10.7)	4 (9.5)	1 (8.3)	
SNF	2 (7.1)	1 (2.4)	1(8.3)	
Other	0	0	0	
Reoperation for Infection Post Stage 2, n (%)	4 (14.2)	4 (9.5)	5 (41.6)	0.025
Pre Stage 2 to Post Stage 2 ROM Arc Delta [SD]	9.13 [12.5]	10.33 [25.9]	20.0 [30.8]	0.441