Risk Factors for Perception of Leg Length Discrepancy following Total Hip Arthroplasty

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INTRODUCTION:

Leg length discrepancy (LLD) remains one of the most common causes of patient dissatisfaction and malpractice litigation following total hip arthroplasty (THA). Importantly, many patients perceive a discrepancy in leg length even in the absence of a clinically significant LLD on radiographs. This disconnect between objective and subjective assessment poses a challenge for surgeons in both preoperative counseling and postoperative satisfaction. This study aimed to identify patient and surgical characteristics associated with LLD perception after THA. It was hypothesized that patients with a higher body mass index (BMI) would be less likely to perceive a LLD after THA.

METHODS:

This retrospective study included patients undergoing primary THA between January and December 2021 at a high-volume joint replacement institute. Patients were sent Hip Disability and Osteoarthritis Outcome Scores, Joint Replacement surveys, which included four custom questions on perceived LLD before and after surgery. Patient demographic and surgical characteristics were obtained from our institutional database. Logistic regression was used to identify significant predictors of postoperative LLD perception.

RESULTS:

Surveys were sent to 1,038 patients and returned by 486 (47%). Among all respondents, 20% perceived a LLD preoperatively while 23% perceived a LLD postoperatively. Among patients who perceived a postoperative LLD (n=111), 57% had not perceived one preoperatively and 29% improved after recovery. Patients who perceived a preoperative LLD were more likely to perceive a postoperative LLD (odds ratio (OR): 5.39; 95% confidence interval (CI) 3.20-9.10; p<.01) and perceive improvement after surgery (OR: 7.17; 95% CI: 2.36-21.84; p<.01). Women were more likely to perceive a postoperative LLD (OR: 2.30; 95%: 1.34-3.84; p<.01). Patients with a body mass index (BMI) ≥ 30 were more likely to perceive improvement in LLD after THA (OR: 4.45; 95% CI: 1.53-12.93; p<.01) and after recovery (OR: 4.37; 95% CI: 1.48-12.94; p<.01). Surgical approach and age were not associated with perceived leg length discrepancy.

DISCUSSION AND CONCLUSION:

Perceived preoperative LLD and female sex were the strongest predictors of LLD perception after THA. Additionally, patients with a BMI ≥ 30 were more likely to report improvement in perceived LLD after surgery. These findings highlight the importance of identifying patient-specific risk factors that influence perception and underscore the value of targeted preoperative counseling to manage expectations. Improved understanding of LLD perception may help reduce dissatisfaction and mitigate the risk of litigation following THA. Future research should investigate the relationship between perceived and radiographic LLD and evaluated whether preoperative education strategies can reduce postoperative perception related dissatisfaction.

Table 1. Prior to your hip replacement surgery, did you notice a difference between the length of your legs?

	Total (n=486)	Yes (n=97)	No (n=389)	*P*
Age	70.60±9.12	70.27±10.24	70.68±8.83	.78
Biological sex				.37
Women	281(57.8)	60(61.9)	221(56.8)	
Men	205(42.2)	37(38.1)	168(43.2)	
Height (in.)	66.58±4.06	66.52±4.25	66.59±4.02	.89
Weight (lbs.)	189.12±47.15	186.97±49.01	189.66±46.73	.38
Mean BMI	29.94±6.80	29.67±7.40	30±29.67	.33
BMI				.22
<30	279(57.4)	61(67.9)	218(56.0)	
≥30	207(42.6)	36(37.1)	171(44.0)	
History of Scoliosis				.15
Yes	7(1.4)	3(3.1)	4(1.0)	
No	479(98.6)	94(96.9)	385(99.0)	
Preoperative HOOS, JR	53.98±13.59	52.82±14.40	54.27±13.38	.62
One-year postoperative HOOS, JR	88.21±13.21	89.93±13.59	87.79±13.10	.09
Surgical approach				.20
Direct anterior	244(50.2)	43(44.3)	201(51.7)	
Posterolateral	242(49.8)	54(55.7)	188(48.3)	

Note. Significance level set at p≤.05. Categorical variables displayed as frequency (%). Continuous variables displayed as mean±SD
Abbreviations: BMI = body mass index; HOOS, JR = Hip Dysfunction and Osteoarthritis Outcome Score, Joint Replacement

Table 2A. After your hip replacement surgery, have you noticed a difference between the length of your legs?

	Total (n=486)	Yes (n=111)	No (n=375)	*P*
Age	70.60±9.12	70.12±8.87	70.75±9.20	.62
Biological sex				**<.01**
Women	281(57.8)	82(73.9)	199(53.1)	
Men	205(42.2)	29(26.1)	176(46.9)	
Height (in.)	66.58±4.06	65.57±3.84	66.88±4.08	**<.01**
Weight (lbs.)	189.12±47.15	183.30±46.54	190.84±47.26	.12
Mean BMI	29.94±6.80	29.90±7.01	29.95±6.75	.85
BMI				.88
<30	279(57.4)	63(56.8)	216(57.6)	
≥30	207(42.6)	48(43.2)	159(42.4)	
History of Scoliosis				.20
Yes	7(1.4)	3(2.7)	4(1.1)	
No	479(98.6)	108(97.3)	371(98.9)	
Preoperative HOOS, JR	53.98±13.59	53.19±15.48	54.20±13.03	.91
One-year postoperative HOOS, JR	88.21±13.21	84.44±15.76	89.28±12.21	**.01**
Surgical approach				.07
Direct anterior	244(50.2)	64(57.7)	180(48)	
Posterolateral	242(49.8)	47(42.3)	195(52)	
Preoperative LLD				**<.01**
Yes	97(20.0)	48(43.2)	49(13.1)	
No	389(80.0)	63(56.8)	326(86.9)	

Note. Significance level set at p≤.05. Categorical variables displayed as frequency (%). Continuous variables displayed as mean±SD
Abbreviations: BMI = body mass index; HOOS, JR = Hip Dysfunction and Osteoarthritis Outcome Score, Joint Replacement

Table 2B. Significant predictors of LLD perception after THA

	B	SE	*P*	OR (95% CI)
Perceived a preoperative LLD	0.84	0.13	**<.01**	5.39 (3.20-9.10)
Biological sex (Woman)	0.41	0.13	**<.01**	2.30 (1.34-3.84)

Note. Significance level set at p≤.05
Abbreviations: B = Unstandardized Beta; SE = Standard Error; OR = Odds Ratio, CI = Confidence Interval

Table 3A. If yes to Q2, was this LLD better or same/worse after surgery

	Total (n=111)	Better (n=28)	Worse (n=45) Same (n=38)	*P*
Age	70.12±8.87	68.64±10.69	70.61±8.18	.57
Biological sex				.07
Women	82(73.9)	11(39.3)	65(78.3)	
Men	29(26.1)	17(60.7)	18(21.7)	
Height (in.)	65.57±3.84	66.55±4.43	65.23±3.59	.14
Weight (lbs.)	183.30±46.54	206.00±46.49	175.64±44.25	**<.01**
Mean BMI	29.90±7.01	32.97±8.21	28.87±6.29	.02
BMI				**.01**
<30	63(56.8)	10(35.7)	53(63.9)	
≥30	48(43.2)	18(64.3)	30(36.1)	
History of Scoliosis				.57
Yes	3(2.7)	0(0)	3(3.6)	
No	108(97.3)	28(100)	80(96.4)	
Preoperative HOOS, JR	53.19±15.48	52.09±15.81	53.57±15.45	.72
One-year postoperative HOOS, JR	84.44±15.76	89.02±16.27	83.01±15.42	**.05**
Surgical approach				.07
Direct anterior	64(57.7)	12(42.9)	52(62.7)	
Posterolateral	47(42.3)	16(57.1)	31(37.3)	
Preoperative LLD				**<.01**
Yes	48(43.2)	22(78.6)	26(31.3)	
No	63(56.8)	6(21.4)	57(68.7)	

Note. Significance level set at p≤.05. Categorical variables displayed as frequency (%). Continuous variables displayed as mean±SD
Abbreviations: BMI = body mass index; HOOS, JR = Hip Dysfunction and Osteoarthritis Outcome Score, Joint Replacement

Table 3B. Significant predictors of perceiving LLD improvement after THA

	B	SE	*P*	OR (95%CI)
Perceived a preoperative LLD	0.99	0.28	**<.01**	7.17 (2.36-21.84)
BMI ≥ 30	1.49	0.54	**<.01**	4.45 (1.53-12.93)

Note. Significance level set at p≤.05.
Abbreviations: B = Unstandardized Beta; SE = Standard Error; OR = Odds Ratio, CI = Confidence Interval

Table 4A. If yes to Q2, was this LLD better or same/worse after recovery

	Total (n=111)	Better (n=32)	Worse (n=12) Same (n=67)	*P*
Age	70.12±8.87	69.25±9.99	70.47±8.41	.89
Biological sex				.76
Women	82(73.9)	23(71.9)	59(74.7)	
Men	29(26.1)	9(28.1)	20(25.3)	
Height (in.)	65.57±3.84	65.79±3.98	65.47±3.81	.91
Weight (lbs.)	183.30±46.54	193.09±40.91	179.33±48.31	.09
Mean BMI	29.90±7.01	31.69±8.02	29.18±6.58	.11
BMI				**.03**
<30	63(56.8)	13(40.6)	50(63.3)	
≥30	48(43.2)	19(59.4)	29(36.7)	
History of Scoliosis				.86
Yes	3(2.7)	1(96.9)	2(2.5)	
No	108(97.3)	1(3.1)	77(97.5)	
Preoperative HOOS, JR	53.19±15.48	54.57±16.65	52.62±15.06	.43
One-year postoperative HOOS, JR	84.44±15.76	88.98±14.44	82.87±15.98	.08
Surgical approach				.30
Direct anterior	64(57.7)	16(50.0)	48(60.8)	
Posterolateral	47(42.3)	16(50.0)	31(39.2)	
Preoperative LLD				.08
Yes	48(43.2)	18(56.3)	30(38.0)	
No	63(56.8)	14(43.7)	49(62.0)	

Note. Significance level set at p≤.05. Categorical variables displayed as frequency (%). Continuous variables displayed as mean±SD
Abbreviations: BMI = body mass index; HOOS, JR = Hip Dysfunction and Osteoarthritis Outcome Score, Joint Replacement

Table 4B. Significant predictors of perceiving a LLD improvement after recovery from surgery

	B	SE	*P*	OR (95%CI)
Perceived a preoperative LLD	0.76	0.28	**<.01**	4.55 (1.50-13.84)
BMI ≥ 30	0.73	0.28	**<.01**	4.37 (1.48-12.94)

Note. Significance level set at p≤.05.
Abbreviations: B = Unstandardized Beta; SE = Standard Error; OR = Odds Ratio, CI = Confidence Interval