



Fig. E-1A

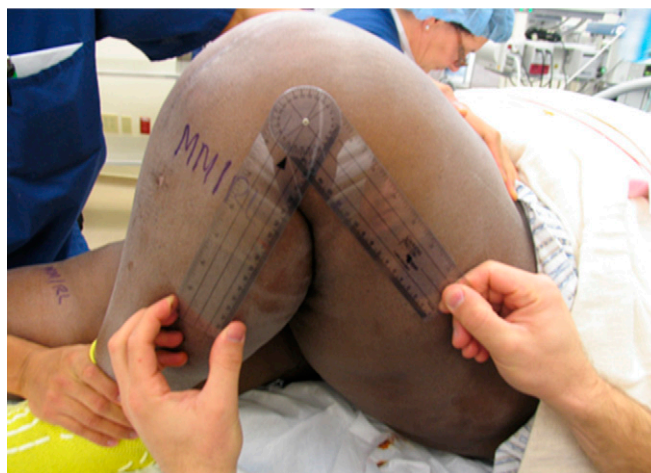


Fig. E-1B

Figs. E-1A and E-1B A patient who had developed bilateral knee stiffness. **Fig. E-1A** Evaluation of patient before manipulation under anesthesia. **Fig. E-1B** Range of motion and gain in flexion are evaluated after manipulation under anesthesia.



Fig. E-2

Our technique for performing manipulation under anesthesia. The surgeon is listening for destruction of scar tissue.

TABLE E-1 Characteristics of Patients Who Had Total Knee Arthroplasty, According to Time of Manipulation Under Anesthesia

	Timing of Manipulation Under Anesthesia		
	Early	Late	P Value
Mean age	57.5	54	0.08
Age* (% of patients)			
<45 yr	11	8.5	0.025
45-54 yr	25	53	
55-64 yr	37	25	
65-74 yr	23	8	
≥75 yr	3.5	5.5	
Sex* (% of patients)			
Male	27	30.5	0.67
Female	73	69.5	
Race* (% of patients)			
White	40.5	44.5	0.14
Black	30	41.5	
Other	29	14	
Body mass index* (% of patients)			
<25	12	14	0.83
25-29	23	22	
30-34	37	28	
35-39	16	22	
≥40	12	14	
Prosthesis* (% of patients)			
Cruciate-retaining	73	72	0.9
Posterior-stabilized	26.5	28	
Surgeon* (% of patients)			
A	42.5	55.5	0.4
B	39	30.5	
C	18.5	14	
Comorbidities* (% of patients)			
Diabetes	23	30.5	0.38
Hypertension	40	47	0.44
Cardiac disease	11	25	0.055
Smoker	16.5	36	0.019
Alcohol user	10	14	0.54
Gastrointestinal disease	23	30.5	0.38
High cholesterol	27	30	0.67
Hypothyroidism	7	16	0.11

*Percentages may not add exactly to 100 due to rounding.

TABLE E-2 Adjusted Multivariable Regression Analysis of Clinical Outcomes Between Early and Late Manipulation Under Anesthesia Stratified by Prosthesis and Surgeon*

Outcome According to Prosthesis and Surgeon†	Early MUA	Unadjusted Model of Late MUA (95% CI)	P Value	Adjusted Model of Late MUA‡ (95% CI)	P Value
Cruciate-retaining prosthesis					
Mean gain in range of motion (<i>deg</i>)	Referent	−20 (−23.36 to −14.49)	<0.0001	−21 (−25.2 to −14.94)	<0.0001
Mean gain in KS function score (<i>points</i>)	Referent	−4.2 (−8.65 to 0.14)	0.0576	−2.19 (−6.79 to 2.42)	0.34
Mean gain in KS objective score (<i>points</i>)	Referent	−3.7 (−7.35 to −0.10)	0.0437	−3.24 (−7.12 to 0.64)	0.10
Posterior-stabilized prosthesis					
Mean gain in range of motion (<i>deg</i>)	Referent	−22 (−33.44 to −17.89)	<0.0001	−23 (−44.89 to −5.42)	0.01
Mean gain in KS function score (<i>points</i>)	Referent	−5.1 (−9.86 to −0.41)	0.0341	0.16 (−10.19 to 10.52)	0.97
Mean gain in KS objective score (<i>points</i>)	Referent	−6.2 (−10.44 to −2.09)	0.0043	−5.28 (−13.62 to 3.05)	0.19
Surgeon A					
Mean gain in range of motion (<i>deg</i>)	Referent	−21 (−23.36 to −14.49)	<0.0001	−22 (−25.27 to −14.84)	<0.0001
Mean gain in KS function score (<i>points</i>)	Referent	−4.2 (−8.65 to 0.14)	0.0576	−2.2 (−6.79 to 2.42)	0.35
Mean gain in KS objective score (<i>points</i>)	Referent	−3.7 (−7.35 to −0.11)	0.0437	−3.2 (−7.12 to 0.64)	0.10
Surgeon B					
Mean gain in range of motion (<i>deg</i>)	Referent	−22 (−33.44 to −17.89)	<0.0001	−23 (−44.89 to −5.43)	0.015
Mean gain in KS function score (<i>points</i>)	Referent	−5.1 (−9.86 to −0.41)	0.0341	−1.8 (−10.19 to 10.52)	0.97
Mean gain in KS objective score (<i>points</i>)	Referent	−6.2 (−10.44 to −2.09)	0.0043	−5.2 (−13.62 to 3.05)	0.19
Surgeon C					
Mean gain in range of motion (<i>deg</i>)	Referent	−19 (−21.23 to −10.20)	<0.0001	−20.5 (−24.55, −9.03)	<0.0001
Mean gain in KS function score (<i>points</i>)	Referent	−5.9 (−11.05 to −0.94)	0.0208	−4.8 (−11.18, 1.56)	0.13
Mean gain in KS objective score (<i>points</i>)	Referent	−5.4 (−9.79 to −1.03)	0.0163	−3.7 (−9.70, 2.23)	0.21
*MUA = manipulation under anesthesia. †KS = Knee Society. ‡Models adjusted for age, sex, race, body mass index, diabetes, hypertension, cardiac disease, smoking, alcohol, gastrointestinal disease, high cholesterol, and hypothyroidism.					