

Open-Label Randomized Clinical Trial to Assess the Effects of Preoperative Acupuncture in Moderate-High Anxiety Patients Undergoing Total Knee or Hip Arthroplasty

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INTRODUCTION

- Acupuncture is commonly used to reduce pain and anxiety, prompting practitioners to explore its use in the perioperative setting.
- The effects of postoperative acupuncture on pain and anxiety are well studied, however the value of preoperative acupuncture has yet to be determined.
- This study investigated the effects of preoperative acupuncture on preoperative anxiety and postoperative pain in high anxiety patients undergoing total hip or knee arthroplasty.

Modified Amsterdam Preoperative Anxiety and Information Scale (APAIS).

Directions: For each of the questions below, please put a mark in ONE box corresponding with your answer.

1: Not at all; 2: Somewhat; 3: Moderate; 4: Moderately high; 5: extremely

Questions	1	2	3	4	5
1. I am worried about the anesthetic.					
2. The anesthetic is on my mind continually.					
3. I am worried about the procedure.					
4. The procedure is on my mind continually.					

Figure 1. Modified Amsterdam Preoperative Anxiety and Information Scale (APAIS-A-T), survey administered during preoperative evaluation.

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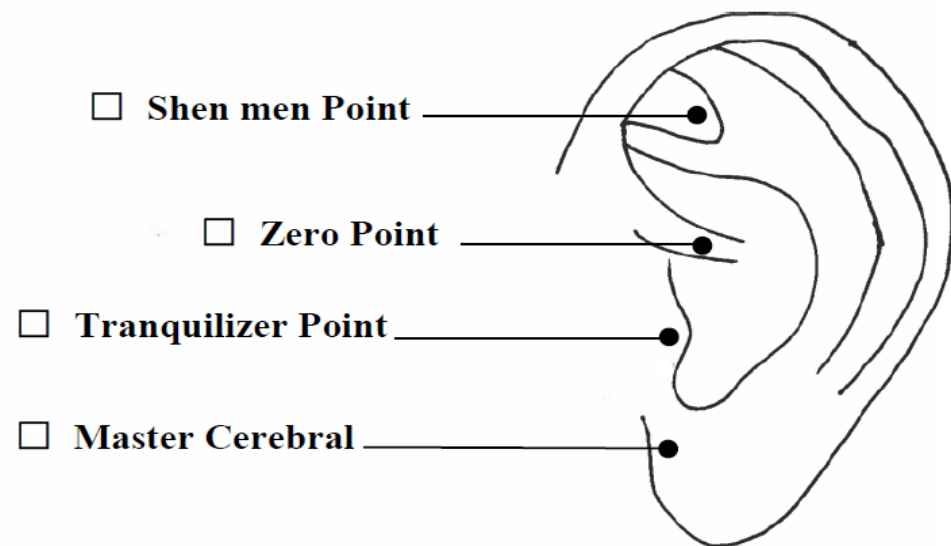
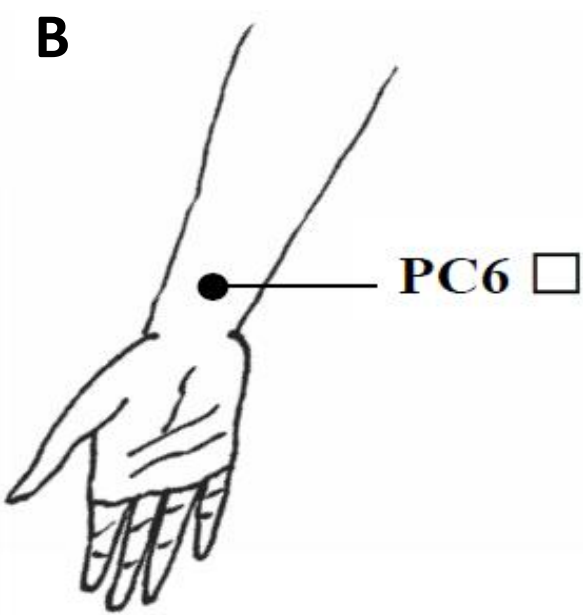


Figure 2.

A) Auricular acupuncture at the Shen men, Zero, Tranquilizer, and Master Cerebral points;
B) Body acupuncture at the PC6 point.



METHODS

- Single-site, open label trial including 60 adults with high-anxiety who underwent elective scheduled Total Hip Arthroplasty (THA) or Total Knee Arthroplasty (TKA).
- Patients were identified as moderate-high anxiety based on an Amsterdam Preoperative Anxiety and Information Scale (APAIS) score >10 (of 20, **Figure 1**).
- 1:1 randomization to receive either preoperative acupuncture (**Figure 2**) or standard of care (no acupuncture treatment) on day of surgery.
- Primary outcome:** self-reported preoperative anxiety before and after acupuncture and self-reported pain in the first 3 postoperative hours.
- Secondary outcomes:** total opioid consumption (0-24hrs), anti-emetics and anxiolytics use, incidence of postoperative nausea and vomiting, patient satisfaction, and length of stay.
- This study was approved by the Hartford Healthcare IRB and informed consent was acquired prior to registration and enrollment of all patients.

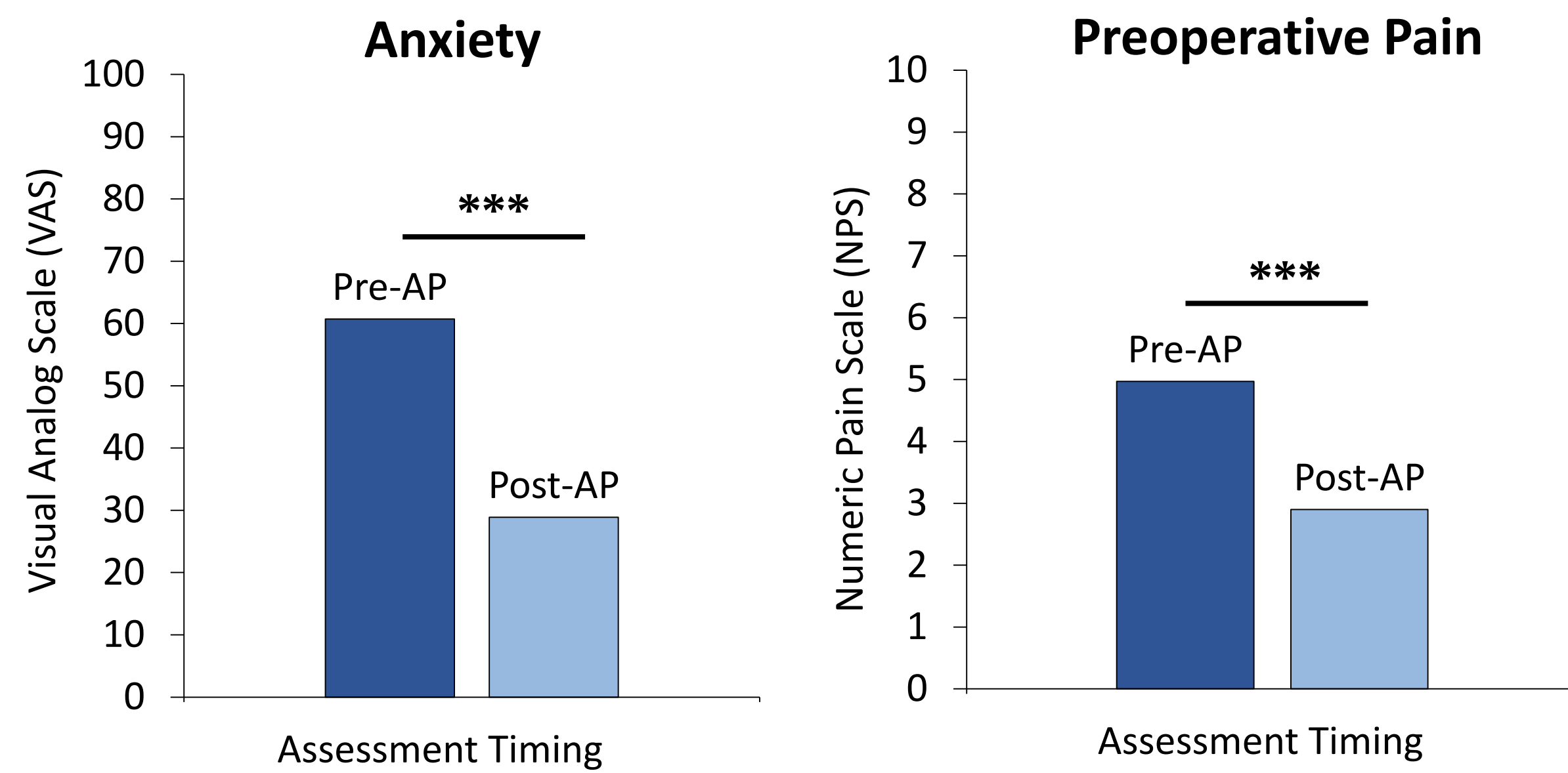


Figure 3. Anxiety and pain pre- and post- mixed auricular and body acupuncture; p<0.001***

Table 1. Patient Demographics and Characteristics				
Variable	Acupuncture (n=30)	Control (n=30)	X ² , 95% CI, or U	p-value
Age (years), mean ± SD	70 ± 10	68 ± 8	2.6, 6.5	0.39
Sex, n (%)			0.88	0.35
Female	22 (73.3)	25 (83.3)		
Male	8 (26.7)	5 (16.7)		
Ethnicity, n (%)			--	0.35
Hispanic or Latino	4 (13.3)	1 (3.3)		
Non-Hispanic or Latino	26 (86.7)	29 (96.7)		
Race, n (%)			4.75	0.09
Caucasian / White	26 (86.7)	24 (80.0)		
African American / Black	0 (0.0)	4 (13.3)		
Other	4 (13.3)	2 (6.7)		
BMI (kg/m ²), mean ± SD	32.2 ± 5.3	30.4 ± 5.5	1.1, 4.5	0.22
CCI	1.0, 2.0	0.0, 2.0	U=332.0	0.06
History of Mental Illness, n (%)				
Anxiety	13 (43.3)	10 (33.3)	0.64	0.43
Bipolar disorder	0 (0.0)	1 (3.3)	--	1.00
Depression	8 (26.7)	6 (20.0)	0.37	0.54
History of acupuncture, n (%)			1.93	0.17
Yes	12 (40.0)	7 (23.3)		
No	18 (60.0)	23 (76.7)		
Pre-op APAIS Score (0-20) mean ± SD	13.3 ± 2.4	13.9 ± 2.6	-1.9, 0.7	0.33
Pre-op VAS score (0-100) mean ± SD	60.7 ± 21.3	59.7 ± 30.1	-12.5, 14.6	0.87
Surgery type, n (%)			0.07	0.80
THA	15 (50.0)	16 (53.3)		
TKA	15 (50.0)	14 (46.7)		

Abbreviations: SD = Standard Deviation, BMI = Body Mass Index, CCI = Charlson Comorbidity Index, APAIS = Amsterdam Preoperative Anxiety & Information Scale VAS = Visual Analog Scale, THA = Total Hip Arthroplasty, TKA = Total Knee Arthroplasty

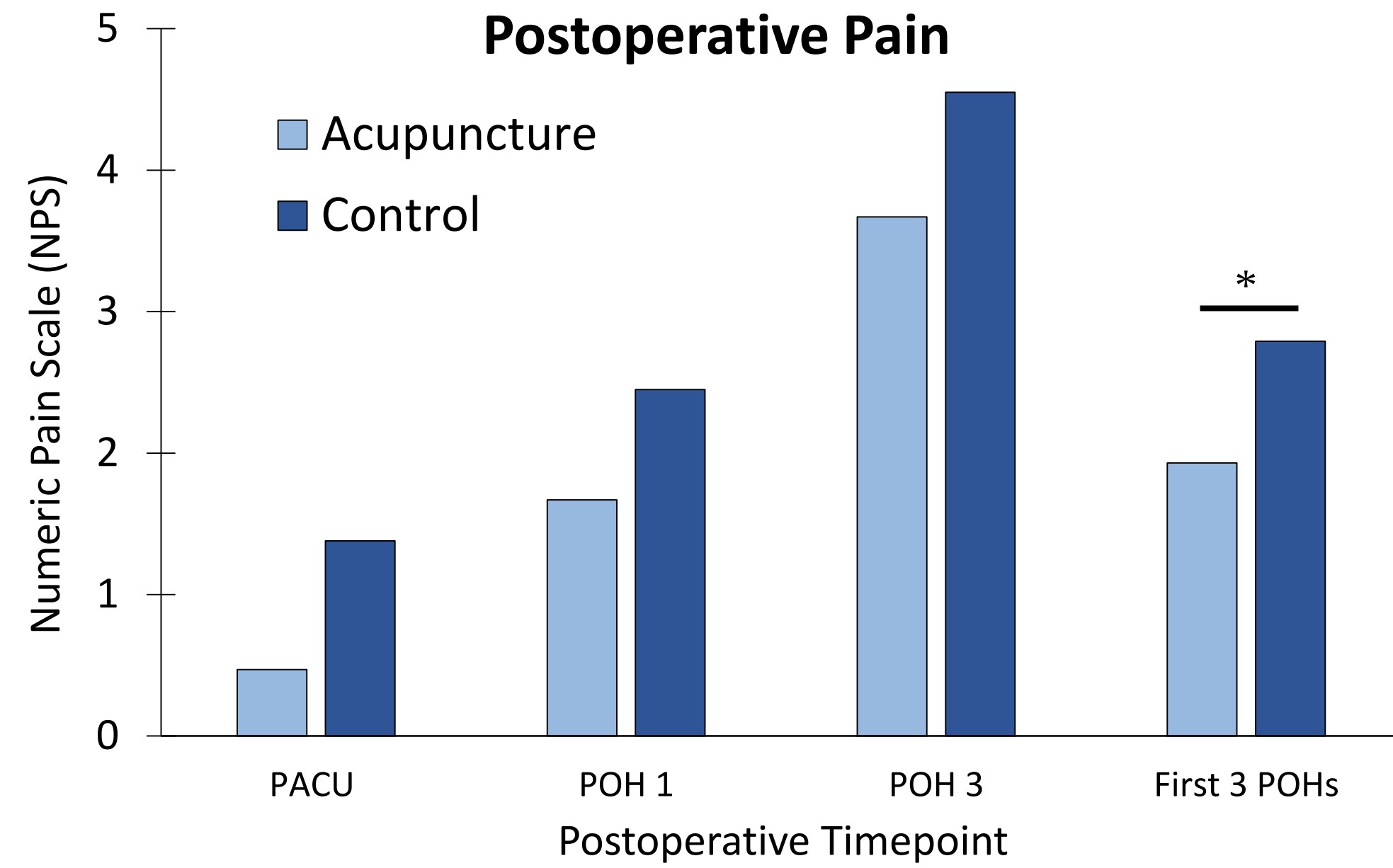


Figure 4. Postoperative pain in acupuncture vs. control group in the post anesthesia care unit (PACU), at postoperative hour 1 (POH), postoperative hour 3 (POH3), and in the first 3 postoperative hours; p<0.05*

Table 2. Secondary Outcomes				
Variable	Acupuncture (n=30)	Control (n=30)	X ² , 95% CI, or U	p-value
PONV, POH1, n (%)			--	0.11
Yes	0 (0.0)	4 (13.3)		
No	30 (100.0)	26 (86.7)		
PONV, POH3, n (%)			0.00	1.00
Yes	5 (16.7)	5 (16.7)		
No	25 (83.3)	25 (83.3)		
Antiemetic use median, IQR	0.0, 1.0	0.0, 1.0	398.0	0.37
Midazolam dose (mg)	4.0 ± 1.7	4.2 ± 1.8	-1.2, 0.7	0.61
Midazolam dose >2mg	19 (63.3)	22 (73.3)	0.69	0.41
Length of stay (hours) median, IQR	29.5, 3.5	29.0, 3.0	390.5	0.38
30-Day Complication, n (%)			--	0.17
Yes	3 (10.0)	7 (23.3)		
No	27 (90.0)	23 (76.7)		
Postop. Opioid Total MME, 0-24 hours mean ± SD	45.5 ± 30.0	52.5 ± 30.9	-22.7, 8.8	0.38
Patient Satisfied? (9/10 of 10), n (%)				
Overall	21 (70.0)	24 (80.0)	0.80	0.37
Pain	19 (63.3)	20 (66.7)	0.07	0.79
Anxiety	21 (70.0)	19 (63.3)	0.30	0.58

Abbreviations: PONV = Postoperative Nausea & Vomiting, POH = Postoperative Hour, IQR = Interquartile Range, MME = Morphine Milli-Equivalence, SD = Standard Deviation

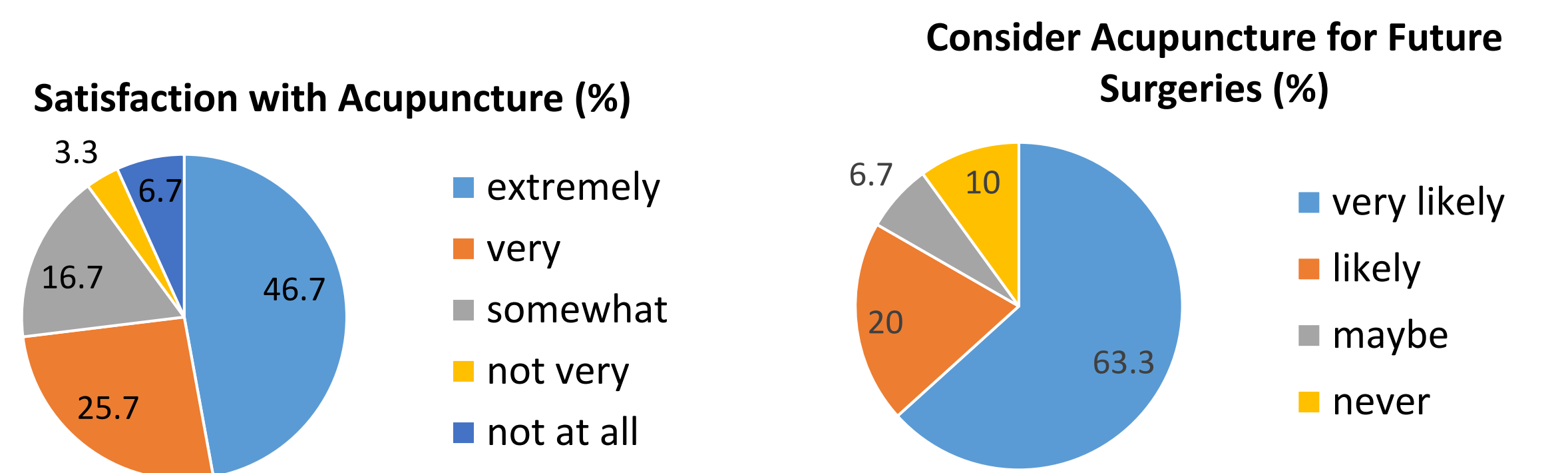


Figure 5. Patient satisfaction with preoperative acupuncture

RESULTS SUMMARY

- Preoperative anxiety and pain scores were significantly lower following acupuncture treatment (28.90±21.54 vs 60.73±21.28, p<0.001 and 2.90±6.62 vs 4.97±3.01, 95% CI=1.44-2.69, p <0.001, **Figure 3**).
- Acupuncture patients reported significantly lower pain scores than control patients in the first 3 postoperative hours (1.93±1.63 vs 2.79±2.83, CI = 0.13-2.21, p=0.029, **Figure 4**).
- No significant differences in postoperative complications or patient satisfaction were observed (**Table 2**).
- Most patients were satisfied with the acupuncture treatment and reported a likelihood of considering perioperative acupuncture for future surgeries (**Figure 5**).

CONCLUSIONS

- Preoperative acupuncture was associated with increased relaxation and comfort prior to surgery in a moderate to high anxiety patient cohort who underwent elective, scheduled THA or TKA.
- Preoperative acupuncture is efficacious at reducing preoperative anxiety and pain prior to and immediately following surgery.
- These findings support further exploration of the efficacy of preoperative acupuncture in the perioperative setting.

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