

PERIOPERATIVE ACUPUNCTURE IN PEDIATRIC ANESTHESIA



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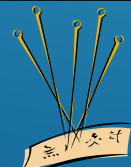
Department of Anesthesiology

University of Connecticut

&

Department of Nurse Anesthetist

Quinnipiac University



DISCLOSURE



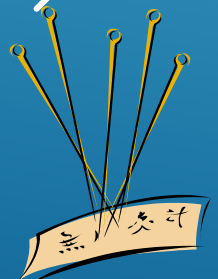
▶ NONE





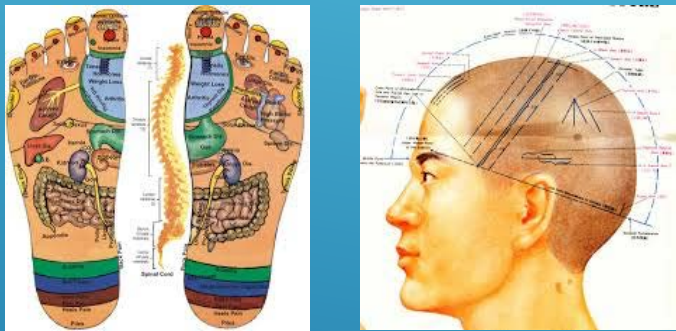
- ▶ Based on Traditional Chinese Medicine that one can apply various physical stimulations to specific points on the body surface to *promote physiological balance and healing of body.*

ACUPUNCTURE

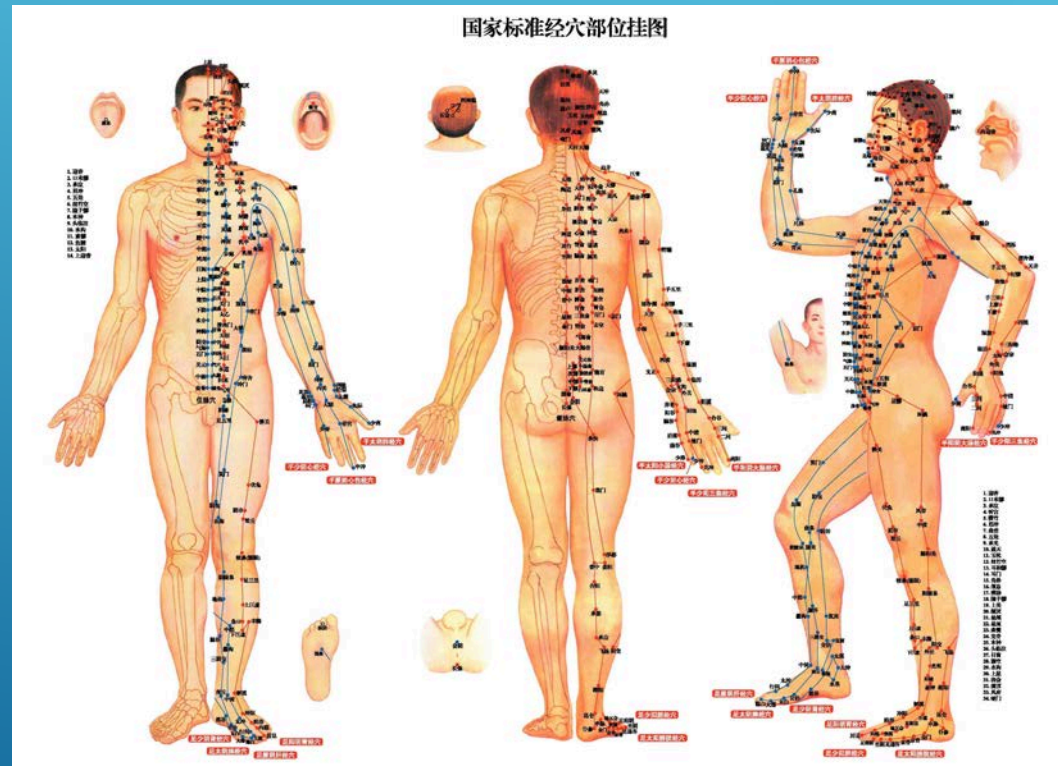




▶ **Microsystem**



▶ **Macro/Classic Body system**



SYSTEMS OF PRACTICE

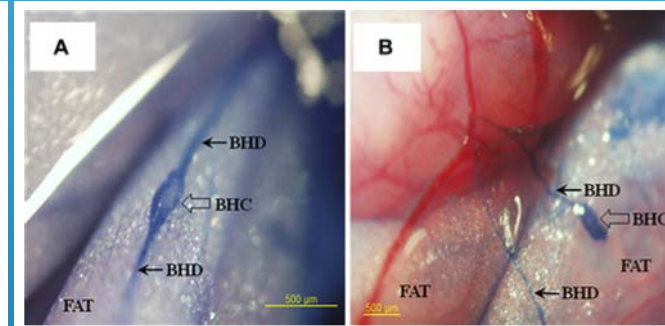
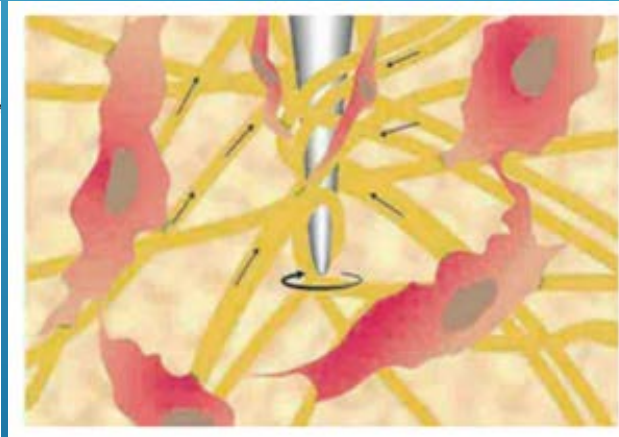
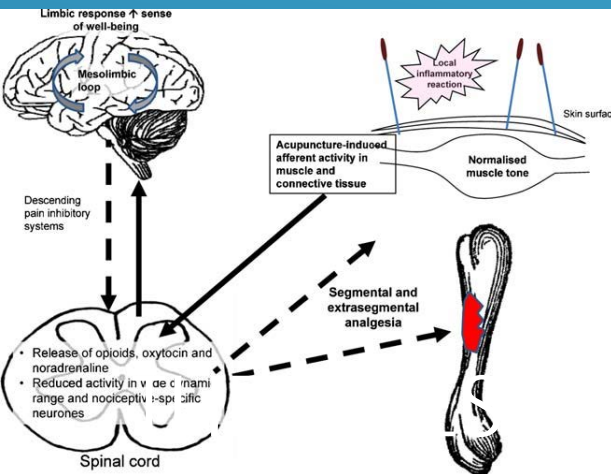


▶ Past

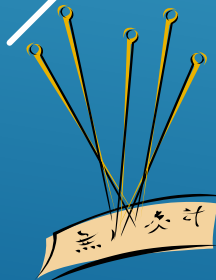
- ▶ Yin-Yang
- ▶ 5 elements
- ▶ Energy Channel
- ▶ Internal/external
- ▶ Qi

▶ Present

- ▶ Neurophysiologic Theory
- ▶ Connective Tissue Principle
- ▶ Primo Vascular System

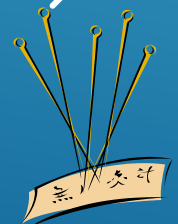


Theory



- ▶ **Pressure**
- ▶ **Needles**
- ▶ **Cupping**
- ▶ **Moxibustion**
- ▶ **Laser**
- ▶ **Injection**
- ▶ **Electrical stimulation**
- ▶ **Radiofrequency**
- ▶ **Ultrasound wave**

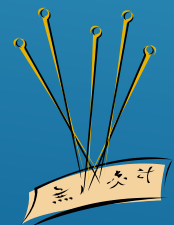
TECHNIQUES OF PRACTICE





Acupuncture showed efficacy in adult **postoperative** and chemotherapy related nausea and vomiting as well as in adult **postoperative** dental pain

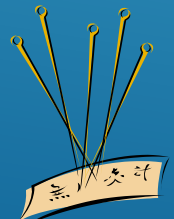
NATIONAL INSTITUTES OF HEALTH CONSENSUS
1997, NOV. 3-5; 15(5): 1-34

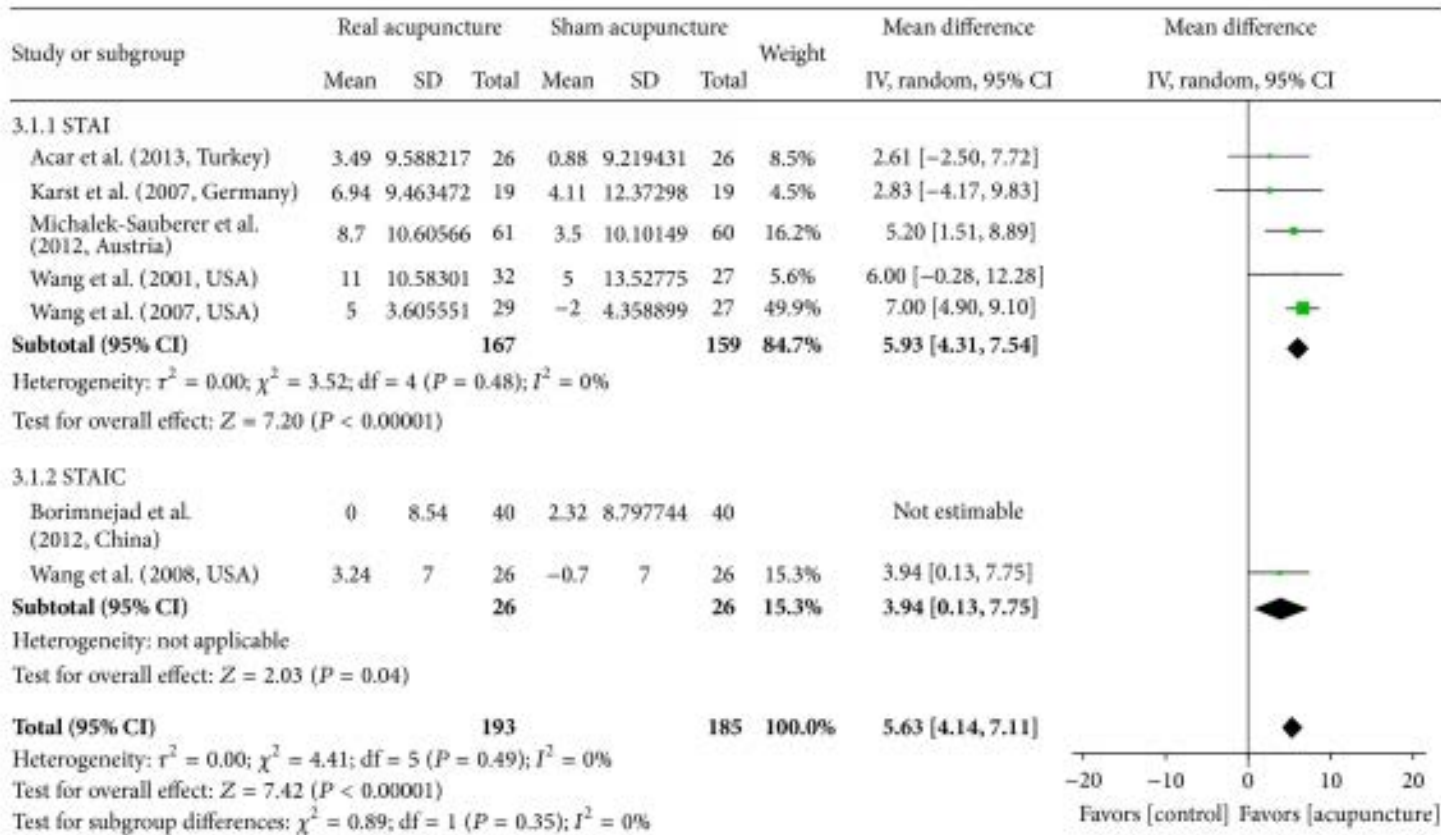




- ▶ **Preoperative Anxiety**
- ▶ **Perioperative Organ Protection**
- ▶ **Postoperative Nausea and Vomiting**
- ▶ **Postoperative Emergence Delirium**
- ▶ **Postoperative Pain**
- ▶ **Postoperative Ileus**

**CLINICAL ACUPUNCTURE FOR
PERIOPERATIVE PERIOD**



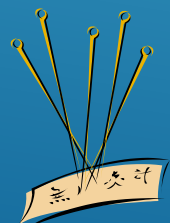


META-ANALYSIS OF PREOPERATIVE ANXIETY

EVIDENCE-BASED COMPLEMENTARY AND ALTERNATIVE MEDICINE

VOLUME 2014 (2014), ARTICLE ID 850367, 12 PAGES

[HTTP://DX.DOI.ORG/10.1155/2014/850367](http://dx.doi.org/10.1155/2014/850367)





56 citations between 1972-March 2015

Acupuncture significantly

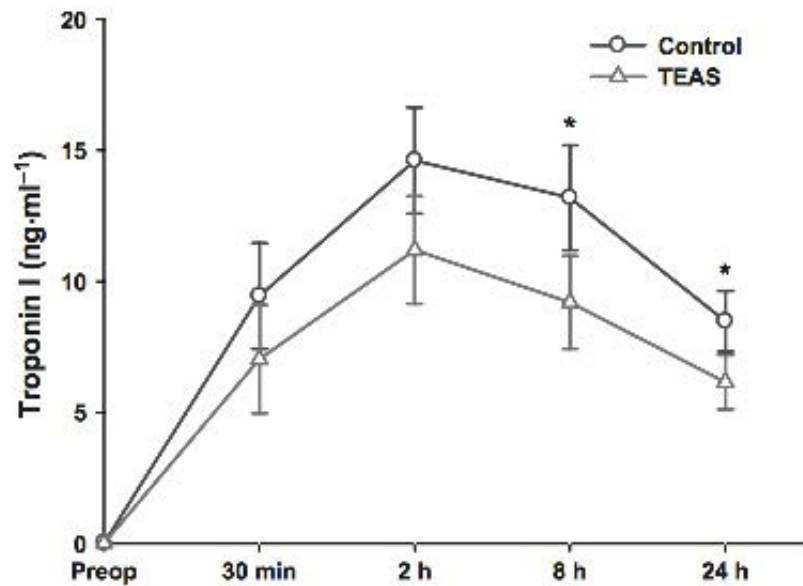
- ▶ **Reduced the amount of volatile anesthesia during surgery ($P < 0.001$)**
- ▶ **Shortened time to extubation ($P = 0.001$)**
- ▶ **Improved postoperative patient recovery ($p = 0.003$)**
- ▶ **Reduced blood level of brain tissue injury marker S100 β 48 hours after operation ($P = 0.001$)**
- ▶ **Decreased Incidence of PONV ($P = 0.017$)**

No patient studied suffered from awareness

EFFECTS OF ACUPUNCTURE IN ANESTHESIA FOR CRANIOTOMY: A META-ANALYSIS

J NEUROSURG ANESTHESIOLOG 2017 JUL;29(3):219-227





Postvariables	Control group (n = 36)	TEAS group (n = 34)	P-value
Ventilation (h)	10 (8.5–20)	6 (5.5–10)	0.004
Urine output (ml·kg·h ⁻¹)	3.4 (2.3–5.5)	3.6 (2.5–5)	0.915
ICU stay (h)	46 (24–50)	41 (23–47)	0.032
Hospital stay (days)	8 (7–9)	8 (7–9)	0.673

Data are median with interquartile range. ICU, intensive care unit; TEAS, transcutaneous electrical acupoint stimulation.

PERIOPERATIVE CARDIAC PROTECTION

PEDIATRIC ANESTHESIA 2012;22(8): 805–811





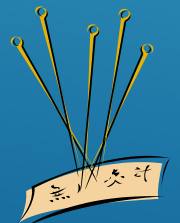
40 trials involving 4858 participants

Compared with sham treatment P6 acupoint stimulation significantly

- **Reduces nausea (RR 0.71, 95% CI 0.61 to 0.83)**
- **Reduces vomiting (RR 0.70, 95% CI 0.59 to 0.83)**
- **Reduces the need for rescue anti-emetics (RR 0.69, 95% CI 0.57 to 0.83).**

POSTOPERATIVE NAUSEA AND VOMITING PEDIATRIC DATA

COCHRANE DATABASE SYST REV
PMC 2011 JUNE 13.



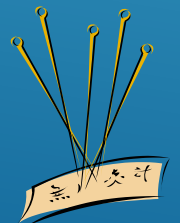


Compare to Antiemetic Drugs

- No difference in the risk of nausea (RR 0.82, 95% CI 0.60 to 1.13)
- No difference in the risk of vomiting (RR 1.01, 95% CI 0.77 to 1.31)
- No difference in the need for rescue antiemetics (RR 0.82, 95%CI 0.59 to 1.13).

POSTOPERATIVE NAUSEA AND VOMITING PEDIATRIC DATA

COCHRANE DATABASE SYST REV
PMC 2011 JUNE 13.





The Antiemetic Effect of P6 acupoint

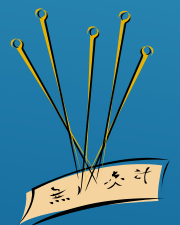
- Similar for adults and children
- Similar between the invasive and noninvasive stimulations

The side effects associated with P6 acupoint stimulation were minor

There was no evidence of publication bias from contour-enhanced funnel plots

POSTOPERATIVE NAUSEA AND VOMITING PEDIATRIC DATA

COCHRANE DATABASE SYST REV
PMC 2011 JUNE 13.

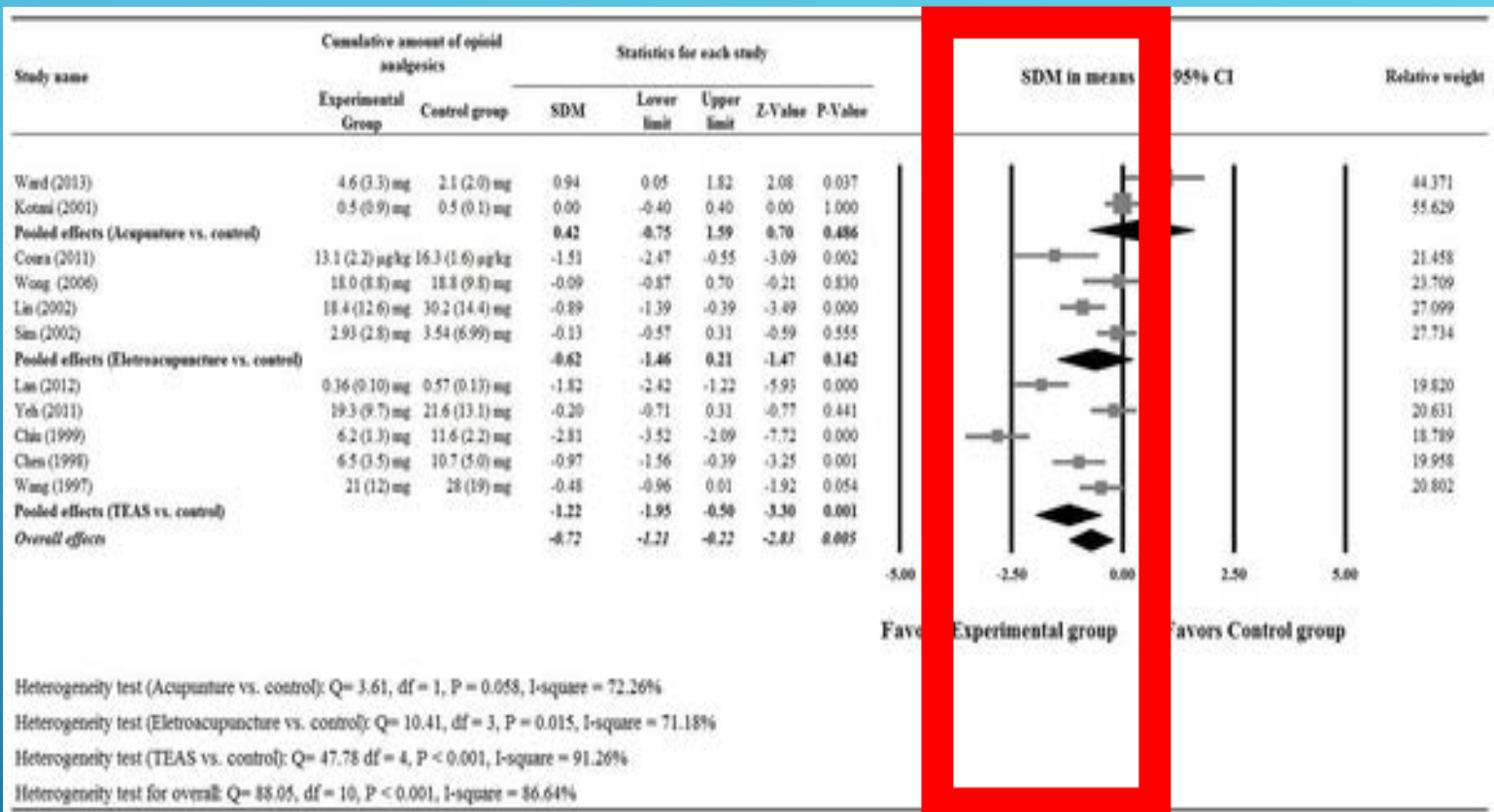




- ▶ **MEDICAL ACUPUNCTURE 2008;20(3): 151-154.**
 - ▶ Needling at SP6, HT7, LR3, and pressure @ auricular Shenmen point
- ▶ **PEDIATRIC ANESTHESIA 2009;19(11):1096-101**
 - ▶ Needling after general anesthesia LI4, and HT 7
- ▶ **PEDIATRIC ANESTHESIA 2012;22(110):1105-1109**
 - ▶ Capsicum plaster on bilateral HT-7 applied preoperatively
- ▶ **EUR J ANAESTHESIOLOGICAL 2016; 33:535-542**
 - ▶ Electrical stimulation of HT-7

POSTOPERATIVE EMERGENCE DELIRIUM



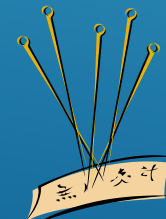


Heterogeneity test (Acupuncture vs. control): $Q = 3.61, df = 1, P = 0.058, I^2 = 72.26\%$
 Heterogeneity test (Electroacupuncture vs. control): $Q = 10.41, df = 3, P = 0.015, I^2 = 71.18\%$
 Heterogeneity test (TEAS vs. control): $Q = 47.78, df = 4, P < 0.001, I^2 = 91.26\%$
 Heterogeneity test for overall: $Q = 88.05, df = 10, P < 0.001, I^2 = 86.64\%$

POSTOPERATIVE PAIN

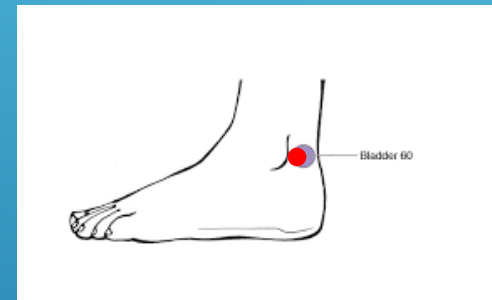
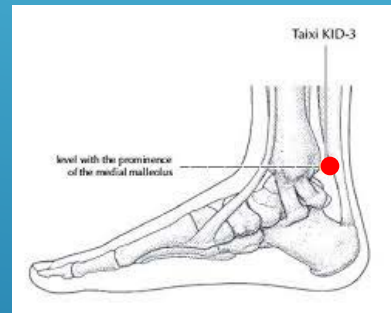
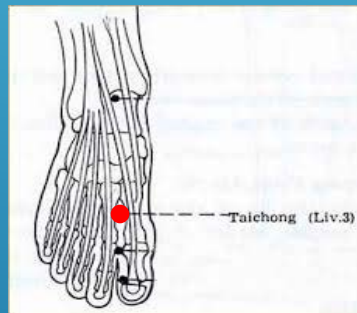
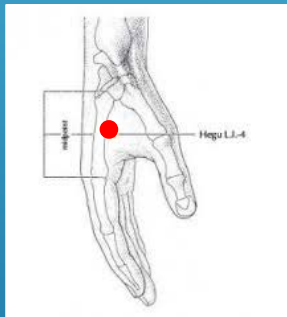
PLOS ONE PUBLISHED: MARCH 9, 2016

[HTTPS://DOI.ORG/10.1371/JOURNAL.PONE.0150367](https://doi.org/10.1371/journal.pone.0150367)





20 patients (7-18 year old) received acupuncture postoperatively
 Children's Hospital and Research Center Oakland
 Acupuncture points used bilateral LI4, and Lv 3; unilateral at Kidney 3 and
 UB 60



Morphine use (mg/kg/hr) before and after acupuncture the first session in group 1^a

	2 Hours Before Treatment (Baseline)	0-4 Hours After Treatment	4-8 Hours After Treatment	8-12 Hours After Treatment	12-24 Hours After Treatment
Mean	0.04 ± 0.02	0.03 ± 0.02	0.02 ± 0.02	0.03 ± 0.02	0.03 ± 0.01
Difference from baseline		-0.01 ± 0.01	-0.01 ± 0.02	-0.01 ± 0.01	-0.00 ± 0.01

^aData presented as mean ± SD.

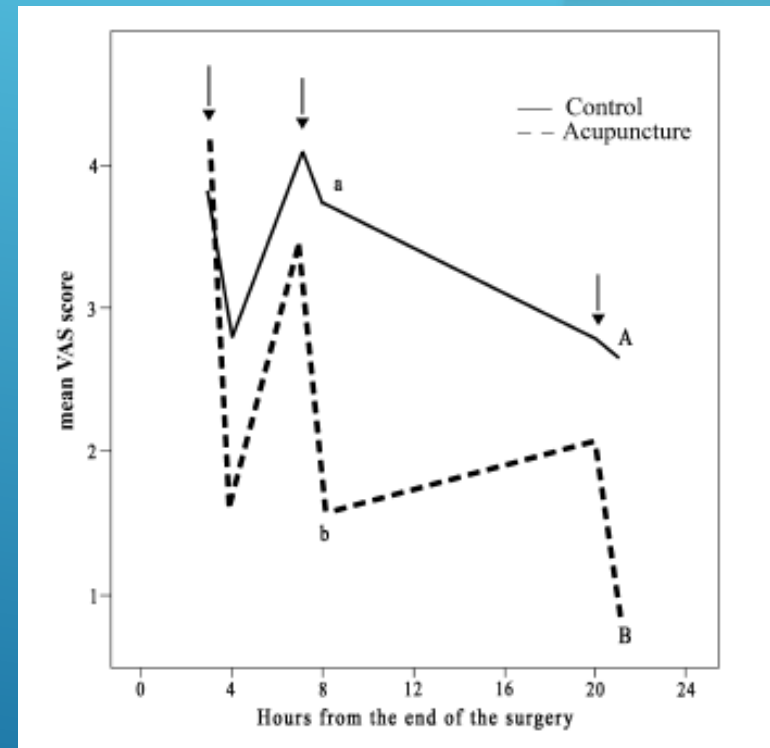
PEDIATRIC POSTOPERATIVE PAIN





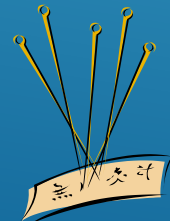
Acupuncture for Post-tonsillectomy Pain

	Acupuncture group (n = 30)		Control group (n = 30)	
	M	sd	M	sd
Age (years)	5.1	2.2	6.1	2.6
	N	%	N	%
Male	17	57	17	57
Procedure performed				
Tonsillectomy	7	23	8	26
Adeno-tonsillectomy	23	77	22	73
Postoperative complications				
Vomiting	6	20	5	17
Bleeding	1	3	2	7
Indication for surgery				
Chronic tonsillitis	17	57	22	73
Hypertrophy	23	77	22	73



PEDIATRIC POSTOPERATIVE PAIN

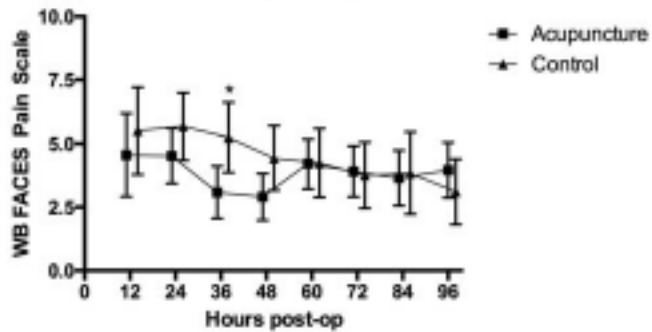
PEDIATRIC ANESTHESIA 25(2015)603-609



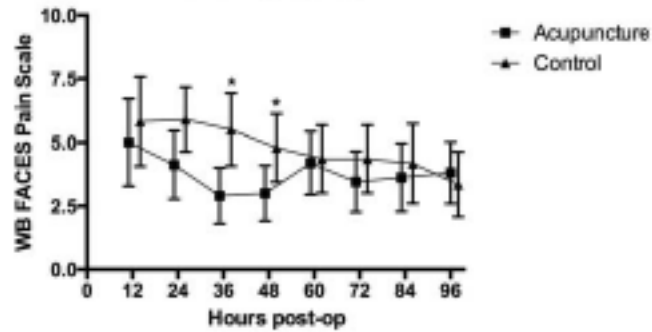
Acupuncture for Post-tonsillectomy Pain



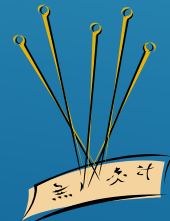
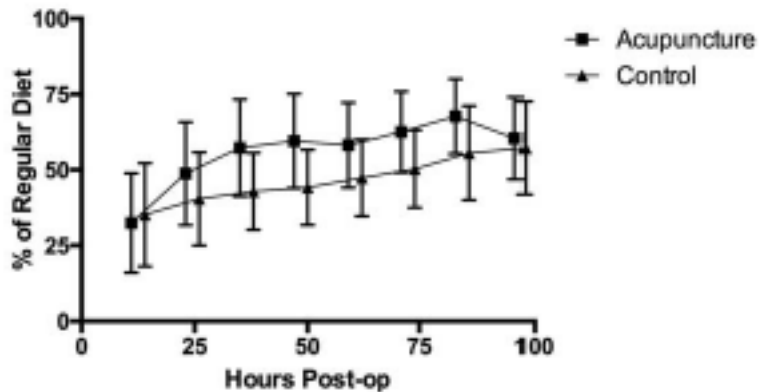
A Parent Pain Rating
Mean (95% CI)



B Patient Pain Rating
Mean (95% CI)



PO Intake

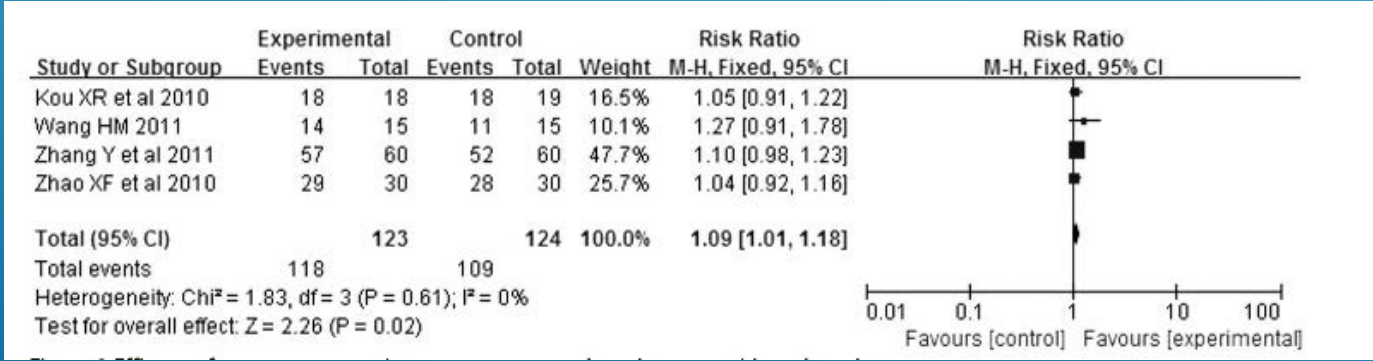


PEDIATRIC POSTOPERATIVE PAIN

THE LARYNGOSCOPE 125(2015)1972-1978

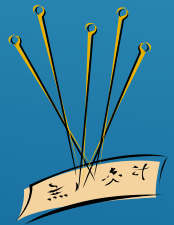


- 8 RCTs were included (a total of 123 patients in the intervention groups and 124 patients in the control groups) met the criteria for meta -analysis
- The Meta-analysis results indicated that acupuncture combined with usual care showed a significantly higher total effective rate than the control condition (usual care) (RR 1.09, 95% CI 1.01, 1.18; P = 0.02).
- Zusanli (ST 36) and Shangjuxu (ST 37) were the most common acu- points selected



POSTOPERATIVE ILEUS

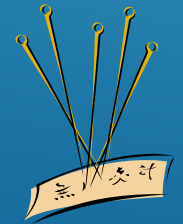
J TRADIT CHIN MED 2016 JUNE 15; 36(3): 271-282





- ❖ **Minimizing sedative and narcotic analgesic usage**
- ❖ **Reduce postoperative complications associated with anesthesia and surgery**
 - **Emergence delirium/cognitive dysfunction**
 - **PONV**
 - **POI**
 - **Others**

ENHANCED RECOVERY AFTER SURGERY





- ▶ Perioperative acupuncture reduces the consumption of anesthetics and analgesics along with anesthesia related complications, protection of organs in the perioperative period
- ▶ The beneficial effect of Perioperative acupuncture is a promising with respect to enhanced recovery after surgery

PERIOPERATIVE ACUPUNCTURE IN PEDIATRIC ANESTHESIA PRACTICE

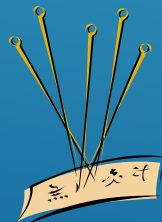




“I have proved that acupuncture is highly effective as a postoperative antiemetic. Why are you not using it? “

-John Dondee, MD-

PERIOPERATIVE ACUPUNCTURE





Pediatric Adverse Events Estimates

Total pediatric adverse events	29
Total treatments	1865
Adverse event incident rate	1.55/100 treatments
Acupuncture related adverse events	0
Total pediatric serious adverse events reviewed	1
Total serious adverse event incident rate	5.36/10,000 treatments*

**ESTIMATES CALCULATED FROM REVIEWED PEDIATRIC
ADVERSE EVENT DATA**

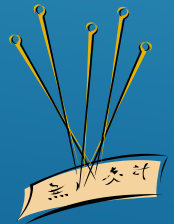


Special efforts should focus on optimizing the clinical application of perioperative acupuncture.



- ▶ **The choice/selection of acupuncture points, mode, duration and frequency of treatment**
- ▶ **The intervention may not be easily conducted (time consuming)**
- ▶ **Required time, equipment/instruments and availability of specialized skills**
- ▶ **The onset and duration to achieve effectiveness may be longer than medications**
- ▶ **The intervention may not be rewarded as other techniques e.g. regional block by 3rd party payer.**

BARRIERS PREVENT PERIOPERATIVE ACUPUNCTURE IN PEDIATRIC ANESTHESIA PRACTICE





ACUPUNCTURE IN ENHANCED RECOVERY AFTER SURGERY

