PERIOPERATIVE ACUPUNCTURE IN PEDIATRIC ANESTHESIA

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DISCLOSURE

► NONE





ノシングシオ

 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.

主状人う

ACUPUNCTURE



Microsystem

Macro/Classic Body system





SYSTEMS OF PRACTICE



Past

⊳ Qi

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

Present

- Neurophysiologic
 Theory
- Connective Tissue Principle

主人人は

Primo Vascular System





- 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 lleus

CLINICAL ACUPUNCTURE FOR PERIOPERATIVE PERIOD



Study or ouberous	Real acupuncture		Shan	n acupunc	ture	144-2-det	Mean difference		Mean	n differe	nce		
study of subgroup	Mean	SD	Total	Mean	SD	Total	weight	IV, random, 95% Cl		IV, ran	dom, 95	5% CI	
3.1.1 STAI													
Acar et al. (2013, Turkey)	3.49	9.588217	26	0.88	9.219431	26	8.5%	2.61 [-2.50, 7.72]				_	
Karst et al. (2007, Germany)	6.94	9.463472	19	4.11	12.37298	19	4.5%	2.83 [-4.17, 9.83]					
Michalek-Sauberer et al. (2012, Austria)	8.7	10.60566	61	3.5	10.10149	60	16.2%	5.20 [1.51, 8.89]			-	-	
Wang et al. (2001, USA)	11	10.58301	32	5	13.52775	27	5.6%	6.00 [-0.28, 12.28]			-		
Wang et al. (2007, USA)	5	3.605551	29	-2	4.358899	27	49.9%	7.00 [4.90, 9.10]				-	
Subtotal (95% CI)			167			159	84.7%	5.93 [4.31, 7.54]				•	
Heterogeneity: $\tau^2 = 0.00$; $\chi^2 =$	3.52; df	= 4 (P =	0.48);	$I^2 = 0$	96								
Test for overall effect: $Z = 7.20$	(P < 0.)	00001)											
3.1.2 STAIC													
Borimnejad et al. (2012, China)	0	8.54	40	2.32	8.797744	40		Not estimable					
Wang et al. (2008, USA)	3.24	7	26	-0.7	7	26	15.3%	3.94 [0.13, 7.75]			-	_	
Subtotal (95% CI)			26			26	15.3%	3.94 [0.13, 7.75]					
Heterogeneity: not applicable													
Test for overall effect: $Z = 2.03$	(P = 0.	04)											
Total (95% CI)			193			185	100.0%	5.63 [4.14, 7.11]			3	•	
Heterogeneity: $r^2 = 0.00$; $\chi^2 =$ Test for overall effect: $Z = 7.42$ Test for subgroup differences: γ	4.41; df $(P < 0.)^2 = 0.8$	f = 5 (P = 00001) 9: $df = 1 (P = 00001)$	0.49) (P = 0	$(I^2 = 0)$ (35): I^2	% = 0%				-20 Favo	-10 ors [contro	0 ol] Favo	10 rs [acup	20 unctur

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



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 S100β 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 NEURIOSURG ANESTHESIOL 2017JUL;29(3):219-227









Postvariables	Control group (n = 36)	TEAS group (n = 34)	<i>P</i> -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 ANAESTHESIOL 2016; 33:535-542**
 - Electrical stimulation of HT-7

POSTOPERATIVE EMERGENCE DELIRIUM



Seafy same	Comulative an analg	nount of opioid resics	Statistics for each study					
	Experimental Group	Centrol group	SDM	Lower Simit	Upper Smit	Z-Value	P-Value	ŝ.
Wind (2013)	4.6 (3.3) mg	21G.0 mg	0.94	0.05	1.82	2.08	0.037	1
Kotani (2001)	0.5 (0.9) mg	0.5 (0.1) mg	0.00	-0.40	0.40	0.00	1.000	
Pooled effects (Acspuature vs. control)			0.42	4.75	1.59	0,70	0.486	
Cours (2011)	13.1 (2.2) µgkg	16.3 (1.6) pgkg	-1.51	-2.47	-0.55	-3.09	0.002	
Wong (2006)	18.0 (8.8) mg	18.8 (9.8) mg	-0.09	-0.87	0.70	-0.21	0.830	
Lis (2002)	18.4 (12.6) mg	30.2 (14.4) mg	-0.89	+1.39	-0.39	-3.49	0.000	
Sim (2002)	2.93 (2.8) mg	3.54 (6.99) mg	-0.13	-0.57	0.31	-0.59	0.555	
Pooled effects (Eletroacapanetare vs. control)			-0.62	-1.46	0.21	-1.47	0.142	
Las (2012)	0.36 (0.10) ang	0.57 (0.13) mg	-1.82	-2.42	-1.22	-5.95	0.000	
Yeb (2011)	19.3 (9.7) mg	21.6 (13.1) mg	-0.20	-0.71	0.31	-0.77	0.441	
Chin (1999)	6.2 (1.3) mg	11.6 (2.2) mg	-2.81	-3.52	-2.09	-7.72	0.000	
Chen (1998)	65(3.5)mg	10.7 (5.0) mg	0.97	-1.56	-0.39	3.25	0.001	
Wang (1997)	21 (12) mg	28 (19) mg	-0.48	-0.96	0.01	-1.92	0.054	
Pooled effects (TEAS vs. control)			-1.22	-1.95	-0.50	-3.30	0.001	
Overall effects			-8.72	-1.21	-0.22	-2.83	0.005	1
								-5.00
								Favo
Heterogeneity test (Acupunture vs. contro	s): Q= 3.61, df	= 1, P = 0.058,	I-square =	72.26%				



Heterogeneity test (Eletroacupuncture vs. control): Q= 3.01, at = 1, P = 0.005, Paquare = 72.20% Heterogeneity test (Eletroacupuncture vs. control): Q= 10.41, df = 3, P = 0.015, I-square = 71.18% Heterogeneity test (TEAS vs. control): Q= 47.78 df = 4, P < 0.001, I-square = 91.26%

Heterogeneity test for overall: Q= 88.05, df = 10, P < 0.001, 1-square = 86.64%

POSTOPERATIVE PAIN PLOS ONE PUBLISHED: MARCH 9, 2016 <u>HTTPS://DOI.ORG/10.1371/JOURNAL.PONE.0150367</u>





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^{21}

	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

ⁿData presented as mean ± SD.

PEDIATRIC POSTOPERATIVE PAIN





Acupuncture for Post-tonsillectomy Pain

	Acupun group (/	cture n = 30)	Control group (n = 30)		
	м	SD	м	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 complication	ns				
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



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% Cl 1.01, 1.18; P = 0.02).
- Zusanli (ST 36) and Shangjuxu (ST 37) were the most common acu- points selected

	Experim	ental	Contr	ol		Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% Cl	M-H, Fixed, 95% CI
Kou XR et al 2010	18	18	18	19	16.5%	1.05 [0.91, 1.22]	+
Wang HM 2011	14	15	11	15	10.1%	1.27 [0.91, 1.78]	
Zhang Y et al 2011	57	60	52	60	47.7%	1.10 [0.98, 1.23]	
Zhao XF et al 2010	29	30	28	30	25.7%	1.04 [0.92, 1.16]	•
Total (95% CI)		123		124	100.0%	1.09 [1.01, 1.18]	•
Total events	118		109				
Heterogeneity: Chi ^z =	1.83, df = 3	3 (P = 0	.61); = 1	0%			
Test for overall effect	: Z = 2.26 (F	P = 0.02)				Favours [control] Favours [experimental

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



ACUPUNCTURE IN ENHANCED RECOVERY AFTER SURGERY

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