

# Acupuncture instead of codeine for tonsillectomy pain in children



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## ABSTRACT

**Objectives:** Severe throat pain can result from tonsillectomy and last up to 10 days in children. Codeine elixir has long been used for pain relief, but has recently been banned by the Food and Drug Administration due to a recently recognized risk of death. We explored acupuncture as an alternative means of pain relief for children and adolescents after tonsillectomy.

**Methods:** This was a retrospective review of children and adolescents who underwent tonsillectomy over a three-month period. No narcotics were prescribed after surgery. Patients who wanted help with pain relief were offered acupuncture. Perceived pain level was assessed before and after the acupuncture treatment. Following the 10-day recovery for tonsillectomy, patients or their parents were queried as to how long the pain relief from acupuncture intervention was perceived to last.

**Results:** 56 children and adolescents underwent tonsillectomy in the three-month window selected for the retrospective review. 31 of these patients (ranging from 2 to 17 years in age) received an acupuncture intervention for postoperative pain. The mean reported pain level before acupuncture was 5.52 (SD = 2.28) out of 10. This fell to 1.92 (SD = 2.43) after acupuncture. Statistical analysis supported the general conclusion that pain reports decline after acupuncture in the sampled population. However, the limitations of the methodology and the sample suggest that this generalization should be treated as preliminary. 17 patients or their parents provided a post-recovery report for how long they believed the acupuncture intervention lasted. The mean duration of perceived acupuncture benefit was 61.24 h, though the standard deviation was large (64.58 h) with about 30% of patients reporting less than three hours of benefit and about 30% reporting more than 60 h. No adverse effects were observed as a result of acupuncture treatments.

**Conclusions:** The data tentatively suggest that acupuncture decreases perceived pain in children and adolescents after tonsillectomy. These data – combined with the cost effectiveness, safety and ease of administering acupuncture – suggest that further studies exploring the effectiveness of acupuncture in juveniles after tonsillectomy are merited.

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## 1. Background

Tonsillectomy is a uniform surgical insult which results in a predictable course of healing and decreasing pain over about 10 days [1]. More than a half million tonsillectomies are done annually in the United States [2]. This surgery often results in severe throat pain which can last throughout and beyond the

standard 10-day recovery period [3]. There have been two major approaches to reducing this post-operative pain.

First, efforts are made to reduce tissue trauma during surgery. Various technology-assisted surgical instruments have been developed to reduce tissue damage. All of these devices increase the cost of tonsillectomy but no surgical instrument or technique has been found to be superior to the rest at decreasing pain [4–7]. Intravenous medications such as ondansetron and dexamethasone are helpful in reducing postoperative nausea and pain and are routinely given during surgery [8].

Second, pain medication is prescribed to relieve pain after surgery. For decades doctors have prescribed codeine elixir. However, about 7% of the general population metabolizes codeine in an ultra-rapid fashion to morphine [9], the active metabolite. This can lead to morphine levels which far exceed therapeutic levels [10] and, on rare occasions, result in death from respiratory arrest. In February 2013 the Food and Drug Administration issued a Boxed Warning [11], the agency's strongest warning, banning the

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use of codeine after pediatric tonsillectomy. Some doctors prescribe hydrocodone elixir in place of codeine elixir for their patients. However, hydrocodone elixir is metabolized in the same manner as codeine and thus also exposes patients to the risk of respiratory arrest [12].

The current study came about as a result of the author's search for a safe and effective substitute for codeine. I explore in this report the use of acupuncture as an alternative to narcotics to reduce post-operative tonsillectomy pain in juveniles (children and adolescents). Acupuncture in general has been shown to reduce pain [13], has a low risk of complications [14], can be done quickly, and has minimal cost. However, its employment in support of surgical interventions remains a novel practice in Western medicine. Nonetheless, its application is increasing. A recent Boston Children's Hospital study showed patients having acupuncture at anesthetic induction prior to undergoing tympanostomy tube placement experienced less post-operative pain and emergence agitation than controls after surgery [15].

This result encouraged me to move beyond the scope of the Boston study to determine whether acupuncture would be effective in relieving pain in patients on whom I performed tonsillectomies – a surgery requiring a much more protracted recovery. Tympanostomy tube patients almost always attend school the next day. In contrast, tonsillectomy patients can miss school for up to 10 days.

The following analysis is a formal exploration of the perceived pain relief by those tonsillectomy patients who accepted post-operative acupuncture.

## 2. Methods

### 2.1. Participants

The author performed all surgeries and acupuncture techniques. All surgeries were done at Rady Children's Hospital in San Diego; acupuncture was done at El Centro Regional Medical Center Outpatient Clinic in El Centro, CA and an office in Encinitas, CA.

The study is a retrospective review of juvenile tonsillectomy patients. The patient pool was drawn from the author's practice and included all patients less than 18 years of age who underwent tonsillectomy during a 3-month period beginning January 15, 2013 and ending April 16, 2013. The Institutional Review Board of Rady Children's Hospital granted approval for this retrospective chart review.

56 juvenile patients underwent tonsillectomy during the 3-month study period. In addition: all 56 patients also had adenoidectomy; 13 had bilateral myringotomy and tube insertion; two had nasal cautery; and one had cerumen removal.

There were no intra-operative complications. However, one patient experienced oropharyngeal bleeding 11 days postoperatively which required cauterization under anesthesia.

Not all 56 patients were considered in the current review. Selected patients had to meet the following two criteria. First, they had to present for pain relief within the traditional 10-day tonsillectomy recovery window. Second, selected patients had to receive the acupuncture intervention. This was purely a pragmatic

constraint due to study limitations: only patients who received the intervention were assessed for pain relief. No pain data was available for patients who received no treatment.

42 patients presented during the first 10 days after surgery for pain relief. Nine of these patients refused acupuncture. Patients who declined acupuncture were offered an acupressure intervention instead. At that point, they ceased to be regarded as participants and were excluded from the study sample. The remaining two rated their pain score as 0 and were not offered acupuncture.

The final study sample consisted of 31 patients (20 females, 11 males) who agreed to undergo an acupuncture intervention. The mean age of this sample was 9.23 years (SD = 4.32 years, range = 2–17 years). Pain reports were collected from these patients or their parents immediately before and after the intervention. 17 of these patients or parents (10 females, 7 males) provided an additional report after the recovery window, estimating how long the benefits of the acupuncture intervention lasted. The mean age of this subsample was 9.59 years (SD = 4.05 years, range = 5–16 years).

### 2.2. Tonsillectomy

Patients received a total of 2–3 cc of 1% lidocaine with 1:100,000 epinephrine injected into both tonsil beds before the start of surgery. An anesthetic technique using nitrous oxide and sevoflurane was used for all patients. Tonsillectomy was done using monopolar electrocautery set at 24 W and all patients were given intravenous dexamethasone 0.5 mg/kg up to a maximum of 12 mg.

None of the patients were prescribed narcotics for use at home. Parents were advised to use acetaminophen or ibuprofen elixir for pain relief. Patients were allowed to return to normal activity at their own discretion and no dietary restrictions were suggested.

### 2.3. Acupuncture intervention and pain reports

Patients were invited to return during the 10-day recovery if the family wanted help with pain relief. Upon arrival, the patient or parent (pending patient age and apparent maturity) was asked to use the Faces Pain Score-Revised Scale (Fig. 1) to assess current level of discomfort. If the pain score was greater than zero, acupuncture was offered free of charge for the patient. This measurement was repeated again immediately after the acupuncture treatment resulting in a "before acupuncture" pain report and an "after acupuncture" pain report.

The acupuncture intervention used sterile, single-use, stainless steel acupuncture needles with a shaft of 15 mm in length and 0.16 mm in diameter [16] and a shaft of 40 mm in length and 0.25 mm in diameter [17] (Seirin, Shizuoka, Japan).

The acupuncture point LI4 (Fig. 2) was the primary point chosen for use in the acupuncture intervention. This point has been shown effective in randomized, controlled trials at reducing pain after aural [15] and oral surgery [18,19]. Stimulation at LI4 increases activity in the somatosensory cortex and a region of the brainstem known as the periaqueductal gray area, as revealed by functional magnetic resonance imaging, that are involved in processing pain

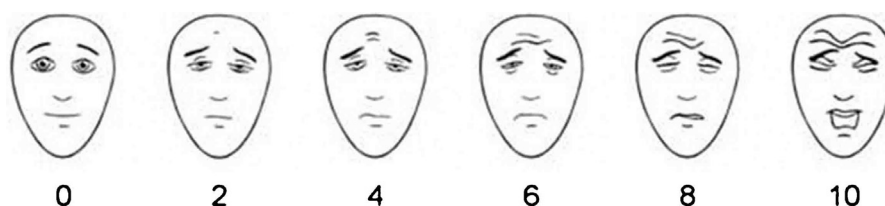


Fig. 1. FACES Pain Score-Revised Scale.

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