Getting back in touch with tonsill

By Elizabeth Neville Regan, MSN, RN, and Karin Nevius, BSN, RN

Once performed routinely for patients with recurrent tonsillitis (1.4 million procedures in 1959), tonsillectomy is no longer such a common procedure: just 530,000 patients of all ages had a tonsillectomy (with or without adenoidectomy) in 2006.[1,2] The tonsils are a pair of soft lymphatic tissue situated on either side of the oropharynx and are considered part of the lymphatic system (see *Anatomy of the oropharynx*). This article focuses on tonsillectomy, but the procedure may be performed in conjunction with adenoidectomy.

Indications for tonsillectomy have evolved over the years; a recent study found that 58% of patients ages 5 to 13 who underwent tonsillectomy had the procedure done for airway obstruction or sleep apnea, compared with 42% who underwent tonsillectomy for recurrent throat infections, the most common indication for tonsillectomy in the past.[1] Additional accepted indications for tonsillectomy include recurrent acute or chronic tonsillitis, peritonsillar abscess, biopsy for neoplasm, and recurrent acute rheumatic fever in patients who are *Streptococcus* carriers.

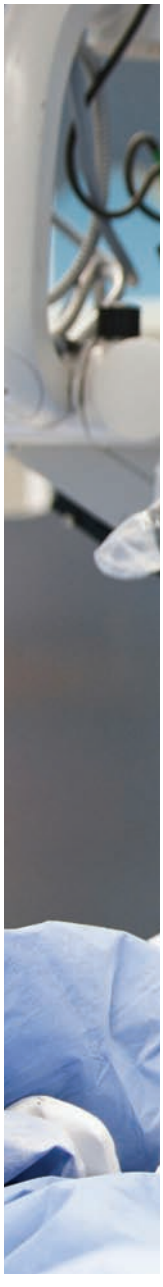
The effectiveness of nonsurgical treatment of tonsillitis is another reason that fewer children with recurrent tonsillitis are undergoing tonsillectomies. Nonsurgical treatment for children and adults includes intermittent courses of antibiotics, long-term antibiotics, analgesics, and no therapy (due to the child outgrowing the problem of recurrent sore throats). A 2009 review examined four studies comparing tonsillectomy to nonsurgical treatment, and found that severely affected children had one (rather than three) unpredictable episodes of sore throat in the first postoperative year. Total sore throat days for patients treated with tonsillectomy dropped from 22 to 17, with 5 to 7 of those days falling in the immediate postoperative period.[3] For these children, the issue appears to be exchanging the uncertainties of the timing of future sore throats with the certainty of a predictable period of postoperative pain, followed by fewer sore throats in the future.

Preoperative preparation

Once the decision is made to proceed with a tonsillectomy, preoperative preparation includes a complete history and physical and required lab tests (typically a complete blood cell count, platelet level, prothrombin time, partial thromboplastin time, and bleeding time). Some otolaryngologists require bleeding evaluation tests only if the patient has a personal or family history of bleeding. A preoperative ECG and chest X-ray aren't needed unless the patient has a history of heart disease. Other preoperative evaluation is based on the patient's medical condition.[4]

If the patient is a child, preparation options vary depending on the institution and the child's age. The better-prepared the child is, the smoother the induction phase intraoperatively. Age-specific teaching tools vary, but may include coloring books, picture books, or touring OR and associated areas. Some institutions have induction rooms that let parents be present during anesthesia induction. The OR team must then transport the child to the OR suite, which presents potential risks such as accidental extubation or airway compromise. Another option is to let one parent in the OR suite (once donned in scrubs or coverall jumpsuit) to provide comfort to the child. This option is safer because the patient doesn't need to be moved.

The circulating nurse plays a major role in this induction phase, supporting the child and parent through the process. Once the child's level of sedation is deep enough to proceed with the intubation, the circulating nurse guides the parent out of the induction room or OR and hands off the parent to a waiting team member to escort the parent back to the waiting room. The nurse must be prepared for unexpected parental responses varying from crying to dizziness secondary to possible exposure to the



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This once-common surgery isn't so common anymore. Here's what you and your patient need to know.

inhalation agent the child received. As soon as the parent is safely handed off, the circulating nurse should return to the OR suite to provide assistance with the induction.

During surgery

The circulating nurse assures that the required OR equipment is available for the procedure:

- a headlight, mirrored or fiberoptic depending on surgeon preference
- rolling stool
- suction apparatus
- instrument table
- Mayo stand
- the surgeon's technology of choice: electrosurgical unit, microdebrider, ablation device, or harmonic scalpel. The chosen technology must be tested for working quality.
- special equipment or instruments required by the surgeon. This equipment should be documented in the chart and confirmed by the circulating nurse.

Once the OR suite is prepared, the circulating nurse proceeds to the patient assessment, which should include confirming:

- a valid consent form
- a completed surgical site confirmation form
- the patient's N.P.O. status, allergies, medical/surgical history, any prostheses (contacts, hearing aids), and patient and/or parent's understanding of the surgical process.

Because airway management is vital for patients undergoing tonsillectomies, the anesthesia team will assemble physiologic monitoring devices including a pulse oximeter probe, BP cuff, ECG leads, inhalation mask, oral airway, intubation tube, breathing circuit, and appropriate-sized I.V. catheters.

For a tonsillectomy, patients are positioned supine with their arms tucked at their sides, although an arm board may be used on one arm for I.V. access by the anesthesia provider. The patient's head is placed on an appropriate-sized foam head rest to minimize pressure points and help immobilize the head during surgery. Positioning may be done before induction or after, depending on the child's age.

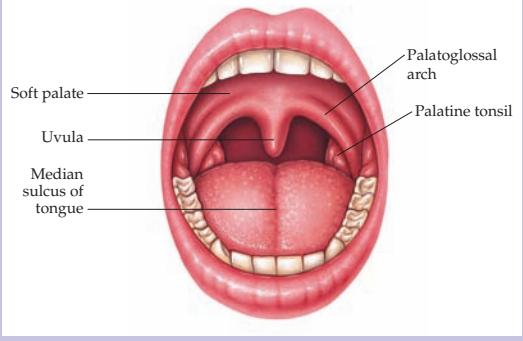
The mask is placed on the patient's face and slowly the inhalation agent is begun. (Children who can't tolerate a supine position may sit upright on the OR table with parent support when the mask is applied.) Most children don't like needle sticks, so timing the insertion of the I.V. catheter is important. If the patient can tolerate I.V. insertion while awake, this procedure is completed before anesthesia induction; otherwise, the procedure is completed after anesthesia induction.

Next, the patient is endotracheally intubated with the appropriate-sized uncuffed endotracheal (ET) tube. The tube is taped into place, usually at the midline.[4] This allows easier access for the surgeon to the back of the oral airway. Protective ophthalmic lubricant is instilled into each eye to prevent corneal abrasions and the eyes are taped closed. Use a water-based lubricant to reduce the risk of surgical fire.

The ET tube is briefly disconnected from the breathing circuit (to prevent extubation) and the anesthesia provider monitors the patient's airway as the table is turned 90 degrees. This lets the surgeon sit or stand at head of bed while performing the procedure. Once the table is turned, the ET tube is reconnected. A rolled towel or sheet is placed under the patient's shoulders to hyperextend the neck. The circulating nurse must know the OR team's preference and be ready with the positioning devices for a smooth start of the case.

No skin prep is needed. Tonsillectomies are considered a clean-contaminated procedure unless pus is present, so draping is minimal. Most surgeons request a head drape—two towels opened all the way and placed lengthwise under the patient's head. The top towel is then manipulated around the head like a turban covering the eyes and secured with a small towel clip. At this point a simple impervious sheet is placed over the patient. This provides a clean barrier and a method for securing

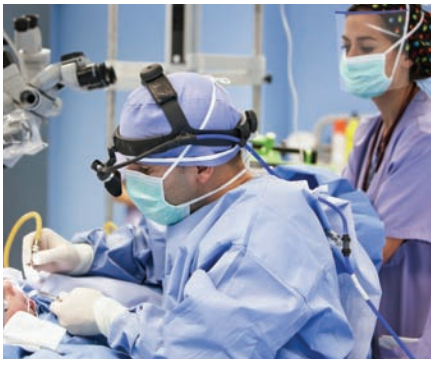
Anatomy of the oropharynx



Source: Anatomical Chart Company. *Systems & Structures.* 2nd ed. Skokie, IL: Lippincott Williams & Wilkins; 2000:22.

the suction and other surgical devices during the procedure.

The sterile field prepared by the scrub person includes the tonsil instruments: mouth gags and retractors per surgeon preference, surgical blade (#12 or #15, depending on technique), long Allis clamp (straight or curved), long delicate tonsil scissors, long fine-tipped tissue forceps, two forceps clamps, Hurd elevator, sweetheart tongue retractor, tonsil and adenoid suction tip, long fine-tipped vascular forceps, and possibly a tonsil knife. Disposable items that need to be available include two 12-French red rubber catheters, suction tubing, electrosurgical pencil, guarded electrosurgical tip, tonsil suction-electrosurgical device, tonsil sponges, and specimen cup (two if malignancy is suspected). Medications include the local anesthetic drugs per surgeon preference, and hemostatic agents as needed.[5]



Diathermy uses a monopolar or bipolar electric current to coagulate blood vessels.

The procedure begins with the placement of the preferred mouth gag, which permits the visualization required for a procedure performed at the back of the oral cavity. The mouth gag often is anchored to the rim of the Mayo stand, which is then elevated to stabilize in place, resulting in a "no-hands" technique. Assure that the Mayo stand isn't pressing on the patient's chest and remind the team to avoid leaning on the stand—this could compromise the stability of the mouth gag. Once the mouth gag is in place, local anesthesia (such as bupivacaine or lidocaine 1% with epinephrine) can be administered into the lateral aspect of the oral-pharyngeal cavity.

Comparing surgical technologies

Tonsillectomy can be performed using one of several accepted operative methods.

• The ***cold knife*** or cold dissection technique is the traditional method: the oral cavity is exposed using a mouth gag, the soft palate is palpated to exclude an occult cleft deformity, and nasal catheters are passed via the nose and grasped in the oral cavity to provide soft palate traction. A heavy clamp is placed on both ends of catheter to retain position. A slightly curved clamp is used to grasp the superior tonsil pole with gentle medial traction and the anterior tonsillar pillar mucosa is incised with a #12 blade. Tonsil scissors are used in a superior lateral dissection to expose the tonsil capsule and then to dissect the superior posterior tonsillar pillar muscle fibers off the capsule. The tonsil capsule is then dissected from the fossa muscle attachments using any preferred instrument (such as a Hurd dissector, tonsil knife, scissors, or Yankauer suction tip).

Dissection continues to the inferior tonsil pole, where a tonsil snare, loaded with a wire for guillotine removal of the tonsil, is then used to sever the inferior pole vessels, allowing removal of the tonsil. Initial hemostasis is achieved by placement of a tonsil pack that may have a topical hemostatic agent added. Any observed active bleeding vessels are cauterized or suture ligated to achieve final hemostasis.[6] The ET tube is adjusted as needed and the same process is repeated on the other side. In the final step, the stomach is suctioned with an orogastric tube to remove any blood that might have accumulated. All retraction devices are then removed and the oral cavity is observed for any additional bleeding. Be careful to avoid premature extubation as the mouth gag is lifted from its position.[5]

Compared to newer technology, the cold knife technique has disadvantages, including increased operative time and increased intraoperative blood loss.[6] In most cases, the increased blood loss isn't significant from a cardiovascular standpoint, although it may increase the amount of blood that enters the stomach.[6]

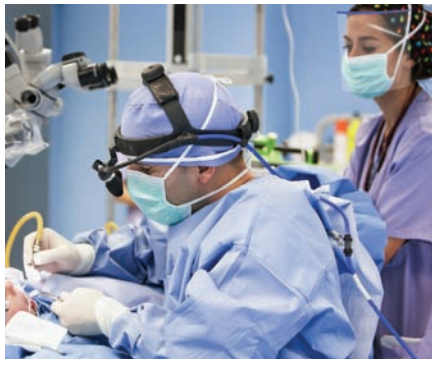
• ***Diathermy***, or electrosurgical technique, uses a monopolar or bipolar electric current to coagulate blood vessels. In monopolar diathermy, the same device can cut and coagulate the tissue. The current passes away from the pencil to the tissue for coagulation and returns to an electrode placed on the leg. Most otolaryngologists in the United States use this technique because of the reduced intraoperative blood loss and lower costs compared with

the cold knife technique.[7] The basic surgery is otherwise similar to the cold knife procedure. Bipolar diathermy works by passing electrical current from one tip on the forceps to the other, resulting in tissue coagulation only between the two tips (surrounding tissue isn't affected as in monopolar diathermy). This technology is used to provide hemostasis after dissection performed by monopolar cutting or cold knife dissection.

A review of randomized controlled trials of children and adults undergoing tonsillectomy by cold knife or diathermy techniques compared two outcomes: intraoperative bleeding and pain control.[8] Bleeding was defined in three categories: intraoperative, primary bleeding (within 24 hours), or secondary bleeding (after 24 hours). One study found less blood loss intraoperatively in the diathermy group (mean blood loss of 12 mL) compared to the cold knife group (mean blood loss of 26 mL).[8] No episodes of primary bleeding were reported, and the overall rate of secondary bleeding was about 6% in each study.[8] The combined data suggest that diathermy causes less intraoperative blood loss than the cold knife technique, but that the two techniques didn't differ in rates of primary or secondary bleeding.[8] The postoperative pain analysis indicated that diathermy appeared to cause more postoperative pain than the cold knife technique.[8]

- ***Microdebrider*** technique, which uses a cylindrical, electrically powered shaver supplied with continuous suction, has gained greater acceptance as the technique of choice recently. The applied suction draws soft tissue into a port on the side of the tip, where it's sheared off by the scissors-type action of the blades. The advantage of the microdebrider is its ability to spare adjacent mucosa during surgery while removing the required tissue. Another important advantage is the continuous suction, which results in greater visualization in a very confined surgical field.[9]

Studies comparing diathermy and microdebrider techniques found no difference in surgical time, but the microdebrider caused slightly greater blood loss and a more rapid recovery to near-normal diet and normal activity.[10] However, because the cost of microdebrider surgery is higher than any other method now in use, and it requires extensive surgeon training, its clinical application isn't widespread.[10]



Should an airway fire occur, the surgical team must act quickly and efficiently, so simulation training is crucial.

- Another new technique, the ***harmonic scalpel***, is a blade that vibrates at 55,000 cycles per second using ultrasound, allowing precise cutting and coagulation.[11]
- First used in orthopedic surgeries, ***coblation*** is an example of radiofrequency ablation in which energy passes through a conductive medium producing a plasma field. Because the current doesn't pass through the tissue, this technique reduces heating and damage to surrounding tissue.[11] An advantage of coblation is that it provides simultaneous tissue ablation and hemostasis. However, the data suggest that this method is associated with greater morbidity (specifically postoperative hemorrhage) than some other methods, although this may be related to practitioner experience with the technique.[11]

Handling intraoperative complications

While tonsillectomy is considered a relatively easy procedure, OR nurses must be ready for intraoperative complications such as burns and airway fire.

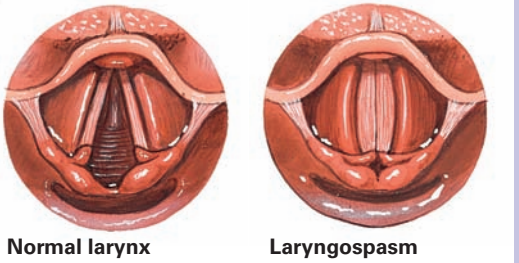
Burns can be caused by inadvertent contact of the monopolar diathermy pencil to oral tissue. Burns also can be caused if the flow of electrical current passes through a metal instrument in the surgical field (for example, a clamp) and comes into contact with the oral mucosa.[7]

Airway fire can occur during tonsillectomy because electrocautery can be an ignition source; tonsillar tissue or an ET tube can be the fuel, and oxygen and nitrous oxide can be the oxidizer. An oxygen leak around the ET tube during tonsillectomy and petroleum-based lubricants also are fire risks. One study conducted found that ET tubes were flammable in an environment of oxygen greater than 25%.[12] To reduce the risk of fire, keep F_iO_2

below 0.25, consider using a cuffed ET tube, keep the electrocautery device at the lowest setting possible (25W coag), and maximize the distance between the ET tube and the electrosurgical device. If positive-pressure ventilation is needed, notify the surgeon to prevent the activation of the cautery at this time.[13]

Should an airway fire occur, the surgical team must act quickly and efficiently, so simulation training is crucial.[14] Extinguish the fire with 0.9% sodium chloride solution, rapidly assess for the need to remove the ET tube, protect the patient's airway, and assess the injury. Late recognition or poor management of airway fire can be life-threatening.

A look at laryngospasm



Normal larynx
Vocal cords open during normal inspiration

Laryngospasm
Sudden closure of vocal cords

Source: *Surgical Care made Incredibly Visual.* Philadelphia, PA: Lippincott Williams & Wilkins; 2007:136.

Postoperative care

Aside from standard postoperative care and assessment, specific postanesthesia care for the patient undergoing a tonsillectomy includes maintaining a patent airway, managing postoperative pain, monitoring for surgical site bleeding, and assuring adequate hydration.

• ***Airway maintenance***. Upon arrival to the postanesthesia care unit (PACU), place the child in the tonsillar position—on the side with the face partially down. Airway and chest movement should be visible to the nurse to assure maximum respiratory integrity. This position also lets secretions drain easily from the mouth.[15] Patients who've had a tonsillectomy are especially prone to laryngospasm and must be observed closely for airway patency. Airway obstruction may result from swelling of the palate, nasopharynx, retropharyngeal space, tongue, or nose.

If the patient develops laryngospasm, administer positive pressure via a bag-valve-mask device and administer 100% oxygen. If positive pressure doesn't break the spasm, the patient may need to be given succinylcholine, a muscle relaxant, to help relax the vocal cords. Provide respiratory support with a bag-valve-mask device until the drug effects subside. If the patient can't maintain adequate respirations, reintubation may be necessary. Continue to provide emotional support to help the patient relax during the episode (see *A look at laryngospasm*).

For all posttonsillectomy patients, administer cool humidified air via face mask or face tent to provide comfort, minimize swelling, and provide supplemental oxygen.[15] Once the patient is awake and reactive, position him or her in a semi-Fowler position with the head of bed elevated 30 degrees to 45 degrees .[16] Airway-related problems are more likely to occur in overweight and obese children than in children with normal body mass index.[17] Closely monitor patients identified as being at risk. The nurse-to-patient ratio is 1:1 for all pediatric patients until consciousness and reflexes return.[18]

• ***Pain management***. Pain in children has historically been undertreated. Children who are younger, nonverbal, or agitated are more at risk for undertreated pain. Focus the pain assessment to the child's developmental level and use an age-appropriate pain intensity rating tool. Tonsillectomy is usually associated with severe postoperative pain that can result in poor oral intake in children. Tackling the pain issue early and effectively managing the pain can prevent secondary complications. A recent small study found that perioperative bupivacaine infiltration was safe for children, significantly decreased postoperative analgesic requirements, and improved postoperative pain management following tonsillectomy.[19]

Posttonsillectomy pain can include throat pain, pain with swallowing, and otalgia (referred pain from the pharynx to the ear). Acetaminophen is the drug of choice for postoperative pain and an acetaminophen/codeine combination may be used if necessary. Around the clock, scheduled analgesic dosing is more effective than p.r.n. dosing in reducing pain intensity in children after tonsillectomy.[20] Scheduled dosing didn't increase the frequency or severity of any opioid-related adverse effects other than constipation.[20]

Although acetaminophen, alone or in combination with codeine, is the most common analgesic prescribed for children after ambulatory surgery,

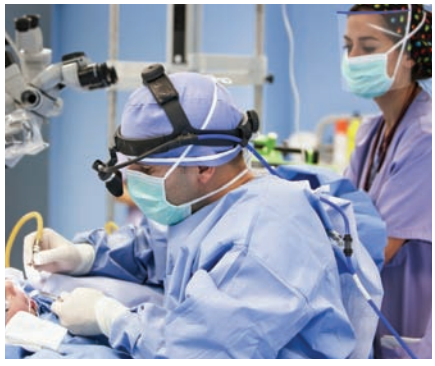
its analgesic effect varies widely, so it may need to be administered in conjunction with other agents.[20] Nonsteroidal anti-inflammatory drugs (NSAIDs), long avoided because of their association with increased bleeding risk, may have a role in posttonsillectomy pain management, as a review found that NSAIDs didn't significantly increase bleeding in children after tonsillectomy.[21] Data were insufficient to compare the risk of bleeding with each individual type of NSAID. In addition, patients had less nausea and vomiting when NSAIDs were used as part of the analgesic regimen than when they weren't.[21] Another study found that ibuprofen isn't a contraindication to tonsillectomy and can be used for postoperative pain management.[22]

Although most children undergoing a tonsillectomy are healthy, NSAIDs should be avoided in children who have conditions in which NSAIDs aren't recommended, such as renal and hepatic impairment, hypertension, risk of gastrointestinal bleeding, or allergy.

Nonpharmacologic interventions include an ice collar to reduce pain and bleeding risk, guided imagery, and parental presence.[15]

• ***Surgical site bleeding***. Bleeding remains the most significant complication of tonsillectomy—it can arise at any moment after surgery and can become life-threatening. Primary bleeding occurs within 24 hours of surgery and occurs in 0.2% to 2.2% of patients; secondary bleeding occurs more than 24 hours postoperatively and occurs in 0.1% to 3.7% of patients.[23] Delayed bleeding (typically 7 to 10 days postoperatively) is caused by premature separation of the eschar secondary to an underlying infection or dehydration.[24] Risk factors for postoperative bleeding include age (12 years or older), male gender, and operative techniques using heat.[25] Use of dexamethasone to reduce the risk of postoperative nausea and vomiting has also been associated with an increased risk of bleeding.[26]

Be alert to the potential for bleeding in the postoperative period and consider the risk factors when performing patient assessments. Clots or fresh blood in the nose or throat, frequent swallowing, clearing of the throat, and vomiting of dark blood are indications of possible bleeding. Check the back of the patient's throat with a flashlight for trickling of blood. Decreased BP, tachycardia, pallor, and restlessness are hallmark signs of hemorrhage and should be reported to the surgeon immediately.[15] If significant bleeding occurs, the child may need to return to the OR for suturing or cauterizing of the blood vessels.[15]



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• ***Nausea, vomiting, and dehydration.*** Between 40% and 85% of patients develop postoperative nausea and vomiting. Nausea, vomiting, and pain with swallowing means patients may delay drinking fluids in the early postoperative period, putting them at risk for dehydration.[27] Because pain is the major obstacle for a return to an oral diet, coupling analgesia and timing of oral intake is crucial for a quick recovery.[28] Administering dexamethasone after anesthesia induction appears to reduce the risk of postoperative nausea and vomiting, but has been associated with an increased risk of bleeding.[26] In children with persistent vomiting or refusal to swallow, monitor urine output, and consider parenteral rehydration if dehydration is evident.

In the PACU, you can offer ice chips and fluid once the child is conscious and reflexes have returned. (Opinion is mixed on whether fluids should be lukewarm or cold.[15]) The child's preference and likes and dislikes may dictate the type of oral intake. Children are the best judges of what they can tolerate, so consider the child's wishes.[29] Avoid using straws or pacifiers; the sucking action can precipitate bleeding.

Preparing patients to go home

Before discharge, teach patients and their families the following points:

- Avoid throat clearing and coughing.
- Avoid bending, straining, or lifting.
- Consume a bland, soft diet, beginning with liquids and avoiding citrus juices. Soft foods such as

bread, gelatin, and mashed potatoes can be introduced gradually. Avoid scratchy, hard, or spicy foods for 7 to 10 days, to reduce the risk of throat bleeding.

- Rest the voice.
- Expect to see bloody or tarry stools due to swallowed blood.
- Administer pain medication as prescribed for throat, ear, or jaw pain. Adequate pain management will ensure that the child drinks plenty of fluids. If acetaminophen is prescribed, use only the dosing device that comes packaged with the product. Explain to the parent or caregiver that the acetaminophen dose is based on the child's age and weight. Review with the parent or caregiver the maximum daily dose of acetaminophen that the child may receive. Carefully read all over-the-counter medication labels to determine if the product contains acetaminophen, and don't give the child more than one acetaminophen-containing medication at a time.
- Be prepared for possible increased throat discomfort between postoperative days 4 and 8 due to separation of eschar from the pharyngeal bed.[16]
- Immediately report signs of bleeding, such as frequent and repeated swallowing and bright red emesis. Delayed hemorrhage can occur 7 to 10 days postprocedure.

During the first few days after tonsillectomy, children can exhibit general anxiety and sleep disturbances. Problems cited include problems falling asleep, problems staying asleep, and crying when waking up. The extent of these problems is related to the child's degree of anxiety before surgery. A preoperative program (including information and role playing, for example) to involve the child and the caregiver could improve the postoperative course for the child.[30]

A retrospective study of 2,554 children (mean age, 5.9 years) who'd had tonsillectomy and adenoidectomy found that most parents felt well-prepared to care for their child at home, about 13% of children had postoperative bleeding from the mouth or nose, and for most patients, pain was highest on the second postoperative day.[31] This information can help improve pre- and postoperative management for children undergoing tonsillectomy, as evidence-based research is key to keeping patients safe and providing the best possible care. **OR**

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RESOURCES

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The authors and planners have disclosed that they have no financial relationships related to this article.

DOI-10.1097/01.ORN.0000412323.58650.2b

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