

# *Microdebrider Intracapsular Tonsillectomy: A Narrative Review*

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## Abstract

**Introduction:** Microdebrider intracapsular tonsillectomy is a relatively recent surgical procedure used to treat various tonsil and adenoid disorders. Unlike traditional tonsillectomies, which involve the complete removal of the tonsils, this technique uses high-speed rotation to remove only the diseased tissue, allowing for more precise removal while preserving the surrounding healthy tissue. This procedure has gained popularity in recent years due to its ability to reduce postoperative pain and allow for a quicker return to regular eating habits, especially in children with tonsillitis and sleep apnea. In this review, we aim to explore the efficacy, safety, and limitations of microdebrider intracapsular surgery in the management of otolaryngologic conditions.

**Methods:** A preliminary search was conducted on several databases to identify relevant articles on tonsillectomy. The study focused on keywords such as "microdebrider", "Coblation tonsillectomy", "intracapsular tonsillectomy", "conventional tonsillectomy" and "minimally invasive tonsillectomy" and included patients with recurrent and/or chronic tonsillitis and patients with tonsillar hypertrophy with symptoms of obstructive sleep troubles such as persistent snoring.

**Conclusion:** Microdebrider Intracapsular tonsillectomy is a surgical procedure used for various conditions related to the tonsils, with less tissue removed than traditional tonsillectomy. It causes less pain, has a shorter recovery time, and has fewer complications.

However, there is a small risk of tonsil regrowth and the need for an additional procedure. The decision on which method to use depends on the patient's medical history and the surgeon's recommendation, and it is essential to understand potential complications and seek medical attention promptly if needed.

**Keywords—** Otolaryngology; Debridement; Post-operative pain; Tonsillectomy techniques; Treatment outcome.

## I. BACKGROUND

The tonsils are two tissue clusters that are located on either side of the throat and are enclosed in a pocket at the side of the palate. Each tonsil's lower edge is located next to the tongue, deep in the neck. They are the immune system's first line of defense against viruses and germs that enter our mouth and hence are susceptible to infection and inflammation. A relatively recent surgical procedure called microdebrider intracapsular surgery is used to treat various tonsil and adenoid disorders using high-speed rotation to remove tissue, allowing for more precise removal of the affected tissue while preserving the surrounding healthy tissue [1]. It has become a procedure that has become increasingly popular in recent years, and its benefits over traditional tonsillectomy techniques are numerous. One of the most significant advantages of this procedure is the reduced postoperative pain and quicker recovery time that it offers patients, particularly children [2]. Traditional tonsillectomy techniques have been known to result in severe postoperative pain, leading to extended periods of time off school or work, and delayed recovery times. Microdebrider intracapsular tonsillectomy is a more gentle approach that allows for the precise removal of affected tissue while preserving the surrounding healthy tissue [3]. In addition, microdebrider intracapsular tonsillectomy has also shown promise in treating other tonsil and adenoid disorders. For example, it has been used to treat recurrent tonsillitis, which is a common condition in children and adults alike [4]. Recurrent tonsillitis can be painful and disruptive to daily life, but microdebrider intracapsular tonsillectomy offers a more precise approach that reduces pain and allows for quicker recovery times. This approach can also minimize the risk of excessive bleeding, which is a common complication of traditional tonsillectomy methods. Due to its ability to remove diseased tissue while conserving healthy tissue, this treatment is especially beneficial for those who experience recurrent tonsillitis or adenoiditis [5]. Children with tonsillitis and sleep apnea can benefit from this approach as it significantly decreases postoperative pain and allows for a quicker return to regular eating habits [6]. Despite its many benefits, microdebrider intracapsular tonsillectomy is not without its limitations. In some cases, the procedure may not completely remove all affected tissue, particularly in patients with more severe tonsillitis or adenoiditis [7]. There is also a risk of complications such as bleeding, infection, and anesthesia-related risks, although these risks are relatively low [8]. While the procedure is not without its limitations, it has shown promise in treating a variety of otolaryngologic diseases and is likely to become an increasingly popular treatment option in the future. In this review, we aim to explore the efficacy, safety, and limitations of microdebrider intracapsular surgery in the management of otolaryngologic conditions.

## II. MATERIAL AND METHODS

A preliminary search was conducted on several databases including PubMed, ScienceDirect, Cochrane Library, and EMBASE. This search aimed to identify relevant articles, and the references in those articles were also reviewed to find additional sources of information. Only English-language publications that appeared between 1985 and 2022 were reviewed. In the study, patients aged below 3 and above 25 years, those with acute peritonsillar abscesses or tumors, bleeding tendencies, immune deficiencies, and pregnancy were excluded.

Keywords such as "microdebrider", "tonsillectomy", "Coblation tonsillectomy", "intracapsular tonsillectomy", "conventional tonsillectomy" and "minimally invasive tonsillectomy" were used. The inclusion criteria for the study involved patients with recurrent and/or chronic tonsillitis and patients with tonsillar hypertrophy with symptoms of obstructive sleep troubles such as persistent snoring, whether associated with apnea or not.

## III. RESULTS

A total of 13 studies were initially identified from the database search. After applying the inclusion and exclusion criteria, 11 studies were deemed eligible for inclusion in this review [1], [3]–[7], [9]–[13]. Out of which, there were five randomized controlled trials (RCTs) [1], [6], [9], [11], [13], two observational studies [3], [7], two comparative studies [4], [12], a meta-analysis [10] and a case series [5].

#### IV. DISCUSSION

In 2016, there were over 530,000 surgeries performed on children under the age of 15 in the United States. The second-most common surgical operation on kids that year was tonsillectomy, which was commonly accompanied by adenoidectomy [14].

Chronic tonsil infections and upper airway obstruction causing sleep disturbances are the most prevalent reasons for tonsillectomy in children. Studies have shown that removing the tonsils through tonsillectomy can significantly improve the quality of sleep, cognitive performance, behavior, and overall well-being in individuals suffering from sleep-disordered breathing (SDB) and obstructive sleep apnea (OSA) [10], [14].

An increase in the number of complications and rates of morbidity linked with total tonsillectomy, for example postoperative bleeding, dehydration, hospitalization, pain management, rehydration, and the need to return to the hospital to manage postoperative bleeding resulted in the development of intracapsular tonsillectomy as an alternative [15].

The application of microdebrider for surgery of sinus in rhinology began in 1997. Studies carried out in 1997 indicated that the utilization of a microdebrider during adenoidectomy was an effective method [16].

The tonsillectomy procedure is generally recommended for children who are not prone to recurrent tonsillitis, as there is a possibility of tissue remnants causing reinfection [4]. The main goal of performing an intracapsular tonsillectomy is to reduce the size of the tonsils and to help eliminate obstructions.

This procedure involves the resection of most of the tissue but leaves behind a thin layer of tissue that protects the vessels and nerve fibres present within the tonsillar capsule [10].

The use of the microdebrider technique during surgery, which involves preserving the tonsillar capsule attached to the pharyngeal constrictor muscle, may result in postoperative pain reductions when compared to the conventional cold dissection technique [11].

##### 1. *Indications*

Microdebrider tonsillectomy is indicated for conditions related to the tonsils, including symptomatic tonsillar [5] and adenoid hypertrophy in children [4], [12], tonsillar hyperplasia [9], adenotonsillar hyperplasia [4], irreversible inflammatory lesions in the tonsils [10], obstructive sleep apnea-hypopnea syndrome (OSAHS) [4], [10], [13], and recurrent or chronic tonsillitis [4], [6].

##### 2. *Traditional tonsillectomy and microdebrider intracapsular surgery*

Traditional tonsillectomy and microdebrider intracapsular surgery differ in terms of the extent of tissue removed, postoperative bleeding and recovery times. In traditional tonsillectomy, the tonsil tissue is removed with the use of either the cold knife or electrocautery technique which include both cutting or burning, along with its capsule. It has long been a frequent treatment for recurrent tonsillitis or other tonsil-related illnesses. On the other hand, in microdebrider intracapsular tonsillectomy there is less damage to the tissue of the neck and a lower danger of bleeding because the tonsil capsule is still intact. After surgery, patients often feel less discomfort and can get back to their regular routines sooner. The preservation of some tonsil immunological function is a further advantage of intracapsular tonsillectomy. A small piece of the tonsil tissue can be removed to preserve some of the tonsils' function in the immune system. Furthermore, traditional tonsillectomy carries a higher risk of bleeding, especially in the first few days following the operation [6]. Despite its possible downsides, traditional tonsillectomy may still be advised in some circumstances, such as for individuals with bigger tonsils or those who have had major tonsil-related problems [7]. In the end, a number of variables, including the patient's medical history and the surgeon's recommendation, will determine whether to have a standard or intracapsular tonsillectomy.

##### 3. *Post-operation pain and recovery time*

Factors contributing to pain, such as inflammation, swelling, and difficulty swallowing were assessed postoperatively after the procedure, by some of the studies. Patients were encouraged to communicate any changes in pain level or other symptoms [2]. Pain medication should be recommended, and most physicians prescribe either acetaminophen or acetaminophen with codeine postoperatively [17]. Some studies showed that intracapsular microdebrider tonsillectomy results were less painful postoperatively compared with bipolar or monopolar extracapsular tonsillectomy in a pair [12], [18]. Furthermore, there is a small risk of tonsil regrowth and hence requiring an additional procedure [19]. Also, children who had done intracapsular microdebrider

tonsillectomy felt significantly less pain postoperatively both statistically and clinically [20].

The recovery time after the intracapsular microdebrider tonsillectomy differs from patient to patient. Recovery time depends mostly on some factors such as age and overall health [6]. Walton J et.al found that the mean number of days of analgesic use is 4.4 days, the mean number of days until the resumption of a regular diet is 3.9 days, and the mean number of days until the resumption of normal activity is 2.9 days [8]. Microdebrider intracapsular tonsillectomy causes less pain with rapid recovery and fewer delayed complications [6], [21].

#### 4. *Complication rates and safety considerations*

The two most undesired outcomes of a tonsillectomy are bleeding and the regrowth of tonsillar tissue post-surgery. Numerous studies discussed the occurrence of postoperative hemorrhage when using a microdebrider [16]. R. Schmidt et al. mentioned incidence of post-tonsillectomy hemorrhage was almost 3 times higher in the group of total tonsillectomy, with a rate of 3.1%, compared to only 1.1% in the partial tonsillectomy group. Intracapsular tonsillectomy by microdebrider proved to have a lower incidence of postoperative bleeding than extracapsular tonsillectomy [22]. Data suggest that the use of a microdebrider during tonsillectomy is linked to lower postoperative pain and a potentially decreased risk of complications such as delayed bleeding and dehydration. Sobol SE et al. reported a tonsillar regrowth rate of up to 3.2% in cases that had intracapsular tonsillectomy; the incidence of complications has not been found to be higher than that associated with other techniques [1]. Tonsil tissue regrowth in microdebrider tonsillectomy was very low, as indicated by a study that it was only 0.46% [16]. Further research is needed to determine the long-term effectiveness and safety of this technique.

#### 5. *Advances in technology and technique*

The use of a newly developed technique, the microdebrider tonsillectomy, is becoming more prevalent for tonsillectomy, and it's believed to provide various benefits over conventional techniques like electrocautery [10]. Microdebrider intracapsular tonsillectomy is a surgical technique that involves the use of a rotary cutting device powered by electricity to remove tonsil tissue. The surgery is done under general anesthesia and necessitates a specific instrument known as a microdebrider [3]. Intravenous antibiotics and dexamethasone dosed by body weight are routinely administered [1]. The anesthesia induction and positioning of the patient are similar for most patients undergoing tonsillectomy, regardless of which technique is used to remove the tonsils. Typically, patients are placed in a supine position and orally intubated, with the endotracheal tube taped to the chin in the midline [19]. Although, some practitioners prefer to use a laryngeal mask airway [23], [24]. To enable the surgeon to sit or stand at the head of the bed, the bed is rotated by 90-180 degrees. The patient is positioned at the edge of the bed, and a small shoulder roll is placed. To keep the mouth open throughout the procedure, either a Crowe-Davis, McIvor, or Dingman mouth gag is inserted and expanded [19]. Pressure is applied to the nasopharynx for hemostasis. The tonsils are then removed by the microdebrider (for example; Using the Medtronic power system, 1800 rpm, variable setting; Medtronic, Minneapolis, Minn) and hemostasis of the tonsillar and adenoid beds can be achieved using monopolar suction electrocautery [1].

#### 6. *Limitations*

Intracapsular tonsillectomy is a relatively new procedure, there is currently limited data on its long-term outcomes and potential complications, which limits the conclusions that can be drawn. There are a limited number of studies available that have specifically examined the limitations of intracapsular tonsillectomy using a microdebrider. Finally, some studies use different patient populations, surgical techniques, and outcome measures, which could make it difficult to compare and synthesize their findings.

### V. CONCLUSION

Microdebrider intracapsular tonsillectomy is a surgical procedure used for various conditions related to the tonsils, with less tissue removed than traditional tonsillectomy. Traditional tonsillectomy seems to have a higher risk of bleeding and a longer time for recovery, Microdebrider intracapsular tonsillectomy method provides advantages such as less tissue damage, a lower risk of bleeding, and a faster recovery time. It causes less pain, has a shorter recovery time, and has fewer complications. However, there is a small risk of tonsil regrowth and the need for an additional procedure. The decision on which method to use depends on the patient's medical history and the surgeon's recommendation, and it is essential to understand potential complications and seek medical attention promptly if needed.

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