

**Bipolar scissors versus cold dissection
tonsillectomy**

Thesis

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Otorhinolaryngology

By

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Abstract

Bipolar scissors is one of the new surgical instruments which has been recently used in tonsillectomy. In this work, one hundred patients indicated for tonsillectomy were divided into two equal groups. The first group underwent bipolar scissors tonsillectomy, and the second one underwent the cold dissection technique. Bipolar scissors technique proved to be much better than the cold dissection tonsillectomy regarding the easiness of use, reduced intraoperative blood loss, and operative time which indirectly impacts the cost-effectiveness of this procedure. The disadvantages of the bipolar scissors include delayed postoperative pain, and thermal trauma to the tongue and oral mucosa. In this study, we concluded that bipolar scissors is proved to be safe and effective measure for tonsillectomy.

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I dedicate this work to the soul of my dear friend; **Moataz Bahgat**. Although he is no longer with us, he is forever remembered. Wish God blesses his soul in the heaven.

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List of Abbreviations

Abbreviation	Word
APC	Argon Plasma Coagulation.
CDL	Contact diode laser.
CO ₂ Laser	Carbon dioxide Laser.
CW	Continuous wave.
GABHS	Group A β hemolytic streptococcus.
HS	High significant difference.
KTP Laser	Potassium Titanyl Phosphate Laser.
LVSS	Ligasure Vessel Sealing System.
MIT	Microdebrider intracapsular tonsillectomy.
NS	No significant difference.
OHS	Obstructive hypopnea syndrome.
OSAS	Obstructive sleep apnea syndrome.
P value	Predictive value.
S.D	Standard deviation.
SRBD	Sleep-related breathing disorder.
UARS	Upper airway resistance syndrome.
VAS	Visual analogue scale.
VPI	Velopharyngeal insufficiency.
YAG Laser	Yttrium Aluminum Garnet Laser.

Infections and inflammatory diseases involving the pharynx, tonsils, and adenoids account for a significant proportion of childhood illnesses and pediatric healthcare expenditures. They often result in two of the most common surgical procedures of childhood; tonsillectomy and adenoidectomy **(Wiatrak and Woolley, 2005)**.

In the early twentieth century, tonsillectomy was the most popular procedure for treating various respiratory and systemic diseases with its popularity reaching a peak approximately 65 years ago. It began to decline with the advent of antibiotics **(Kornblut, 1987)**. In the 1960s and 1970s, one to two million tonsillectomies, adenoidectomies, or combined procedures were performed annually in the United States **(Shaikh et al., 1976)**.

Currently, these operations are performed at what appears to be about half the rate of those forty years ago. However, neither the indications for tonsillectomy nor the complications associated with the procedure have changed much **(Bluestone, 1985)**.

Over the years, various techniques have been described including cold dissection technique which is currently the most common method of tonsillectomy in the U.K., guillotine excision, electrocautery, suction diathermy dissection, cryosurgery,

ultrasonic removal, laser, monopolar and bipolar diathermy dissection **(Saleh et al., 1999)**. Cold dissection tonsillectomy is considered the gold standard technique, however, bipolar electrodissection tonsillectomy is one of the electrosurgical dissection methods, and its use for tonsil dissection had been advocated by some authors and hence popularized in many centers **(Pang et al., 1994; Brodsky et al., 1996)**.

Bipolar electrosurgical scissors is a new instrument that was originally designed for open surgery using a dual-function that cut and coagulate at the same time **(Winslow et al., 2000)**. Bipolar scissors tonsillectomy appears to combine the best of cold scissors dissection and electrosurgical techniques, allowing rapid tonsillar removal with minimal bleeding and desirable tissue effects **(Isaacson and Szeremeta, 1998)**.

Embryology of the tonsils

The second branchial pouch is visible in the fourth week of gestation and demonstrates canalization and branching in the eighth week. The tonsillar sinus is divided into a superior and inferior division by the *intratonsillar fold of Hammar* in the early second trimester. Lymphoid infiltration of the lamina propria occurs in the seventh month of intrauterine life. Primary follicles form late in gestation, but germinal center stimulation does not occur until shortly after birth. At birth, a vestigial tonsil is visible hidden between the tonsillar pillars. During the first year of life, there is rapid proliferation of lymphoid elements and formation of active germinal centers **(Isaacson and Parikh, 2008)** (Fig.1).

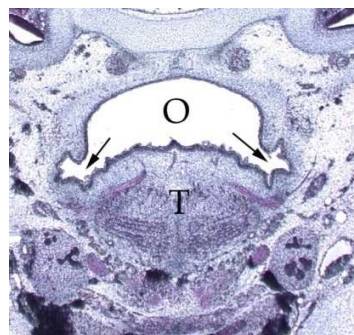


Fig. 1: 56 days post-conception — early formation of the tonsillar fossa (arrows). O, Oropharynx; T, tongue (After **Isaacson and Parikh, 2008**).

Waldeyer's Ring

Together the lingual tonsils anteriorly, the palatine tonsils laterally and the pharyngeal tonsils (adenoids) posterosuperiorly form a ring of lymphoid or adenoid tissue about the upper end of the pharynx known as *Waldeyer's tonsillar ring*. All the structures of Waldeyer's ring have a similar histology and presumably similar functions (**Wiatrak and Woolley, 2005**).

The Palatine Tonsils (*tonsillae palatinae tonsil*)

They represent the largest accumulation of lymphoid tissues in Waldeyer's ring and, in contrast to the lingual and pharyngeal tonsils, constitute a compact body with a definite thin capsule on its deep surface. The tonsillar crypts are blind tubules which arise from the epithelium on the surface of the tonsil and extend deeply into the tissues. The tonsillar capsule is a specialized portion of the pharyngobasilar fascia that covers the surface of the tonsil and extends into it to form septa that conduct the nerves and vessels, so the tonsil is not easily separated from its capsule, but the capsule is united largely by loose connective tissue to the pharyngeal muscles. The tonsil can be easily dissected from its normal position by separating the capsule from the muscle through

this loose connective tissue. The tonsillar fossa is composed of three muscles; the palatoglossus muscle (arch) which forms the anterior pillar, the palatopharyngeus muscle (arch), which is the posterior pillar, and the superior constrictor muscle of the pharynx, which forms the larger part of the tonsillar bed (**Hollinshead, 1982**) (Fig.2).

The muscular wall is thin, and immediately against it on the outer wall of the pharynx is the glossopharyngeal nerve. This nerve can be easily injured if the tonsillar bed is violated, and the nerve could be temporarily affected by edema following tonsillectomy that produces both a transient loss of taste over posterior third of the tongue and referred otalgia (**Wiatrak and Woolley, 2005**).

The palatine tonsil, however, does not completely fill the interval between the two arches, so that a small depression, the supratonsillar fossa, exists at the upper part of the interval. Further, the tonsil extends for a variable distance under cover of the glossopalatine arch, and is here covered by a reduplication of mucous membrane; the upper part of this fold reaches across the supratonsillar fossa, between the two arches, as a thin fold sometimes termed the *plica semilunaris*; the remainder of the fold is called the *plica triangularis*. Between the *plica triangularis* and the surface of the tonsil is a space known as the tonsillar sinus; in many cases, however, this sinus is obliterated by its walls becoming adherent. In the child, the tonsils are relatively larger than in the

adult, and about one-third of the tonsil is imbedded. After puberty the imbedded portion diminishes considerably in size and the tonsil assumes a disk-like form, flattened from side to side; the shape; and size of the tonsil, however, vary considerably in different individuals. The medial surface of the tonsil is free except anteriorly, where it is covered by the *plica triangularis*; it presents about twelve to fifteen orifices leading into small crypts or recesses from which numerous follicles branch out into the tonsillar substance **(Gray, 1918)**.

The arteries supplying the tonsil are the dorsalis linguæ from the lingual, the ascending palatine and tonsillar from the external maxillary, the ascending pharyngeal from the external carotid, the descending palatine branch of the internal maxillary, and a twig from the small meningeal.

The veins end in the tonsillar plexus, on the lateral side of the tonsil.

The nerves are derived from the sphenopalatine ganglion, and from the glossopharyngeal nerve **(Gray, 1918)**.