IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 10 Ser. 4 (October. 2025), PP 38-44
www.iosrjournals.org

Evaluation Of Surgical Outcomes Of Endoscopic Microdebrider Assisted Adenoidectomy In RIMS, Imphal

Chanwang Mongchan[1], Vanathu Mariyapragasam M[2], Ladeiti Hynniewta[3], Saurabh Shukla[4], Eepsita R Marak[5], Badaiahun Nongrum[6], Th Kalpana Devi[7], Oinam Priyokumar Singh[8], Sudhiranjan Thingbaijam[9]

[1-9]*(Department Of Otorhinolaryngology, Regional Institute Of Medical Sciences, Imphal, Manipur, India)*

Abstract:

Background*: Adenoids are nasopharyngeal lymphoid tissues provides immune defence against various microorganism. Adenoid hypertrophy causes obstructive sleep apnoea also cause serious consequences including cor-pulmonale, failure to thrive, permanent neurological damage, hypersomnolence, behavioural disturbances and developmental delay. Adenoidectomy by conventional blind curettage carries many complications. Powered instrumentation is an important tool for ENT surgeons. Further development is endoscopic power-assisted adenoidectomy with a microdebrider. Hence, this study conducted to determine the surgical outcomes of endoscopic microdebrider assisted adenoidectomy in terms of influence on the duration of surgery, intra-operative bleeding, recovery time and completeness of removal of the adenoid tissues and the complications.*

Materials and Methods*: A hospital based longitudinal study was conducted in 89 children underwent endoscopic microdebrider assisted adenoidectomy in our institute, for a period of 2 years from the month of January 2021 to December 2022.*

Results*: The mean age of the children was 8.9 years with preponderance of male gender (57.3%). Mean intraoperative time was 32.4 minutes with minimum intraoperative time of 24 mins and maximum of 55 minutes. Mean intraoperative blood loss was 40.1 ml. 94.4% recovered in 1 day after surgery. 97.7 % cases adenoid removed completely.*

Conclusion: *Endoscopic power assisted adenoidectomy with microdebrider technique can have considerable influence on the duration of surgery, intra-operative bleeding, recovery time and completeness of removal of the adenoid tissues.*

Key Word*: Microdebrider assisted adenoidectomy, Powered instrumentation, Adenoidectomy, Sleep disordered breathing, Nasal endoscopy*

Date of Submission: 12-10-2025 Date of Acceptance: 22-10-2025

I. Introduction

The adenoids are nasopharyngeal lymphoid tissues forming a part of Waldeyer ring first described in 1868 by Meyer.[1] Adenoid provide protection against various microorganisms and other toxins. The size of the adenoid increases during first 6 to 8 years and gradually decreases by adolescence. Enlarged adenoid may cause chronic nasal obstruction, rhinorrhoea, mouth breathing, snoring, recurrent sinusitis and recurrent otitis media with effusion.[2] Long term obstructive sleep apnoea due to adenoids can lead to serious consequences including cor-pulmonale, failure to thrive, permanent neuro-logical damage, dento-skeletal malocclusions, dentofacial changes, hypersomnolence, behavioural disturbances and developmental delay.[3,4]

Adenoidectomy is one of the most common surgical procedures performed in paediatric otolaryngological practice. The conventional adenoidectomy using curette was first described in 1885.[1] It performed blindly by most of the surgeons without visualizing the nasopharynx and leads inadequate adenoid tissue removal, eustachian tube scarring, bleeding and nasopharyngeal stenosis. In the modern surgical field, there are techniques employing direct vision with the advantage of reduced blood loss, and the ability to remove adenoid tissue from the choanae, while avoiding trauma to Eustachian tubes. Of these techniques those with largest clinical experience are the microdebrider and the suction coagulator, others are KTP laser, coblator plasma field device and harmonic scalpel. Single use instruments abolish any potential risk of infection transmission.[5]

The term ‘powered instrumentation’ refers to motor driven instruments that deliver continuous suction to the surgical site with cutting action. Power assisted instruments was initially designed for arthroscopic surgeries and then used for the sinonasal procedures. First used for adenoid removal by Yanagisawa.[6]

Powered instrumentation is an important tool for ENT surgeons. Further development is endoscopic power assisted adenoidectomy with microdebrider. This surgical technique can have considerable influence on the duration of surgery, intra-operative bleeding, recovery time and completeness of removal of the adenoid tissues. Hence, this study was conducted to determine the surgical outcomes of endoscopic microdebrider assisted adenoidectomy and the complications.

II. Material And Methods

Study Design: A hospital based longitudinal study

Study Location: Department of Otorhinolaryngology, RIMS, Imphal, Manipur

Study Duration: January 2021 to December 2022

Sample size: 89 cases

Sample size calculation: The Sample size was calculated based on the formula,

$N = 4PQ/L^2$

where,

P = 17%; proportion was taken from study conducted by Modi AT et al.[7]

Q = 100- P

= 100 – 17 = 83 (L= absolute allowable error = 8%)

Therefore,

N = 4 x 17 (100 – 17)/64

= 88.18 ~ 89

Hence, the calculated sample size required for the study was 89.

Sampling method:

Convenience sampling

Inclusion criteria:

1. Children with symptoms of obstructive sleep apnoea, mouth breathing and snoring or adenoid facies between age group 5-15 years
2. Adenoid hypertrophy confirmed by X-ray nasopharynx lateral view and nasal endoscopy (Fig. 1A) if the child is cooperative

Exclusion criteria:

1. Children with associated cleft palate or previous history of repair of cleft palate
2. Bleeding or coagulation defect
3. Cervical spine anomalies
4. Craniofacial abnormalities
5. Down syndrome

Study variables:

Independent variables	Dependent variables:
i. Age	**i.** Mean intraoperative time in minutes
ii. Sex	**ii.** Mean volume of intraoperative blood loss in ml
iii. Indications of adenoidectomy	**iii.** Proportion of children with intraoperative collateral damage
	iv. Proportion of children with completeness of removal of adenoid
	v. Proportion of children with recovery time in days
	vi. Proportion of children with any post operative complications

Procedure methodology:

Operational definitions:

Intraoperative time:

Defined as time taken from beginning of fixation of the mouth gag till the removal of the mouth gag and was recorded in minutes on a stop watch.

Intraoperative blood loss:

Defined as difference between the amount of fluid collected in the vacuum flask at the end of the procedure and the amount of saline used for irrigation. A three-inch size gauze piece when used for mopping and packing nasopharynx was counted and assumed to a corresponding blood loss of 10 ml.

Intraoperative collateral damage:

Defined as injury to eustachian tube opening, injury to nasal mucosa, damage to the muscles and posterior choana, injury to teeth, injury to lips, injury to gums, injury to anterior pillar, injury to uvula and cervical spine fracture during the surgical procedure.

Completeness of removal of adenoid:

A less than 20 % residual tissue is regarded as complete removal, 20-50 % as partial and more than 50 % residual as sub-optimal removal.

Recovery time:

Defined as number of days taken to return to normal activity as gauged by the patient or parents during the routine post operative follow up visit at 7th post-op day.

Complications:

Any complications following the procedure in the form of post operative haemorrhage, fever, neck stiffness was noted during the immediate post operative hospital stay. Complications like nasopharyngeal stenosis, velopharyngeal insufficiency and loss of vision were assessed at 4 weeks follow up.

Study tools:

1. Hopkins Karl Storz endoscope 0-degree, 30-degree (2.7mm/3mm)
2. Endoscope camera (Karl Storz)
3. Microdebrider console (Karl Storz unidrive SIII ECO) (Fig. 2A)
4. Microdebrider hand piece (Fig. 2B)
5. Microdebrider blades (Fig. 2C)
6. Stop watch clock

Procedure:

After preoperative investigations, informed written consent, assent for the study were taken. Endoscopic microdebrider assisted adenoidectomy technique was performed in supine position. Mouth kept open using Boyle Davis mouth gag and tongue blade. The soft palate was retracted using infant feeding tubes that were placed through nasal cavities and retrieved from the oropharynx. This helped to stabilize tonsillar pillars and pulls the uvula out of field. Bilateral nasal cavity packed with 4% Lignocaine 30ml + 5 ml Adrenaline (1:1000) soaked nasal packs.

Depending on age of the patient and nasal cavity size, 3 mm or 2.7 mm diameter endoscope was introduced through nasal cavity along with 40° angled, 4 mm Microdebrider blade passsed through the oral cavity with the blade at a speed of 1500 rpm in oscillating mode used for removal of adenoid tissues. The resection began from the choanal sill with a side-to-side sweeping motion of the microdebrider, progressing posteriorly till perimysium of superior constrictor reached (Fig. 1C) and inferiorly until the inferior border of the pad was reached. Care was taken to preserve the velopharyngeal function by leaving a rim of adenoid tissue just above the Passavant's ridge and keeping the tip of microdebrider under continuous endoscopic view throughout the operation to avoid injuries and damage to the nearby structures. Adenoids were removed completely under direct vision with endoscope and haemostasis achieved.

Intraoperative time was recorded in minutes, beginning from fixation of the mouth gag till the removal of the mouth gag. Intraoperative blood loss was calculated from the difference in amount of irrigation fluid used and the collected fluid in the vacuum flask. In addition, a three-inch gauze pieces when used for mopping and packing was counted and assumed to a corresponding blood loss of 10 ml. Intraoperative collateral damage was assessed in the operating theatre itself by looking at the injury to the surrounding structures and the surgeon performing the procedure notes this level of satisfaction. Completeness of removal of adenoid was assessed. Recovery period assessed during the post operative days. Any complications following the procedure were noted.

Statistical analysis

All the data was analysed using IBM SPSS version 21 (SPSS Inc., Chicago, IL). Descriptive statistics in the form of frequencies, percentages, means and standard deviations was used. Categorical variables like gender, completeness of removal of adenoid and complications are expressed as frequency and percentages. Continuous variables like age, intraoperative time, intraoperative blood loss and recovery time in days, are expressed as mean (SD) or median (range) depending on the type of distribution.

III. Result

This study was conducted among 89 children between the age group of 5 to 15 years admitted and undergoing endoscopic microdebrider assisted adenoidectomy in RIMS hospital.

Table 1. Age group of the children (N=89)

Age group	Number of patients	Percentage
5 to 10 years	66	74.1
11 to 15 years	23	25.9

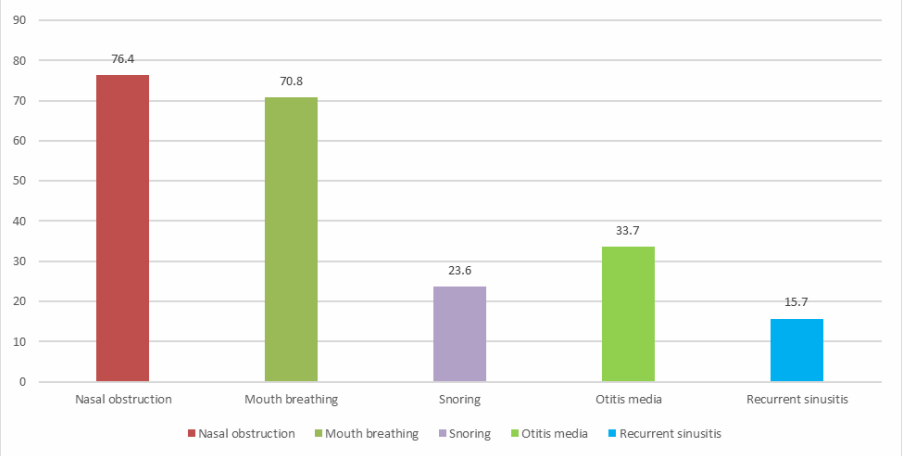
Table 1 shows the distribution of the children according to the age group. Majority of the children belonged to the age group of 5 to 10 years (74.1%). The mean (SD) age of the children was 8.9 (±2.5) years and median age was 9.0 years with minimum age of 5 years and maximum age of 15 years.

Table 2. Distribution of children according to gender (N=89)

Gender	Number of patients (n)	Percentage (%)
Male	51	57.3
Female	38	42.7

Table 2 shows preponderance of male gender (57.3%) and the ratio of M:F is 1.3:1.

Figure 1. Distribution of children according to indication for adenoidectomy* (N=89)



*multiple options

Figure 1 shows the distribution of the children according to the indications for adenoidectomy where most common indication was nasal obstruction (76.4%) followed by mouth breathing (70.8%), otitis media (33.7%), snoring (23.6%) and recurrent sinusitis (15.7%).

Table 3. Distribution of children according to iDuration of the surgery (in minutes) (N=89)

	Duration of the surgery(minutes)
Mean (SD)	32.4 (±5.5)
Median (range)	31.0 (24.0 -55.0)

Table 3 shows that the mean (SD) duration of the surgery for undergoing endoscopic microdebrider assisted adenoidectomy was 32.4 (±5.5) minutes and median was 31.0 min with minimum duration was 24 minutes and maximum was 55 minutes.

Table 4. Distribution of children according to intraoperative blood loss (in ml)(N=89)

	Intraoperative blood loss (ml)
Mean (SD)	40.1 (±10.5)
Median (range)	38.0 (25.0 -80.0)

Table 4 shows that the mean (SD) intraoperative blood loss due to endoscopic microdebrider assisted adenoidectomy was 40.1 (±10.5) ml and median was 38.0 ml with minimum intraoperative blood loss of 25 ml and maximum intraoperative blood loss of 80 ml.

Table 5. Recovery time of the children after undergoing endoscopic microdebrider assisted adenoidectomy (N=89)

Recovery time (days)	Number of patients (n)	Percentage (%)
One day	84	94.4
Two days	5	5.6

Table 5 shows that majority of the children (94.4%) recovered in one day and five children recovered after two days of surgery. No intraoperative collateral damage was seen in this study.

Figure 2: Completeness of removal of adenoid (N=89)

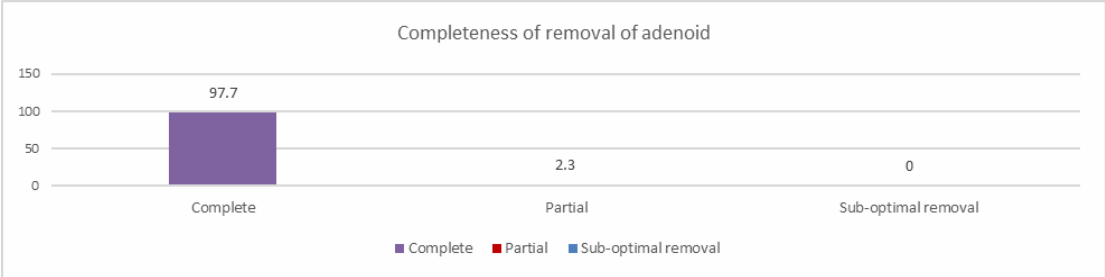


Figure 2 shows that the removal of the adenoid was complete in almost all the children except two children where the removal was partial removal.

Table 6. Immediate post operative complication during the hospital stays (N=89)

Complications	Number of patients (n)	Percentage (%)
Fever	1	1.1
Hypernasality	9	10.1
Neck pain	7	7.9
Postoperative bleeding (secondary haemorrhage)	0	0

*multiple response

Table 6 shows the immediate post operative complications during the hospital stay includes fever among one case (1.1%), hypernasality among nine cases (10.1%) and neck pain among seven cases(7.9%).

IV. Discussion

Adenoidectomy is one of the most common surgeries performed among children in ENT practice. Thus, the operating area is relatively narrow and the surgeon has to be experienced before performing the operation. New technique like microdebrider assisted adenoidectomy needs a set of endoscopic surgical instruments.[4] This study was conducted to determine the surgical outcomes of endoscopic microdebrider assisted adenoidectomy and its complications.

Our study reported that among the 89 children who underwent endoscopic microdebrider assisted adenoidectomy, the mean (SD) age of the children was 8.9 (±2.5) years and minimum age of 5 years and maximum age of 15 years. This finding was in accordance with the study conducted by Pagella F et al.[8]

We found male preponderance (57.3%) among those who underwent endoscopic microdebrider assisted adenoidectomy. Studies conducted by Aref ZF et al[9], Shaweta et al[10] also showed that majority of the children were male.

In our study showed that the most common indications for adenoidectomy was nasal obstruction (76.4%) followed by mouth breathing (70.8%). Comparable findings were seen in the study conducted by Manhas M et al[11] where the most common complaint was mouth breathing with snoring.

This study reported that the mean (SD) intraoperative time for surgery was 32.4 (±5.5) minutes and median was 31 minutes with minimum duration of surgery was 24 minutes and maximum duration was 55 minutes. Results were comparable studies conducted by Basista et al[12] and reported that the average operative time was 20 min (15-26 min), Juneja et al[13] showed 34.08 min (range 15-60 min). Some other studies by Somani et al[14] reported the average operative time was 12 min (range: 8–16 min), Alharbi et al[15] showed mean operative time 12.9±4.3 min, Anand et al[16] showed mean was 12 min 10 seconds and Das et al[17] showed the total duration of endoscopic microdebrider assisted adenoidectomy was 14 minutes 45 seconds. Though the precise steps of adenoidectomy take very less time around 4-8 minutes, we considered from beginning of fixation of the mouth gag till the removal of the mouth gag and as a result, the time taken in our study may seem longer than the studies mentioned above.

The mean (SD) intraoperative blood loss for undergoing endoscopic microdebrider assisted adenoidectomy in our study was 40.1 (±10.5) ml and median was 38.0 ml with minimum intraoperative blood loss of 25 ml and maximum intraoperative blood loss of 80 ml. This is almost similar to the blood loss in studies by Wadhera et al.[18], Datta et al[19], Harugop et al[20] blood loss was 77.30 ml which were higher than our finding. Studies by Alharbi et al[15] was 13.5±2.9 ml, Stanislaw et al[21] was 15ml which was significantly lesser than our study.

No intraoperative collateral damage was seen in this study and the surgeons were fully satisfied with the procedure. Regarding the removal of adenoid almost all children had complete removal except two children where the removal was partial (20-50%). Similarly, Somani et al[14] reported no collateral damage to surrounding structures and surgeon satisfaction was high. Study conducted by Datta et al[19] reported mild trauma to the nasal mucosa over the septum in five cases and one case had epistaxis.

The immediate post-operative complications in our study during the hospital stays after undergoing adenoidectomy included fever among one case (1.1%), neck pain among seven children (7.9%) and hypernasality among nine children (10.1%). The cause of fever in one child was found to be viral fever and no local cause could be found. Similar finding was reported in the study by Somani et al.[14]

In our study there was none of the children with any post operative complications at the time of four weeks follow up after undergoing endoscopic microdebrider assisted adenoidectomy. Similarly, no complications were reported in studies by Ferreira et al.[22] A study by Jaber et al[23] reported complications like velopharyngeal incompetence in three patients, reactionary haemorrhage in three patients.

Limitations:

One of the study's limitations is relatively lesser sample size hence the issue of generalization. The efficacy of the micro debridement could not be well established owing to the fact that there was no comparison and the study participants were not randomly selected which could well be a source of selection bias and hence the internal validity. However, it could be argued that since a representative sample size was calculated, this study results could be generalizable to the population of the similar characteristics. Even though the equipment was costly and requires replacement, which could have limited our study, we were able to procure the equipment from the hospital which made it possible to complete the sample. Another shortcoming is that the resected tissue is not available for histopathological examination. Hence larger randomized trials is warranted for increasing the robustness of the study results.

V. Conclusion

This study was conducted among 89 children between the age group of 5 to 15 years admitted and undergoing endoscopic microdebrider assisted adenoidectomy in RIMS hospital. The mean (SD) age of the children was 8.9 (±2.5) years. More than half (57.3%) of the children were of male gender. The most common indication of adenoidectomy was nasal obstruction which was complaint by three-fourth of the children. The mean (SD) duration of surgery was 32.4 (±5.5) minutes. The mean (SD) intraoperative blood loss was 40.1 (±10.5) ml. Almost all the children recovered by one day following the surgery and five children recovered by two days. No intraoperative collateral damage was seen in this study. The removal of the adenoid was complete in almost all the children except two children where the removal was partial. The immediate post operative complications during the hospital stays after undergoing adenoidectomy included fever among one children, hypernasality among nine children and neck pain among seven children. None of the children had any post operative complications at the time of four weeks follow up after undergoing the surgery. It can be recommended that a comparative study with different procedures of adenoidectomy at multicentric level with larger sample size can help in determining the surgical outcomes of endoscopic microdebrider assisted adenoidectomy and its complications.

References

[1]. Thornval A. Wilhelm Meyer And The Adenoids. Arch Otolaryngol Head Neck Surg. 1969 Sept;90:383-86.
[2]. Tankel JW, Cheesman AD. Symptom Relief By Adenoidectomy And Relationship To Adenoid And Post Nasal Airway Size. J Laryngol Otol. 1986;100(6):637-40.
[3]. Bronillette RT, Fernbach SK, Hunt CE. Obstructive Sleep Apnoea In Infants And Children. J Pediatr. 1982;100(1):31-40.
[4]. Rubin RM. Effects Of Nasal Airway Obstruction On Facial Growth. Ear Nose Throat J. 1987;66:44-53.
[5]. Walker P. Pediatric Adenoidectomy Under Vision Using Suction Diathermy Ablation. Laryngoscope. 2001;111:2173–77.
[6]. Becker DG. Powered Instrumentation In Surgery Of The Nose And Paranasal Sinuses. Otolaryngol Head Neck Surg. 2000;8(1):18-21.
[7]. Modi AT, Raval JB, Aiyer RG, Shah PC. Comparative Study Between Conventional Curettage Adenoidectomy Versus Endoscopic Microdebrider Assisted Adenoidectomy: Our Experience. Indian J Otolaryngol And Head Neck Surgery. 2020 Jul 9:1-6.
[8]. Pagella F, Matti E, Colombo A, Giourgos G, Mira E. How We Do It: A Combined Method Of Traditional Curette And Power-Assisted Endoscopic Adenoidectomy. Actaotolaryngol. 2009 May;129(5):556-9.
[9]. Aref ZF, Taya UK, Abdelmaksoud AA, Gahlan AA. Endoscopically Assisted Microdebrider Adenoidectomy Versus Conventional Curettage Adenoidectomy.
[10]. Shaweta, Azad RK, Minhas RS, Mohindroo S. Comparison Of Microdebrider Assisted Adenoidectomy And Adenoid Curette Adenoidectomy. Int J Otolaryngol Head Neck Surg. 2018 May;4(3):819-22.
[11]. Manhas M, Deva FA, Sharma S, Koul D, Gul N, Jamwal PS, Et Al. Endoscopic Adenoidectomy Replacing The Outdated Curette Adenoidectomy: Comparison Of The Two Methods At A Tertiary Care Centre. Indian J Otolaryngol And Head Neck Sur. 2022 Mar 21:1-7.
[12]. Basista H, Saxena G, Modwal A, Prasad B. Endoscopic Adenoidectomy With Microdebrider. Sch J App Med Sci. 2015;3(5B):1906-09.
[13]. Juneja R, Meher R, Raj A, Rathore P, Wadhwa V, Arora N. Endoscopic Assisted Powered Adenoidectomy- A Randomised Controlled Trial. J Laryngol Otol. 2019;133:289-93.
[14]. Somani SS, Naik CS, Bangad SV. Endoscopic Adenoidectomy With Microdebrider. Indian J Otolaryngol Head Neck Surg. 2010 October;62(4):427-31.
[15]. Alharbi F, Ahmed MR, Juraibi WA. Microdebrider Assisted Powered Adenoidectomy: A Prospective Study. Egypt J Otolaryngol. 2019;35:37-40.
[16]. Anand V, Sarin V, Singh B. Changing Trends In Adenoidectomy. Indian J Otolaryngol Head Neck Surg. 2014 December;16:375-80.

[17]. Das AT, Prakash SB, Priyadarshini V. Combined Conventional And Endoscopic Microdebrider Assisted Adenoidectomy. JCDR. 2017 February;11(2):5-7.
[18]. Wadhera R, Vashist A, Kumar, P, Ghai A. Endoscopic Adenoidectomy With Microdebrider. Indian J Otolaryngol Head Neck Surg. 2021;2(1):1-5.
[19]. Datta R, Singh VP, Deshpal. Conventional Versus Endoscopic Powered Adenoidectomy: A Comparative Study. Med J Armed Forces India. 2009;65:308-12.
[20]. Harugop AS, Soni S, Tejaswini JS. Efficacy And Safety Of Microdebrider Assisted Adenoidectomy Over Conventional Adenoidectomy. Bengal J Otolaryngol Head Neck Surg. 2020 April;28(1):59-66.
[21]. Stanislaw P, Koltai PJ, Fenstel PJ. Comparison Of Power Assisted Adenoidectomy Versus Adenoid Curette Adenoidectomy, Arch Otolaryngol Head Neck Surg. 2000;126(7):845-49.
[22]. Ferreira MS, Mangussi-Gomes J, Ximendes R, Evangelista AR, Miranda EL, Garcia LB, Et Al. Comparison Of Three Different Adenoidectomy Techniques In Children - Has The Conventional Technique Been Surpassed? Int J Pediatrotorhinolaryngol. 2018 Jan;104:145-49.
[23]. Jaber MR. Complications Of Microdebrider Assisted Endoscopic Adenoidectomy. Currpediatr Res2021; 25 (6): 626-29.

Figures

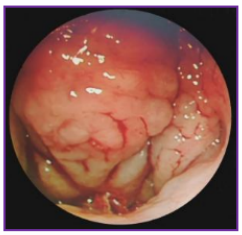


Figure 1A. Pre-op Grade III Adenoid

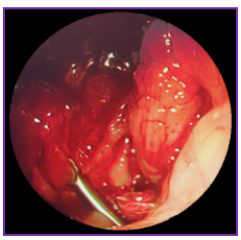


Figure 1B. Intraoperative adenoidectomy with microdebrider

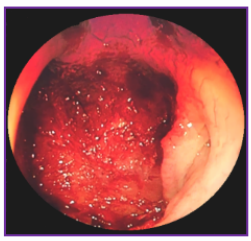


Figure 1C. After completion of adenoidectomy

Figure 2A. Karl Storz Microdebrider console

Figure 2B. Handpiece (Karl Storz)

Figure 2C. 40 degree angled Microdebrider blades