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# **RESEARCH ARTICLE**

# ENDOSCOPY ASSISTED ROUTINE ORAL MAXILLOFACIAL SURGICAL PROCEDURES

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#### **ABSTRACT:**

**Purpose**: The purpose of this study is to demonstrate the feasibility of incorporating endoscope as an adjunctive armamentarium in diagnosis, and gaining enhanced visualization for surgical access during routine minor oral and maxillofacial procedures. **Materials and Methods**: 4 mm diameter  $0^{\circ}$  and  $30^{\circ}$  rigid endoscope with 250 watt halogen light source through fiber optic cable from Serwell Medi Equip Pvt Ltd Chennai was used in varying clinical situations on 7 patients. **Results**: All the incisional biopsy procedures performed were characteristic of the fact they presented in surgically inaccessible areas, where the use of endoscope facilitated additional access and visualization. 2 treated cases of cystic pathologies were assessed for the presence of any remnant tissues on the cystic wall with the aid of endoscope (1 patient on follow-up and another patient immediately after treatment). The use of endoscope in inferior alveolar neurectomy allowed for easy identification of the superior limit of the nerve at its entrance in to the mandibular foramen, which otherwise would have required extensive retraction for visualization. **Conclusion**: At the end of this limited case series study it can be inferred that endoscope can be used as an essential adjunct to the regular armamentarium employed and once its use is understood, it can be incorporated for various procedures in the maxillofacial region. Its application can be extended to all facets of oral and maxillofacial surgery in the near future.

Key words: Endoscope, Endoscopic assisted surgery

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#### INTRODUCTION

The use of endoscopes dates back to as early as the 1800's, following their invention and use in general surgery. Application of endoscopes for maxillofacial region was first demonstrated by Ohnishi et al in 1975, and used it for arthroscopic temporomandibular joint surgery.<sup>4</sup> Since then the use of endoscopes for maxillofacial surgery have extended to trauma, orthognathic surgery, salivary gland diseases, maxillary sinus and pathologies of the jaw bones.

#### Materials and Methods:

Description of the Apparatus: For all the 7 cases presented in this limited study, a 4mm diameter,  $0^{\circ}$  and  $30^{\circ}$  rigid endoscope with a 250 watt halogen light was used. (Serwell Medi Equip Pvt. Ltd., India)

## Case Records:

7 patients who reported to the Division of Oral & Maxillofacial Surgery, Rajah Muthiah Dental College & Hospital, were included in this study. The presenting complaints of these patients and the proposed manner in which we decided to use endoscope on these patients are tabulated (*Table 1*). Following routine clinical, radiological and hematological investigations, all the patients were taken up for endoscopic-assisted maxillofacial procedures under local anesthesia in a day care setting (cases 1, 3, 4, 6 & 7) ) and 2 patients under general anesthesia (cases 2 and 5). Of the 7 patients treated – 3 therapeutic, 2 diagnostic, 1 confirmatory and 1 follow-up procedure was accomplished with the use of rigid endoscope. (*Serwell Medi Equip Pvt. Ltd., India*) Fig 1



Fig 1: 4mm diameter, 0° and 30° rigid endoscope with a 250 watt halogen light was used. (Serwell Medi Equip Pvt. Ltd., India)

At the end of this limited case study, it allowed us to concur that: the incorporation and use of endoscope during routine oral and maxillofacial procedure can in a substantial way prove to be of great assistance for visualization during surgical access, serve as a versatile adjunctive armamentarium, and facilitate better post operative sequelae. The summary of results is tabulated below (**Table 1**).



#### **DISCUSSION**:

The practice of minimally invasive surgery has gained rapid momentum in recent years and its advent has led to a concurrent increase in the number of procedures performed on a routine basis. Endoscopic assisted maxillofacial surgeries have come to become a mainstay in practice for a variety of clinical situations. The uses of endoscopes for definitive procedures in general surgery and gynecology have been well documented. <sup>4</sup> Their application in oral and maxillofacial surgery can be broadly categorized as diagnostic, therapeutic, confirmatory and for follow up of treated cases.

Endoscopy is defined as "the examination of the interior of a canal or hollow viscus by means of an endoscope." The inherent anatomy of the maxillofacial region lends itself amenable to this technique. <sup>6</sup> Presently, the use of endoscopic assisted surgery has been reported in the management of zygomatic complex fractures <sup>5</sup>, in bilateral sagittal split ramus osteotomy <sup>4</sup>, diagnosis and treatment of obstructive salivary gland diseases<sup>8</sup>, guided biopsy of mandibular cystic lesions<sup>6</sup>, exploration of cystic cavities after cystotomy<sup>1</sup>, surgery for inflammatory maxillary sinus disease<sup>7</sup>, surgery for chronic sinusitis with antrochonal polyp <sup>3</sup> and retrieval of dental implants from maxillary sinus <sup>2</sup>. Other areas of application include facial esthetic surgery such as brow lift, removal of ectopic mandibular third molars present at distant sites such as condyle, root retrieval from maxillary sinus through middle meatus antrostomy, and foreign body retrieval from nose, ear and paranasal sinuses. A summary of various applications of the use of endoscope in maxillofacial surgery are listed below (**Table 2**).

In the present study, the use of the endoscope was limited to being adjunctive armamentarium. In 2 cases (cases 3 and 4) of right side inferior alveolar nerve neuralgia where inferior alveolar neurectomy was performed, the use of endoscope allowed ready and easy visualization of the mandibular foramen on the medial aspect of the ramus. In the patient with complaint of limited mouth opening (case 1), initially presumed to be oral submucous fibrosis because of the associated deleterious habits, the use of endoscope for intraoral examination allowed for the detection and visualization of an ulcero-proliferative lesion distal to 18, which could have not been visualized on routine clinical examination. A subsequent incisional biopsy and a histopathological examination determined the lesion to be squamous cell carcinoma. Examination of both cystic cavities in the mandible allowed for confirmation immediately and on follow up, absence of any remnant tissue or abnormal proliferations (cases 6 and 7). The potential for development of ameloblastomas and even odontogenic carcinomas in the walls of odontogenic cysts has been documented.<sup>1</sup> The use of endoscope in cystic cavities can also be extended for internal examination of large jaw cysts that may contain regional neoplastic processes within the cystic lining. Such areas are difficult to inspect with the standard "bony window technique." <sup>4</sup> Also in cases where the cystic lesion is located in the body of the mandible and extending in to the ramus, the curvature of the mandible does not permit direct visualization of that part of the cyst. <sup>1</sup> Under such circumstances the use of semi-rigid or flexible endoscope allows for visual inspection and also facilitates biopsy. Endoscopic Sinus Surgery (ESS) is principally used to address obstruction of the ostiomeatal complex. <sup>7</sup> In the present study nasal



endoscopy was successfully employed for both visualization and treatment of sinus and nasal pathologies (cases 2 and 5).

The benefits of the endoscopic assisted procedures include direct visualization of an illuminated and magnified operating field, small and remotely placed incisions that result in inconspicuous scars, minimal dissection and manipulation of tissues with a concomitant decrease in pain and swelling, minimal post operative morbidity and potential cost saving due to decreased operating room use and shorter duration of stay.

#### Table 1: Summary of Results

Cases	Presenting complaint	Provisional Diagnosis	Proposed manner of use of Endoscope		Outcomes
Case 1 (Fig 2A/2B)	Restrictedmouthopening (IID < 3mm)	? Oral Submucous fibrosis	Diagnostic	Endoscopic assisted biopsy of an ulcero- proliferative mass detected during endoscopic examination	HP diagnosis: Squamous Cell Carcinoma
Case 2 (Fig 7)	Pain, sense of obstruction and unease in relation to the left nostril	? Nasal polyp	Diagnostic	Biopsy of the mass through nasal endoscopy	HP diagnosis: Inflammatory polyp
Case 3 (Fig 3A/3B)	Pain in relation to the right side of the face	Rt side Inferior Alveolar Neuralgia	Therapeutic	Endoscopic assisted right inferior alveolar nerve neurectomy	Patient free of symptoms
Case 4	Pain in relation to the right side of the face	Rt side Inferior Alveolar Neuralgia	Therapeutic	Endoscopic assisted right inferior alveolar nerve neurectomy	Patient free of symptoms



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Case 5 (Fig 6A/6B)	Continuous post nasal drip, sense of congestion in the nostrils and occasional episodes of headache	Chronic maxillary sinusitis	Therapeutic	Endoscopic assisted right and left middle meatus antrostomy	Patient free of symptoms
Case 6 (Fig 5)	Pain and swelling in relation to right posterior mandible (46, 47, 48 region) with episodes purulent discharge	Periapical cyst	Confirmatory	Endoscopic assisted examination of the cystic cavity after enucleation	Confirmation of cystic cavity free of any residual disease
Case 7 (Fig 4)	Initially presented with complaints of pain in relation to right posterior mandible. OPG revealed radiolucency in relation to angle- ascending ramus. Cystostomy was performed and specimen sent for HPE	Odontogenic keratogenic tumor	Follow-up	Endoscopic assisted examination of the cavity after cystotomy on follow up	Presence of granulation tissue suggestive of healing

## Table 2: Applications of Endoscope for Maxillofacial Procedures

Management of zygomatic complex fractures <sup>5</sup>, Bilateral sagittal split ramus osteotomy <sup>4</sup>, Diagnosis and treatment of obstructive salivary gland diseases<sup>8</sup>, Guided biopsy of mandibular cystic lesions<sup>6</sup>, Exploration of cystic cavities after cystotomy<sup>1</sup>, Surgery for inflammatory maxillary sinus disease<sup>7</sup>, Surgery for chronic sinusitis with antrochonal polyp <sup>3</sup> Retrieval of dental implants from maxillary sinus <sup>2</sup>. Facial esthetic surgery such as brow lift, Removal of ectopic mandibular third molars Root retrieval from maxillary sinus Foreign body retrieval from nose, ear and paranasal sinuses



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Fig 2A: Restricted Mouth Opening with 3 mm IID



Fig 3A: Resected right inferior alveolar nerve



Fig 4: Endoscopic view of treated cystic cavity (OKC) on follow up. 1. Granulation tissue 2. Clear bony margins 3. Bony spicule

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Fig 2B: Endoscopic view of lesion distal to 18. Upper right III Molar 2. Lower right III Molar 3. Tissue for biopsy 4. Buccal Mucosa



Fig 3B: Endoscopic view of the nerve at its superior limit. 1. Right Inferior alveolar nerve 2. Superior limit of nerve at mandibular foramen 3. Scissors used for dissection



Fig 5: Endoscopic view of the cystic cavity immediately following cyst enucleation. 1. Bony septae 2. Lining free bony cavity 3. Lingual cortical plate perforation



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Fig 6A: Endoscopic view of left maxillary sinus 1. Pus discharge in the left maxillary sinus



Fig 7 Endoscopic view of the left maxillary sinus. 1. Incisional biopsy of intranasal mass

## **CONCLUSION:**

But for the cost of procuring an endoscope unit, training and requisite technical expertise, it can be definitively stated that endoscopic assisted routine maxillofacial procedures have a great impact and tremendous bearing on practice of the profession.

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Fig 6A: Endoscopic view of following nasal endoscopy through left nostril. 2. Ball probe showing the maxillary osteum after antrostomy



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