

CURRENT DIAGNOSIS AND TREATMENT OF RHINOSINUSITIS - FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS)

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One of the most significant advances in Otolaryngology - Head and Neck Surgery has been in the diagnosis and treatment of rhinosinusitis. The subject of rhinosinusitis may initially appear uncomplicated but recent developments in Rhinology have more to offer than the traditional sinus X-rays, antibiotics, nasal decongestants, antral washouts, anrostomies or Caldwell-Luc procedures.

The diagnosis of sinusitis may at times be problematic. Anterior rhinoscopy with the naked eye is a comparatively inaccurate method of examination in the light of the availability of flexible or rigid nasoendoscopes. The invention of the Hopkins Rod Telescope brought about a magnified and better illuminated view of the nasal cavity and its clefts and added a new dimension in nasal examination. The early work of Messerklinger⁽¹⁾ laid the foundations of endoscopy of the nose, in addition to demonstrating the pathways of mucociliary clearance of the sinuses in human nasal mucosa. He demonstrated that the secretions from the larger sinuses reach the natural ostia via well-defined secretion pathways. The work of Messerklinger⁽¹⁾ was further developed by Stammberger⁽²⁾ and Kennedy⁽³⁾. These workers revolutionised endoscopic diagnosis, pathophysiology and the treatment of rhinosinusitis, with the development of the Messerklinger Technique of Functional Endoscopic Sinus Surgery (FESS). The tenets on which this technique is based are:

- 1) Most paranasal sinus infection are rhinogenic in origin and spread to the sinuses from the nose.
- 2) In chronic or recurrent infections, the focus of infection is in the stenotic clefts of the anterior ethmoids, particularly the ethmoidal infundibulum and frontal recesses. These stenotic areas harbour foci of infection. Eradication of these foci promotes physiological drainage and ventilation of the dependent sinuses.

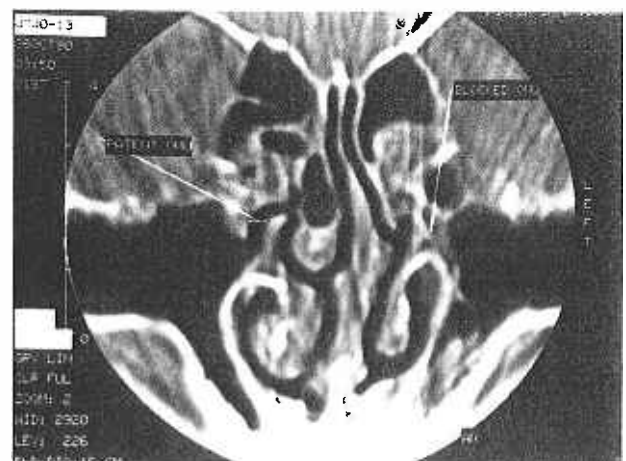
Today, these concepts are generally accepted and have since added a new dimension to the diagnosis and treatment of rhinosinusitis. The earlier traditional operations eg the Caldwell-Luc operation for maxillary sinusitis and external fronto-ethmoidectomy operations, have focused primarily on the removal of diseased mucosa from these sinuses rather than determining and eradicating the focus of infection in the anterior ethmoids and infundibular area. Many of these radical operations have given way to "Functional Endoscopic Sinus Surgery (FESS)", a form of minimally invasive surgery where the exact pathology, as assessed by endoscopy and CT Scans is

determined and eradicated, leaving behind normal functioning structures. This technique has enhanced the physicians' ability to evaluate and treat patients better, both medically and surgically.

The FESS technique essentially involves the examination of the nose with a rigid endoscope, paying particular attention to the middle-meatus of the lateral nasal wall. As a therapeutic procedure, the rigid endoscope is used to visualise the area of pathology on one hand, and surgical instruments are placed parallel to the endoscope. The diseased area is eradicated preserving as much of normal tissue as possible, in particular, the middle turbinate. With this technique, the amount of pathological tissue removed is tailored to the pathology present and if need be a total ethmoidal-sphenoidectomy can be performed endoscopically exposing the anterior skull base from below.

With the development of naso-endoscopy, radiological attention was focused not on the major sinuses per se but on the lateral wall of the nose. Conventional sinus radiographs did not detail the anatomical variations and pathology in the lateral nasal wall. In fact, there have been instances where normal plain sinus radiographs have erroneously excluded the presence of sinusitis. Before the CT Scans were available, conventional tomography of the paranasal sinuses were performed. But today, the coronal CT Scan of the paranasal sinus is the investigation of the choice for suspected sinus pathology after nasoendoscopy. To further maximise the yield and benefit from coronal CT Scans, Zinreich⁽⁴⁾ has detailed the technique of coronal CT for FESS. The Coronal CT (Fig 1) of a patient with chronic nasal obstruction details the abnormalities detected which were not visualised by plain sinus radiographs, ie a deviated septum with an obstructed osteo-meatal complex in the infundibular area. This diagnosis would have been missed

Fig 1 - Coronal CT of a patient with chronic nasal obstruction showing a deviated nasal septum and obstructed osteo-meatal unit (OMU) on the left.



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Fig 2 - Endoscopic view of small nasal polyps (arrow) in the middle meatus. Courtesy of Prof. Gerald Wolf. m - middle turbinate, s - septum

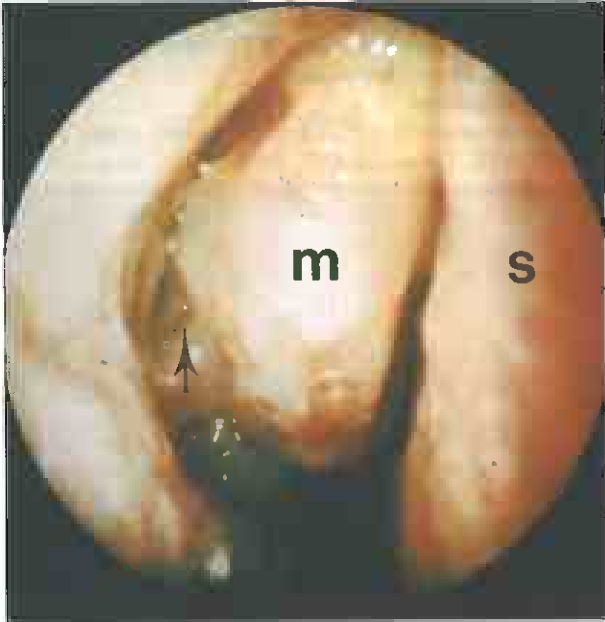


Fig 3 - Endoscopic view of a Concha Bullosa obstructing the middle meatus. Courtesy of Prof. Gerald Wolf. s - septum, c - concha bullosa



Fig 4 - Corresponding Coronal CT of patient in Fig 3 showing obstructed hiatus semilunaris due to concha bullosa Courtesy of Prof. Gerald Wolf



if anterior rhinoscopy and plain sinus radiographs were performed and the nose assessed in the traditional way. This patient responded well to a septoplasty and FESS.

With the availability of the naso-endoscope, the thorough evaluation of the 'Nose Case' would require a nasoendoscopy (flexible or rigid). Small nasal polyps within the middle meatus would be missed on anterior rhinoscopy with the naked eye, as shown in Fig 2. Rigid nasoendoscopy in another patient showed a concha bullosa of a right middle turbinate with hyperplastic mucosa obstructing the hiatus semilunaris (Fig 3). The corresponding CT Scan demonstrates the obstructed hiatus semilunaris (Fig 4). FESS would be the ideal technique to deal with these cases where pin point precision surgery would relieve the patient of his symptoms. Also note that the maxillary antrum is free of disease radiologically. After a complete history and nasoendoscopy, a decision should be taken whether to do a coronal CT Scan. Plain sinus radiographs have a limited role today for the diagnosis and assessment of patients for FESS.

Functional Endoscopic Sinus Surgery is a difficult therapeutic operation to do well. The anatomy of the nose and sinuses are very varied, with the anterior cranial fossa, optic nerve and orbit close to one's operative field. The therapeutic procedure should be done by an experienced surgeon who has had proper cadaveric dissection experience with endoscopes. Hence, a certain degree of caution should be exercised on who does Functional Endoscopic Sinus Surgery (FESS). There is a great temptation to read about FESS, attend a course of FESS and then proceed with an operation on a patient. This approach has to be modified, and some degree of control has to be exercised. An over-enthusiastic surgeon could lead to problems which could not only cause harm to the patient but also ruin a surgeon! The approach should be to select a group of competent surgeons who would undergo formal training and more importantly have an Endoscopic Sinus Surgery Laboratory within the department akin to the Temporal Bone Laboratory which all Otolaryngologists are familiar with. With better training in FESS, this will produce even better results and lower the morbidity and mortality of the procedure.

In spite of the surge of functional endoscopic sinus procedures being performed, there is still a role for conventional radical sinus surgery especially in polypoidal frontal sinusitis and irreversible diseased mucosa in the maxillary antrum after FESS has failed. The FESS concept can still be an adjunctive procedure with regards to the diagnosis of pathology in these radical operations. FESS would also be of limited use in patients with gross nasal polyposis as shown in Fig 5. The other

Fig 5 - Patient with gross nasal polyposis where FESS would not be suitable



contraindications would be if there is bony obstruction or scarring around the frontal sinus ostium, intracranial complications, osteitis, osteomyelitis of the frontal bone or invasive malignant disease of the nose and paranasal sinuses.

Since the foundations of FESS were laid, there has been an exponential number of these procedures being performed in North America. This has led to an evaluation by the American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS)⁽⁹⁾. The controversial points that need to be addressed are as follows:

- 1) Have patients undergoing this procedure had adequate medical therapy?
- 2) Does every patient with an abnormal CT Scan have to undergo surgery?
- 3) What are the long-term benefits of FESS?

These issues would have to be evaluated and the Rhinology and Paranasal Sinus Committee and Quality Assurance Subcommittee have been appointed by the AAO-HNS to look into these questions.

The FESS operation has emerged as the diagnostic and therapeutic procedure of choice in chronic or recurrent rhinosinusitis in the selected patient. If well performed, it provides gratifying results to patients who would have undergone radical open surgery of the nose and sinuses. However if poorly performed, there is significant morbidity and potential mortality⁽⁶⁾. FESS has redefined the pathogenesis and diagnosis of rhinosinusitis and as a therapeutic procedure, revolutionised radical sinus surgery to the state-of-the-art minimal invasive surgery for the patients for which FESS is suitable.

In conclusion, the Messerklinger Technique for FESS is primarily a *diagnostic* concept based on the pathophysiology

of sinusitis. With the aid of conventional or computed tomography of the paranasal sinuses, an accurate diagnosis can be obtained, a prerequisite to proper management of rhinosinusitis. The focus on operating on the larger sinuses can be avoided if pathology is identified in the infundibulum or frontal recess. The Messerklinger Technique has its indications as well as specific problems.

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