SIALOENDOSCOPY - A NEW APPROACH TO SALIVARY GLAND OBSTRUCTIVE PATHOLOGY –A REVIEW

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ABSTRACT
Sialoendoscopy is a novel minimally invasive technique to explore the salivary duct system and to treat obstructive salivary disease. It can be used either as a diagnostic method to rule out inflammatory processes in the parotid and submandibular glands (diagnostic sialoendoscopy) or to treat pathological areas (stenosis, extract foreign bodies, or sialolithiasis) through the use of appropriate instruments (interventional sialoendoscopy). This paper reviews the role of sialoendoscopic procedure in the diagnosis, treatment and postoperative management of sialadenitis, sialolithiasis and other obstructive salivary gland diseases.

KEYWORDS: Salivary glands, Sialadenitis, Sialendoscopy, Sialoliths.

INTRODUCTION
Salivary gland diseases were first described in ancient times by Hippocrates, 460-370 BC. Ever since the knowledge of salivary gland diseases, the treatment protocol has changed over the years. The ‘endoscopic revolution’ triggered by Philip Bozzini and Desmereaux has made dramatic changes in almost all the surgical specialities. The endoscopic approach has not spared salivary gland pathology. In the early 1990s, endoscopy of salivary gland emerged and has caused a drastic change in the treatment protocol of salivary gland diseases. Sialoendoscopy is a novel minimally invasive technique and one of the most fascinating innovations to explore the salivary duct system and to treat obstructive salivary disease.
It was described for the first time in the early 1990s by Katz. Sialendoscopy uses semi-rigid or rigid miniaturized endoscopes with optical fibers providing high-quality images to explore the parotid and submandibular salivary ducts. For diagnostic purposes, sialendoscopy is superior to imaging for obstructive pathologies. The uncalcified stones, stenosis, polyps, mucosal plugs and foreign bodies often missed by imaging methods, can be visualized by this technique. When used for therapeutic purposes, sialendoscopy is a minimally invasive and non-traumatic surgical technique enabling endoscopic stone removal, stricture dilatation and salivary gland lavage.[2]

**Indications**[3,4]
- Non-neoplastic obstructions such as sialoliths, When the calculus removal by conventional method is hazardous to perform as in posterior portion of wharton’s duct with its proximity to lingual nerve or in stenson’s duct posterior to sigmoid area.
- For screening of ductal system to rule out any residual calculi after surgical sialolithotomy.
- Sialendoscopy can be effective in patients with radioiodine-induced sialadenitis.
- Patients with refractory symptoms from any pathology, not responding to conservative management may benefit from interventional sialendoscopy.
- When there is positive evidence of ductal dilatation or stenosis, mucous plugs, strictures on sialography or ultrasonography.
- Recurrent episodes of major salivary gland swellings without obvious cause
- strictures and bends in ductal system or presence of intraductal adenoids or foreign bodies.

**Contraindications**[5]
- Sialendoscopy is contraindicated during acute infections. The use of endoscope during such conditions, increases the risk of ductal perforation and potential spread of infection into the head and neck soft tissues.
- Relative contraindications include, patients with microstomia or trismus. intraparenchymal stones and ductal lumen which cannot be enlarged to 1.3mm

**Advantages of sialendoscopy**[5,6]
- -Performed as an ambulatory out-patient procedure in one visit.
- High cure rate.
Avoids facial nerve damage.

Lower morbidity.

No radiation exposure.

No scar formation.

Ensures complete removal of stones.

Identifies radiolucent stones, polyps, stenosis, mucous plugs and foreign bodies.

New aspects of this anatomy, such as sphincter like strictures and their location in the submandibular and parotid ducts are confirmed.

Disadvantages[^7]

- Mobility of the endoscope is limited at the distal end of the gland.
- Convoluted portions of the salivary duct are impassable with a rigid endoscope.

Instrumentation[^8,2]

The ability to perform this technique is the result of the development of miniature endoscopic imaging tools. Depending on the rigidity, there are three types on mini endoscopes that can be introduced into ductal system of salivary glands. They are rigid, semi rigid and flexible. The majority of endoscopes that are currently in use are of semi rigid type. It combines the acceptable properties of both the rigid and flexible types. It allows for the visualization of the diseases process and its stiffness allows manipulation and better navigation.

![Fig 1A The new set of diagnostic and multifunctional sialoendoscopes (0.8- millimeter diameter [top right], 1.1-mm diameter [top left] and 1.6-mm diameter [lower right]). The instruments at the lower left are minigrasping forceps.](image-url)
B. Close-up view of the 1.6-mm sialoendoscope with a surgical instrument inside the surgical sleeve.

They are available as both diagnostic and therapeutic scopes. Sialendoscopes are available in diameters ranging from 0.9 to 1.6 mm. (Fig 1) Additionally, a number of miniature instruments such as wire baskets, balloon dilators, grasping forceps, micro drills, biopsy forceps, and guide wires are available for therapeutic purposes.7

Procedure[9,10, 11]

Pre operative assessment is done by using conventional radiography, sialography and ultrasonography. Diagnostic sialendoscopy is usually performed under local anaesthesia. About 20–30 min before starting the procedure, a sterile gauze piece soaked in lignocaine, is placed over the floor of mouth in submandibular gland sialendoscopy or along the upper gingivobuccal sulcus in parotid sialendoscopy. Patient is placed supine with head fixed on a head rest and turned towards the surgeon. The patient’s mouth is kept open either with a retractor, bite block, or a dental splint. Identification of the papilla is facilitated by the use of magnification with a microscope or surgical loupes. Once identified, the orifice of the duct is progressively dilated with dilatation probes to match the diameter of the endoscope. The endoscope is then introduced within a fine diagnostic sheath with an operator channel connected to a foot-controlled automatic irrigation system to dilate and washout the gland. The ductal system is explored as far as possible. or grasping forceps. At the end of the procedure, the entire ductal system is reexamined. A 0.75 mm diameter catheter will then be inserted to prevent retractile strictures during the healing process. Although, sialendoscopy pose substantial benefits, it has a few minor complications. Gland swelling post-operatively is expected and usually resolves in approximately 24-48 hours.
The four common techniques are used to remove the sialolith.

1) The grasping technique: the grasper has three prongs that can hold the calculus from behind.

2) Small wire basket retrieval system: this technique involves introducing the basket in closed position to bypass the calculus an open the prongs. The basket is then pulled out in its open position with the stone entrapped between the prongs.

3) Mechanical fragmentation; done by intracorporeal lithotripter

4) Laser fragmentation.

**Treatment of strictures and adhesions**

For such procedures, dilation is employed. Two types of balloons are commonly used, The first step in this is anesthetizing and leaving the duct with 2% lidocaine and saline. if there is no improvement, a dilation balloon is inserted which can be inflated up to 3mm. the pressure
created by the inflation can be sufficient to dilate most strictures. Another technique for dilating strictures is to expand the stricture region with grasping forceps used as a dilator.

**Post operative management**

After interventional sialoendoscopy, a temporary polymeric stent is introduced into the duct and kept in place for 4 weeks to prevent obstruction of ductal lumen by post operative edema and to serve as a passive dilator to prevent future strictures. A total of 100 mg hydrocortisone solution should be injected intraductally after any procedure. All patients are advised antibiotics and analgesics postoperatively.

**Success rate**

Success rate of parotid endoscopic sialolothotomy is 86% and of submandibular sialolithotomy is 89% respectively.

**CONCLUSION**

The clinical application of sialendoscopy is a breakthrough in management of salivary gland disorders, as it has a dual role in diagnosis and treatment of salivary gland ductal obstructions. It is an organ preserving technique which proves to be safe and effective and should be considered as treatment of choice for patients with obstructive pathology. Hence, Sialoendoscopy is efficient and promising in diagnosing and treating salivary gland pathologies.

**BIBLIOGRAPHY**