# Sialoendoscopy: A New Alternative for the Treatment of Salivary Pathology. Our Experience

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**Objectives**: Sialoendoscopy is a procedure used to visualize the salivary ducts and their pathology. 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 (interventionist sialoendoscopy). We attempt to prove a declining rate of salivary gland excision.
**Patients and method**: Sialoendoscopy was performed in 8 patients.
**Results**: Of these, 50% of patients were diagnosed as having sialolithiasis and the other 50% had chronic sialoadenitis. In patients with sialolithiasis, sialoendoscopy allowed the extraction of the calculus in 2 patients (50%). In the remainder, sialoendoscopy provided confirmation of the diagnosis in all cases.
**Conclusions**: Sialoendoscopy is a new technique for use in the diagnosis, treatment, and post-operative management of sialolithiasis, sialoadenitis, and other salivary gland pathologies.

**Key words**: Sialoendoscopy. Sialolithiasis. Sialoadenitis.

**Sialoendoscopia: una nueva alternativa en el tratamiento de la patología salival. Nuestra experiencia**
**Objetivos**: La sialoendoscopia es un procedimiento cuya finalidad es visualizar los conductos salivales y sus procesos patológicos. Se utiliza como método diagnóstico, para descartar procesos inflamatorios de las glándulas (sialoendoscopia diagnóstica) y para tratar áreas patológicas (estenosis, retirar cuerpos extraños o cálculos), mediante instrumental (sialoendoscopia intervencionista). Queremos mostrar la disminución de extirpación glandular.
**Pacientes y método**: Se estudia a 8 pacientes intervenidos con sialoendoscopia.
**Resultados**: En el 50% se trataba de sialolitiasis y en el otro 50%, de sialodenitis crónica. En las sialolitiasis la sialoendoscopia intervencionista permitió extraer el cálculo en 2 (50%) casos. En el resto la sialoendoscopia permitió confirmar el diagnóstico en todos los casos.
**Conclusiones**: La sialoendoscopia es un nueva técnica que nos permite diagnosticar, tratar y hacer un adecuado seguimiento de las sialodenitis, sialolitiasis y otras afecciones glandulares.

**Palabras clave**: Sialoendoscopia. Sialolitiasis. Sialodenitis.

## INTRODUCTION

Sialoendoscopy was performed for the first time at the beginning of the nineties. Modifications made to rigid endoscopies led Oded Nahlieli and Francis Marchal to create similarly designed semi-rigid endoscopies, albeit with slightly different characteristics.[1,2]

Starting with these scopes, a new, currently growing technique has been developed. Nahlieli and Marchal's observations have been very important in establishing diagnostic criteria in sialoendoscopy.

Sialoendoscopy can be used as a diagnostic method, to rule out inflammatory causes of the glands, to treat diseased areas (stenosis or calculi) through instrumentation. Indications cover all inflammation of the salivary glands of unknown origin.[3,5,9]

Despite its simplicity, sialoendoscopy, particularly interventionist sialoendoscopy, is a procedure that entails challenges. The use of a rigid sialoendoscope requires expertise given the potential risk of perforation of the salivary duct, injuring the vascular and nearby neural structures. The endoscope can only be used with adequate vision. Distal

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calculi or the narrowing of the duct may limit the endoscope's advance and its usefulness.

Sialolithiasis affects 1.2% of all salivary glands. According to published data, salivary calculi are found in 80%-90% of cases in the submaxillary gland.[5] These calculi are of varying shape and composition and have a growth rate of 1 mm per year. They may float freely or be partially adhered to the duct walls. Sialolithiasis may be transient or complicated by bacterial infection.[4,5]

Mucous plugs comprising epithelial and inflammatory desquamative cells are considered to represent degenerative changes of the epithelial cells in the duct. Hence, they may play a decisive role as a factor in obstruction and contribute to the narrowing of the area and formation of polyps and/or calculi.

The patency of the salivary duct may be altered as a result of stenosis, giving rise to clinical symptoms not unlike those of lithiasis. Once the narrowing has been located endoscopically, it can be visualized and resolved by means of a system of dilators or balloon dilators.[3,5]

Our objective is to verify the usefulness and efficacy of sialoendoscopy to prevent interventions that entail greater morbidity (glandular resection).

## METHODS

### Description of the Technique

The procedure is carried out by a principal surgeon and 1 assistant. Instrumentation consists of: probes of increasing size (745847-56; Karl Storz Endoscope, Germany), dissection clamps, angled scissors, biopsy clamps, a twin-channel (0.25 mm and 0.65 mm) Marchal 11575 sialoendoscope (Karl Storz, external diameter 1.3 mm), light source and cable, mouth opener, and lip retainer[5] (Figure 1).

There are 4 approaches by which to insert the endoscope: through the natural opening, by means of a papillotomy posterior to the natural opening of the duct, searching for the duct in a more posterior area, or by opening it up.[5]

We infiltrate 10% lidocaine at the level of the papilla, not directly on top of it in order to avoid losing the orifice and to ensure an adequate view. We insert the salivary dilators starting with the narrowest one (0000). In order to insert the probe, traction is placed on the papilla of the gland. This traction straightens out the twisting of the ducts. The 000 probe is then inserted, followed by the 00. The dilator is used every 2 sizes. Probe 0 is then inserted and then, all the probes up to size 6. Effort should be made to not force and when you cannot go from one size to the next larger size, go back to a finer probe. Where there is a significant narrowing around the orifice to the Wharton duct, we can perform a small papillotomy in the first 5 mm. Papillotomy of the Stenon duct should be avoided. Once sufficient dilatation has been attained, an anaesthetic solution of 1% lidocaine with adrenaline (1:100 000) should be infiltrated. The endoscope is inserted approximately 1 cm and the duct is flushed with saline solution or anaesthesia until a clear view can be achieved.

It is advisable to follow the black dot on the screen of the monitor as this is compatible with the lumen of the duct (Figure 2).

With sialolithiasis, we use holmium laser probes fitted to the fiberscope (365 µm fibres; ref. 27750172) that break up the calculi under direct view for collection in a basket[6] (Figure 3).

We maintain antibiotic prophylaxis for the first 48 hours and clinical check-ups are carried out after each intervention. This procedure does not require a hospital stay of longer than 24 h. Patients with a rupture of the Wharton duct or extensive marsupialization should be monitored for the risk


**Figure 1.** A: surgical instrumentation. B: sialoendoscope. C: approach to the submaxillary gland.

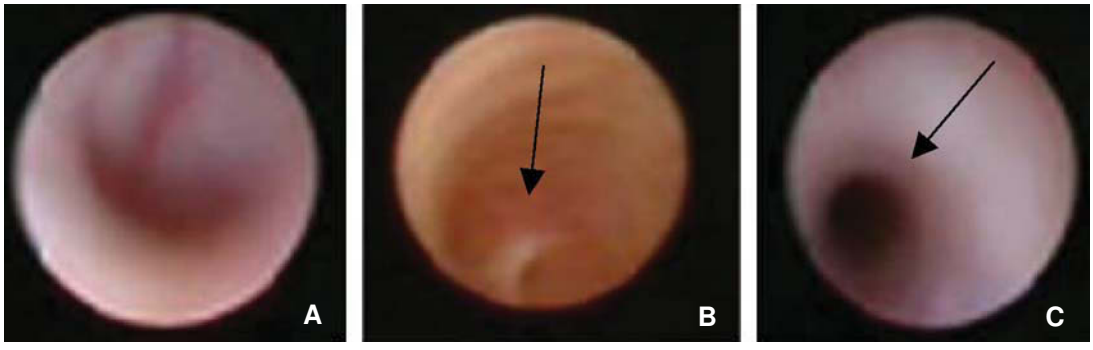


**Figure 2.** Endoscopy images. A: stenon duct, vascularization of the walls and their ringed appearance can be seen. B: Wharton duct. The endoscope reaches down to the branches (arrow). C: lumen of the duct, the black dot on the screen we should follow when inserting the endoscope.

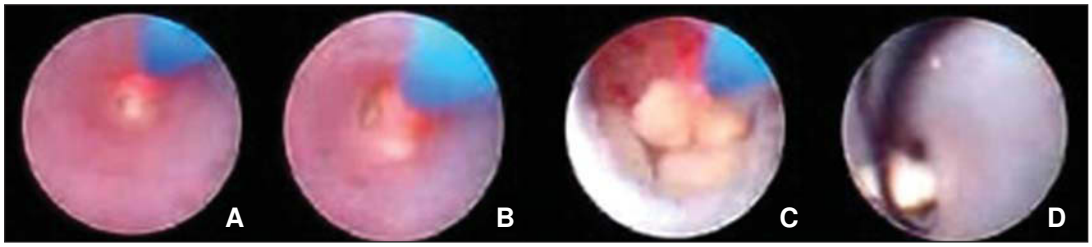


**Figure 3.** The calculus seen to obstruct the lumen of the duct is broken up by laser to facilitate its removal and the remains are collected using a basket.

of spread of the oedema and/or infection of the floor of the mouth that may involve the airway.

We have performed sialoendoscopy in 8 patients with symptoms of obstruction or chronic inflammation of the major salivary glands during the period between December 2005 and September 2007. Of the 8 patients, 6 were females and 2 males, with a mean age of 38 years. The salivary glands undergoing surgery were the submaxillary glands in 6 cases and the parotid glands in 2. Four of these cases were diagnosed as obstruction and 4 received a diagnosis of chronic sialodenitis (Table).

A pre-operative sialoresonance was performed. In all cases, the procedure was carried out under general anaesthesia, with a mean duration of 120 minutes. In the cases with lithiasis, we used holmium laser probes to break up the calculi.

In the cases with chronic sialodenitis, after examining the duct, the main ducts and secondary ducts were seen to have stenoses and cotton-like adhesions. In these cases, the duct was flushed with saline and 1% lidocaine solution and the basket was used as a dilator.

## RESULTS

We were successful in eliminating the lithiasis (4 patients); in 50% of these cases we excised the glands because the calculi were so large (12 and 15 mm) that we were unable to break them up enough with laser (patients 3 and 7). We were successful in 75% of the 4 cases diagnosed as chronic sialodenitis. In 1 of the cases (patient 8), the symptoms improved over the 3 weeks following the surgery, but reappeared; consequently, the duct was ligated in the course of a superficial parotidectomy and the symptoms remitted.

We had a 25% complication rate, with 2 cases of lingual oedema. We were unable to remove the tube in the patients who were admitted into the ICU immediately and had to wait for the oedema to resolve (6 h after surgery). One patient was released the following day and the other one remained hospitalized for 2 more days because the gland had been excised. As a result of the large size of the calculus, he suffered traumatic ranula that resolved 2 days later (antibiotic and anti-inflammatory treatment) (Table).

The patient was seen 1 month after surgery, with check-ups at 3 months and 1 year. In the first case, follow-up time was 1 year and 9 months.

## DISCUSSION

Sialoendoscopy can be carried out as an ambulatory procedure[5] or under general anaesthesia. It is performed under general anaesthesia at our centre to facilitate the surgeon's manoeuvrability and to spare the patient unnecessary discomfort.

Approaching through the natural opening or by means of a posterior papillotomy entails fewer complications, fosters correct entrance into the ductal lumen, and prevents the formation of dead ends. When inserting the endoscope, we irrigate while advancing in an attempt to dilate the duct, since in baseline conditions the lumen is a virtual one and only in this way will we be capable of observing it properly. Manoeuvres should involve the least amount of trauma possible to avoid perforations and late-forming stenoses.

Sialoendoscopy enables us to examine the epithelium covering the ducts, making it possible to find calculi that

Description of the Sample[a]

| *Patient* | *Age* | *Sex* | *Dx-Pre* | *Dx-Post* | *Diagnostic Test* | *Gland Affected* | *Complications* |
|---|---|---|---|---|---|---|---|
| 1 | 35 | Female | Adenitis | Narrowing | SialoRM | Right submaxillary | No |
| 2 | 42 | Female | Lithiasis | Lithiasis | SialoRM | Right submaxillary | No |
| 3 | 57 | Male | Lithiasis | Lithiasis | SialoRM | Left submaxillary | No |
| 4 | 22 | Female | Lithiasis | Lithiasis | SialoRM | Left submaxillary | Lingual oedema |
| 5 | 20 | Female | Lithiasis | Narrowing | SialoRM | Right submaxillary | No |
| 6 | 32 | Female | Adenitis | Adenitis | SialoRM | Both parotids | Inflammation |
| 7 | 38 | Male | Lithiasis | Lithiasis | SialoRM | Left submaxillary | Lingual oedema/ranula |
| 8 | 58 | Female | Adenitis | Narrowing | SialoRM | Right parotid | No |

[a]Dx-pre indicates pre-operative diagnosis; Dx-post, post-operative diagnosis; sialoRM, sialoresonance.

cannot be diagnosed by other examination methods (radiography, computerized tomography, or ultrasound). Thus, the diagnostic and therapeutic benefits of sialoendoscopy are greater than conventional radiological methods[6]; despite this, many authors recommend the use of sialography. Moreover, it has been possible to avoid unnecessary excision of salivary glands and one case of mucoepidermoid carcinoma of the salivary duct has been reported. In the future, we will therefore be able to diagnose tumours more often and at earlier stages.

In the experience of some authors, the submaxillary gland has an outstanding chance of being cured. It is possible that the high rate of extractions of the submaxillary gland has to do with the belief that a submaxillary gland with lithiasis is relatively non-functioning. Nevertheless, according to studies by Marchal et al,[4,6] treating the obstruction has been seen restored gland function. In our series, we have been able to prevent the excision of the gland in more than half the patients (62.5%).

The most common cause of obstruction reported in the medical literature is sialolithiasis (79% of the glands) with a high success rate in removal (86%). The complications cited are postoperative stenosis (2.5%) as the most common one; with post-operative infection (1.6%), post-operative bleeding (0.5%), traumatic ranula and perforation of the duct (0.7%), and paresthesia of the lingual nerve (0.4%) as the least common.[5,7,8] A recent experimental study has used artificial stents to facilitate access and protect the ducts.[8]

Sialoendoscopy is a new procedure, with low morbidity and little discomfort that can be used in the diagnosis and treatment of inflammatory diseases of the salivary glands.

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