Surgical Armamentarium for Sialendoscopy

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KEYWORDS

• Sialendoscopy • Armamentarium • Instrumentation • Sialendoscopes

KEY POINTS

- Sialendoscopes are comprised of multiple optical fibers which are used for imaging and illumination. They are combined into an optical cable which runs along the length of the endoscope.
- Sialendoscopes having one to two working channels. One of these channels is for irrigation of the duct system, to create an optical cavity. The other working channel allows for the introduction into the field and utilization of various instrumentation.
- There are a variety of disposable and non-disposable instruments that are used while performing sialendoscopy. The most commonly used instrumentation in sialendoscopy are sialolith retrieval baskets, dilators and micro-forceps.

Introduction

The first use of endoscopy in the management of obstructive salivary gland disease was performed in 1990 by Dr Philipe Katz[1] using a flexible mini endoscope to visualize a sialolith. Unfortunately, he was only able to visualize the stone and not perform any type of intervention. Konigsberger and colleagues[2] used a 0.8-mm flexible endoscope in conjunction with intracorporeal lithotripsy. In 1994, Nahlieli and colleagues[3] used a 2.7-mm rigid temporomandibular joint (TMJ) arthroscope that was introduced into the salivary gland duct and used suction to bring the stone forward so that it could be removed.

In 1997, Nahlieli and colleagues[4] published a case series in which they used 3 different endoscopes: a 2-mm cannula and 1.7-mm 30° camera, a 2.7-mm cannula with a 2.3-mm 0° camera, and a pediatric urethroscope (2.5 mm) with a working channel of 1 mm.[4] In 1999, Marchal and colleagues[5] published his experience using a 1.3-mm sialendoscope. Currently, the sialendoscopes are semirigid and come in a variety of sizes and have either modular sheaths or are all-in-one units.

Sialendoscope segments

A fiberoptic endoscope is composed of an optical cable that comprises multiple optical fibers of purified silica glass, which are woven together. Roughly half of the fibers are imaging fibers, and the others are illuminating fibers.

The optical portion of the sialendoscope is composed of 3 segments (Fig. 1). The eye piece is where the imaging fibers join and attach to a magnification lens. This piece is then attached to the camera head. The light post is where the illumination fibers join and are attached to the focusing lens. The ocular assembly is where the imaging and illumination fibers are joined together, running through the cord and terminating at the tip of endoscope. A cross section of the tip shows a mixture of illumination and imaging fibers (Fig. 2).

Basic structures of a fiberoptic endoscope

Because of the mix of these fibers, the image will initially appear granular (Fig. 3A). If available, an high-definition (HD) camera can be programmed to blend the images, which significantly enhances the clarity of the image (Fig. 3B).

White balance

Appropriate illumination is a necessity in performing any endoscopy. The quality of the light that is emitted depends on the source of the light (halogen, xenon, and so forth), the age of the system, and the quality, length, and integrity of the light cable. Because of these factors, the emitted white light is different almost every time the endoscopic system is set up. This quality of white light, called the color temperature, is based on the amount of red light versus the amount of blue light, with the green light being ignored and is expressed in kelvins. White balancing equalizes the red/blue light proportions.

White balancing is performed by focusing the endoscope onto a white surface. Once the white balancing occurs, the color should shift and appear whiter on the screen (Fig. 4).

Sialendoscopes

The modular sialendoscope

Early generation sialendoscopes were all modular in construction. They were 0.75 mm or 1.0 mm in diameter. They

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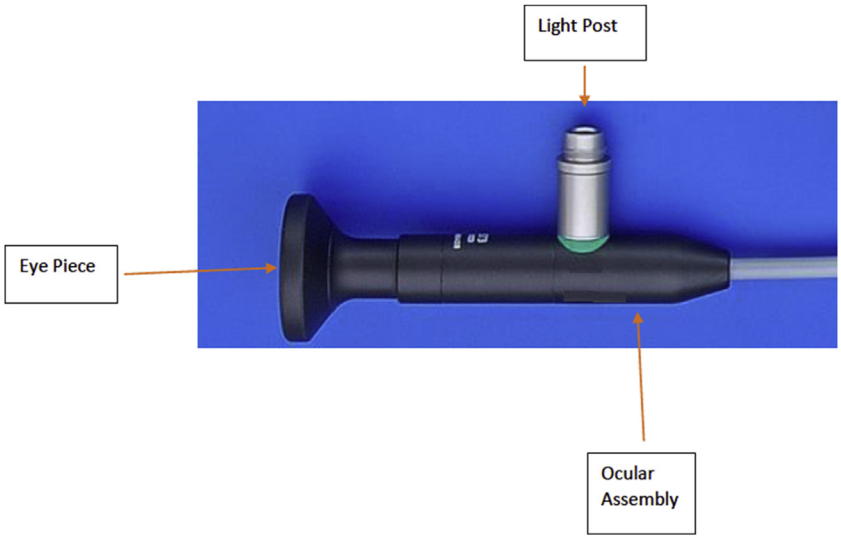

Fig. 1 The different segments of the optical portion of the sialendoscope.

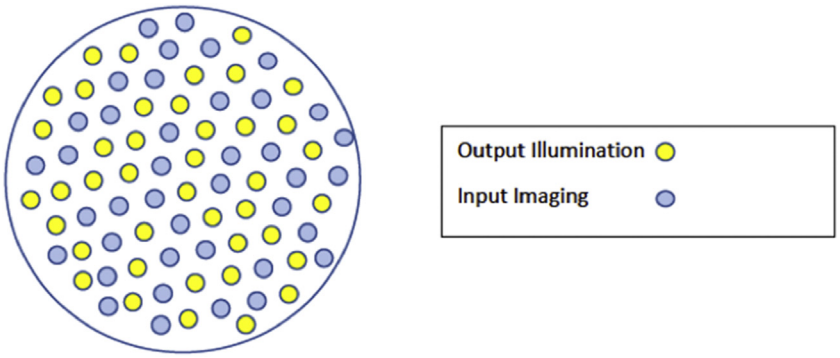

Fig. 2 Cross section of sialendoscope tip showing illuminating and imaging fibers.

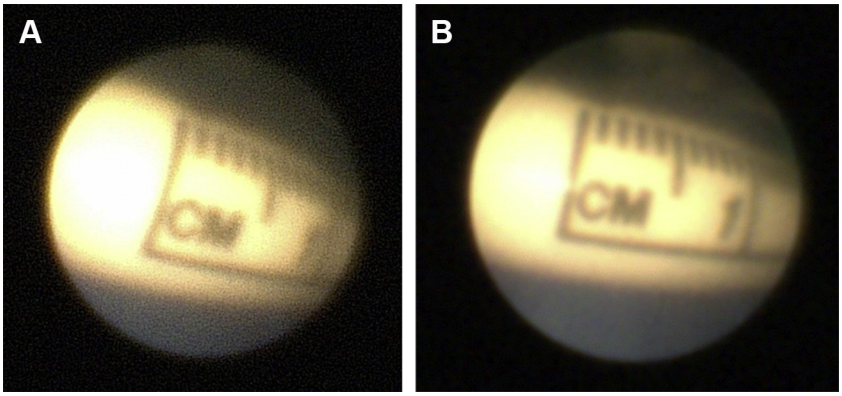

Fig. 3 (*A*) Normal image. (*B*) Enhanced image.

were different than the current systems because they were much longer in length, making them more vulnerable to breakage. Note that the sialendoscopes discussed in this section are manufactured by Karl Storz Endoscopy (Tuttlingen, Germany).

The current iteration of the modular sialendoscopes is a 0.75 mm in diameter with a shorter working length of 16.0 cm. There are 3 sheaths that can be used with this scope (Fig. 5, Table 1). The sheaths in cross section have the appearance of being stacked (Fig. 6). The sheaths are first inserted into the duct opening, and then the scope is inserted (Fig. 7).

The integrated sialendoscope

The integrated sialendoscope is composed of both the imaging system and working channels.

The 2 types of channels are the irrigation channel and, in the operating sialendoscope, a working channel. There are 2 styles of sialendoscopes: the straight tip (Fig. 8) and the