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## **Title: Standardization of Basket Use in Sialendoscopy: A Ten-Year Retrospective Study**

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## Author Questionnaire

**1. Microscopy:** Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **Yes, done**

**2. Software:** Does the part of your protocol being filmed include step-by-step descriptions of software usage? **Yes**

*Videographer: Please record the computer screen for the shots labeled as SCREEN*

**3. Filming location:** Will the filming need to take place in multiple locations? **NO**

### Current Protocol Length

Number of Steps: 24

Number of Shots: 41 (4 SC)

# Introduction

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*Videographer: Obtain headshots for all authors available at the filming location.*

- 1.1. **Giuliano Molina:** The main purpose of this article is to standardize the basic steps involved in successfully removing intraductal sialolithiasis with the basket instrument, doing this, we facilitate all the handling of the instruments, basket and sialendoscopes during sialendoscopy, making the procedure highly safe and successful to the practitioner.

1.1.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 2.3.1*

What are the most recent developments in your field of research?

- 1.2. **Giuliano Molina:** Within the last 20 years, with the advance in the knowledge, scopes and materials, we are capable of retrieving sialoliths (salivary stones) effectively by the Sialendoscopy (alone or in combination with minimal invasive procedures) saving a functioning salivary gland.

1.2.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 2.5.1*

What are the current experimental challenges?

- 1.3. **Giuliano Molina:** The main challenge is to achieve an high success rate of retrieving a salivary stone inside the duct with minimal maneuvers possible and with lesser time consuming.

1.3.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 3.2.1*

What research gap are you addressing with your protocol?

- 1.4. **Giuliano Molina:** With our proposed protocol, we hope to help the beginner assistant physician to perform a high success rate sialendoscopy. The literature has no data reporting this type of standardization protocol on basket use, improving the technique and showing the safety of it.

- 1.4.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 3.4.1*

How will your findings advance research in your field?

- 1.5. **Giuliano Molina:** Our findings will help to create a safety protocol in basket use in sialendoscopy. Beyond the patient safety, one can use the protocol among different services, helping to create an international bank of Data to evaluate the efficacy and safety of the technique, helping to training new physicians.

- 1.5.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 4.1.1*

*Videographer: Obtain headshots for all authors available at the filming location.*

**Testimonial Questions (OPTIONAL):**

***Videographer: Please ensure that all testimonial shots are captured in a wide-angle format, while also maintaining sufficient headspace, given that the final videos will be rendered in a 1:1 aspect ratio.***

How do you think publishing with JoVE will enhance the visibility and impact of your research?

- 1.6. **Giuliano Molina**, Head, Chief in Head: This highly regarded, and highly credible Journal can provide high visibility for our article. The style of this scientific journal meets the purpose of our video article, in a practical and objective way.
  - 1.6.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 4.1.1*

Can you share a specific success story or benefit you've experienced—or expect to experience—after using or publishing with JoVE?

- 1.7. **Giuliano Molina**, Head, Chief in Head: We hope to achieve a great collaboration in the medical literature on improving the Sialendoscopy technique. This could benefit patients around the world, saving cost from the health providers, improving the surgeon's training, saving time and making the sialendoscopy a safer procedure.
  - 1.7.1. INTERVIEW: Named talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B-roll: 3.2.1*

**Authors: Could you please also deliver the above statements in Portugal?**

*Videographer: Please film the testimonials in both English and Portugal*

**Ethics Title Card**

This research has been approved by the Ethics Committee at Beneficencia Portuguesa Hospital

# Protocol

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**NOTE:** The authors provided many shots in sections 3, 4, and 5, and timestamps were added. The videographer shot the rest.

## 2. Preoperative Preparation of the Sialendoscope

**Demonstrator:** Giulianianno Molina

- 2.1. To begin, inspect the sialendoscopes and supporting instruments in a sterile field and verify the integrity of their materials [1].
  - 2.1.1. WIDE: Talent holding and examining each sialendoscope and support instrument under sterile conditions.
- 2.2. Using manual handling, test the basket operation outside the duct system after opening the wires as per the manufacturer's instructions [1].
  - 2.2.1. Talent holding the basket device and manually opening the wires.
- 2.3. Connect the fiber optic cables to the video rack lighting system and maintain light intensity at approximately 50 percent [1]. Attach the other end of the fiber optic cable to the sialendoscope [2].
  - 2.3.1. Talent connecting fiber optic cables to the lighting system and adjusting light settings.
  - 2.3.2. Talent attaching the cable end to the sialendoscope port.
- 2.4. Check the monitor screen for the presence of light and ensure proper image formation [1].
  - 2.4.1. SCREEN: Show monitor displaying illuminated view through sialendoscope, attempting to read the wire label clearly. *Videographer: Please record the computer screen for the shots labeled as SCREEN*
- 2.5. Rotate the video image adjustment to focus and eliminate any honeycomb artifacts on the monitor screen [1]. Use the wire packaging label to confirm that the image quality is optimal and the letters are legible [2].
  - 2.5.1. SCREEN: adjusting the zoom control on the video system.
  - 2.5.2. SCREEN: Monitor displaying improved focus on the label with honeycombs

removed and clear letters visible.

- 2.6. Identify the irrigation channel caudally, with the optical fiber centered and the working channel cranially positioned [1]. Adjust the scope so the "north" orientation of the sialendoscope aligns correctly with the screen using the wire label as reference [2].
  - 2.6.1. Talent holding the sialendoscope and pointing out irrigation, optical, and working channels.
  - 2.6.2. SCREEN: Image orientation being adjusted to match the label's alignment with screen direction.
- 2.7. Connect a full sterile physiological 0.9 percent saline solution setup to the irrigation channel [1] and ensure no air bubbles are present that could interfere with image formation inside the ductal system [2].
  - 2.7.1. Talent connecting saline tubing to the irrigation channel of the sialendoscope.
  - 2.7.2. Close-up shot of tubing and fluid chamber with no visible air bubbles inside.

### **3. Sialendoscopy Technique**

- 3.1. Now, place the patient in the supine position under general anesthesia, with the orotracheal tube on the side opposite to the affected gland [1].
  - 3.1.1. Patient being positioned supine on the surgical table, with the anesthesia setup visible and orotracheal tube placed on contralateral side.
- 3.2. Dilate the salivary gland papilla progressively with dilators until it fits the appropriate size of the sialendoscope [1] and then insert the sialendoscope once proper size is achieved for clear duct visualization [2].
  - 3.2.1. Video# 1: timestamps 00:17-00:021 and 1:27-1:38
  - 3.2.2. Video# 2: timestamps 00:02-00:21
- 3.3. Attach a 20-milliliter syringe filled with sterile 0.9 percent saline solution or isotonic water to the sialendoscope irrigation system [1].
  - 3.3.1. Talent connecting the pre-filled syringe to the irrigation inlet of the sialendoscope.
- 3.4. Once the duct is distended, gently navigate the sialendoscope into it without using



major maneuvers or twists [1].

3.4.1. Video# 3: timestamps 00:05-00:18 AND Video# 4: timestamps 00:01-00:30.

3.5. Using the sialendoscope, inspect the main, secondary, and tertiary ducts in detail [1-TXT].

3.5.1. Video #5: timestamps: 04:31-05:44

**TXT: Remove mucus plugs with saline irrigation**

3.6. After cleaning, locate the salivary stone or stones inside the duct and prepare for stone capture maneuvers [1].

3.6.1. Video #6: timestamps: 05:34-06:03

#### 4. Standardization of Basket Use in Sialendoscopy

4.1. Using the sialendoscope, inspect all duct extensions during the initial phase, checking for the presence of stenosis and evaluating it across the main, secondary, and tertiary ducts [1].

4.1.1. Video #7: timestamps: 07:36-08:18

4.2. Observe the appearance and location of any duct stenosis and estimate its size in comparison to the main duct [1]. Also, look for stones located beyond the stenosis and assess the nature of the saliva, whether milky or clear [2].

4.2.1. Video #8: timestamps: 00:26-00:49.

4.2.2. Video #9: timestamps: 00:58-01:15

4.3. After the initial inspection, examine the main, secondary, and tertiary ducts directly to locate stones, making note of their exact positions within the ductal network [1].

4.3.1. Video #10: timestamps: 27:05-27:15 and 27:35-27:46.

4.4. Observe the size of each sialolith carefully and document whether the stones occupy the full duct diameter or are smaller [1].

4.4.1. Video #11: timestamps: 00:00- 00:20

- 4.5. Identify whether the stones are single or multiple, and plan the approach accordingly as a single or multiple attempt retrieval [1].

- 4.5.1. Video #12: timestamps: 40:25- 41:45.

- 4.6. Flush the duct with sterile 0.9 percent physiological saline solution while maneuvering the sialendoscope to observe the stone mobility, and classify them as fixed, minimally mobile, or freely mobile [1].

- 4.6.1. Video #12: timestamps: 24:15- 24:40.

- 4.7. Select the appropriate basket type 3-wire, 4-wire, or 6-wire, based on the size and mobility of the stone, ensuring a better chance of successful capture [1].

- 4.7.1. Video #13: timestamps: 00:04- 00:08 AND Video#14: timestamps: 00:05-00:08 AND Video#15: timestamps: 00:03-00:07 AND Video#16: timestamps: 00:00-00:06.

## **5. Different Approaches for the Technique**

- 5.1. After completing the prior evaluation, place the tip of the basket directly against or very close to the anterior part of the sialolith for the Type A frontal approach [1]. Open the wires gently [2] and flush with sterile saline solution while attempting to trap the stone as it is carried into the basket [3].

- 5.1.1. Video # 17: timestamps: 01:22- 01:30.

- 5.1.2. Video # 18: timestamps: 01:07- 01:19.

- 5.1.3. Video # 19: timestamps: 26:20- 26:40.

- 5.2. Select the Type B side-to-side approach for relatively mobile, single stones smaller than the duct diameter [1]. Position the basket tip beside the stone, aligning the wires laterally [2]. Gently flush with sterile saline solution [3] and use soft lateral movement of the open basket to dislodge and capture the stone [4].

- 5.2.1. Video # 20: timestamps: 30:56- 31:08.

- 5.2.2. Video # 20: timestamps: 31:07- 31:21.

- 5.2.3. Video # 20: timestamps: 33:45- 34:00.

- 5.2.4. Video # 20: timestamps: 46:50- 47:05

- 5.3. Use the Type C back-to-forward approach for stones that are as large as the duct or for fixed stones with low mobility [1]. Position the basket tip posterior to the sialolith and open the wires behind it [2] and bring the basket forward while flushing gently to wrap around the stone [3]. Once the wires enclose the stone, pull the basket wires to secure the stone [4].

5.3.1. Video # 21: timestamps: 05:27- 05:50.

5.3.2. Video # 21: timestamps: 07:26- 07:43.

5.3.3. Video # 21: timestamps: 08:10- 08:30.

5.3.4. Video # 21: timestamps: 08:31- 08:42

- 5.4. Perform a final inspection of the main, secondary, and tertiary ducts before completing the procedure to check for residual stones or stenosis [1].

5.4.1. Video # 22: timestamps: 01:40-01:50 AND 02:55-02:58

## Results

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### 6. Results

- 6.1. Endoscopic stone extraction was successfully performed in 100% of the Pure Sialendoscopy group [1], with all patients also receiving intraductal steroids [2].
  - 6.1.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Endoscopic Stone Extraction" with value "132 (100%)"*
  - 6.1.2. LAB MEDIA: Table 1. *Video editor: Highlight the row "Intraductal Steroids" with value "132 (100%)"*
- 6.2. Submandibular gland involvement was noted in 68.9% of patients [1].
  - 6.2.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Submandibular Stones" with value "91 (68.9%)"*
- 6.3. Most patients presented with pure stones [1], and parotid stones were observed in 31.1% [2].
  - 6.3.1. LAB MEDIA: Table 1. *Video editor: Highlight the row "Pure Stones" with value "127 (96.2%)"*
  - 6.3.2. LAB MEDIA: Table 1. *Video editor: Highlight the row "Parotid Stones" with value "41 (31.1%)"*
- 6.4. Single stones were identified in 65.9% of cases, while multiple stones were seen in 34.1% [1].
  - 6.4.1. LAB MEDIA: Table 2. *Video editor: Highlight the rows "Single" and "Multiple" under "Stones Characteristics"*
- 6.5. No major complications occurred, and no infections, dehiscence, or stuck baskets were reported [1].
  - 6.5.1. LAB MEDIA: Table 2. *Video editor: Highlight all rows under "Overall Post-operative Complications"*
- 6.6. The mean sialendoscopy duration was 62 minutes, ranging from 48 to 98 minutes [1].
  - 6.6.1. LAB MEDIA: Table 2. *Video editor: Highlight the "Sialendoscopy Time Duration" row showing "62 (average)" and "48–98 (range)"*
- 6.7. Stones were localized in the main duct in 73.5% of cases, and 26.5% were in secondary or tertiary ducts [1].
  - 6.7.1. LAB MEDIA: Table 3. *Video editor: Highlight the 2 rows under "Sialolithiasis Localization"*

- 6.8. Basket types included 4-wire baskets in 68.9% of cases [1], 3-wire in 25.8% [2], and 6-wire in 5.3% [3].
- 6.8.1. LAB MEDIA: Table 3. *Video editor: Highlight the row “4-WIRE”*
- 6.8.2. LAB MEDIA: Table 3. *Video editor: Highlight the row “3-WIRE”*
- 6.8.3. LAB MEDIA: Table 3. *Video editor: Highlight the row “6-WIRE”*
- 6.9. The side-to-side technique was used in 35.6% of patients [1], while the back-to-forward technique was applied in 55.3% [2].
- 6.9.1. LAB MEDIA: Table 3. *Video editor: Highlight the “Side-to-Side” row*
- 6.9.2. LAB MEDIA: Table 3. *Video editor: Highlight the row “Back-to-Forward” under “Approach Technique”*

Pronunciation guide

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## 1. Sialendoscope

- **Pronunciation link:** <https://www.howtopronounce.com/sialendoscope>
  - **IPA:** /,saɪəˈlɛn.dəˌskoʊp/
  - **Phonetic Spelling:** sigh-uh-LEN-duh-skohp([howtopronounce.com](https://www.howtopronounce.com), [merriam-webster.com](https://www.merriam-webster.com))
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## 2. Sialendoscopy

- **Pronunciation link:** <https://www.howtopronounce.com/sialendoscopy>
  - **IPA:** /,saɪəˌlɛnˈdɑː.skə.pi/
  - **Phonetic Spelling:** sigh-uh-len-DOS-kuh-pee
- 

## 3. Sialolith

- **Pronunciation link:** <https://www.merriam-webster.com/medical/sialolith>
- **IPA:** /ˈsaɪə.ləˌlɪθ/

- **Phonetic Spelling:** SIGH-uh-lith([merriam-webster.com](https://www.merriam-webster.com))
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#### **4. Sialolithiasis**

- **Pronunciation link:** <https://www.merriam-webster.com/medical/sialolithiasis>
  - **IPA:** /ˌsaɪə.lə.liˈθaɪ.ə.sɪs/
  - **Phonetic Spelling:** sigh-uh-luh-THIGH-uh-sis
- 

#### **5. Sialolithotomy**

- **Pronunciation link:** <https://www.merriam-webster.com/medical/sialolithotomy>
  - **IPA:** /ˌsaɪə.lə.liˈθɑː.tə.mi/
  - **Phonetic Spelling:** sigh-uh-luh-THOT-uh-mee([merriam-webster.com](https://www.merriam-webster.com), [howtopronounce.com](https://www.howtopronounce.com))
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#### **6. Sialoadenitis**

- **Pronunciation link:** <https://www.howtopronounce.com/sialoadenitis>
  - **IPA:** /ˌsaɪə.loʊ.æd.əˈnaɪ.tɪs/
  - **Phonetic Spelling:** sigh-uh-loh-ad-uh-NIGH-tis([howtopronounce.com](https://www.howtopronounce.com))
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#### **7. Endoscopy**

- **Pronunciation link:** <https://www.howtopronounce.com/endoscopy>
  - **IPA:** /ɛnˈdɑː.skə.pi/
  - **Phonetic Spelling:** en-DOS-kuh-pee([howtopronounce.com](https://www.howtopronounce.com), [merriam-webster.com](https://www.merriam-webster.com))
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#### **1. Sialoadenectomy**

- **Pronunciation link:** <https://www.merriam-webster.com/medical/sialoadenectomy>
- **IPA:** /ˌsaɪə.ləʊ.æd.əˈnek.tə.mi/
- **Phonetic Spelling:** sigh-uh-loh-ad-uh-NEK-tuh-mee([merriam-webster.com](https://www.merriam-webster.com))

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## 2. Sialography

- **Pronunciation link:** <https://www.merriam-webster.com/medical/sialography>
  - **IPA:** /ˌsaɪəˈlɒɡ.rə.fi/
  - **Phonetic Spelling:** sigh-uh-LOG-ruh-fee([merriam-webster.com](https://www.merriam-webster.com))
- 

## 3. Endoscope

- **Pronunciation link:** <https://www.merriam-webster.com/dictionary/endoscope>
  - **IPA:** /ˈɛn.dəˌskoʊp/
  - **Phonetic Spelling:** EN-duh-skohp([merriam-webster.com](https://www.merriam-webster.com))
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## 4. Endoscopist

- **Pronunciation link:** <https://www.merriam-webster.com/medical/endoscopist>
  - **IPA:** /ɛnˈdɒs.kə.pɪst/
  - **Phonetic Spelling:** en-DOS-kuh-pist([merriam-webster.com](https://www.merriam-webster.com))
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## 5. Nasopharyngoscope

- **Pronunciation link:** <https://www.merriam-webster.com/medical/nasopharyngoscope>
  - **IPA:** /ˌneɪ.zəʊ.fəˈrɪŋ.ɡəˌskoʊp/
  - **Phonetic Spelling:** nay-zoh-fuh-RING-guh-skohp([merriam-webster.com](https://www.merriam-webster.com))
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