Received: 17 September 2020 | Revised: 5 April 2021 | Accepted: 11 May 2021

DOI: 10.1002/lio2.591

ORIGINAL RESEARCH

Laryngoscope Investigative Otolaryngology

# Safety practices for in-office laryngology procedures during clinical reintroduction amidst COVID-19

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## Abstract

**Objective:** Describe safety practices for performing in-office laryngology procedures during clinical re-introduction amidst the coronavirus disease 2019 (COVID-19) pandemic.

**Methods:** An anonymous survey in Qualtrics was created to evaluate demographics, preprocedure testing, practice settings, anesthesia, and personal protective equipment (PPE) use for five procedure categories (non-mucosal-traversing injections, mucosal-traversing injections, endoscopy without suction, endoscopy with suction/mucosal intervention via working channel, and laser via working channel). The survey was emailed to the Fall Voice Community on Doc Matter and to members of the American Broncho-Esophagological Association (ABEA) from May to June 2020.

**Results:** Eighty-two respondents were analyzed (response rate: 10%). Respondents represented diverse locations, including international. Most reported academic (71%) or private practices (16%), laryngology fellowship training (76%), and a significant practice devotion to laryngology and broncho-esophagology. During the early re-introduction, most continued to perform all procedure categories. The office was preferred to the OR setting for most, though 36% preferred the OR for laser procedures. There was a preference for preprocedural SARS-Cov2 testing for procedures involving a working channel (>67%), and these procedures had the highest proportion of respondents discontinuing the procedure due to COVID-19. Various types of topical anesthesia were reported, including nebulizer treatments. The most common forms of personal protective equipment utilized were gloves (>95%) and N95 masks (>67%). Powered-air purifying respirators and general surgical masks were used infrequently.

**Conclusions:** During the early re-introduction, respondents reported generally continuing to perform office laryngology procedures, while greater mucosal manipulation affected decisions to stop procedures due to COVID-19, perform preprocedural

SARS-Cov2 testing, and alter topical anesthesia. Gloves and N95 masks were the predominate PPE.

**Level of Evidence:** N/A.

KEYWORDS
coronavirus, COVID-19, laryngoscopy, otolaryngology, personal protective equipment

## 1 | INTRODUCTION

The disease processes caused by SARS Cov-2 (COVID-19) required practice groups and hospital systems to make profound changes to safety practices in an effort to reduce health care provider and patient risk of viral exposure. Procedures performed by otolaryngology-head and neck surgeons, particularly laryngology procedures, were a focus of concern given the aerosolizing nature of these procedures and associated risk.[1] There was a great effort by our colleagues to promote reasonable safety practices early in the COVID-19 pandemic, including guidelines[2] and position statements[3] from the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS), as well as efforts from a number of experienced groups.[1,4-6] Additionally, in April 2020, the AAO-HNS published virtual webinar data regarding patient selection, personal protective equipment (PPE) and endoscopic reprocessing consensus data from 300 providers from the laryngology community.[7] Despite these efforts, providers faced unprecedented challenges in the early phase of clinical re-introduction after the shutdown of in-person care provision. For laryngologists specifically, in-office laryngology procedure safety protocols were not clearly described. We sought to document the safety practices of otolaryngology-head and neck surgeons providing in-office laryngology care to patients during this early transition to help describe the measures at the time that were felt to keep providers and patients as safe as possible. We feel it is important to document such trends to add to the necessary framework from which future safety protocols can be created should such a crisis occur again in the future. To our knowledge, this is the earliest cohort of aggregated, anonymous data reported by otolaryngology-head and neck surgeons regarding their safety practices for a variety of in-office laryngology procedures.

## 2 | MATERIALS AND METHODS

A 30-point anonymous survey was developed, and data was collected anonymously through Qualtrics (Qualtrics Software Company, Provo, UT). As the survey was anonymous without identifiable information, our institution did not require a formal Institutional Review Board approval. Survey questions included demographics, provider practice setting, and detailed questions regarding safety practices for 5 groups of laryngology procedures, which were categorized as follows: (1) non-mucosal traversing injections without placement of a scope for visualization (NON-MUCOSAL-INJECTIONS), (2) mucosal-traversing injections without a scope (MUCOSAL-INJECTIONS), (3) endoscopy without suction (ENDOSCOPY-ALONE), (4) endoscopy with suction and/or non-laser intervention via a working channel flexible laryngoscope (NON-LASER), and (5) laser via a working channel flexible laryngoscope (LASER). See Appendix S1 for more details. Questions asked for each procedure category included preferences for SARS-Cov-2 testing before procedures, setting for procedures, method of local anesthesia for procedures, and preferred personal protective equipment during procedures.

The survey link was distributed via 2 distribution groups. The first was through DocMatter (DocMatter Inc., San Francisco, California), a web-based professional social media site for health care providers. The survey was posted May 2020 to the "Fall Voice: EBT Event Announcement Subgroup," then sent directly to otolaryngology-head and neck surgery providers that are members of the "Fall Voice Community: Eat, Breathe, Talk" Community. A second distribution was initiated June 2020 via email to the members of the American Broncho-Esophagolocical Association (ABEA). To avoid duplicate responses for members of both distribution lists, the ABEA distribution survey included an initial question allowing respondents to opt out if the survey had already been completed. Responses were collected from May 7 2020 to June 12 2020.

Collected data was downloaded from Qualtrics in Microsoft Excel and combined for analysis. Surveys that were incomplete were excluded from data analysis. Respondent location of practice was assessed to evaluate for external validity and for regional variations in safety practices. Comparisons were performed with Fisher's exact test analyses in Microsoft Excel.

## 3 | RESULTS

### 3.1 | Demographics

Fifty-six of 343 providers completed the survey via Doc Matter (response rate: 56/343 (16%)), and 33 of 563 providers completed the survey via the ABEA (response rate: 33/563 [6%]). The cumulative response rate was 10%. Seven respondents indicated they had already completed the survey and 4 were incomplete, so were excluded ($n = 82$ for data analysis).

Demographic data are shown in Table 1. The most prevalent practice settings were academic (58/82) or private practice without an academic affiliation (13/82). Laryngology and broncho-esophagoscopy comprised more than 50% of the clinical practice of 78% of respondents. Seventy-nine respondents (96%) were from the United States, while 3 were international (Israel, India, and Brazil, respectively).

**TABLE 1** Demographics of survey respondents (N = number count)

| | N | % |
|---|---|---|
| *Time in practice* | | |
| 0-5 years | 21 | 25.6 |
| 6-10 years | 22 | 26.8 |
| 10-20 years | 21 | 25.6 |
| 20+ years | 18 | 22.0 |
| *Practice setting* | | |
| Academic | 58 | 70.7 |
| Private with academic affiliation | 10 | 12.2 |
| Private only | 13 | 15.9 |
| Military | 0 | 0.0 |
| Retired | 0 | 0.0 |
| Other | 1 | 1.2 |
| *Fellowship training* | | |
| Laryngology | 62 | 75.6 |
| Head and neck surgery | 1 | 1.2 |
| Pediatric otolaryngology | 8 | 9.8 |
| Rhinology | 0 | 0.0 |
| Facial plastics & reconstructive surgery | 0 | 0.0 |
| Otology/neurotology | 0 | 0.0 |
| No fellowship training | 8 | 9.8 |
| No answer provided | 3 | 3.6 |
| *Percent practice devoted to laryngology and/or bronchoesophagology* | | |
| 0%-25% | 7 | 8.5 |
| 26%-50% | 11 | 13.4 |
| 51%-75% | 13 | 15.9 |
| >75% | 51 | 62.2 |

Respondents from the United States were from a total of 24 States, including Western (n = 4 states), Midwestern (n = 6 states), Southern (n = 10 states), and Northeastern (n = 4 states) states as defined by US Census data.[8] No more than 8 respondents were from any state. California and Ohio had the highest number of respondents (8 each), followed by New York with 7.

## 3.2 | Procedure practices

### 3.2.1 | Stopping procedures due to COVID-19 and preprocedural SARS-Cov2 testing

Procedural data are detailed in Table 2. MUCOSAL-INJECTIONS without endoscopy were halted due to COVID-19 at a significantly higher rate compared to NON-MUCOSAL INJECTIONS without endoscopy (7/47 vs 1/65, respectively; OR 11.23, 95% CI 0.002-0.733). Of those performing the MUCOSAL-INJECTIONS without endoscopy, significantly more required negative SARS-Cov2 testing prior to the procedure compared to NON-MUCOSAL INJECTIONS (15/40 vs 9/64, respectively; OR 3.617, 95% CI 1.284-10.766). NON-LASER procedures with endoscopy were no longer performed due to COVID-19 at a significantly higher rate compared to ENDOSCOPY ALONE (10/64 vs 1/82, respectively; OR 15.15, 95% CI 0.002-0.500). All procedures involving manipulation of the mucosa (MUCOSAL INJECTIONS without endoscopy, NON-LASER procedures, and LASER procedures) resulted in higher numbers of respondents halting the procedure or requiring preprocedure testing. Preprocedure SARS-Cov2 testing was highest for NON-LASER (36/54) and LASER (33/41) procedures with endoscopy. These latter two categories also had the highest proportion of respondents choosing to stop performing the procedure due to COVID-19 (10/82 for each). Limitations to preprocedure SARS-Cov2 testing for all procedure types included facilities not allowing testing and cumbersome testing logistics, which were reported across all procedure types, ranging from 6.3% to 15.0% of respondents.

### 3.2.2 | Setting

The majority of respondents continued to perform procedure categories in the office. MUCOSAL-INJECTIONS without endoscopy trended towards a higher preference for the regular pressure operating room setting vs NON-MUCOSAL-INJECTIONS, but this did not reach statistical significance (3/40 vs 0/64; OR 0.000, 95% CI 0.000-1.479). Procedures involving manipulation of the mucosa (MUCOSAL INJECTIONS without endoscopy, NON-LASER procedures, and LASER procedures) had more respondents reporting procedures in non-office settings. LASER procedures had the highest preference for an operating room setting, including 10/41 preferring regular pressure rooms and 5/41 negative-pressure rooms.

### 3.2.3 | Personal protective equipment

All respondents used some form of PPE for all procedure types. The most common forms of PPE utilized were gloves (>95% for all procedures) and eye protection (>84% for all procedures). N95 mask use increased significantly with MUCOSAL-INJECTIONS without endoscopy compared to NON-MUCOSAL-INJECTIONS (89.7% vs 67.1%; OR 5.817, 95% CI 1.797-24.943). N95 masks were preferred across all procedures, and 88% of respondents reported use for all procedures excluding NON-MUCOSAL-INJECTIONS without endoscopy. Standard face mask use for all other procedure types was less than 35%. Powered-air purifying respirators (PAPRs) and general surgical masks were used infrequently for all procedure types.

### 3.2.4 | Type of local anesthesia

Most respondents reported utilizing a non-mucosal traversing subcutaneous injection of local anesthetic (45/64) for NON-MUCOSAL-INJECTIONS without endoscopy. Over 50% of respondents utilized a subcutaneous and trans-cutaneous topical injection of local anesthetic for MUCOSAL-

**TABLE 2** Reported safety practices by procedure type (N = number count)

| | Non-mucosal traversing injections, without scope (NON-MUCOSAL INJECTIONS) | | Mucosal-traversing injections, without scope (MUCOSAL INJECTIONS) | | Endoscopy, without suction (ENDOSCOPY ALONE) | | Endoscopy with suction/non-laser intervention via working channel (NON-LASER) | | Laser via working channel (LASER) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| *Performing procedure?* | | | | | | | | | | |
| Yes | 64 | 78.1 | 40 | 48.8 | 81 | 98.8 | 54 | 65.9 | 41 | 50.0 |
| No, stopped due to COVID-19 | 1 | 1.2 | 7 | 8.5 | 1 | 1.2 | 10 | 12.2 | 10 | 12.2 |
| No, unrelated to COVID-19 | 17 | 20.7 | 35 | 42.7 | 0 | 0.0 | 18 | 21.9 | 31 | 37.8 |
| *Preprocedure testing?* | | | | | | | | | | |
| Yes, at least 1 negative test | 9 | 14.1 | 15 | 37.5 | 21 | 26.0 | 36 | 66.6 | 33 | 80.4 |
| No, my facility will not allow | 4 | 6.2 | 6 | 15.0 | 9 | 11.1 | 4 | 7.4 | 0 | 0.0 |
| No, logistics too cumbersome | 10 | 15.6 | 6 | 15.0 | 10 | 12.3 | 7 | 13.0 | 4 | 9.8 |
| No, symptom screening is sufficient | 41 | 64.1 | 13 | 32.5 | 41 | 50.6 | 7 | 13.0 | 4 | 9.8 |
| *Procedure setting* | | | | | | | | | | |
| Office | 64 | 100.0 | 37 | 92.5 | 79 | 97.5 | 44 | 81.4 | 26 | 63.4 |
| Regular pressure operating room | 0 | 0.0 | 3 | 7.5 | 2 | 2.5 | 5 | 9.3 | 10 | 24.4 |
| Negative pressure operating room | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 5 | 9.3 | 5 | 12.2 |
| *Local anesthesia*[a] | | | | | | | | | | |
| None | 19 | 28.6 | 5 | 12.5 | 10 | 12.3 | 0 | 0.0 | 1 | 2.4 |
| Subcutaneous injection (non-mucosal traversing) | 45 | 71.4 | 21 | 52.5 | — | — | 10 | 18.9 | — | — |
| Topical via transcutaneous injection | — | — | 21 | 52.5 | 2 | 2.5 | 17 | 32.1 | 12 | 29.3 |
| Topical via inhaled nebulizer | — | — | 4 | 10.0 | 1 | 1.2 | 11 | 20.8 | 10 | 24.4 |
| Topical via aerosolization spray (trans-nasal and/or transoral) | — | — | 9 | 22.5 | 20 | 24.7 | 17 | 32.1 | 17 | 41.5 |
| Topical via nasal pledgets | — | — | 8 | 20.0 | 54 | 66.7 | 30 | 56.6 | 19 | 46.3 |
| Topical via channeled scope or other trans-oral or trans-nasal catheter | — | — | 7 | 17.5 | 3 | 3.7 | 42 | 79.2 | 33 | 80.5 |

[a]Indicates multiple responses allowed, percentages may exceed 100%.

INJECTIONS without endoscopy (21/40 for each). Most respondents utilized topical anesthesia via nasal pledgets (54/81) for ENDOSCOPY ALONE, followed by topical via aerosolization spray trans-nasally or trans-orally (20/81). A vast majority reported topical anesthesia via a channeled scope or other trans-oral or trans-nasal catheter and some form of topical nasal anesthesia for NON-LASER and LASER procedures. There was more variability with these latter procedure categories, and less than 25% reported utilizing topical via inhaled nebulizer for these procedures (11/54 and 10/41, respectively).

## 4 | DISCUSSION

It has been estimated that 3.8% to 20% of health care workers will become infected with SARS-Cov2, with 15% developing severe symptoms.[9] Otolaryngology-head and neck surgery is considered a high-risk field for disease transmission because aerosolization of secretions from respiratory epithelium is common during procedures with any sort of mucosal intervention.[1,10] It is suggested that otolaryngologists performing tracheostomy have a 4.15 greater risk of contracting SARS-Cov2 compared to those not performing tracheostomy.[10]

Despite important efforts made for safe practice recommendations by societies and groups of experienced providers,[1-6] limited data are available describing actual safety practices. Deferral of elective and non-time sensitive procedures was recommended early in the pandemic. For potentially aerosolizing procedures, including nasal and laryngeal endoscopy, it was recommended that for high risk patients (positive SARS-Cov2 testing, influenza-like symptoms, or under evaluation for COVID-19 infection), providers utilize PAPR or single-use N95 masks, along with goggles or face-shield, gown, and gloves. For low risk patients (asymptomatic, untested, or negative test within 48 hours), it was recommended that providers use an N95 mask and eye protection, as well as gown and gloves.[1,5] With this as background and with the unique risks posed by anesthetizing and performing mucosal manipulating procedures in the office, we endeavored to garner anonymous data and describe safety practices performed by

colleagues across a broad spectrum with a specific focus on office-based laryngologic procedures. This documentation is vital to increasing awareness of specialty practices, as well as to support the development of guidelines and recommendations for otolaryngology-head and neck surgeons during future crises.

The demographic data show that respondents represented a variety of practice types, years in practice, regions of the country, and even several international respondents. Meanwhile, respondents tended to have fellowship training in laryngology and have a significant proportion of their practices devoted to laryngology and bronchoesophagology. While the response rate was low, this is still a relatively large sampling of such specialists and the only such study evaluating prevalent safety practice patterns for these types of procedures during the pandemic.

The most basic safety practice questions for office-based laryngologic procedures are whether to perform them at all and, if so, how they can be done safely. According to estimates by the Centers for Disease Control and Prevention, approximately 40% of infected individuals will be asymptomatic with an estimated 75% infectious potential compared to symptomatic individuals.[11] The high prevalence of asymptomatic patients presents additional risk to providers if using symptom screening alone as a preprocedural tool, whether by choice or due to restrictions or logistical issues with testing. As mentioned, several groups have suggested deferring elective cases due to the COVID-19 pandemic.[1,5]

According to the survey herein (Table 2), during the early re-introduction most respondents continued to perform all of the office-based procedure categories. This may be in contrast with early recommendations to defer elective and non-time-sensitive exams.[5] Of those respondents who reported stopping procedures due to COVID-19, most were predictably for mucosal-manipulating procedures. Preference for stopping procedures due to COVID-19 was highest for NON-LASER and LASER procedures, and this corresponds with data suggesting that suctioning and laser procedures in the airway are aerosolizing.[12] Though most continued to perform each of the procedure categories in the office setting, as might be predicted, an increasing number of respondents reported moving NON-LASER and LASER procedures to the operating room, some to negative-pressure rooms.

The majority of respondents performing NON-LASER and LASER procedures with endoscopy opted for preprocedure testing. This is in contrast to the remaining procedures, in which formal testing was not performed in the majority of cases. This data is particularly relevant to the Laryngology community, as no specific testing recommendations pertaining to these procedures had been published. Concerns over the availability of SARS-Cov2 testing are warranted based on our survey results, as facilities not allowing testing and cumbersome testing logistics were reported across procedure types ranging from 6.3% to 15.0%.

Due to variety in procedure types and differences in technique amongst providers, conclusions based on our survey data for local anesthesia during COVID-19 are difficult to make. However, it appears that respondents did not limit their use of any particular form of local anesthesia, with all forms represented across procedures in Table 2. Of note, respondents reported continued use of topical aerosolization sprays, even though it has been suggested that these sprays generate aerosols comparable to those generated with a sneeze.[13] For this reason, nasal pledgets have been suggested as an alternative topical anesthetic, and laryngoscopy procedures necessitating topical anesthetic spray (eg, biopsy, injection, and laser) were recommended to be delayed.[1]

Concern over aerosol generation during all aspects of these procedures is paramount, and selection of appropriate PPE is critical. Based

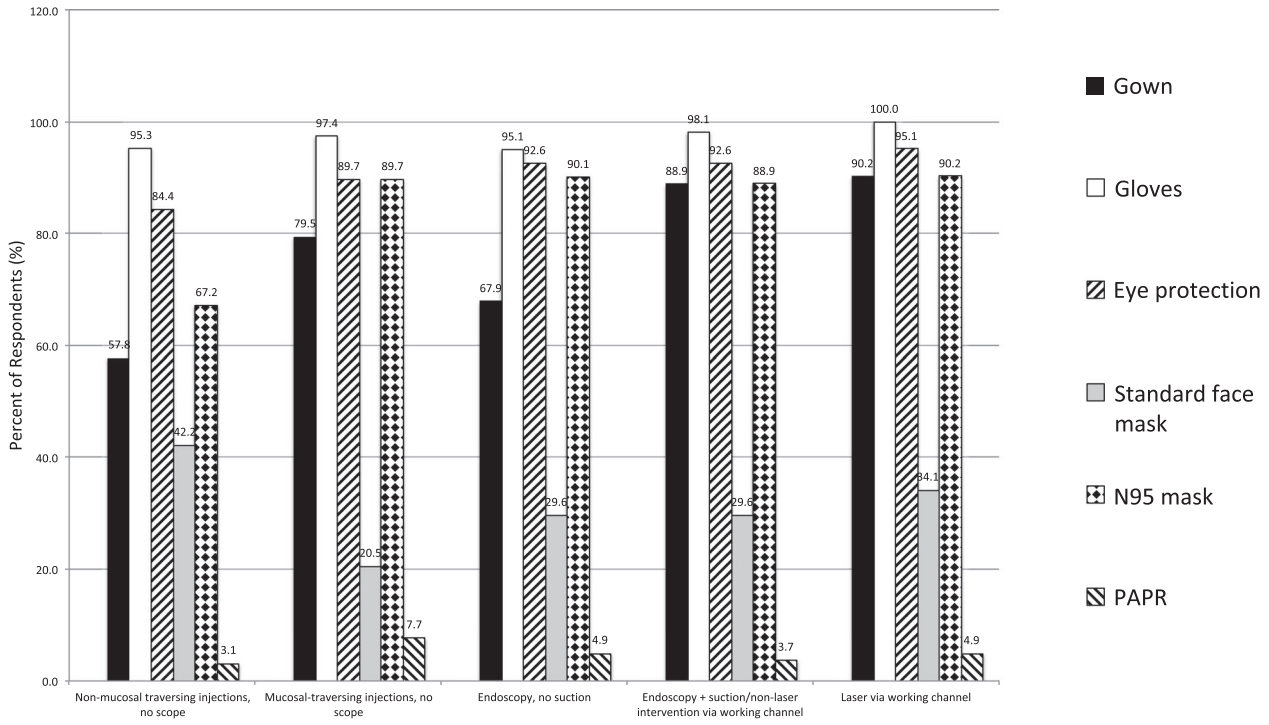


**FIGURE 1** Personal protective equipment use by respondents and by procedure type. PAPR, powered-air purifying respirator

on our survey data (Figure 1), respondents showed a strong preference for N95 masks over general surgical masks and PAPRs. This preference is consistent with the suggestion that PAPRs should be used in cases of probable or confirmed COVID-19,[1] although the use of PAPRs has remained controversial as increased risk of self-contamination has been reported.[5] In addition, PAPRs present the issues of difficult communication due to loud noise of the device, and expensive and complex decontamination processes that may not be available in a variety of health care settings. Although it has been suggested that PAPRs provide greater protection compared to N95 masks, there are no data we were able to find that reported a direct comparison of N95 masks to PAPRs in the clinical setting. Nonetheless, it is unclear from our survey whether low use of PAPRs was due to respondent preference or low availability. Meanwhile, surgical masks were likely felt to be inadequate.

Our survey study is limited in a number of ways. First, we have a low response rate, though 2 survey distribution platforms were utilized to mitigate this and did lead to a reasonably large number of overall responses. Next, we were limited as to the number of questions we could ask based on the requirements of the platforms utilized. Information on background infection rates and greater detail on geographic location and practice-types would have allowed for further stratification of this information that would have been very useful. We also had hoped to report on additional details regarding the barriers to protective equipment and testing, but had to reduce the number of questions surrounding this important topic. Next, there are limitations based on our study being conducted from May 7 to June 12, 2020. While there likely have been a number of changes to provider practices, we feel that the documentation of this significant number of provider practice patterns is important to report and contribute the body of literature seeking to best create guidelines to protect our colleagues and our patients. Finally, while the anonymous nature of the study allows for more forthright responses, data is based purely on provider preferences, which is a limitation. In future studies, other subspecialties of otolaryngology-head and neck surgery that perform in-office procedures could also be investigated.

## 5 | CONCLUSIONS

Safety practices to minimize infectious risk of office-based laryngology procedures during the reintroduction of clinical practice amidst COVID-19 are reported. The majority of survey respondents continued all investigated laryngology procedure categories; however, procedures involving manipulation of the mucosa resulted in a higher number of respondents stopping the procedure, requiring preprocedure SARS-Cov2 testing, and increasing use of PPE. The preferred practice setting for these procedures continued to be the office setting. The most common PPE utilized across all procedures were gloves and N95 masks. PAPR use was infrequent. These results can be used by practitioners to advocate for testing, PPE availability, and other safety needs during future crises.

### CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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### SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

**How to cite this article:** Calcagno H, Anthony BP, Halum SL, Parker NP. Safety practices for in-office laryngology procedures during clinical reintroduction amidst COVID-19. *Laryngoscope Investigative Otolaryngology*. 2021;6(4):780–785. https://doi.org/10.1002/lio2.591