



# Nonserologic test for COVID-19: How to manage?

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## Abstract

**Background:** Diagnosis of Severe Acute Respiratory Coronavirus-2 (SARS-CoV-2) infection is currently based on real-time PCR (RT-PCR) performed on either nasopharyngeal (NPS) or oropharyngeal (OPS) swabs; saliva specimen collection can be used, too. Diagnostic accuracy of these procedures is suboptimal, and some procedural mistakes may account for it.

**Methods and results:** The video shows how to properly collect secretions from the upper airways for nonserologic diagnosis of COVID-19 by nasopharyngeal swab (NPS), oropharyngeal swab (OPS), and deep saliva collection after throat-cleaning maneuver, all performed under videoendoscopic view by a trained ENT examiner.

**Conclusions:** We recommend to perform NPS after elevation of the tip of the nose in order to reduce the risk of contamination from the nasal vestibule, and to let it flow over the floor of the nasal cavity in parallel to the hard palate in order to reach the nasopharynx. Then the tip of the swab should be left in place for few seconds, and then rotated in order to achieve the largest absorption of nasopharyngeal secretions. Regards OPS, gentle anterior tongue depression should be used to avoid swab contamination from the oral cavity during collection of secretions from the posterior pharyngeal wall. These procedural tricks would enhance diagnostic reliability.

## 1 | INTRODUCTION

Diagnosis of Severe Acute Respiratory Coronavirus-2 (SARS-CoV-2) infection is currently based on Real-Time PCR (RT-PCR) performed on either nasopharyngeal (NPS) or oropharyngeal (OPS) swabs<sup>1</sup>; however, it has been described that a negative NPS or OPS does not rule out coronavirus 2019 (COVID-19), and this could be related to different situations.<sup>2</sup> Given the fact that SARS-CoV-2 RNA title in the upper respiratory tract peaks between days 7 and 10 after the clinical onset, a late sample timing could account for a false negative result.<sup>2</sup>

It is well known that diagnostic accuracy of NPS and OPS is not so high, being the detection rate of SARS-

CoV-2 RNA respectively of 63% and 32%<sup>1</sup>; therefore, UNITED States Centers for Disease Control and Prevention have recommended the collection of sole upper respiratory NPS.<sup>1</sup> Reduced detection rate could be related to either inadequacy of sample collection into the nasopharynx (the risk that the collection of secretion is performed into the nasal cavity rather than the nasopharynx is not neglectable, given the incomplete patient cooperation during this unpleasant maneuver),<sup>3</sup> or a limited viral local tropism due to the low expression of ACE-2 receptors in the epithelial cells of the nasopharyngeal/oropharyngeal surface.

Despite these considerations, collection of upper airway secretions by means of NPS/OPS still represents the



**FIGURE 1** Nasopharyngeal swab execution [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

first line diagnostic modality to test patients and otherwise asymptomatic population for COVID-19, provided that it is early and adequately performed after onset of symptoms. Self-collection of saliva samples has been proved to be an alternative safe, cheap and noninvasive diagnostic mean to confirm SARS-CoV-2 infection.<sup>4,5</sup>

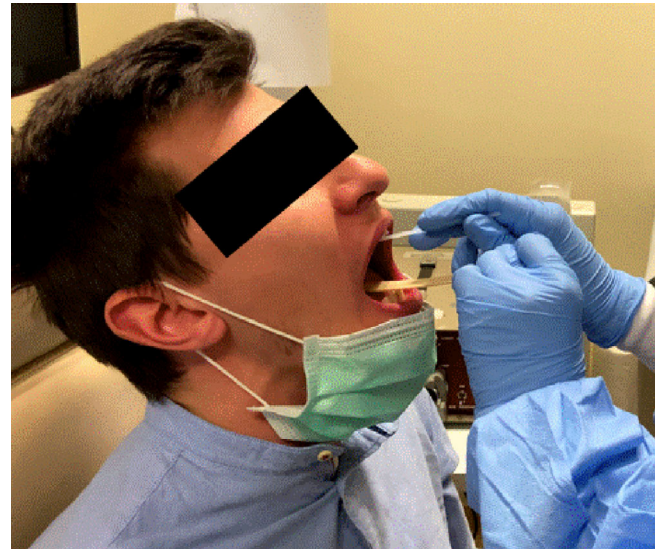
## 2 | METHODS

We propose a videoclip (Video S1) showing the three main sample collection procedures (ie.: NPS, OPS, and saliva collection after throat-cleaning maneuver) performed under videoendoscopic view by a trained ENT examiner.

## 3 | RESULTS

We recommend to perform NPS after elevation of the tip of the nose in order to reduce the risk of contamination from the nasal vestibule (Figure 1), and to let it flow over the floor of the nasal cavity in parallel to the hard palate in order to reach the nasopharynx. Then the tip of the swab should be left in place for few seconds, and then rotated in order to achieve the largest absorption of nasopharyngeal secretions. Regards OPS, gentle anterior tongue depression should be used to avoid swab contamination from the oral cavity during collection of secretions from the posterior pharyngeal wall (Figure 2).

With regards to self-collection of saliva samples, a throat-cleaning maneuver would be useful to retrieve infected secretions both descending from the nasopharynx and moving up from the tracheo-bronchial district.





**FIGURE 2** Oropharyngeal swab execution [Color figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

## 4 | CONCLUSIONS

These procedural tricks would enhance diagnostic reliability, in particular in the case of NPS, given that the risk of collecting secretions from the nasal cavity rather than the nasopharynx is unneglectable, also on the basis of incomplete patient cooperation during this unpleasant maneuver.

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### SUPPORTING INFORMATION

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

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