Beyond Q-tips: The Swabbing Guide for SARS-CoV-2

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Zoom Chat vs. Q&A

Submit any technical issues via the chat function.

Use the Q&A function to submit questions you would like the speaker to address at the end of the webinar.
Disclosures

Relevant Financial Relationship(s):
Nothing to Disclose

Off Label Usage:
Nothing to Disclose

Learning Objectives

• Identify the advantages of flocked swabs over traditional fiber (e.g., rayon) swabs.

• List three acceptable swab types that can be used for SARS-CoV-2 molecular testing.

• Recall which anatomical site the Mayo Clinic 3D-printed swab is designed to sample and identify potential advantages of this swab type.

• Describe the proper collection technique for NP, MT, and terminal nares collection for SARS-CoV-2 molecular testing.
Outline

I. Swabs:
   I. Traditional fiber vs Flocked:
   II. Types:
      I. Nasal (terminal nares)
      II. Mid-turbinate
      III. Nasopharyngeal
      IV. Oropharyngeal
   III. Mayo Clinic 3D-printed vs Commercial:
   II. Availability of swabs:
   III. Suitability of different swabs for SARS-CoV-2:
   IV. Proper collection technique with each swab:

Flocked vs Fiber Swabs

![Diagram comparing flocked vs fiber swabs]
Flocked Swabs

- Flocked swab tips are typically perpendicularly sprayed on Nylon fibers for quick sample uptake and elution of 90% of sample compared to spun swabs which trap the majority of specimen in the “mattress” structure.

- Mayo Clinic 3D-printed mid-turbinate (MT) swab also uses same “flocked” design with bristles.

Lots of Flocked Swab Types/Options

- Brands:
  - Copan Diagnostics
  - Becton Dickinson (BD)
  - Typenex
  - IPB SteriFlock
  - StatLab
  - iCLEAN

<table>
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<tr>
<th>Description</th>
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<tr>
<td>220310</td>
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<tr>
<td>Moist Flocked Swab, Sterile Single Wrapped</td>
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<tr>
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<td>Flexible Flocked Swab, Sterile Single Wrapped</td>
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Nasopharyngeal vs. Mid-Turbinate vs. Nasal/Oropharyngeal Swab

- Flocked nasopharyngeal swabs (top 2) compared to flocked mid-turbinate (middle) and rayon oropharyngeal (bottom) swab, used for both nasal and oropharyngeal sampling.

Mayo Clinic’s 3D Anatomic Printing Lab (RST)

- Established 2006; Directed by Dr. Jonathan Morris
- Make 3D-printed anatomical models and serializable patient-specific surgical guides for routine & complex procedures
- With unstable commercial supply chain, idea to 3D-print swabs to supplement supply
- While dozens of NP 3D-printed swab designs are available, no MT 3D-printed swab design
- Mayo designed, printed, validated and FDA registered a 3D-printed adult MT swab
Mayo Clinic’s 3D-Printed Adult MT Swab

- Using Formlabs Form 3D-printers with Formlabs Surgical Guide resin, 3D-mid-turbinate (MT) swabs were printed.
- MT swab is 5 inches long with 80 mm breakpoint
- Stop guard is 2 inches from the tip.
- ~24 hours to print, dry, cure, wrap, steam sterilize
- 324 MT swabs/printer; 20 printers = 6,480/day

Mayo Clinic’s 3D Anatomic Printing Lab
Availability (Supply Chain) of Swabs

- Nasopharyngeal:
  - Multiple vendors:
    - In-use: 3 types (BD), 1 Typenex, 1 IPB, 1 StatLab
    - Backup: iCLEAN
  - Adequate supply

- Mid-turbinate:
  - Copan only vendor: Pediatric & Adult version
  - Mayo Clinic 3D-printed adult MT swab
  - Limited pediatric supply; adequate adult supply

- Nares/Oropharyngeal:
  - Multiple vendors
  - Adequate supply

CDC Recommendations for SARS-CoV-2 test

- A nasopharyngeal (NP) specimen collected by trained healthcare personnel (HCP); or
- An oropharyngeal (OP) specimen collected by trained HCP; or
- A nasal mid-turbinate swab collected by trained HCP or by a supervised onsite self-collection (using a flocked tapered swab); or
- An anterior nares (nasal swab) specimen collected by trained HCP, or self-collected and observed by HCP, or by home or onsite self-collection (using a flocked or spun polyester swab); or
- Nasopharyngeal wash/aspirate or nasal wash/aspirate (NW) specimen collected by trained HCP; or
- A saliva specimen collected by the person being tested, either at home or at a testing site under supervision.
Suitability for SARS-CoV-2 & Upper Respiratory Pathogen Testing

• COVOO:
  • SARS-CoV-2 only
  • Nasopharyngeal (NP), oropharyngeal (OP), nasal mid-turbinate (MT), or terminal nares/nasal swab
• COFLU:
  • SARS-CoV-2, Influenza A&B
  • NP, MT, Nasal (terminal nares)
• SCVMT:
  • SARS-CoV-2
  • Self-collected MT swab

Proper Collection Technique for each Swab Type

• Nasopharyngeal (NP) Swab
  • Must be performed by licensed staff (RN)
  • Tilt head back 70°
  • Swab one nostril
  • Insert swab completely into nasal cavity
  • Rotate for 5 seconds

• Mid-Turbinate (MT) Swab
  • Can be performed by unlicensed staff
  • Tilt head back 70°
  • Swab both nostrils
  • Insert swab until stopper is reached
  • Rotate 5 seconds in each nostril

• Anterior Nasal Swab
  • Can be performed by unlicensed staff
  • Tilt head back 20°
  • Swab both nostrils
  • Insert absorbent tip of swab into nares
  • Rotate along outer wall of each nostril
Considerations for Training Unlicensed Staff

- Mayo Clinic has successfully trained phlebotomists, desk operations staff, and nursing aids on various swabs
- Additional training may also be required
  - Hand hygiene protocol
  - Proper PPE use: donning and doffing
  - Laboratory computer systems
  - Storage and transportation of swabs
- Competency assessments to ensure proficiency and document training

Proper PPE for All Swab Types

- Gown – must cover torso from neck to knees and arms to end of wrists
- Surgical mask
- Plastic full-face shield
  - Protective eyewear not required with full face shield
  - Droplet mask with attached shield not acceptable
- Gloves – must extend to cover wrist of gown
THANK YOU

QUESTIONS & DISCUSSION

Next Upcoming Webinar

*Common lab interferences*

Brooke Katzman, Ph.D.
May 19, 2021
11am-12pm CT
Questions?