



**SPECIAL ISSUE ARTICLE**

# Virtual dermatopathology: A potential educational tool during COVID-19 pandemic

Dear Editor,

Currently, we all are going through testing times when our outpatient services are suspended and consequently skin biopsies are not being performed. This has profoundly impacted the in-person teaching of residents, thereby paving the way for technology-driven learning.

Training in dermatopathology forms an integral part of dermatology postgraduate curriculum. The conventional dermatopathology teaching model in pre-COVID-19 period comprised of discussion of glass slides by the faculty, usually on a 5- or 10-header microscope. As this is not feasible nowadays, there is a need to replace traditional microscopy with an educational medium that complies with the concept of social distancing. Virtual microscopy seems to be a good solution to this problem.

Virtual dermatopathology uses whole slide imaging, wherein the glass slides are scanned at the highest magnification of  $\times 40$  and a composite whole slide image is formed, simulating a glass slide under standard optical microscope, as specific areas can be zoomed in and out at various magnifications and navigated from one field to another without compromising the image quality.<sup>1</sup> In cases where microorganisms need to be demonstrated, scanning can also be done using  $\times 100$  objective. These slides are then uploaded on the cloud server and a large collection of digital slides can be grouped in different folders according to the broad category of dermatoses. For better learning, a short clinical history is provided alongside the digital images and key findings visualized are marked with annotations.<sup>2</sup> In cases where required, special stains and immunohistochemical markers can also be included. Moreover, one can add a section of quiz slides for self-assessment by the residents and competency evaluation by the faculty. Many online resources of dermatopathology digital slides are available as learning tools.<sup>1</sup>

There are several advantages of using digital slides over glass slides for dermatopathology education. Any number of students can log onto the link provided and visualize the slide library containing hundreds of slides at their own flexibility of time and place. This obviates the difficulty encountered in teaching a big batch of students exceeding the microscope heads available at a given institute. Even students in remote locations, where there is scarcity of trained dermatopathologists, can benefit from this virtual learning program.<sup>1</sup> As the possibility of conducting dermatopathology workshops remains bleak in near future, digital slides will come handy in reaching out to a large number of enthusiastic residents.

Furthermore, the slide quality is well maintained when stored digitally and this overcomes the problem of fainting or breaking of glass slides when archived for years. This is particularly relevant for rare

conditions, which may be infrequently encountered and biopsied. Digital slides can be stored in a hard disk and circumvent the problem of bulk space required for storage of glass slides, thereby providing an easy and quick method of retrieval.

Few studies have compared the acceptability, diagnostic accuracy and educative usefulness of virtual microscopy vs traditional glass slide microscopy. Koch et al reported similar performance among dermatology and pathology residents when making a diagnosis using either virtual slides or glass slides. A vast majority of them (79%) felt virtual microscopy to be useful for learning dermatopathology, while only 44% of the residents supported it as a testing tool.<sup>3</sup> A study comparing the diagnostic accuracy among dermatopathologists using virtual slides vs photomicrographs found no significant difference between the two formats. About 90% of the participants reported virtual dermatopathology as a useful tool for teaching and learning purposes, while only 10% of the participants perceived that photomicrographs provided more diagnostic information than virtual slides.<sup>4</sup> Brick et al found that diagnostic accuracy was better with glass slides than virtual slides among dermatology residents, with no overall personal preference for either of the methods. The study concluded that those with prior experience and training in virtual microscopy are likely to perform better with digital slides.<sup>5</sup>

Some challenges that may be encountered in preparing digital slides are availability of a slide scanner which is an expensive equipment, time constraints as scanning each slide takes about 20 to 30 minutes and hiring of technicians involved in scanning the glass slides with a backup of software engineers.

It is hopeful that with the prevailing uncertainty of the pandemic and ongoing technological advancements, virtual microscopy is likely to gain acceptance among dermatopathologists and residents and institutional digital slide libraries will be increasingly adopted in dermatopathology education.

## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

Geeti Khullar<sup>1</sup>   
Mithilesh Chandra<sup>2</sup>

<sup>1</sup>Department of Dermatology and Sexually Transmitted Diseases, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India

<sup>2</sup>Pathology Consultancy Services, Noida, Uttar Pradesh, India

**Correspondence**

Dr Geeti Khullar, Department of Dermatology and Sexually Transmitted Diseases, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi 110029, India.  
Email: geetikhullar@yahoo.com

**ORCID**

Geeti Khullar  <https://orcid.org/0000-0002-7518-0101>

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