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Global impact on dermatology practice due to the COVID-19 pandemic



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Abstract This contribution focuses on the effects of coronavirus disease 2019 (COVID-19) on dermatology practice. We discuss the impact on practice volume and procedures and on the considerable increase in teledermatology use. We also describe the important roles that dermatologists have played in enhancing infection prevention and on the frontline. During the crisis, dermatologists have faced the challenge of a shortage of resources, such as personal protective equipment, in the health care system. In addition, they have been involved in managing cutaneous manifestations related to COVID-19 and occupational disease caused by personal protective equipment. Dermatologists have made a diligent effort to identify melanoma and to ensure the treatment of high-risk skin cancers. Safety guidelines have been suggested to minimize the potential risks associated with the systemic use of immunosuppressant agents and immunomodulators in patients with severe inflammatory skin disease during the pandemic. Finally, social distancing necessitated that dermatology conferences take place virtually and teaching via e-learning increased.

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Introduction

The coronavirus disease 2019 (COVID-19) pandemic is having a huge impact on dermatology, as evidenced by the reduction of nonessential visits and procedures and the emergence of teledermatology (TD).¹⁻⁵ Hospital and academic centers have made a diligent effort to adjust to unprecedented conditions.⁶ Dermatologists have served on the frontline of health care worldwide.^{7,8} During this critical time, they have played a significant role in enhancing preventive measures,⁹⁻¹¹ even while facing the shortages

of personal protective equipment (PPE) in the health care system.¹²⁻¹⁴

Soon after the spread of COVID-19 worldwide, reports of cutaneous manifestations related to the disease appeared.¹⁵ Dermatologists have been focusing on demystifying the skin manifestations related to COVID-19¹⁶ as well as diagnosing and treating adverse effects of a plethora of drugs that have been utilized to treat the disease. In addition, they have been involved in the management of occupational disease caused by PPE.¹³ COVID-19 is a challenge for the treatment of dermatologic patients, either with skin cancer or severe inflammatory skin disease.¹ Dermatologists have focused on en-

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sure the treatment of high-risk cancers during the crisis.¹⁷ The risks associated with using systemic immunosuppressants and immunomodulators for inflammatory skin disease have been addressed, and safety guidelines have been suggested.^{4,18} Finally, the COVID-19 pandemic is having a significant impact on teaching and scientific activities in the dermatologic community.^{4,19,20}

We discuss the immense impact of this pandemic on the dermatology practice, challenges that dermatologists have faced, and recommendations for skin disease management during this period.

Practice volume

There has been a substantial decrease in nonessential in-person consultations mainly, because exposure of nursing staff, health care providers, and patients to asymptomatic carriers presents a substantial risk, and cancellations of appointments for skin patients with fever or respiratory symptoms is insufficient.²¹ A considerable decrease of appointments was noted in both private practice and hospital settings.^{22,23} The number of dermatologic consultations in outpatient hospital clinics decreased, and only patients with suspected malignancy or those on biologic agents were provided appointments.^{1,22} Patients with chronic dermatoses were offered the option of submitting their clinical images and/or having a video consultation.²²

Skin lesions may play a role in indirect viral transmission and, therefore, it is important to prevent the nosocomial spread from asymptomatic-infected cases.⁹ Hospitals took drastic measures to reduce the flow of patients and prevent overcrowding in the outpatient dermatology departments, laboratories, and surgical units.²⁴ There was a recommendation to postpone outpatient visits for non-acute allergic conditions, acne, alopecia, chronic skin conditions, and cosmetic procedures.²⁵ To minimize droplet transmission of the disease, the screening activities in sexually transmitted disease clinics were suspended, and only visits for clinical trials were scheduled.²⁴ Similarly, increasing the working hours of dermatologists and posting them in shifts helped prevent overcrowding.³

One study showed that of 147 consultations during the lockdown period, only 40 required in-person visits, of which 11 required urgent intervention; the remaining 107 patients were consulted through teledermatology.²⁶ A US study performed in March 2020 revealed that 53% of clinics were open, 31% of clinics were just seeing emergency cases, and 16% of clinics were closed.⁵ A web-based US survey reported that, from the third week of February to the third week of March, the average number of patients seen per week declined from 149.4 to 63.4.²³ Two-thirds of respondents estimated a >50% further decrease during the next weeks. Postponement of nonessential appointments increased from 35.5% to 79.4% during this period.

Teledermatology

TD provides patients ongoing access to dermatologic care and is a safer way to evaluate patients, including those with a confirmed or suspected COVID-19 infection.²⁷ Several reports indicated a significantly increased number of dermatologists using TD during the pandemic.^{23,28} In a preliminary report published at the beginning of the pandemic, mean estimated TD visits totaled 37.8% of practice visits for the next month.²³ University, academic, and government dermatologists were more likely to use TD than private practitioners, and dermatologists with >30 practice years less likely; these associations, however, require validation. TD did not impact deferred or postponed biopsies during this period.

The loosening of regulatory restrictions, such as relaxed Health Insurance Portability and Accountability Act compliance, allowed by federal authorities appears to have enhanced the implementation of TD.^{29,30} The dramatic increase in TD use reflects a need to continue providing dermatology care for non-emergent cases and an expectation that TD can significantly reduce the risk of COVID-19 transmission.^{6,31-33} TD reimbursement improved significantly during the COVID-19 pandemic. Before this pandemic, only 16 US states had true payment parity laws that reimbursed telehealth as an in-person office visit.³⁴ In an effort to minimize the COVID-19 spread, several US states enacted telehealth expansion laws.^{29,35} More US states made room for remote monitoring and store-and-forward services that will greatly facilitate the management of patients with chronic conditions. Copayment or out-of-pocket deductibles for TD consultations were eliminated in some US states.³⁶

Technologic advances in platforms and mobile applications appear to have enhanced the adoption of TD. WhatsApp messenger (Facebook, Menlo Park, California) is currently one of the most popular applications used worldwide, allowing its users to communicate via text or voice messages, photos, and videos.^{37,38} WhatsApp messenger (Facebook) can deliver both real-time (through video and audio chat) and store-and-forward TD. Simply put, the patient can send the picture and/or text, and the dermatologist can reply at a convenient time; therefore, WhatsApp messenger (Facebook) can serve as an interface between patients and dermatologists.³⁷ A recent report, regarding pauci-symptomatic COVID-19 skin manifestations, describes the spread of this information via WhatsApp (Facebook) text messaging among 400 dermatologists of a French group. This example of successful communication highlights the strength of social networks and instant text messaging in health care providers' activity and the necessity of TD implementation.³⁸

Dermatologists who used TD for new patients during the pandemic may have been capable of accommodating more appointment requests than they actually did, and video TD consultations may offer an advantage in physician-patient interaction compared with other forms of TD (eg, telephone

calls). This aligns with reports of higher satisfaction for video than for store-and-forward TD among dermatologists before this pandemic.^{39,40} Recent advances in communication technology via modern video-conferencing equipment are facilitating telehealth. Innovations including real-time diagnostic data transfer and cloud technology are enhancing telehealth and making it more popular. Although no one truly knows what the post-pandemic dermatology practice will look like, the ever-evolving power of telehealth is becoming part of a dermatologist's "new normal."

Procedures

A substantial decrease in the number of minor procedures, such as biopsy, cryotherapy, and electrosurgery, was noted during the crisis. In a US study, the number of biopsies per week decreased from 19.8 to 7.7 in the beginning of the lockdown.²³ Removing benign lesions, such as cysts and lipomas, and performing cosmetic procedures were deferred. Enhancing preventive measures for infection control during dermatologic surgery is discussed later in this contribution. Dermatologists had to adapt their patterns of skin cancer removal, focusing on the identification of a melanoma (ie, taking a biopsy from a suspicious pigmented lesion) and removing high-risk tumors while postponing procedures for low-risk malignancies.¹⁷ Intermediate-risk malignancies were reviewed on a case-by-case basis and often postponed (detailed in the Skin cancer management section of this contribution).

Aesthetic procedures

The aesthetic practice has taken a backseat during the crisis as most cosmetic procedures require close contact with the skin and mucosa, which increases the risk of viral transmission.⁴¹ Some procedures should be strictly prohibited, while others might be performed under recommended precautions. Laser treatments should currently be prohibited, because the virus may survive up to 9 days on the plastic and stainless steel of the handpiece, and alcohol-based skin preparations (important for the prevention of COVID-19 spread) are prohibited due to laser safety principles. Fractional radiofrequency, high-intensity focused ultrasound, and cryolipolysis devices that use steel, gold, or plastic handpieces should be avoided for similar reasons.⁴² Deep chemical peels, such as phenol and highly concentrated trichloroacetic acid, that induce substantial epidermal damage should not be performed due to risk of viral contamination. Microneedling carries a risk of infection and viral autoinoculation and should be avoided as well.⁴³ Thread-lift procedure should be avoided owing to serious potential side-effects including infections, thread extrusion, and inflammatory reaction.^{44,45} More invasive aesthetic procedures should also be avoided.

Aesthetic procedures, such as botulinum toxin injection, hyaluronic acid fillers, superficial chemical peeling, and

platelet rich plasma injections (PRP), are deemed safe.⁴² Timely botulinum toxin A injections can elevate the mood of patients during these coronavirus days.⁴² Not performing the procedure in a patient who regularly receives it can cause acute botulinum toxin deficiency syndrome. Also, botulinum toxin may help to decrease viral infections from herpes and human papilloma viruses.⁴⁶ Hyaluronic acid fillers can induce only a mild immune response.⁴⁷ Injecting with smaller gauge needles, under antibiotic coverage with a macrolide or tetracycline that has anti-inflammatory activity, may decrease the risk of side effects.⁴² PRP contains a good amount of thrombin that enhances its antimicrobial activity. Also, PRP enhances endothelial cell proliferation and migration that can result in quicker healing.⁴⁸ For these reasons, PRP procedures are considered safe during the COVID-19 pandemic.⁴²

Although many cosmetic procedures were cancelled or postponed during the pandemic, many patients will return for their maintenance treatments once the pandemic restrictions are lifted. Providers should proceed with caution and continue to practice the use of enhanced PPE in all procedures.⁴⁹

Dermatology involvement in direct COVID-19 care

Enhancing infection control

Dermatologists working in endemic areas should ask patients about respiratory symptoms, travel history to endemic areas, or contact with a confirmed COVID-19 case.⁴ Effective hand hygiene—with regular hand washing—has been shown to decrease viral transmission among humans and has been encouraged by dermatologists. Cleansing the hands with an alcohol-based hand gel or washing them with soap and water for 20 seconds is adequate. Antiseptics such as octanediol, chlorhexidine, and iodine do not affect the viral structure.⁵⁰ Alcohol-based skin cleansers are preferred before performing procedures. As the virus stays in the air for up to 3 hours,⁵¹ it is advisable to open the windows after procedures. Conjunctivitis may be caused by aerosol contacts with the conjunctiva or hand to eye contact. This is important not only for ophthalmologists but for dermatologists as well.⁵² Another effective way to minimize the viral spread is through a high air exchange cycle rate (ie, >25 cycles/hour).^{53,54} If more than one operating room is available, use another operating room after each procedure. Most important, the operating dermatologist should use PPE, such as head caps, face masks, protective eyewear, protective suits, and gloves, during the procedures.⁴¹

Dermatoscopy should be avoided for all patients with COVID-19, except if urgently needed.⁴ Also, dermatologists should avoid performing dermatoscopy on highly dangerous sites of infection, such as hands, nails, face, eyes, and mucous membranes. The dermatoscope should be sterilized with 70% alcohol before and after use, and the use of a disposable dermatoscopic lens or transparent adhesive tape is advisable if available.

Table Skin manifestations in COVID-19

Morphology	Characteristics
Maculopapular eruption (47%)*	Perifollicular or PR-like, \pm purpura; rarely infiltrated lesions, EM-like or EED-like
Urticarial lesions (19%)	Trunk or generalized
Pseudo-chilblain (19%)	Acral areas (hands and feet); late in the course of disease
Vesiculobullous lesions (9%)	Some with varicella-like features; trunk, limbs; lesions appear commonly before other findings
Livedo or necrosis (6%)	Truncal or acral ischemia; lesions suggestive of occlusive vascular disease
Other morphologies	Petechiae or purpuric lesions, palmar erythema, perifollicular eruption, pruritus, mucosal lesions

* A frequency of eruptions as reported by Galván Casa et al.¹⁶ COVID-19, coronavirus disease 2019; EED, erythema elevatum diutinum; EM, erythema multiforme; PR, pityriasis rosea.

Management of COVID-19–related cutaneous manifestations

Some report have COVID-19 may be associated with cutaneous manifestations. Some evidence has linked COVID-19–related dermatologic presentations to the presence of angiotensin-converting enzyme 2 in the skin.⁵⁵⁻⁵⁷ A focused on the hypercoagulable state noted in vasculopathic lesions, and others have focused on the vascular damage that could be directly induced by the virus.^{16,58} Some reports have indicated that COVID-related cutaneous manifestations may represent a secondary immunologic reaction or solely a manifestation of COVID-19–related drug eruption.⁵⁹⁻⁶¹ Still, the pathogenesis of cutaneous manifestations in COVID-19 is not fully understood and several mechanisms may be involved.

Cutaneous manifestations have been reported in up to 20% (18 out of 88 patients in an Italian study) of COVID-19 patients.¹⁵ In this study, 14 patients developed a nonspecific eruption, three generalized urticaria, and one varicella-like eruption. The trunk was the most common site of involvement, and minimal itching was noted. Most lesions healed without any sequelae, and there was no correlation with severity of COVID-19. The cutaneous manifestations constitute one of the inseparable components of this intriguing disease. In the largest study (375 patients) of skin manifestations in COVID-19,¹⁶ the skin findings were classified into five morphologic groups: maculopapular eruption, pseudo-chilblain, urticarial lesions, vesiculobullous lesions, and livedo or necrosis (Table). The preclinical phase of the disease was characterized by vesiculobullous eruptions (15%), while pseudo-chilblain demonstrated a later onset and other cutaneous findings appeared concurrently with systemic symptoms.^{16,58-65} Other, less common skin manifestations include petechiae or purpuric lesions, palmar erythema, perifollicular eruption, pruritus, and mucosal lesions.⁶⁰

The relatively nonspecific dermatologic presentation of a maculopapular eruption has a broad differential diagnosis including infections and drug eruptions, with COVID-19 being a new consideration.^{15,66-69} A case from Thailand reported a patient who was admitted with a petechial eruption and thrombocytopenia. The initial belief was that the patient had Dengue fever. Given the concomitant respiratory dis-

tress, additional evaluation was performed, and a diagnosis of COVID-19 was confirmed by a laboratory workup including reverse transcriptase-polymerase chain reaction.⁷⁰ This case illustrates that cutaneous manifestations can be helpful in establishing a COVID-19 diagnosis. The dermatologist may play a crucial role in suspecting and diagnosing the disease, particularly in the presence of respiratory distress and fever.⁷¹

Management of drug eruptions

Dermatologists should be familiar with cutaneous adverse effects of drugs used in the therapy of COVID-19 and be preemptive, as these may herald incumbent systemic toxicity.⁷⁰ Drugs that are being utilized in the treatment of COVID-19, such antiviral and antimalarial agents, have a broad spectrum of adverse effects. Differentiating drug eruptions from COVID-19–related skin manifestations can be challenging. Dermatologists must possess a watchful eye for adverse effects of drugs—especially as these may herald systemic effects—and manage them in a timely manner.

Management of occupational skin disease

Given that COVID-19 is a highly infectious disease with human-to-human transmission and adequate vaccine supply or highly effective treatment had been unavailable, health-care professionals are at risk of being infected. As a result, it is mandatory that they take adequate precautions, including using PPE such as face masks, gowns, visors or goggles, and gloves. The use of a highly protective facial mask, such as the filtering face piece 3, for a long time can cause pressure marks on the skin in areas such as the nasal bridge.⁷² Health care workers have experienced numerous cutaneous manifestations secondary to PPE use, including erythema, indentation, ecchymosis, maceration, abrasion, and erosion.^{73,74} The “COVID-19 medical staff sign” (COVID-19 MS sign) refers to pressure injuries related to PPE use in health care workers.⁷⁵ This sign was dedicated to the memory of those health care workers who lost their lives fighting COVID-19 and to those currently fighting the disease. A “partial COVID-19 MS sign” reflects a milder presentation affecting fewer facial

sites.⁷⁶ Delayed pressure urticaria has also been reported, the nose is the most common site of skin damage (83.1%) among frontline health care workers.⁷⁷

A consequence of frequent hand washing with fat-soluble disinfectants, such as 75% alcohol or chlorine-based disinfectants, is excessive drying of the skin with disruption to the skin barrier. This can present as hand dermatitis and, ultimately, be complicated with severe itching and bleeding from scratching. In individuals predisposed to barrier dysfunction disorders, such as atopic dermatitis, further complications such as infections and fissures may arise. Adequate protective measures, including the regular use of an emollient, are recommended.^{78,79} Hyperhidrosis or hyperhydration of the hands can develop after long use of gloves and increases the risk of allergic contact dermatitis. An odds ratio of 2.17 for occupational hand dermatitis has been reported.⁷⁷

Dermatologists on the frontline

As the number of coronavirus cases had continued to rise, the need for frontline physicians increased. During this pandemic, dermatologists have been redeployed in inpatient, outpatient, and emergency departments. They have worked alongside critical care specialists and intensivists in COVID-19 wards worldwide.⁸⁰ As most dermatologists do not typically treat critical patients, they needed refresher training in simple procedures.⁷ Intensive care training is invaluable and makes dermatologists on the frontline more efficient. Dermatologists can participate in the triage of patients presenting with a fever and eruption and can help in establishing a diagnosis and treatment plan.⁸¹ They can determine whether the eruption in a patient with fever is suggestive of COVID-19. It is ultimately the dermatologist on the frontline who can differentiate among various eruptions and etiologies of pruritus, including drug-adverse effects, underlying skin disease, and pulmonary disease.

Dermatologic surgery

After lockdown, new priorities mandated that only surgical interventions that cannot be delayed should be performed.⁸² The management of patients undergoing surgery should include screening for COVID-19 infection before admission.⁸³ The patient must wait for screening results to process. If the patient is negative for COVID-19, the operation can continue. If the patient is positive, surgery is postponed. Patients and health care personnel are at risk of acquiring COVID-19. Measures should be taken to minimize morbidity related to dermatologic surgery, including placing patient chairs a minimum of 1.5-m apart, removing sources of infection (such as magazines) in the waiting room, staggering appointment times to maintain social distance protocols in the waiting room, limiting support persons to one, using best available PPE, considering N95 masks for periorificial surgery, and selecting dissolving sutures to minimize follow-up appointments.⁸⁴

Skin cancer management

TD consultations should be utilized, whenever possible, for the evaluation and diagnosis of new patients. One should consider repeated teleconference and/or photographic follow-up of small lesions suspected of being nonmelanoma skin cancers, reserving biopsy for growing or highly concerning lesions.⁸⁵ An excisional biopsy with 2-mm margin should be taken, if possible, when a malignant melanoma (MM) is suspected. Management of the MM patient during the pandemic should be coordinated based on the stage of the tumor, nodal involvement, and metastasis.⁸⁶ As per guidelines of National Comprehensive Cancer Network, treatment of MM *in situ* should be deferred for 3 months.⁸⁶ T1 MMs (≤ 1 mm thick) may also be delayed for up to 3 months, even for positive biopsy margin, as long as biopsy removed the majority of the lesion. Also, one may delay wide excision for up to 3 months for invasive MMs of any depth, for which previous biopsy had clear histologic margins or only peripheral transaction of the *in situ* component. Surgical management of T3/T4 (> 2 mm thick) should take priority over T1/T2 (≤ 2 mm thick) MMs. Sentinel lymph node biopsy may be delayed for up to 3 months unless wide excision is planned, in which case these procedures can be performed at the same time.

Superficial basal cell carcinoma removal might be postponed for 6 months; whereas other basal cell carcinoma types may be postponed for 3 to 6 months, with exceptions for highly symptomatic lesions.^{84,87} Actinic keratosis and squamous cell carcinoma *in situ* do not require any intervention.⁸⁸ For the treatment of invasive squamous cell carcinoma, dermatologists should take into account prognostic variables including location, size > 2 cm, depth > 2 mm, differentiation, perineural or lymph vascular invasion, recurrence, and immunosuppression.⁸⁴ Small, differentiated squamous cell carcinomas can be deferred. The National Comprehensive Cancer Network recommends that patients with Merkel cell carcinoma be treated promptly, with the exception of tumors < 1 cm in size in older patients; definitive treatment is necessary, as growth of Merkel cell carcinoma is often rapid.⁸⁹ Treatment of locally aggressive tumors, such as dermatofibrosarcoma protuberans and microcystic adnexal carcinoma, should take into account the patient's overall health, health care resource considerations, and tumor variables.⁸⁴ The National Comprehensive Cancer Network guidelines recommend delaying treatment of such tumors, if there are no high-risk features.⁸⁶

Systemic therapy for inflammatory skin disease

During this pandemic, potential risk from immunosuppressive and biologic and targeted agents for both COVID-19–infected patients and those at risk for the disease have been addressed.

Immunosuppressive treatments

Immunosuppressive agents, such as corticosteroids, cyclosporine, methotrexate, and azathioprine, have not been reported to result in increased respiratory disease from COVID-19. It was recently reported that three children on immunosuppressive agents were positive for COVID-19 but only showed mild symptoms and did not have any respiratory complications.² The European Task Force on Atopic Dermatitis released a statement on immunosuppressants and immunomodulators indicating that these can be continued in patients with atopic dermatitis.⁴ Patients who test positive for COVID-19 should undergo an interdisciplinary risk assessment before immunomodulator discontinuation due to possible side effects from abrupt cessation. Data currently suggest that it is safe for patients to be on immunosuppressants during the COVID-19 pandemic. Although data are sparse, there is a consensus that patients who need systemic therapy and have no COVID-19 symptoms may continue their treatment.^{1,90} Corticosteroids have been associated with delayed viral clearance in patients with severe acute respiratory syndrome and Middle East respiratory syndrome,⁴ and the World Health Organization does not recommend routine use of systemic steroids for managing COVID-19 patients.⁹¹ A letter to the editor discussed the possible risk to patients receiving corticosteroids, tacrolimus, cyclosporine, mycophenolate mofetil, azathioprine, and methotrexate.¹⁸ It was suggested that these treatments be discontinued in patients with viral symptoms or potential COVID-19 exposure.

Biologic and targeted treatments

There is a concern about an increased risk of morbidity and mortality from COVID-19 in patients on biologics. This is based on data demonstrating that biologics increase susceptibility to certain infections.² The tumor necrosis factor- α inhibitors may be protective by decreasing inflammation from the COVID-19-induced cytokine storm.⁴ A trial of adalimumab treatment for COVID-19 was being performed.⁴ Interleukin (IL)-17 blockers may also benefit COVID-19 patients; the data on the effects of biologics on COVID-19, however, are insufficient. As per American Academy of Dermatology guidelines, it is appropriate to discontinue immunosuppressive drugs patients diagnosed with COVID-19.⁹² Patients without symptoms or mild respiratory symptoms who do not have consistent close contact with a confirmed COVID-19 case may have their biologic therapy continued.^{92,93} Patients with moderate or severe respiratory symptoms should have biologic therapy discontinued and, if based on clinical presentation there is a concern for COVID-19, then the patient should be referred to the hospital.⁹⁴

A decision to begin biologics and targeted treatments during the pandemic should be based on a discussion between the patient and the dermatologist, weighing the risks and benefits of treatment in patients who are low risk for COVID-19.^{92,95} Biologic therapy for patients who belong to a high-

risk population might be postponed.^{2,81} The high-risk category includes patients who are older than 60 years of age or have comorbidities, such as diabetes, chronic obstructive pulmonary disease, chronic kidney disease, cancer, cardiovascular disease, tobacco use, or liver disease.⁹⁶ These patients should be started on an alternative therapy, where possible.

Conferences and education

The COVID-19 pandemic is substantially impacting dermatology conferences and other teaching activities. Most conferences have been taking place virtually, and e-learning activities such as webinars have increased significantly.²⁰ Remote teaching of dermatology residents and students through online lectures, seminars, and case discussion is deemed safer than traditional teaching methods during this critical time.^{4,19,97} We have performed a web-based survey of dermatologists regarding attendance of virtual conferences, webinars, and other e-learning activities during the pandemic. We discuss the results in a separate report in this special issue.

Conclusions

Dermatologists have played important roles in infection prevention and judicious management of skin disease during this critical period. The COVID-19 pandemic is having a huge impact on dermatology practice. Although we cannot say that this situation will have long-lasting effects in every aspect of dermatology practice, TD is becoming an essential tool and is here to stay. Dermatologists must ensure they take all precautions necessary to minimize the potential risks of COVID-19 as practices begin re-opening.

Conflict of interest

The authors have no conflict of interest.

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