



Contact Lens Practice in COVID-19

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Introduction

SARS-CoV-2 is a highly infectious respiratory virus that can cause symptoms to range from mild illness to severe acute respiratory syndrome that results in the development of coronavirus disease, two types of SARS-CoV-2 have been detected (L and S) [1]. The L form is accepted to be more aggressive and is suspected to be the derived variant of the ancestral S type, it is significantly more prevalent in Wuhan, China. In January 2020 its frequency of isolation has been decreased [2]. Mainly transmission of the disease is through respiratory droplets when symptomatic people cough or sneeze. Contact transmission is a way of infection but the primary mode of transmission is the large droplets of virus-laden mucus when an uninfected person touches a surface that is contaminated with Viral particles emitted from the respiratory tract of an infected person and with a series of subconscious movements touch the nose, mouth, and eyes. Ultimately, the virus enters the body through mucus membranes. The disease was named infection by the World Health Organization (WHO) due to virus as coronavirus disease 2019 (COVID- 19), in February 2020 [3] and was officially assigned pandemic status In March 2020.

In response to COVID-19 global fundamental changes varying in relation to the potential for transmission of the disease have been adopted to reduce the chance of infection. Although our knowledge of COVID-19 is incomplete, personal and environmental hygiene is important along with optimizing protection against certain and possible transmissions routes. Many have imposed a new way of working mostly by shifting towards teleworking. However, preventing conventional face-to-face examination is a challenge for eye care practitioners even though telephone triage provides a useful starting point for establishing emergency patients. Physicians and their primary care staff are responsible for ensuring that all guidelines and requirements for the care of all patients are strictly adhered to.

In eye care clinics practitioners uses alcohol-and bleach-based disinfectants to disinfect ophthalmic instruments and office furniture [4]. It is recommended to use the same disinfection practices to prevent SARS- CoV-2 transmission as used in other viral pathogens to prevent office-based spread before and after every patient encounter. It is also recommended by both The CDC and WHO to wash their hands for at least 20 seconds with soap and water after they have been in a public place, or after coughing, or sneezing in order to decrease the risk of contracting the virus. Use at least 60% alcohol hand sanitizer if soap and water is unavailable and should cover all surfaces of their hands and avoid touching their face with unwashed hands. Due to direct contact and the limited working distance, in the optometry field, the issue is critical especially in contact lens practice, which in regard has major implications for the sustainable management of contact lenses, which at the time of COVID-19 still remain an effective, safe and important solution for correcting refractive errors. There may be critical changes in the local eye care, thus it is important to remind the contact lens wearer to minimize their risk of complication. Contact lens care procedure should be the same as those under normal circumstances, which include hand washing and drying with a paper towel before both insertion and removal of contact lens, cleaning contact lens daily, following guidelines for Case care, and avoiding Contact Lens exposing to water. In this epidemic time where there is a restriction in the local clinical care, practitioners should consider counseling patients to reduce or eliminate sleep with their Contact Lenses on or consider changing to daily disposable lenses. Face, eyes, nose, and mouth should not be touch along with contact lens wear with unwashed hand, especially with any cold or flu-like symptoms. By using correct hand hygiene techniques and contact lens care procedure the risks of infection, inflammatory responses and viruses transmission to the ocular surface will be eliminated.

No evidence found an increased risk of COVID-19 by wearing contact lenses compared to spectacles lens wear nor that wearing spectacles provide protection against COVID-19. This being a concern relates to the fact that SARS-CoV-2 has been isolated in tears, and that the virus transmitted by hand contact could be transferred to contact lenses during their insertion and removal.

Based on the experience of previous epidemics, such as Previous MERS-CoV [5] and SARS-CoV1 [6,7] World Health Organization (WHO) issued an emergency international public health warning (PHEIC). On 30 January 2020, this set of guidelines include the use of goggles or face shield to protect against eye transmission of CoV. There are some reports indicating that CoVs also affect the eye from the ophthalmological scientific community [7-9]. The eye is rarely involved in human CoV infection based on recent studies. It is also not preferred entrance to infect the respiratory tract by human CoVs [10].” The results from recent study showed that SARS-CoV-2 transmission risk is low through tears [11]. Therefore, until now, no findings support the concern that healthy contact lens wearers are more at risk of contracting COVID-19. Many would not agree due to the lack of data, however, from previous outbreaks of coronavirus disease including SARS the lack of evidence suggests the low incident of developing COVID-19 from contact lens wear. Adenovirus, other coronaviruses, herpes virus, human immunodeficiency virus, influenza virus, and Zika virus are Viruses associated with human infections that were found in the tear film or on ocular surface tissues [12-15]. With the exception of adenoviral infections, it has been said that these viruses are found at low levels and believed that they are not transmitted from the ocular surface.

Epidemic Keratoconjunctivitis is an ocular viral infection caused by the non-enveloped DNA virus adenovirus. Accounts for 65-90% of viral conjunctivitis cases, it is highly infectious and spread rapidly through direct contact [16,17]. In close contact between patients and healthcare providers and in eyecare clinics, Keratoconjunctivitis has been implicated in actively transmitted diseases [18,19]. It has shown that there is no increased risk of developing EKC in contact lens wearers, with a reported of 3-15% in contact lens wearers [18,20]. In fact, adenoviral infection can be treated using bandage silicone hydrogel contact lenses [21]. Whereas, in herpes simplex keratitis (envelope DNA virus) there are conflicting data on the association between contact lens wear and HSK occurrence or reoccurrence [10-14].

Another virus related to the ocular surface is the human immunodeficiency virus. It is an enveloped RNA virus (a different form of RNA virus) that causes acquired immunodeficiency syndrome (AIDS). it has been detected in n most ocular tissues of patients with AIDS including tear film, cornea, and conjunctiva. Also, it has been recovered from the surface of contact lenses [17]. However, it is currently believed that the ocular surface is not a transmission way for HIV. Based on CDC state saliva, tears, or sweat that is not mixed with the blood of an HIV-positive person cannot spread HIV [22]. Research has shown that an appropriate

rubbing of contact lenses along with most contact lens care systems would stop the chance of the lens transferring the virus to the eye and causing HIV [23]. Yet, AIDS is associated with opportunistic infections due to the immunodeficiency and compromise which puts patients at ocular infection risk [24]. Along with changing to daily contact lens managing the patient and their ocular health is important as it relates to safe contact lens wear.

Even though there are many differences in these viruses and COVID-19 in terms of their structural biology, vectors, and other factors: CDC released on March 20, 2020, related information to AIDS patients and precautions as it relates to COVID-19 [25]. Because of the currently limited data, the available information on disease spread via viral contaminants that are highly infectious and potentially spread by direct contact remains the best evidence.

Samples of tears were collected from thirty-six SARS-CoV patients and were sent for SARS-CoV detection in 2004. One patient had RNA identified on all samples, respiratory smears and tears and RNA of SARS-CoV was detected in all three patients. The findings of this study suggest that SARS-CoV may occur in tears and confirm the need to be taken appropriate precautions to prevent transmission through ocular tissues and secretions [9,26]. On the other side in 2020 Ivan Seah Yu Jun and his colleagues’ study, sixty-four samples were collected from seventeen COVID-19 patients and between Day 3 to Day 20 from initial symptoms. Both viral culture and reverse transcription-polymerase chain reaction (RT-PCR) did not detect the virus.

However, Guangfa Wang, a clinician of China’s national pneumonia experts’ group on 22 January 2020 developed conjunctivitis while working with his eyes unprotected during the midpoint of the outbreak of Wuhan and then tested positive for the virus. This led to a possible different transmission route for CoVid-19 through eye infection. However, the frequency of conjunctivitis in patients with COVID-19 reported to date is low, at <3% [12,19]. Lu et al. stated that the disease can be transmitted by the mucous membranes, including the conjunctiva [27]. Affiliated Hospital of Zhejiang University Jianhua Xia MM et al. conducted a study on thirty confirmed novel coronavirus pneumonia patients. Using disposable sampling swabs and at a period of 2 to 3 days secretions of tear and conjunctival collected twice for reverse-transcription polymerase chain action (RT-PCR). Niral RNA was found twice in tear fluid and conjunctival secretion of one patient with conjunctivitis. Whereas In the severe or common-type patients without conjunctivitis no viral RNA was found in conjunctival secretions and tear fluid [28].

As mentioned earlier Contact lens safety has not changed in this pandemic and appropriate hygiene for contact lens wear and care should be the same as that always recommended. Yet in this time with social distancing, and potentially severely compromised access to local eye care are different. Practitioners should be aware of local clinical care facilities during this pandemic and work to

reduce the impact of adverse events related to contact lenses on the wider health care system. According to local and regional considerations, the implications will vary. As on March 24, 2020, many countries suspended their eye care routine, with moving to provide, telephone only consultations, scaled-back provision, and/or emergency services in optometric practices.

In the United Kingdom, for example, rather than refer into the National Health Service, practitioners should manage cases within an optometric framework, including contact with patients through telephone and/or consulting through video used by suitable phone app to help make rapid triage and management decreasing the need for burdening other clinical colleagues. However, for some cases, it is preferred to be managed by referral to optometric colleagues licensed to practice as an Independent prescriber and can treat significant contact lens adverse events. Local Minor Eye Conditions Services (MECS) may be an alternative care pathway in other cases. Patients are sent to local optometrists under this service, which they have undergone accredited training in advanced optometric care that can triage whether referral to ophthalmology is necessary and treat minor eye conditions within their scope of practice. Eyecare professionals must avail themselves of the relevant options as soon as possible to benefit both their patients and the wider healthcare system, and not wait for the contact lens wearer to reports having some form of an adverse event to start investigating the possibilities.

Whereas in Australia and North America, optometrists are more likely to be the first port of call for contact lens patients with clinical adverse events. Reduced level of eyecare routine needs to be considered and enacted. The impact on the wider healthcare system in countries where contact lens fitters are less likely to offer clinical care to patients with clinically significant adverse events should be minimized and advice management pathways should be considered. During this pandemic, practitioners should make more efforts to minimize contact lens complications by providing clinical advice to their patients. As recommended by the American Academy of Ophthalmology, the simplest way would be to replace the contact lens with spectacle during this time [29]. However, in some cases, this suggestion is likely not practical for many contact lens wearers, keratoconus for example.

Across 4,120 visits soft contact lens wearers review of 1,276 records, 82% did not present with any complications during the period of more than two years of observation [30]. In daily disposable lens wear annual incidence of symptomatic CIEs is significantly less than in daily reusable soft lens wear [31]. 2-7x increased risk of incidence of symptomatic CIEs in extended wear in comparison to daily wear [32,33]. Regardless of material type annual incidence of microbial keratitis in extended soft lens wear higher than in daily wear [34-37].

To reduce any potential burden on hospital visits at this pandemic, the risk of contact lens wear should be minimized. In Steele and Szczotka-Flynn, the relative risks of developing CIEs

are summarized [38]. This includes non-modifiable factors such as higher prescription ($\geq 5D$) (1.21-1.6x), younger age (1.75-2.61x) and history of a previous event (2.5-6.1x) and modifiable factors such as bacterial burden on margins of the lid and the lens (5-8x), overnight wear (2.5-7x) and lens replacement schedule (12.5x). Similar to that, MK is also associated with many factors, including poor lens and storage case hygiene for daily wear, overnight wear [34,36,37], infrequent replacement of lens case, water exposure, and smoking. Changing non-modifiable risk factors is not possible, however, there are chances to address the behaviors of modifiable risk factors, such as in daily disposable lens wearers the incidence of CIEs is reduced [30,31], in this time of reduced clinical provision this type of lenses is preferred.

In order to lower the risk of contact lens complications, individuals must stop planned or accidental overnight wear. Many individuals used their lenses on extended wear for an occupational reason and since most of them are currently working from home the same benefits may no longer be present. In this case, changing to a daily wear schedule is preferred until normal clinical provision is available. Only after consultation between the patient and their contact lens practitioner contact lens wearing schedules could be undertaken.

At this time positive changes such as correct use of multipurpose solutions with rub and rinse cleaning of reusable lenses, hand hygiene, cleaning case daily, and regular lens case replacement should be advised to patients by their eye care professionals. Most importantly counsel on the avoidance of contact with water to eliminate the risk of microbial keratitis, especially *Acanthamoeba* keratitis which in recent years has increased [39,40]. In all of the time it is an important aim for the profession to adhere to compliant lens wear and care practices, however, in this current outbreak of SARS-CoV-2 attention should increase in this area. Patient should be educated on care practices and safe wear to reduce contact lens-related complications requiring clinical care.

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Conflict of Interest

None.

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