Comprehensive Teleoptometry Exams in Canada: A Proposed Clinical Framework

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Abstract

PURPOSE: Many high-income countries like Canada are faced with unmet needs regarding the availability of access to eye care, especially in rural, remote, or northern areas. Teleoptometry has the potential to improve access to primary eye care and help prevent, detect, diagnose and treat uncorrected refractive error and sight-threatening eye diseases. Given the rapid adoption of technology for virtual care during the COVID pandemic, the existing teleoptometry guidelines in Canada are limited in scope and may lead to uncertainty for optometrists practicing remote care. The purpose of this paper is to present a scaffold that highlights the similarities and differences between an in-person comprehensive eye examination and one that is delivered through comprehensive teleoptometry in Canada. This proposed clinical framework draws from both the existing published literature and the clinical experience of the authors. This paper discusses issues for teleoptometry including patient consent, efficiency, delegation, training and the patient pathway, including referral protocols when indicated.

RESULTS: Comprehensive teleoptometry eye exams are very similar to in-person eye exams, but depend more on the assistance of an in-person technician/optometric assistant. The exams include delegated tests performed by an optometric assistant and tests controlled remotely by the optometrist, like refraction. However, other tests that require clinical judgment to execute or interpret should be performed by the optometric assistant under the direct supervision of the remote optometrist using live video. The remote optometrist should be able to repeat any test during videoconferencing.

CONCLUSION: Teleoptometry is a tool optometrists can use to reach patients who struggle to access an in-person eye exam. This evidence-informed, draft framework provides a point of reference for discussion by the Federation of Optometric Regulatory Authorities of Canada and the provincial regulatory authorities to protect the public and increase access through the delivery of remote primary eye care in Canada.

KEYWORDS: primary eye care, tele-eye care, teleophthalmology, teleoptometry, telerefraction

INTRODUCTION

Visual impairment has numerous detrimental effects on the quality of life of those who suffer from vision loss.[1] Fortunately, worldwide, 90% of vision loss is preventable or treatable.[2,3] Even before endorsement of the VISION 2020: The Right to Sight initiative in 1999 and the Global Action Plan for the Prevention of Avoidable Blindness and Visual Impairment 2014-2019 by the World Health Organization (WHO), attention has mainly been focused on access to eye care in low- and middle-income countries. However, Canada, a high-income country, is also faced with unmet needs regarding the universality of access to eye care throughout each province or territory.[4,5] In 2019, an estimated 1.2 million Canadians lived with vision loss, representing 3.2% of the total population.[6] The prevalence of vision loss in Canada is expected to increase by nearly 30% in the next decade.[7]

Primary eye care includes the detection, prevention, diagnosis, treatment and management of visual impairment and eye disease.[8] Unfortunately, access to eye care in rural, remote or northern areas of Canada is challenging due to workforce supply, public awareness, availability and regularity of services, affordability of services, and physical accessibility.[4] A 2020 study by Shah et al. showed that optometrists were widely distributed geographically but were predominantly concentrated in urban centers. [9] They concluded that there were 1.70 optometrists per 10,000 population and that there was an "uneven geographical distribution of optometrists relative to utilization and key socio-demographic indicators across Canadian health regions, suggesting that there are likely gaps in both potential and realized equitable access to care." Amongst all of the 109 health regions studied, Saskatchewan, Manitoba and Quebec had some regions with the lowest ratio of optometrists per population.

Telemedicine is defined as "the process of utilizing modern telecommunication technologies to provide clinical service when the patient and the clinician are not in immediate physical proximity", and its fundamental aim is to improve access to care.[10,11] Teleoptometry is used more and more to bridge the gap in the delivery of eye care in Canada, especially since the COVID-19 pandemic encouraged many patients and their eye care providers to familiarize themselves with virtual care.[12] Even though some remote services, like diabetic retinopathy screening programs, have been available in Canada since the 2000s, there is still a gap in delivering primary eye care services remotely. Until recently, Canadian optometrists mostly used telemedicine to triage patients or to perform emergency tele-consultations using images or videoconferencing.[13,14] Even though comprehensive teleoptometric exams have been permissible in some parts of Canada for a few years, most patients and providers have not shown a strong adoption of this tool until recently. This type of eye exam, inspired by the increasing trend of teleoptometry observed in the United States, is an in-office examination conducted by an on-site optometric assistant (OA) and a remote optometrist.

The Canadian Association of Optometrists (CAO) and the American Optometric Association (AOA) support the use of teleoptometry when there are barriers to in-person eye care delivery.[15,16] Comprehensive teleoptometric exams are relatively new in Canada, and in 2019 the Federation of Optometric Regulatory Authorities of Canada (FORAC) adopted its Policy on Teleoptometry, stating that "optometrists must provide the same level of care and observe the same responsibilities as provided in direct patient care."[17] The teleoptometry guidelines in Canada should be updated to be consistent with the growing scientific literature on teleoptometry.[15,18] The provincial regulatory guidelines and policies on teleoptometry may benefit from additional findings on the appropriateness of new technologies and their integration into a comprehensive remote eye exam.

The purpose of this paper is to propose a draft clinical framework about comprehensive teleoptometric exams in Canada to encourage further discussion amongst stakeholders. The authors aim to describe the structure that would approach equivalency to the standard of care of a comprehensive in-person eye exam. The framework is based on both the existing published literature and the clinical experience the authors have gained through research in teleoptometry. Since there are numerous components to a comprehensive eye exam, a review of the literature encompassing all of them is beyond the scope of this paper, nor does this paper address other aspects of optometric consultations like contact lens fitting, ocular emergencies, surgical co-management appointments and optometric specialty services. A companion paper will address the current regulatory framework and related optometry acts across the provinces that may help support ongoing discussions on addressing protection of the public as well as access to care.

EXAM WORKFLOW

A variety of teleoptometry services are available in Canada and elsewhere, and some Canadian optometrists may not be aware of the different models of care and technology. A remote optometric service can be described in terms of the timing of the interaction between the patient and the remote optometrist: synchronous (real time), asynchronous (store-and-forward) or hybrid (both synchronous and asynchronous).[19] Synchronous components are essential to perform tests that require technical knowledge or clinical judgment that are the responsibility of the optometrist, while asynchronous components may enable more efficient data collection and aggregated clinical decision-making. Of note, the asynchronous modality alone doesn't permit a direct practitioner-patient relationship. Examples of teleoptometry that are solely asynchronous include remote patient monitoring, disease-specific screening, and self-administered refraction-only online testing. An asynchronous model alone is incompatible with a comprehensive eye exam.[20,21] Teleoptometry can also be described in terms of the patient location during the consultation. Patients can be assessed in-clinic for tele-consultation or from anywhere with internet connectivity, including their home. An in-clinic tele-consultation is necessary to perform a comprehensive examination because of the availability of equipment needed to collect the required clinical information.

With the current state of technology, only certain parts of the comprehensive eye exam are commonly automated or machine-based (e.g. auto-refraction, non-contact tonometry, automated visual field, fundus photography, optical coherence tomography (OCT)). As long as there are parts of the eye exam that require technical skills to perform, teleoptometry will rely on the delegation of techniques that are usually conducted by optometrists. There is currently no designated professional (e.g., optician, certified optometric assistant, orthoptist) or specific training associated with the assistant role in teleoptometry, which means that OAs are trained by their supervising optometrist. The equipment required to perform a comprehensive teleoptometry exam includes a videoconferencing platform that adheres to the confidentiality requirements of the clinical encounter, an electronic medical record (EMR), a remote-controlled digital phoropter and acuity chart, ancillary webcams for close-up videos of the eyes, in addition to the standard equipment necessary for an in-person eye exam.

The proposed workflow includes tests 1) delegated to the OA, asynchronously, 2) performed by the remote optometrist, synchronously, and 3) a combination of OA and remote optometrist working together synchronously. In the first instance, tasks can be delegated and carried out asynchronously by the OA. These tasks do not require clinical judgment to gather data for the remote optometrist. The OA only requires the technical skill to gather accurate data.

In the second phase of testing, the workflow includes tests performed synchronously by the remote optometrist because they require clinical judgment to perform or interpret. For example, a digital phoropter and visual acuity chart system can be controlled remotely by the optometrist to conduct a subjective refraction. Similarly, testing can be repeated to verify results from phase 1 in case review of the asynchronous data suggests an error or clinically relevant finding. For example, presenting visual acuity can be measured by the OA asynchronously, but the remote optometrist may still decide to re-measure it in real time.

The third phase of testing requires coordination between the OA and the remote optometrist. Essentially, the OA serves as the hands of the optometrist to operate equipment that cannot be controlled remotely (i.e., "partially delegated", synchronous tasks). These tasks require clinical judgment to perform and interpret appropriately and should be performed under the real-time supervision of the remote optometrist. Slit lamp evaluation is an excellent example where the OA drives the slit lamp, and a real-time video feed is viewed by the remote optometrist. The live videos can also be recorded for documentation or subsequent review.

Table 1 shows the proposed workflows of a comprehensive teleoptometry exam compared to a comprehensive in-person eye exam. Remote eye exams and in-person exams are similar in many ways. One exception is fundoscopy, which uses fundus photos in place of direct observation for remote exams. Another difference is that teleoptometry exams rely on the assistance of an in-person OA for some tasks carried out by the optometrist during an in-person exam.

DISCUSSION

To be accurate and efficient, comprehensive teleoptometric exams depend on the delegation of some tasks to an OA. Even for in-person eye exams, the regulation addressing delegation to an OA can vary between Canadian provinces.[22] Some data included in a comprehensive in-person eye exam can be collected by an OA and charted in the EMR for review by the optometrist. However, some tests are more difficult to perform and/or require the clinical judgment of the remote optometrist. To perform those tests during the teleoptometric exam, it is essential that the remote optometrist be able to visualize every part of the eye exam in real time/synchronously, guide the OA, or even perform some tests remotely when necessary.

For in-person eye exams, the optometrist could choose to delegate some tests to an OA working at the same clinic. By regularly working closely with the same OAs, optometrists can become familiar with the skills of their assistants. However, for remote eye exams, optometrists could be paired with a previously unknown OA, especially if the remote optometrist serves multiple locations. Therefore, choosing which tests to delegate to an OA requires careful consideration. The remote optometrist has the same responsibility towards patients for a remote exam as for an in-person exam, which means that the optometrist must make sure that the OA has mastered the necessary skills to perform the delegated tests, especially if the OA has been trained by another optometrist or by a teleoptometry platform provider. To assess the skills of the OA, the remote optometrist working with an OA for the first time should either perform in-person eye exams or a synchronous remote exam with this OA prior to performing regular hybrid exams such as that described in the proposed workflow detailed in Table 1. Doing so will allow the remote optometrist to identify possible gaps in the skills of the OA, which can be addressed through additional training or by performing specific tests synchronously. For instance, if an OA appears to struggle with measurement of the

break and recovery during the near point of convergence, the optometrist could recommend that the OA undergo more training or choose to oversee the test in real time during videoconferencing.

Table 1: *Proposed Comprehensive Eye Exam Workflows for In-Person and Remote Exam Modalities*

In-Person Optometric Exam	Teleoptometric Exam
Optometrist or OA: – Entrance automated pre-testing • Auto-refraction • Non-contact tonometry • Automated visual field • Fundus photography • Optical coherence tomography *Optometrist:* – Case history – Visual acuity – Cover Test – Extraocular motility (EOM) – Convergence – Colour vision – Stereopsis – Sensory fusion – Subjective ocular alignment (Maddox Rod) – Accommodative amplitude – Pupillary reflexes – Subjective refraction – Fusional reserves – Anterior segment (slit lamp) – Fundoscopy	*Tasks delegated to OA (asynchronous):* – Informed consent for remote care – Entrance automated pre-testing • Auto-refraction • Non-contact tonometry • Automated visual field • Fundus photography • Optical coherence tomography – Case history – Visual acuity – Convergence – Colour vision – Stereopsis – Sensory fusion – Subjective ocular alignment (Maddox Rod) – Accommodative amplitude *Tests performed by the remote optometrist (synchronous):* – Case history review – Subjective refraction – Fusional reserves *Tests partially delegated to OA under the direct supervision of the remote optometrist (synchronous):* – Cover test – Extraocular motility (EOM) – Pupillary reflexes – Anterior segment (slit lamp)

TASKS DELEGATED TO THE OA (ASYNCHRONOUS)

The first step of a teleoptometric exam is to obtain informed consent to receive care delivered by an optometrist from another location.[23] Patient consent enables the OA to collect data and also helps to inform the patient about the pathways for receiving care that may differ from a more conventional in-person experience with the optometrist. Patient eligibility should be confirmed beforehand when making the appointment to ensure that the patient is a good candidate for a remote eye exam (see "Patient Management" section for details).

The OA may conduct entrance automated pre-tests, which may include lensometry, auto-refraction, non-contact tonometry, pachymetry, keratometry, automated visual fields, fundus photos and OCT. This automated pre-testing is no different from in-person data collection. A case history may be conducted by the OA directly with the patient or by using a pre-established questionnaire completed by the patient prior to the consultation.

Other delegated tasks, including visual acuity, convergence, color vision, stereopsis, sensory fusion, subjective ocular alignment, and accommodative amplitude, will contribute data recorded in the EMR. Of course, the remote optometrist could choose to perform some of these tests synchronously by using a digital phoropter during videoconferencing. A well-trained optometric assistant should be capable of collecting accurate subjective data for each of these tests and flagging areas of difficulty for review and re-test by the remote optometrist. For tests that do not require direct supervision by the optometrist, the OA should be adequately trained so that these tests may be delegated with accurate and effective data collection.

TESTS PERFORMED BY THE REMOTE OPTOMETRIST (SYNCHRONOUS)

Advances in technology have enabled the formation of seamless virtual connections between people. During the pandemic, examples included the widespread adoption of work-from-home meetings. Prior to connecting to the teleconferencing platform, the remote optometrist can review all of the pertinent data recorded in the EMR. When the remote optometrist connects through the teleoptometry platform, they can establish a direct doctor-patient

relationship in real time. The second phase of the workflow is synchronous and enables interactions very similar to those in an in-person exam.

Case History and Pre-Testing

From phase 1, the case history can be delegated to the OA and documented in the EMR. It is essential that the optometrist begin their remote consultation by reviewing the relevant elements of the case history with the patient at the start of the videoconference. They can review the responses of the patient and follow up with additional questions as needed to provide additional context. The case history is essential for establishing a foundation of trust between the patient, the OA, and the optometrist.

With respect to pre-testing results, the remote optometrist can verify findings and conduct additional tests or repeat tasks. An example may be to have the OA hold the Ishihara test plates to repeat colour vision testing, or to hold a Maddox rod and a transilluminator, so that the optometrist can hear the patient's observations regarding binocular alignment.

Subjective Refraction

Subjective refraction is an essential part of the comprehensive eye exam. There have been very few studies on teleoptometry, and most of them have focused on telerefraction.[20] They have found that subjective, remote refraction is equivalent to an in-person manifest refraction.[20,24-27] A recent study by Blais et al. published in 2024 compared comprehensive teleoptometric exams with "Gold Standard" in-person comprehensive eye exams and reported that "Tele-refraction has a good to excellent agreement with in-person subjective refraction in terms of sphero-cylindrical power and best corrected visual acuity."[28] They also used questionnaires and found no statistically significant difference in visual comfort between the best corrected visual acuity prescription of each exam modality, even though the confidence level of the eye care providers and patient satisfaction were significantly higher with an in-person exam. For the provider, the experience of performing subjective refraction remotely is similar to an in-person subjective refraction using a digital phoropter. A study published in the *Canadian Journal of Optometry* in 2021 highlighted the fact that " refracting opticians […] do not possess adequate training and knowledge to safely and independently perform a refraction and prescribe an optical appliance", suggesting that refraction should be performed by the optometrist with a remotely controlled phoropter.[29]

Of course, the remote optometrist could also choose to oversee or even conduct all the tasks that can be delegated asynchronously with the OA in real time during videoconferencing by instructing the patient during each test while the OA carries out the tasks. However, an area of concern for synchronous testing is that it may increase the exam duration and reduce efficiency, especially if the quality of the video stream is limited by internet bandwidth.

TESTS PARTIALLY DELEGATED UNDER THE DIRECT SUPERVISION OF THE REMOTE OPTOMETRIST (COMBINATION OF OA AND REMOTE OPTOMETRIST WORKING TOGETHER; SYNCHRONOUS)

To perform a comprehensive teleoptometric exam, the remote optometrist will use videos to gather, assess and review clinical findings. The most efficient model is store-and-forward of videos because the patient information is collected by the OA for later review by the optometrist, who could be seeing another patient remotely or in-person during that time. Alternatively, live video recording enables the remote optometrist to better guide the OA when there may be technical difficulties, or when more nuanced observations are required to properly visualize pertinent findings. Therefore, it is preferable to synchronously perform tests that require clinical knowledge to execute or clinical judgement to interpret. Optometrists who review these tests asynchronously must be able to repeat testing synchronously when deemed necessary.

The tasks carried out by the OA use a webcam positioned close to the eyes of the patient and a video camera capable of recording incorporated into the slit lamp. Video quality can be influenced by various technical elements, such as the angle of the webcam if it is attached to an adjustable flexible arm, the distance between the webcam and the eyes if it is set up on the pivoting table of a biomicroscope, the light saturation when using the transilluminator, and the automatic focus on instruments in front of the eyes instead of on the eyes, among others. The quality of the video transmission is another limiting factor that could make remote assessment more challenging, especially for the observation of subtle abnormalities. Limited internet bandwidth may impact the smoothness of real-time videos, while recorded videos may have higher resolution or less lag than a livestream during videoconferencing, especially for slit lamp.

The remote optometrist should have the ability to repeat tests in real time with the patient in the exam chair during videoconferencing. Even though guidelines on delegation differ between Canadian provinces, the current guidelines in the province of Quebec state that only optometrists should perform tests that require professional judgment or particular skills, whether because these tests are too complex or might involve risks of harm to the patient or because they are subjective or require a

qualitative assessment (e.g., subjective refraction, slit lamp, cover test, pupillary reflexes and EOM).[22] The following sections will discuss in detail each of these tests and why they cannot be completely delegated to the OA.

Cover Test

Unilateral cover test (CT) and alternate CT are simple tests to perform on a patient without any binocular misalignment. However, simultaneous and alternate prism CT assessment require technical knowledge to execute and clinical judgment to interpret. For example, certain patients with abnormal ocular alignment will require the remote optometrist to instruct the OA on the use of the prism bars to measure the deviation.

The remote assessment of binocular vision has been studied by optometrists at the Illinois College of Optometry and at the Université de Montréal. McLeod et al. found fair agreement for near heterophorias by Von Graefe, but poor agreement on break and recovery values of negative fusional vergences and positive fusional vergences.[30] Sanghera et al. studied the validity of accommodative testing between remote and in-person eye exams and found a statistically significant difference for the Fused Cross Cylinder method.[31] Leduc et al. reported no significant difference for the Von Graefe Test and the Worth 4 dots test, but a statistically significant difference for the horizontal cover test at both distance and near, which turned out to be not clinically significant.[32]

Extra Ocular Motility (EOM)

EOM is evaluated by testing versions or ductions that may have straightforward observations in the absence of any dysfunction. However, some abnormalities like small neurogenic and mechanical restrictions can be subtle and easily missed, which is why the evaluation of the EOM should be reviewed by the optometrist. When anomalies are detected, the evaluation becomes much more complex and requires repeat evaluation of EOM and perhaps additional tests and clinical judgement from the remote optometrist. For instance, the Parks Three Step test might be necessary to isolate a paretic extraocular muscle in a case of EOM anomaly causing an acquired vertical diplopia.

Pupillary Reflexes

Pupillary reflexes may be challenging to assess remotely or even during in-person eye exams. Depending on the quality and type of the webcam used, along with the brightness of the light and the angle of the transilluminator, light saturation may keep the observer from distinguishing the pupils from the iris on video. More darkly pigmented iris may be challenging, but an infrared filter may diminish the light saturation issues. A slight defect in pupillary reflexes can be very subtle to observe. Interpretation should therefore be reserved to the remote optometrist. In the event of an anomaly, the optometrist may then ask the OA to perform some additional tests to assess the condition or decide if a follow-up with an in-person optometrist is required.

Anterior Segment Evaluation (Slit Lamp Biomicroscopy)

Ideally, the remote optometrist views the slit lamp videos in real time, but if the optometrist reviews a video recorded by the OA, they should still have the opportunity to repeat the evaluation as needed. The slit lamp biomicroscope can be technically challenging to manipulate when trying to perform specific illuminations or when capturing views of specific corneal layers, which means that live videos might be more time-efficient if the remote optometrist can provide feedback or guidance on the spot when the quality of the video is unsatisfactory or if an anterior segment abnormality is discovered and requires further attention.

Very few studies have compared remote versus in-person comprehensive eye exams in terms of ocular health assessment. Blais et al. showed that the agreement between these exam modalities ranged from fair to excellent for ocular health assessment, which includes results for visual acuity, color vision, anterior and posterior segments, and EOM.[28] In terms of diagnosis, an agreement of 86.4% was found for conditions with very little risk of harming patients, and an agreement of 87.5% for mild ocular urgencies. No severe ocular emergencies were observed in the study sample.

PATIENT MANAGEMENT

The remote optometrist is responsible for the patient pathway to the same standard as an in-person optometrist. Distance between the optometrist and patient requires additional planning and collaboration. Establishing referral relationships with local healthcare providers near the patient for timely care and follow-up is essential for teleoptometry to increase access to care and protect the patient. The care team may include, for example, an in-person optometrist, an ophthalmologist, a primary care physician, and the closest hospital emergency room.

The remote optometrist may collaborate with 1) optometrists within the remote clinic where patients are seen, or with 2) other local optometrists working nearby who are willing to accept referrals from the teleoptometry clinic, or he or she may

3) plan in-person clinic days at the remote location on a regular basis.[33,34] Just like for an in-person optometry exam, the remote optometrist must exercise their clinical judgement to decide whether the care provided is appropriate for the patient.

There is no definitive guidance on the appropriate age of a patient for a comprehensive teleoptometry exam. Some techniques commonly used in pediatric eye exams like retinoscopy or Bruckner tests are too complex to delegate. Therefore, it is harder to adapt remote eye examination to young children and non-verbal patients who often require the use of objective tests and an interpersonal approach that is more easily used in-person. Given the lack of definitive evidence, the authors suggest a conservative approach beginning with children 16 and older. Sixteen years of age is recognized as a requirement for independent consent according to the Review of Children's Participatory Rights in Canada.[35]

Ocular health is an essential part of a comprehensive eye examination. Specifically, a fundus evaluation is required to assess the health of the retina and optic nerve for ocular or systemic diseases. The decision to dilate requires clinical judgement that factors in the chief complaint, history, and clinical data. Teleoptometry is limited since the remote optometrist is unable to observe the peripheral retina directly as he or she would during an in-person encounter. Consequently, the optometrist must exercise clinical judgement about whether an in-person dilation is necessary and to assure a smooth patient transition for follow-up care.

Further experience with teleoptometry will enable a better understanding of ideal candidates for remote optometric examination, and of patients who may benefit from a combination of remote and in-person evaluations. Teleoptometry is a tool that has the potential to facilitate access to primary eye care, but not everyone who struggles to access in-person primary eye care is a good candidate for a remote eye exam. The remote optometrist should determine in advance the types of patients for whom it is appropriate to perform a comprehensive teleoptometric exam to facilitate screening when patients book their appointment.

BARRIERS TO TELEOPTOMETRY EXAMS

The adoption of teleoptometry to perform comprehensive remote eye exams is limited by various factors. First, teleoptometry is technology-dependent, meaning that a proper internet connection is essential. Even with generally reliable internet connectivity, there can still be issues with stability and speed in remote areas.

Second, remote eye exams rely on the OA on-site to conduct delegated tasks and operate equipment. Essentially, the OAs serve as the hands, eyes, and ears for the optometrists and are an extension of their care. The level of training and experience of the OA will influence the quality of the data collected during the exam. Optometrists provide staff training on a regular basis for all aspects of their practice. The OA training may benefit from additional experience and support to conduct the unique elements of a remote optometric examination. Indeed, OAs are entrusted with responsibilities in the context of teleoptometry, including patient management, confidentiality and response to in-office acute care events like patients fainting from a vasovagal syncope. As more experience is shared amongst practitioners, best practices should emerge and be incorporated into more formal training and certification. For example, a module in the Canadian Certified Optometric Assistant (CCOA) program could help to provide a standardized approach to encourage greater adoption and effectiveness.

Third, some tests are not yet possible to perform remotely, like the dilated fundus exam, gonioscopy and retinoscopy, so the workflow can also be harder to adapt. There are issues to consider in terms of timing the synchronous and asynchronous parts of the exam.

Fourth, the set-up and equipment needed to perform teleoptometry can be expensive, depending on whether it is integrated in a pre-existing clinic that already has an EMR and the necessary equipment like a digital phoropter. The teleoptometry clinic can be located within a primary care clinic, a hospital, or a community center if a pre-existing optometry clinic is not an option.

Lastly, understanding or acceptance of teleoptometry in some communities may be limited, since remote care might, for instance, not be perceived as culturally appropriate by First Nations, Métis, and Inuit communities without commensurate in-person care.[36] Even though teleoptometry can facilitate access to primary eye care, the delivery of remote optometric services must be planned jointly with these communities beforehand to assure culturally appropriate care.[37,38]

CONCLUSION

Teleoptometry is a tool that may improve access to primary eye care in Canada, as a complement to the in-person standard of care for comprehensive eye exams. The proposed framework in this paper is both evidence-based and experience-based, but it is still limited by the scientific literature on the topic to date. Due to their clinical experi-

ence, the authors suggest that a comprehensive teleoptometric exam include delegated tests and videos of tests that are performed under direct supervision by the remote optometrist. This evidence-informed, draft framework provides a point of reference for discussion by the FORAC and the provincial regulatory authorities to protect the public while assuring increased access through the delivery of remote primary eye care in Canada. This framework must evolve according to the future experience and scientific literature on teleoptometry. Canadian optometrists practicing remotely must remain informed of new evidence-based data on the topic to make sure they keep delivering state-of-the-art remote primary eye care to their patients. More studies on comprehensive teleoptometric exams are needed to further understand the full potential of remote optometry. ●

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