



Corneal topography in myopia management - Q&A with Dominique Cote-Assaf and Nick Lee

Myopia management is multifaceted and has an array of treatment options: corneal topography is an incredibly useful tool in guiding our direction not only when it comes to selecting a treatment option, but also diagnostically with regard to the ocular surface. We talk to optometrists Dominique Cote-Assaf and Nick Lee based in Perth, Australia about how they use corneal topography in their practice.

How do you use corneal topography data with a new myopia management patient?



Using corneal topography in myopic patients is often a great way of starting the conversation on a patient's eligibility to pursue myopia management methods, such as orthokeratology or myopia control soft contact lenses. For myopic patients who are also astigmatic, it is a great way to determine whether the astigmatism is corneal or lenticular/retinal and is useful to determine whether a toric or spherical contact lens will be required.

Importantly, corneal topography will also allow for screening of keratoconus which is helpful as part of the myopia work-up. The age of onset for keratoconus is typically in the teenaged years;^[1] however, it can also occur earlier and is often associated with more rapid progression.^[2] Ethnicity is also an important factor, with keratoconus being more prevalent in Asian^[3,4] and Middle Eastern^[5] populations. Where retinoscopy and slit-lamp bio microscopy may allow you to catch early



keratoconics, a suspicious corneal topography will reveal subclinical keratoconus[1] which should be treated prior to considering myopia management. The MYAH has a tool which uses a neural network to give a percentage chance of keratoconus based on the topography, which is a super quick way of checking. SL-D4: 5 magnifications, halogen illumination and digitally ready for use with the DC-4 attachment.



You can read more about how to use corneal topography as a routine measurement [The Topcon MYAH – Q&A With Mario Teufel](#).

How do you use corneal topography data on follow-up of your patients with myopia?



Patients using ortho-k lenses will require frequent corneal topography measurements to ensure an accurate lens fit, and to monitor for any progression in myopia or changes in refractive status.[6] When fitting ortho-k, topography data can be used to either design your own ortho-k lens, or the data can be exported in a format ready for use by lens manufacturers which will enable them to provide you with a custom ortho-k lens design. Other patients using soft contact lens myopia control methods can sometimes develop eye rubbing habits or discomfort with lenses. This is where corneal topography can help monitor for any changes in corneal shape compared to the patient's baseline corneal topography measurements.[7]



Read more about what topography data you need to fit orthokeratology in our article [What topography data do I need to fit orthokeratology lenses?](#)

What are the key corneal topography outputs you use in managing a patient with myopia?



In ortho-k lens wearers, corneal topography is important to ensure that the lenses are well-centred so that the treatment zone is located evenly around the visual axis and is of adequate size. It is also useful to compare maps (baseline/current) using the differential map function (see figure 1), which can give valuable information on myopia progression, and magnitude of peripheral plus induced.

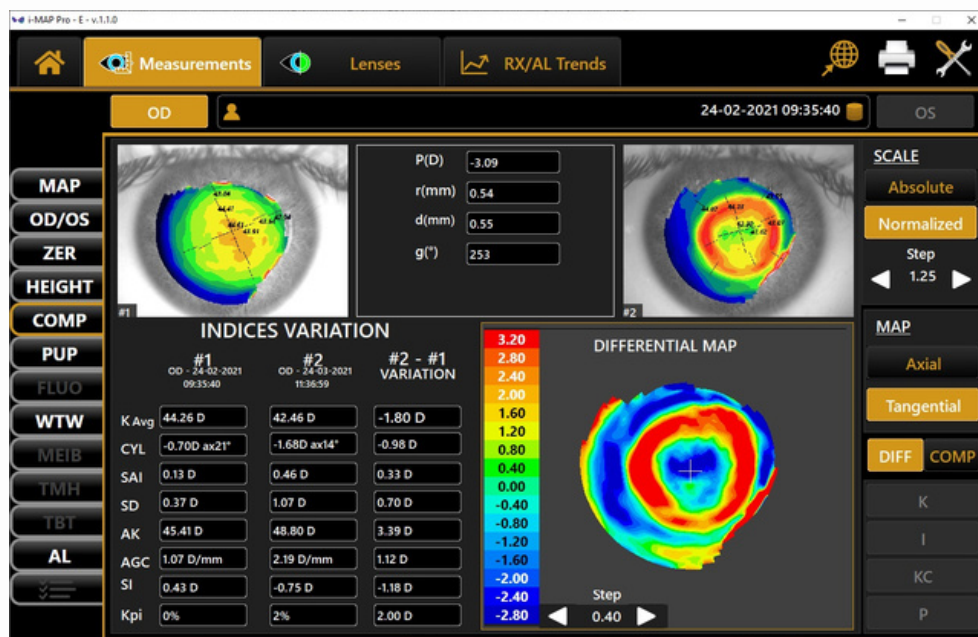


Figure 1: An example of the differential map function on a patient pre- and post-Ortho-K with the Topcon MYAH.



We recently have gained access to Topcon's MYAH instrument, which has been invaluable to monitoring our progressing myopes, especially those using ortho-k, where the combination of corneal topography and axial length data is invaluable. It is well known that it can be challenging to identify progression rates in ortho-k without axial length data, where using refraction as the key measure requires a complete ortho-k wash-out.[8] Also, in cases of pathological myopia with reduced visual acuities, corneal topography can also come-in handy to ensure that there are no corneal irregularities that could be the cause of the reduced visual acuities. Where this does occur, the ability to simulate the effect of the anterior corneal aberrations is a useful tool to educate patients.

What are some tips and techniques to help capture high-quality corneal topography images?



Some tips and techniques that have helped me in obtaining high-quality corneal topography images are as follows.

- Clear instructions to allow geometrically centred scans to counteract the slight offset between the corneal apex and line of sight; ask the patient to look at the first red circle in the direction of their nose, rather than the fixation light of the device. This allows for optimum ortho-k lens designs and accurate monitoring of progressive changes.



- Ensuring that the patient can remain stable on the chin rest and forehead rest, as well as maintaining good fixation. You can instruct the patient to perform a “big blink” and then a “wide stare” to further maximize the area captured for the topography; this is particularly important for baseline measurements as it has implications for all differential or compare maps going forward.
- Chin positioning forward if the patient has a prominent brow ridge.
- A good quality tear film allows a more efficient capture and more reliable results. Adding in a thin eye drop to stabilise the tear film can be useful.

What unique challenges do eyecare practitioners face when performing corneal topography on paediatric patients?



Maintaining stable fixation and attention for the amount of time required to capture a good topography map, can sometimes be challenging for some children. This is where our imagination can help encourage the child to stay still. The MYAH's topography tool becomes very useful in such cases as it is time-efficient and quicker than other topographers at taking the images. Children can also often be looking at the wrong target when performing corneal topographies as they could be fascinated or sometimes frightened by all the colours and rings present on the topographer. Reassuring them that this is not a scary task can sometimes be challenging. Parents are always useful here, to help keep their child's head still on the instrument with gentle pressure and reassurance.



Figure 2: Dominique obtaining corneal topography on a paediatric patient using the Topcon MYAH.

How do you explain corneal topography data to your patients and their parents or carers?



The topography outputs are easiest to explain using the coloured maps such as the 3D map feature on the MYAH (see figure 3), which makes it simple to demonstrate the shape of the cornea like a dome or a small hill. We explain that it is generally even all the way around. Warmer colours on the topography map indicate steeper areas or a bigger hill, and cooler colours show flatter areas. In the cases of ortho-k wearers, the power rings are an easy way to demonstrate the successful positioning and treatment effect.

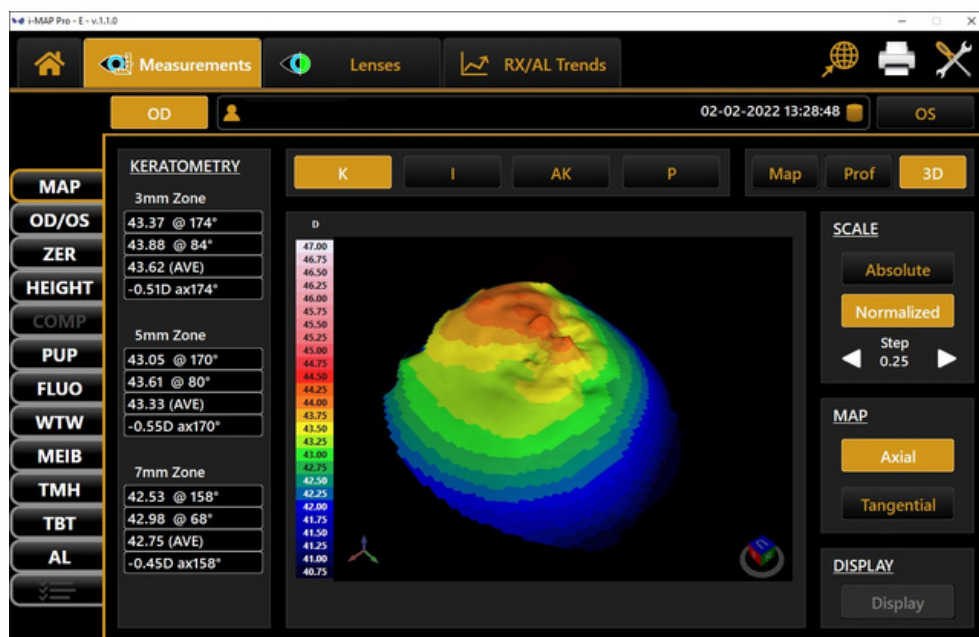


Figure 3: an example of the 3D map visualisation on the Topcon MYAH.

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About Dominique Cote-Assaf

Dominique Cote-Assaf is originally from Montreal, Canada, and grew-up shadowing her father in his optical dispensing practice. With qualifications in Optical Dispensing and a Bachelor of Science, Dominique studied Optometry at Deakin University, Australia and has since completed post-graduate studies in paediatric practice. She practices at the Bullseye Clinic, Perth, Western Australia – an integrative clinic where Dominique primarily provides eyecare services for young children.



About Nick Lee

The best thing about being an optometrist? For Nick Lee, it's being able to make an instant improvement in a person's quality of life and finding the best visual solutions for their day-to day life. A graduate of Optometry at the University of Auckland, New Zealand, Nick has particular interests in orthokeratology, dry eye management, and myopia control. At the Bullseye Clinic, Perth, Western Australia, Nick works primarily in paediatric practice, having completed post-graduate studies in this topic.

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