Kongsberg Vision Meeting 2022: Abstracts

Kongsberg Vision Meeting was held at the University of South-Eastern Norway in Kongsberg, for the 14th time, on November 7–9, 2022. The meeting was organised as a three-day meeting with a lighting design day followed by two clinical optometry and vision research days. Rigmor C. Baraas, Sylvia Pont, Helle K. Falkenberg, Vibeke Sundling, Tove Lise Morisbakk, Gro Horgen Vikesdal, Lotte-Guri B. Steen, Trine Langaas, Randi Mork and Are Røysamb organised the three-day meeting. The theme this year was Light & Vision in a Public Health Perspective. Keynote speakers were Wout van Bommel for the lighting design day, and Bruce Moore and Vibeke Sundling for the research day. Lee Turner from the Department for Education, His Majesty's Government, UK and Mark Mon-Williams, University of Leeds and Bradford Institute of Health Research, UK held a special session on the randomised control trial (RCT) "Glasses-in-Classes", a project run in state-funded primary schools based in the Metropolitan area of Bradford (UK) to ensure that children who need eyeglasses both have access to an eye examination as well as to two pairs of glasses. Teachers are informed and trained to ensure children who have been prescribed glasses wear them at school, and that their spare pair is available if they attend school without their home pair. Preliminary results from the RCT show that wearing eyeglasses over one school year significantly improves reading and literacy skills when a child who needs eyeglasses wears them as compared with those who need eyeglasses, but do not wear them. The abstracts from the other invited and contributed talks on the different days are presented in the order they were given.

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What older people can not see while driving under road lighting of standard quality

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Abstract

Many ophthalmologists and opticians advise cataract surgery when the yellowing of the intraocular lens reaches the stage of the average lens yellowing of a 70-year-old. In my country, the Netherlands, insurance companies do not pay for cataract surgery at an earlier, less severe stage of lens yellowing. Compared to a 25-year-old, the amount of light reaching the retina of an average 70-year-old, at adaptation levels typical for road lighting, is reduced to about 30% due to the combined effect of yellowing of the lens and the smaller pupil, also characteristic of the elderly. Many ophthalmologists and opticians do not realise that this reduction has dramatic consequences for the older motorist while driving during hours of darkness. This also holds when the road has lighting according to international lighting standards (CIE or EN standards).

In my presentation, I will first describe the silhouette principle of road lighting that forms the background for today's luminance concept of road lighting for motorised traffic. The combination of road surface luminance level, luminance uniformity and glare restriction, determines the quality of a road lighting installation. For evaluating the visibility obtained with different road lighting qualities, the concept of "revealing power" is highly suitable. Revealing power is based on the visibility of a large set of 20×20 cm objects with reflections typical of winter clothing, viewed from a distance of 100 m. For example, road lighting with a lighting level of 1 cd / m^2 gives a revealing power value for a 30-year-old of around 80%, near the ideal situation of 100%. But revealing power can decrease to 0% for a 60-year-old under the same road lighting condition. Only when revealing power values are determined for shorter visibility distances are high enough values obtained. However, shorter visibility distances are only acceptable at lower driving speeds.

The biggest problem is probably that most "older" people do not realise that they see far too little to drive safely during hours of darkness, even under what generally is accepted as good road lighting. The elderly driver who does realise this has two options: stay at home or slow down! Slow driving drivers on high-speed motorways, of course, decrease the overall safety on the road. Based on these considerations, it seems wise to perform cataract surgery at an earlier stage of yellowing of the intraocular lens than what is common today.

Lighting in protected areas: a matter of fragile equilibrium

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Abstract

The lighting of protected areas has traditionally been approached from a perspective aimed to minimise light pollution. With this target the luminance levels requested by law are as low as possible, whereas the spectrum of the emitted light avoids blue wavelengths in order to decrease the Rayleigh scattering that impairs astronomical observations and interacts with wildlife in a wide variety of situations. However, little has been said about the safety, the performance and specifically the visual perception of the users of these areas under these lighting conditions. One remarkable particularity is the visual range itself, with a strong shift towards the segment of the mesopic field with lowest levels of illumination. Given the better visual performance of shorter wavelengths in that part of the mesopic field and the consequent decrease in the amount of flux emitted to ensure similar visual performance, an important question arises: can the lower installed power of white light somehow compensate the higher Rayleigh scattering despite the current recommendations? This question will be discussed in the present work.

Personalised lighting design

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Abstract

People's mood and performance may benefit from lighting that matches personal needs and preferences. Researchers are detangling optimal light (and dim) exposure to support human performance, likely including varying light (quality) doses through the day. Successively, tuneable lighting installations can be programmed to deliver light(ing) quality varying in amount (and spectral power distribution) to accommodate users' personal needs. However, for truly personalised lighting design, lighting *needs* may have to be combined with lighting *preferences*.

Generally, preferred illuminance averages are not clustered around the typically recommended practice level of, i.e., 500 lx.

On average, participants in research studies with dimming control chose slightly lower desktop illuminance values. A review of previous work showed that varying results were not a matter of preference but could be explained by stimulus range bias. Typically, the reported mean illuminance was about the midway point on the available range, not an actual preference estimate. Unfortunately, most studies often do not mention the lower and upper dimming limits. Additionally, a significant variation occurs among individuals around their average. In research studies, many participants chose illuminances that differed by more than 25–50% at various times of the day. Participants may, consciously or unconsciously, set a light level related to an internal biological clock. Alternatively, it can be a contrast balancing response to the increasing and decreasing daylight outside and the subsequently increasing and decreasing interior light level.

Nevertheless, personal(ised) lighting design should focus on more design parameters than just light(ing) quality/quantity (i.e., illuminance, luminance, spectral power distribution), as many more parameters directly or indirectly influence a room's personal lighting exposure/experience. For example, the light's incidence and spatial distribution, the preferred view to the outside, the choices of the wall, floor, and furniture finishings, the required privacy level, and the needed interaction with the rest of the space and other users are parameters of which people's preferences and needs can vary.

Most personal(ised) lighting design experiments are executed in working and learning environments. However, since light exposure for humans is essential when employees and students are still/already home (early morning, late afternoon, evening), research focuses on the work and the home environment. Typically, implementing personalised lighting design at home to fulfil people's personal *preferences* and — maybe more crucially — *needs* is an even larger challenge.

Acknowledgements
The author would like to thank professor Steve Fotios for his input and insights around the discussed topic. Additionally, many thanks go to the funding agencies Bertil & Britt Svenssons stiftelse för belysningsteknik and The Swedish Energy Agency who made (ongoing) research in this area possible.

The science and practice behind design for darkness strategies

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Abstract
Recognition of the adverse effects of artificial light at night, commonly referred to as light pollution, has spurred new design strategies aiming to foster sustainable and environmentally responsible urban lighting. This presentation will outline an emerging approach that re-frames discussions away from what is bad about artificial light at night, instead exploring what it means to value — and ultimately design for — darkness. It will outline the theoretical foundations of *design for darkness*, as well as how it can be translated into practical design and policy interventions. As a framework, it situates darkness as both an evaluative lens and a quality of lived experience, and relies on three interrelated core principles. First, darkening cities should be positioned as a means of urban (ecological) restoration akin to greening cities. Second is the adoption of a value-sensitive outlook, working to preserve and promote the positive ecological and social goods offered by darkness. Third, lighting design should strive to create the conditions for positive experiences of urban darkness, and in particular dark skies, through a reconsideration of nocturnal atmospheres. Building on this framework, we will present two strategies for translating design for darkness into practice: *dark acupuncture* and environmentally-responsive or *nature-inclusive* lighting. These will be exemplified via a collaborative project which established a design vision for an urban park in the Netherlands. To conclude, we will offer reflections on the collaborative process between an academic researcher and a practicing lighting designer, and how such co-operations can advance the theory and practice of designing for darkness.

The Importance of Correcting Hypermetropia

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Abstract
Hyperopia is essentially the "forgotten" refractive error, especially given the enormous current interest in myopia. Hyperopia is directly associated with astigmatism, anisometropia, amblyopia, and strabismus, which are all inter-related and major causes of vision impairment in young people. Furthermore, recent evidence shows that significant levels of hyperopia are intimately related to learning problems in children. The Vision In Preschoolers — Hyperopia In Preschoolers (VIP-HIP) Study and other recent research has shown that even 4 and 5 year old children with moderate to high degrees of hyperopia are already significantly adversely affected in their acquisition of preliteracy skills. There is thus a direct linkage between hyperopia and academic performance, and academic failure. So, not only from a disease perspective, but also from a learning perspective, hyperopia is a critically important refractive error that optometrists must be skilled in detecting and treating. We will discuss recent evidence concerning these relationships, the methods of detecting hyperopia through vision screening, and an approach to providing correction for hyperopia in children.

Vision anomalies and manual control in children and adolescents in Norway

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Abstract
In this study we explored the associations between vision anomalies and manual control in healthy children and adolescents. Manual control was assessed with the Leeds Clinical Kinematic Assessment Tool (CKAT (Flatters et al., 2014)) — a

tablet with a handheld stylus. During participation in the annual school vision program in Kongsberg municipality (Norway), girls and boys completed the CKAT test battery. The motor tasks that were assessed here consisted of i) making aiming movements in an invisible star-like pattern and ii) tracing two abstract shapes. The school vision program includes measurements of refractive errors, visual acuity, binocular vision, stereoacuity (TNO), ocular biometry and collecting medical history. Upon assessment of these results a decision about referral was made; if the results constituted either a suspicion and/or a discovery of eye or vision anomalies, the child was referred to the university eye clinic or to their own eye care practitioner. One in four children were referred. The referred and non-referred children were compared against their CKAT results, using Welch's *t*-test for statistical analysis. Children who were referred performed significantly poorer in the aiming task, but not in the tracing task. The results add to cumulating evidence that having a common vision anomaly may have a negative impact on specific aspects of an individual's degree of manual control. Further research is needed to substantiate the findings and to investigate whether there are secondary effects on learning.

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Longitudinal changes in peripheral refraction in a cohort of Swedish schoolchildren

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Abstract

Research in animals has shown that central refractive changes may be regulated by peripheral retinal defocus (Huang et al., 2011). However, research in humans on the impact of peripheral defocus on ocular growth has been inconclusive. Ideally, a longitudinal follow up of peripheral refraction in children might elucidate the role of peripheral retina in regulating ocular growth in humans. Therefore, the aim of this study was to follow a cohort of Swedish schoolchildren for a period of two years and investigate changes in peripheral refraction. In addition, we investigated whether peripheral hyperopic defocus at the initial visit was a risk factor for development of myopia.

The right eyes of 120 children (55% females) with mean age of 12.0 years (*SD* 2.4) were followed up for a period of 2 years. Cycloplegic central and peripheral refraction obtained at the initial and final visits were used to investigate changes in refraction. Central and peripheral refraction was obtained with Shin-Nippon NVision-K 5001 autorefractor along the horizontal meridian (nasal and temporal) out to 30° in 10° steps. Refraction was recalculated into M, J_0 and J_{45} vectors for analyses. Relative peripheral refraction was calculated by subtracting the central measurement from each peripheral measurement. Children were assigned to three refractive categories based on the central spherical equivalent refraction (SER−M) at the initial visit. Hyperopia was defined as SER $\geq$ +0.75 D, myopia was defined as SER $\leq$ −0.50 D and emmetropia was defined as SER between −0.49 D to +0.74 D.

At the initial visit there were 56 children with hyperopia, 10 children with myopia and the remaining 54 children were emmetropic. Analysis of relative peripheral refraction showed that all the emmetropic and hyperopic children who remained non-myopic at the final visit did not show relative peripheral hyperopia. All children showed myopic shift both centrally and peripherally, however the shift was significant only for myopic children. The myopic children and three out of four that became myopic had a relative peripheral hyperopia at the initial visit which increased further in the final visit. In conclusion, this study shows that children with initial peripheral hyperopia are at risk of developing myopia. However, further studies with larger sample sizes are warranted.

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The importance of sleep, food and physical activity for children and adolescents' health and wellbeing

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Abstract

The past decades have provided great evidence-based knowledge about the importance of lifestyle-factors such as physical activity, nutrition, and sleep for health promotion. Despite this, most teenagers do not adhere to dietary guidelines, and there are concerningly high rates of sleep disturbances and use of sleep medication for this age group. Since 1997, the physical activity level has decreased in young people in general, and among adolescent boys in particular. Since 2010, data on Norwegian young people have also shown increased prevalence of mental health challenges and the use of anti-depressant medication has increased by 53% in 15–18 years old the past decade. On top of this, there is a socioeconomic gradient to the health and wellbeing among children and adolescents. Coming from families with high socioeconomic status makes it more likely that the child or adolescent is more physically active, has healthier nutritional habits, and experiences fewer sleep disturbances.

These trends have led the World Health Organization to define physical inactivity as a global health challenge, and they have aimed to reduce physical inactivity by 15% by 2030. This aim was established prior to the Covid-19 pandemic, and the pandemic seems to have worsened these factors especially among young people. In this keynote, I will present a historical overview of the status of sleep, nutrition and physical activity patterns in children and adolescents, and how these patterns affect their health and wellbeing. Further, I will talk about the knowledge of how these patterns relate to eye health, and what future research should focus on in this area.

A longitudinal study of structural and functional changes in central retina of healthy children

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Abstract

Optical coherence tomography angiography (OCTA) has been extensively used to identify retinal microvasculature anomalies in children either born pre-term or with retinal disorders (Mataftsi et al., 2021; Ong et al., 2020; Tiryaki Denur et al., 2020; Vinekar et al., 2016). However, there is currently a lack of longitudinal data on healthy children born full-term. Moreover, the majority of previous studies in children (Ghassemi et al., 2021; Gołębiewska et al., 2017; Guemes-Villahoz et al., 2021) have used inaccurately scaled images to measure OCTA characteristics resulting in erroneous interpretation. OCTA assumes a standard axial length (AL) for characterising retinal microvasculature. Therefore, it is important to correct the image based on the actual axial length of the child to avoid scaling errors.

Data will be presented from a longitudinal study on characterisation of changes in functional and structural components of the central retina in healthy children given by OCTA. The right eyes of 75 children (44 females) born at full-term were followed up for 12 months. Axial length (AL) was obtained with IOLMaster 500. OCTA images were acquired with a Cirrus 5000HD-OCT at both visits. Images were corrected for lateral magnification errors using ImageJ/Fiji software to give accurate measures of vessel density (VD) and perfusion. Foveal and macular thickness measurements were performed manually. Foveal thickness divided by macular thickness gave the fovea-to-macula thickness ratio (FMTR).

Over time, microvascular characteristics such as VD and perfusion decreased, but structural characteristics such as foveal thickness increased. All children showed a significant decrease in VD and perfusion between visits. We observed that older children showed a faster reduction in microvascular characteristics compared to younger children. There was a significant increase in foveal thickness and a decrease in FMTR for all children over time. We found that older children showed a faster increase in foveal thickness and a faster decrease in FMTR compared to younger children.

Our results show that foveal and macular development is an ongoing process in healthy eyes of healthy children.

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Effect of executive function task performance in augmented reality on accommodation response in young adults: Preliminary findings

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Abstract

Mixed reality (MR) head mounted devices (HMD) are an emerging technology that is becoming common in education and training, healthcare, and engineering. However, there is a concern that the vergence-accommodation conflict (VAC) that is inherent in current HMDs may affect individuals' oculo-motor function. We therefore investigated dynamic vergence and accommodation responses in young adults before and after they performed an executive function task in MR.

Dynamic accommodation and vergence response, DAVR [in dioptres, D], were recorded using the PowerRef 3 photorefractor (Plusoptix GmbH, Nuremberg, Germany) in 20 participants (9 females), age 20–24 years with habitual correction, following a 30 min executive function task (Tower of London) in an MR head-mounted 3D display (HoloLens 2). The task involved arranging virtual objects at 50 cm distance to match patterns presented on a physical 2D screen at 4 m. DAVR was measured over a 1 min period before and after performing the task while participants viewed two targets binocularly at 40 cm (near) and 4 m (distance), alternating between them at 3 sec intervals. The participants were instructed to keep the targets fused and focused. Participants were classified into refractive groups according to their spherical equivalent (SER) cycloplegic refraction (hyperopes: SER $\geq$ +0.50 D, emmetropes: $-0.50 <$ SER $<$ +0.50 D and myopes: SER ≤ -0.50 D). DAVR were analysed using paired *t*-test and presented as mean $\pm$ *SD*.

Hyperopes ($n = 5$) exhibited a significant difference in vergence at near (before: 2.57 ± 0.95 D, after: 2.88 ± 1.22 D, $p < 0.001$) and distance (before: 0.35 ± 0.57 D, after: 0.86 ± 0.99 D, $p < 0.001$), and accommodation at near (before: 0.93 ± 0.46 D, after: 2.88 ± 1.22 D, $p < 0.001$) and distance (before: -0.58 ± 0.68 D, after: -0.61 ± 0.65 D, $p < 0.001$). Emmetropes ($n = 11$) also presented a significant difference in vergence at near (before: 2.42 ± 0.69 D, after: 2.77 ± 0.65 D, $p < 0.001$) and distance (before: 0.31 ± 0.55 D, after: 0.82 ± 0.81 D, $p < 0.001$), and accommodation at near (before: 1.28 ± 0.78 D, after: 2.77 ± 0.64 D, $p < 0.001$), but not distance (before: -0.27 ± 0.78 D, after: -0.38 ± 0.77 D, $p = 0.10$). Myopes ($n = 4$) exhibited a significant difference in vergence at near (before: 2.19 ± 0.728 D, after: 2.12 ± 0.77 D, $p = 0.046$), but not distance (before: 0.41 ± 0.65 D, after: 0.41 ± 0.49 D, $p = 0.701$), and accommodation at near (before: 1.26 ± 0.38 D, after: 2.12 ± 0.77 D, $p > 0.001$), but not distance

(before: -0.11 ± 0.77 D, after: -0.23 ± 0.85 D, $p = 0.11$).

All participants were affected by the MR task at near and distance, except for the myopes who appeared to be unaffected at distance (when the accommodation and vergence demands were lower). There were large between-individual differences in DAVR. We speculate that long-term use of MR at near could be detrimental to all individuals, but that it could potentially affect hyperopes to a larger extent than myopes.

Person-centred communication — how does it work?

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Abstract

Person-centred communication promotes person-centred care. Person-centred communication is characterised by trusting relationships, meeting the patient with respect, recognition and sensitivity, responding to the patient's emotions, and managing uncertainty, sharing information, and uncovering the patient's perspective, agreeing on solutions following the patient's values and including patients in choices at the level they want. Listening is essential in person-centred communication.

The traditional Chinese character for listening is made up of several characters, the elements of and requirements for listening: The ear or to hear; we use our ears to listen and understand by listening to the words said and the tone, pace, and emphasis of the words. The eye or to see; we use our eyes to observe body language and pay attention. In that way, we build relationships by listening and assuring others that we are paying attention. The king or to think; we evaluate the words and ideas shared and can be open-minded to what is said or be more critical or analytical when we listen. Therefore, thinking is an essential part of the way we listen. The heart or to feel; we listen with the heart in addition to ears and eyes. When listening with the heart, we experience the emotions shared and feel compassion by listening and relating rationally and emotionally to the person speaking. The number one represents the need for undivided attention and focuses when listening, to listen with individual attention or to be present. To listen effectively, we must reduce unnecessary chatter and focus our attention.

For the clinician, mindfulness and empathy are central in tailoring communication to empower the patient by shared decision-making and supporting and strengthening patient self-efficacy. Mindfulness informs all types of professionally relevant knowledge, both formal knowledge and knowledge learned during practice and observation. Empathic communication encourages trust and mutual understanding. The optometrists' communication self-efficacy relates to personal attributes of mindfulness and empathy (Sundling et al., 2016). Self-efficacy describes a person's belief that they can succeed, and the strength of confidence in success is likely to affect whether people try to achieve the results. Person-centred communication is essential to elicit the patient's needs in decision-making, and providing advice on treatment and involving patients in decisions is a natural part of optometric practice (Sundling et al., 2019). The impact of person-centred communication is better patient satisfaction and better healthcare quality.

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Age-related normal limits for spatial vision in different light conditions

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Abstract

It is well known that visual performance is dependent on illuminance levels. In occupational settings and in the early detection of retinal disease, vision in different light conditions may be of importance. In this study, normal limits of monocular and binocular spatial vision under photopic and mesopic conditions were established.

Photopic and mesopic Visual Acuity (VA) and Functional Contrast Sensitivity (FCS) were measured with both positive and negative contrast optotypes under binocular and monocular viewing conditions using the Acuity-Plus (AP) test. New filters were developed and applied to include participants (age-range 10 to 86 years) who met normal sight criteria. Mean and $\pm 2.5\sigma$ limits were calculated within each 5-year subgroup. Mean values and upper and lower threshold limits for VA and FCS as a function of age were predicted by a biologically meaningful model. The best-fit model parameters describe normal aging of spatial vision for each of the 16 experimental conditions investigated.

Of the 382 participants, 285 passed the selection criteria for normal aging, and enrolled in the analyses to establish normal ageing. Log transforms were applied to ensure approximate normal distributions. Outliers were also removed for each of the 16 stimulus conditions investigated based on the $\pm 2.5\sigma$ limits criterion. Both VA and FCS thresholds were significantly better in photopic conditions when compared to the high mesopic conditions. VA, FCS and the overall variability were found to be age-invariant up to ≈ 50 years in the photopic condition. A lower, age-invariant limit of ≈ 30 years was more appropriate for the mesopic range with a gradual but accelerating increase in both mean thresholds and inter-subject variability above this age. Binocular thresholds were smaller and much less variable when compared to the thresholds measured in either eye. Results with negative contrast optotypes were significantly better than the corresponding results measured with positive contrast ($p < 0.004$).

In line with expectations visual performance was significantly better in higher illuminance levels when compared to lower illuminance levels. Age limits for spatial vision for monocular and binocular viewing under photopic and high mesopic lighting with both positive and negative contrast optotypes were established using a single test which can be implemented either in the clinic or in an occupational setting.

Corneal markers of Diabetic Peripheral Neuropathy

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Abstract

Diabetic peripheral neuropathy or distal polyneuropathy (DPN) is the most common form of diabetic neuropathy (Pasnoor et al., 2013). Half of all patients with diabetes mellitus (DM) suffer from DPN (Stino & Smith, 2017) and early symptoms are tingling or decreased feeling in their toes. DPN can impact balance, posture, gait, and sensation, reduce sleep quality, lead to depression and in late stages foot amputation (Argoff et al., 2006; Domínguez-Muñoz et al., 2020; Pearce et al., 2019). The diagnosis of DPN is often made late because screening evaluates large, myelinated nerve fibres which are affected in established neuropathy, rather than detecting small fibre neuropathy (Perkins et al., 2018).

The small nerve fibres are the earliest to be affected by DM, and can both degenerate and regenerate, and they are central in pain and foot ulceration development (Alam et al., 2017). The gold standard for diagnosis of small fibre neuropathy is assessment of intra-epidermal nerve fibres (IENF) by skin biopsy, which is invasive and has a small, but significant risk of bleeding and infection (Alam et al., 2017). The cornea is the most highly innervated tissue in the body (Al-Aqaba et al., 2019) and pathology in corneal nerve fibres seems to manifest before peripheral neuropathy (Stem et al., 2014).

In vivo corneal confocal microscopy (IVCCM) is a rapid non-invasive technique that can directly visualise the corneal nerve fibres in the sub-basal nerve plexus using 2D scans at a resolution of 1–2 μm (Jalbert et al., 2003). The corneal nerve fibre length (CNFL) measured as $\mathrm{mm/mm^2}$, corneal nerve fibre density (CNFD) $\mathrm{no/mm^2}$, and corneal nerve branch density (CNBD) $\mathrm{no/mm^2}$ is reduced in patients with DPN and people with DM without DPN (Jiang et al., 2016). A meta-analysis by Jiang and co-workers suggests that IVCCM is valuable in detecting and assessing early nerve damage (Jiang et al., 2016). Moreover, Petropoulos and co-workers conclude that there is substantial evidence that corneal nerve loss predicts incident neuropathy and progresses with the severity of DPN. There are sufficient diagnostic and prospective validation studies to prove that IVCCM can be used as a biomarker and primary end point in clinical trials of disease-modifying therapies in diabetic neuropathy (Petropoulos et al., 2021).

However, IVCM has a small field of view (400×400 μm), only approximately 0.2% of the entire sub-basal nerve plexus, favouring higher resolution and magnification. The small field of view, the image acquisition area when sampling, quality of the images, and image analysis methods, all introduce biases to the sampling methodology. Further, the time required to analyse the images needs to be shortened before the instrument is efficient in clinical practice (Herrera-Pereda et al., 2021).

In my PhD research I am exploring corneal morphology with the use of IVCCM, corneal sensitivity and markers in tears in people with type 2 diabetes mellitus without diabetic retinopathy and DPN, and in people with evaporative dry eye disease.

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Exploring the Effects of Second-Eye Cataract Surgery on Heading Perception

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Abstract

To effectively navigate and explore our chaotic environment requires an accurate sense of the direction in which we are travelling, known as heading perception. Whilst there is evidence that second-eye cataract surgery (SES) improves performance on tasks requiring heading perception i.e., driving and self-locomotion, the effect of SES on heading perception has not been tested explicitly. SES refers to the removal of an individual's second cataract having previously had the first of two (bilateral) cataracts removed. To test this, participants ($N = 60$) completed

a heading perception task across two visual conditions simulating the effects of SES: monocular blur and no blur. Heading perception was assessed by showing the participants short videos of a moving ground plane. The participants were required to indicate the point on the horizon towards which they were heading. The contrast of the ground plane was manipulated between videos with three levels: low, medium and high. A significant interaction effect was found, indicating that the difference in error between the visual conditions was largest with the low contrast ground plane. These results support the consensus that SES improves night-time driving (when contrast is low) but has a lesser effect on daytime driving (when contrast is high).

Vision competence is lacking in stroke care

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Abstract

Visual impairments (VIs) affect 60% of all stroke survivors, and include reduced visual acuity, eye movement disorders, visual field defects and different perceptual deficits. Post-stroke VIs lead to negative consequences for the stroke survivor and affect the recovery process. Stroke care is generally highly interdisciplinary, but often lacks vision specialists as part of the team. In order to provide better care and follow up of post-stroke VIs the interdisciplinary stroke team needs to integrate vision competence and routines into their practise. As part of the KROSS (Competence and Rehabilitation of Sight after Stroke) Knowledge Translation (KT) project, we aimed to increase the competence and awareness of post-stroke VIs among interdisciplinary health care professionals (HCP) in stroke care (Mathisen et al., 2021; 2022).

Two qualitative studies in the KROSS KT project explored interdisciplinary HCP perceptions of their competence in vision and how they assessed their patient's visual function. The first included individual interviews with 11 health professionals and managers, and data from two workshop discussions with 26 participants. The interviews were conducted as a part of the preparation process in the KROSS KT project before the implementation started. The second study consisted of four focus group interviews with HCP after the implementation and included their experiences of participating in the KROSS KT project.

Interdisciplinary HCP such as, nurses, physiotherapists and occupational therapists experienced their formal knowledge about the visual function as low. They recalled only briefly learning about eyes and vision during their professional education. Later, in their professional life, problems with vision and visual health were managed by vision experts outside the service they worked in. They had not further developed their theoretical knowledge or clinical skills in vision care and assessment as part of their continuing professional education. This resulted in a lack of both language and terminology to understand reports from vision experts, and they struggled to translate the results from the vision assessment into its practical consequences for their patients. They did, however have some impressions of their patients' visual functions related to other clinical assessments such as cognitive function and balance. Getting access to, and training in using a screening tool such as the KROSS tool helped the participants to assess the visual function after stroke, and they became more confident in performing simple visual tests. Gaining basic knowledge and skills made the participants more aware of the significance and importance of vision in stroke rehabilitation, and they became motivated to further develop their vision competence

Theoretical knowledge of the visual function and clinical skills in assessing vision is lacking among interdisciplinary HCP in municipal health care services. This risks VIs remaining undetected in stroke survivors and other patients that receive health care services, reducing quality of life and the effect of rehabilitation and care. Vision competence needs to be integrated in the education of all HCP in order to improve vision health and promote interdisciplinary collaboration between vision experts and other HCP.

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