FOCUS: EYE

Update On Glaucoma Surgery – Minimally Invasive Glaucoma Surgery
Endothelial Keratoplasty and Emerging Therapies for Corneal Endothelial Disease
Common Strabismus in Children: A Brief Overview
Update On Glaucoma Surgery – Minimally Invasive Glaucoma Surgery

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INTRODUCTION

Glaucoma is an optic neuropathy with characteristic changes in the optic nerve head and visual field. It is a leading cause of irreversible blindness worldwide. The number of people with glaucoma in Asia is estimated to increase to 59.51 million in 2020, and 80.87 million in 2040.1

From the Singapore Chinese Eye Study, the age-standardised prevalence of glaucoma in Singapore is 3.2%.2 Currently the Intraocular Pressure (IOP) is the only modifiable risk factor, and lowering it is the only proven treatment to reduce disease progression. Treatment is life-long, and can be achieved with topical medications, laser or surgery.

Poor adherence to glaucoma medications and multiple side effects, including ocular surface toxicity, are major barriers to effective medical therapy. Non-compliant rates of at least 25% are commonly reported in glaucoma patients.3

While the conventional trabeculectomy and tube shunt surgeries are effective in lowering the IOP, they carry significant surgical risks and are usually offered to patients with more severe disease or uncontrolled IOP on maximum tolerated medical therapy.4

NEW SURGICAL PROCEDURES

In recent years, a new group of surgical procedures known as Minimally Invasive Glaucoma Surgery (MIGS) have emerged. They lower the IOP by increasing drainage of the intraocular fluid (aqueous humour) with minimal dissection and tissue disruption.

They have shown promising results in the short-to-medium term, and have a higher safety profile and faster recovery time than conventional glaucoma surgeries.

As there is less IOP reduction compared to conventional glaucoma surgeries, these procedures are targeted at patients with mild to moderate glaucoma. They can be performed together with cataract surgery, or as a stand-alone procedure.

1. Schlemm’s Canal Devices

iStent

The iStent (Glaukos Corporation, Laguna Hills, CA, USA) is a 1mm snorkel-shaped titanium device that increases drainage of the intraocular fluid. The device is injected into the Schlemm’s canal, a part of the eye’s drainage system, from the inside of the eye using a special viewing contact lens. It was FDA-approved in 2012.

The largest multicentre trial studying the device found that more eyes that underwent phacoemulsification with a single iStent implantation had controlled IOP without glaucoma medications, compared to phacoemulsification alone at 1 year (72% versus 50%, P<0.001), and 2 years (61% versus 50%, P=0.036).5,6

Two meta-analyses concluded that iStent implantation is effective in reducing the IOP and the number of glaucoma medications, either combined with phacoemulsification, or as a solo procedure.7,8

For iStent as a solo procedure, the IOP reduction was 22% at 18 months after 1 implant, 30% at 6 months after 2 implants, and 40% at 6 months after 3 implants.8

iStent Inject

Currently there is a newer, second generation implant, called the iStent Inject (Glaukos, Laguna Hills, CA, USA). The new device has a cone-shaped design for easier implantation, and a modified injector that can be simultaneously loaded with 2 stents (Refer to Figure 1).

Figure 1 The iStent Inject is the world’s smallest medical implant. It allows aqueous humour to drain directly from the anterior chamber into the Schlemm’s canal, increasing aqueous outflow.
A prospective multicentre study has found that following implantation of 2 iStent Injects, majority of the patients (86.9%) achieved a reduction in the number of glaucoma medications.9

There were few to no adverse events reported following implantation of the iStent and iStent Inject.

Hydrus Microstent
The Hydrus Microstent (Ivantis Inc, Irvine, California, USA) is an 8mm nitinol device. Like the iStent, it is also injected into the Schlemm’s canal, a part of the eye’s drainage system, from the inside of the eye. It acts as a scaffold, and dilates 3 clock hours of the canal, promoting circumferential flow of the intraocular fluid into the drainage system (Refer to Figure 2).

2. Subconjunctival Devices
XEN Gel Implant
The XEN Gel Implant (Allergan, Dublin, Ireland) is a biocompatible 6mm porcine collagen-derived gelatin tube, that is inserted from the inside of the eye into the subconjunctival space. That is the space between the outer membrane of the eye ( conjunctival) and the white wall of the eye (sclera).

Conjunctival dissection is avoided, unlike in conventional glaucoma surgery. The inner lumen size of 45microns and the tube length provide flow restriction to minimise excessive lowering of the IOP. Aqueous drains into the subconjunctival space and a bleb is created. It was FDA-approved in 2016.

A multicentre cohort study of 354 eyes compared the efficacy and safety of the XEN Implant to trabeculectomy in various types of uncontrolled glaucoma (primary and secondary open angle glaucoma, and primary angle closure glaucoma).12

The multicentre HYDRUS II study randomised 100 patients with open angle glaucoma and cataracts to undergo either cataract surgery with Hydrus Microstent or cataract surgery alone.10

At 24 months, there was a significantly lower diurnal IOP in the eyes with the Hydrus Microstent (16.9 +/- 3.3mmHg versus 19.2 +/- 4.7mmHg, P=0.0093), and a greater proportion of eyes with the Hydrus Microstent not on glaucoma medications (73% versus 38%, P=0.008), compared to eyes with cataract surgery alone. Adverse events were similar in the 2 groups.

In another multicentre study, there was a significant IOP lowering, following cataract surgery with Hydrus Microstent implant in eyes with primary open angle glaucoma, with an average drop in IOP of 4mmHg from baseline at 2 years post implantation (P<0.001), and 64% of the patients were medication-free.11

3. Suprachoroidal Devices
CyPass Micro-Stent
The CyPass (Alcon, Fort Worth, TX, USA) is a fenestrated 6.35mm long polyamide implant, that is inserted from the inside of the eye into the suprachoroidal space between the white wall of the eye ( sclera) and the thin layer of tissue behind the retina (choroid). The CyPass Micro-Stent was FDA-approved in 2016.

The CyPass device demonstrated a sustained 2-year reduction in IOP and glaucoma medications in patients
with mild to moderate primary open angle glaucoma in the multicentre COMPASS trial. There were 505 patients who underwent either phacoemulsification with CyPass or phacoemulsification alone.

At 2 years, the mean IOP reduction was greater in the CyPass group compared to the control group (7.4mmHg versus 5.4mmHg, P<0.001), and more patients in the CyPass group were medication-free (85% versus 59%, P<0.001).

Reported adverse effects were usually transient and did not affect the visual outcomes (Refer to Figure 4).

CONCLUSION
Current data suggest that MIGS can benefit patients with mild to moderate open angle glaucoma in the short-to-medium term, with a good safety profile. While they provide more surgical options to patients with less severe disease, further studies are needed to determine their long-term safety and efficacy.

The iStent Inject, Hydrus Microstent, and XEN Gel Implant are currently available at the Singapore National Eye Centre (SNEC). The CyPass Micro-Stent is still pending HSA approval.
Endothelial Keratoplasty and Emerging Therapies for Corneal Endothelial Disease

Dr Woo Jyh Haur, Consultant, Department of Cornea and External Eye Disease, Department of Refractive Surgery, Singapore National Eye Centre

INTRODUCTION
Corneal transplantation or keratoplasty has evolved rapidly over the past decade. While Penetrating Keratoplasty (PK) may still be the dominant procedure of choice for the optical correction of corneal diseases worldwide, the advent of newer selective lamellar transplantation techniques has sparked a paradigm shift in the surgical management of corneal diseases.

Instead of replacing all layers of the cornea (as in PK), lamellar keratoplasty selectively replaces only the diseased component of the cornea, namely Anterior Lamellar Keratoplasty (ALK) in corneal stromal diseases without endothelial dysfunction, and Endothelial Keratoplasty (EK) in cases where only the endothelium is compromised.1

In this article, we will focus on the evolution of endothelial keratoplasty techniques, and emerging therapies on the horizon, for the treatment of corneal endothelial diseases.

DISEASES OF THE CORNEAL ENDOTHELIUM
Pathophysiology
The cornea comprises of five main layers: the epithelium, Bowman’s membrane, stroma, Descemet Membrane (DM) and the endothelium.

The endothelium is the monolayer of cells that lines the posterior corneal surface, which is derived from the neural crest during embryologic development.

The metabolically active endothelium serves the important function of maintaining the health and clarity (and therefore transparency) of the corneal stroma through ensuring stromal deturgescence, by both acting as a barrier to fluid movement into the cornea and osmotically drawing water into the aqueous humour as an active pump.

Corneal endothelial cells, however, have a poor capacity for regeneration when lost due to any traumatic insult or disease.

With significant attrition of endothelial reserves below a critical level needed to maintain corneal deturgescence, the cornea is said to have “decompensated”, heralding the onset of edema which disrupts the orderly lamellar organisation and critical spacing of collagen fibrils within the stroma and in turn, degrades the optical transparency of the cornea (Refer to Figure 1).

Etiology
Diseases of the corneal endothelium may be broadly classified into primary and secondary corneal endotheliopathies.2

The most common primary endotheliopathy is Fuchs’ Endothelial Corneal Dystrophy (FECD), an inherited bilateral disease which becomes evident from the fifth decade onwards (Refer to Figure 2). It is characterised by slowly progressive corneal endothelial dysfunction and guttate excrescences on the posterior corneal surface (Refer to Figure 3). Various genetic loci and mutations have been found in both adult and early-onset disease. A gender preponderance towards females is also well recognised in this disease.

Other primary endotheliopathies include posterior polymorphous dystrophy, congenital hereditary endothelial dystrophy...
Before the onset of frank corneal decompensation and edema, many patients may be asymptomatic and features of dystrophy seen in FECD or posterior polymorphous dystrophy may be incidentally detected during a routine ophthalmic examination.

- Common to all eyes with corneal decompensation and edema, patients may then experience increasing glare and blurred vision.

Patients with FECD may often complain of such symptoms being worse in the morning due to the build-up of corneal edema with lid closure overnight.

- In advanced cases of corneal decompensation, epithelial edema and bullae formation from large separations of epithelium from the underlying Bowman’s membrane may result in pain and ocular surface grittiness.

- Occasionally, such patients may present with acute eye pain, redness and tearing if the bullae ruptures to form an epithelial defect (or abrasion) over the cornea, which may also be prone to secondary infection.

**IMPACT OF FUCHS’ ENDOTHELIAL CORNEAL DYSTROPHY AND BULLOUS KERATOPATHY WORLDWIDE AND IN SINGAPORE**

Fuchs’ endothelial corneal dystrophy and bullous keratopathy (predominantly pseudophakic) are the major indications for corneal transplantation globally.

Interestingly, there are clear differences in the disease indications for corneal transplantation between developed (mainly Western) countries (such as the United States, the United Kingdom, Italy, France, Australia), in which FECD was the major indication, and less developed countries (mostly in Asia, Africa and the Middle East), where PBK was the main indication for surgery, accounting for 31%-38% of cases.3

**Clinical Presentation**

Clinical manifestations of corneal endothelial dysfunction may range from mild to severe.

1. Common to all eyes with corneal decompensation and edema, patients may then experience increasing glare and blurred vision.
2. Patients with FECD may often complain of such symptoms being worse in the morning due to the build-up of corneal edema with lid closure overnight.
3. In advanced cases of corneal decompensation, epithelial edema and bullae formation from large separations of epithelium from the underlying Bowman’s membrane may result in pain and ocular surface grittiness.
4. Occasionally, such patients may present with acute eye pain, redness and tearing if the bullae ruptures to form an epithelial defect (or abrasion) over the cornea, which may also be prone to secondary infection.

**Secondary corneal endotheliopathies** may be the result of any extrinsic factor or ocular condition which contributes to the loss of endothelial cell structure and function, including intraocular surgery (in particular cataract extraction), laser peripheral iridotomy performed in eyes with angle closure, chronic ocular inflammation (such as uveitis and viral endothelitis), glaucoma and contact lens use.

Of these, corneal decompensation after cataract surgery or Pseudophakic Bullous Keratopathy (PBK) is a major indication for corneal transplantation worldwide and locally (Refer to Figure 4). Depending on the amount of surgical trauma, a variable extent of endothelial cell loss is usually expected 1 to 5 days after cataract surgery.

Even after these initial cell losses, it has been shown that endothelial cell attrition continues at a rate of 2.5% for at least 10 years after surgery, around 4 times higher than the average rate of 0.6% in unoperated eyes.2

Clinical manifestations of corneal endothelial dysfunction may range from mild to severe.
In Singapore, PBK alone accounted for 32.4% and 46.6% of penetrating and endothelial keratoplasty done at the Singapore National Eye Centre (SNEC) between 2000 and 2011 respectively. Comparatively, only 10.1% of PK and 32.0% of EK cases were performed for FECD locally.3

ENDOTHELIAL KERATOPATHY: CURRENT STANDARD OF CARE

Over the past decade, endothelial keratoplasty has overtaken penetrating keratoplasty as the corneal transplantation technique of choice for endothelial diseases, as a result of its superior safety profile, as well as more rapid and predictable visual outcomes as compared to PK.

Briefly, penetrat*ng kerato*plasty is a full thickness transplantation procedure, in which the host diseased cornea is trephined and completely excised before a full thickness corneal graft is sutured to the recipient bed (Refer to Figure 5). It is a relatively undemanding technique which can be employed for all forms of corneal disease (stromal and/or endothelial) and potentially offers the best optical result due to the absence of a lamellar corneal interface.

Over the years, EK techniques have evolved to be progressively selective in the layers of corneal replacement. From:

- **Deep Lamellar Endothelial Keratoplasty (DLEK)** with donor tissue comprising of stroma and endothelium,
- **Descemet Stripping Endothelial Keratoplasty (DSEK)** with a thinner stromal layer,
- **Descemet Stripping Automated Endothelial Keratoplasty (DSAEK)**, in which donor tissue is prepared with an automated microkeratome, to finally:
- **Descemet Membrane Endothelial Keratoplasty (DMEK)** with the transplantation of only Descemet membrane with endothelium, without any donor stromal tissue.

i. **Descemet Stripping Automated Endothelial Keratoplasty (DSAEK)**

With progressive refinement in surgical technique and donor preparation by eye banks, DSAEK has rapidly emerged as the main EK technique among surgeons and replacing PK as the procedure of choice for endothelial disease (Refer to Figure 6).

Chiefly, DSAEK offers faster visual rehabilitation compared to PK, due to the reduction of surgically induced astigmatism as fewer sutures are used. Many of the disadvantages of PK, such as suture-related complications, graft rejection and wound dehiscence, are also greatly reduced in DSAEK.1

However, endothelial failure with cell loss of 30%-40% at the time of surgery, followed by progressive attrition of endothelial cells for 10 years after the procedure, is a major cause of graft failure.

Penetrating keratoplasty is also associated with a high risk of graft rejection estimated at 20% by 5 years, which may adversely affect long-term graft survival. The full-thickness, “open-sky” surgical approach in PK may also be associated with serious complications, such as suprachoroidal haemorrhage and endophthalmitis, often with blinding consequences.1

**Endothelial Keratoplasty (EK),** on the other hand, involves stripping the host Descemet’s membrane and endothelium, and attachment of the donor endothelium and Descemet’s membrane, with or without residual donor stromal tissue.

ii. **Descemet Membrane Endothelial Keratoplasty (DMEK)**

DMEK represents the next step in the evolution of EK technique. Despite all the benefits of DSAEK, the presence of residual stroma tissue in the donor may contribute to a postoperative hyperopic shift in the patient’s refraction and in some cases, suboptimal visual recovery.
DMEK overcomes this issue through a more anatomically accurate replacement of only donor Descemet Membrane (DM) and endothelium without any stromal tissue, potentially leading to a more rapid visual recovery with minimal refractive change (Refer to Figure 7).

Other purported advantages of DMEK include better visual outcomes and a lower risk of graft rejection, requiring a shorter, less intensive postoperative steroid regimen with a lower likelihood of elevated intraocular pressure and glaucoma.

However, difficulty in donor preparation and the technically demanding nature of DMEK surgery has thus far limited its widespread adoption.4

THE SINGAPORE NATIONAL EYE CENTRE (SNEC) EXPERIENCE

Singapore National Eye Centre (SNEC) performs approximately 85% to 90% of all corneal transplantations in Singapore. All transplantations done in SNEC are tracked by the Singapore Corneal Transplant Study (SCTS), an ongoing prospective registry maintained by the Singapore Eye Bank, which is the national eye bank in Singapore supplying corneal tissues.3

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The SNEC Endothelial Keratoplasty (EK) programme was started in 2006 and since then, we have had a high adoption rate, with over 50% of all corneal transplantations being EK from 2012.

Our surgical technique has evolved with time in order to adapt to the unique configuration of the Asian eye (generally smaller, shallower anterior chamber and higher posterior vitreous pressure), which made EK surgery more challenging.

We started with the standard taco-folding technique at that time (donor folded into a taco shape before insertion into anterior chamber) and progressed to adopting pull-through techniques using either the Busin Glide (donor coiled into an open-ended metal spatula inserted through a temporal wound and pulled into eye by a coaxial forceps from a nasal paracentesis) or Sheets Glide (donor placed on a plastic sheet inserted through the wound into the anterior chamber).

One of the key innovations which our centre has contributed to the field of EK surgery was the development of a donor inserter device, the EndoGlide, which improved the surgical control of both the donor tissue and anterior chamber dynamics during insertion (Refer to Figure 8).

This resulted in a lower endothelial cell loss of 13.1% and 15.6% at 6 and 12 months after surgery respectively, much lower than those published with the taco-folding and Busin Glide techniques.5 Given the technical advantages, short learning curve and better donor endothelial cell preservation, EndoGlide DSAEK very quickly became the donor insertion method of choice in our centre and has also been widely adopted worldwide.

Our data has shown that the 5-year graft survival of DSAEK (79.4%) was superior to that of PK (66.5%) with a lower rate of endothelial cell loss seen in DSAEK (48.7%) over PK (60.9%).6

In our hands, DSAEK also provided significantly better long-term best spectacle corrected visual acuity and lower astigmatism, compared to PK over 5 years of follow up.7

In recent years, our centre has increasingly performed DMEK, as an alternative to DSAEK for patients with endothelial dysfunction and corneal decompensation, with more than 150 cases done to date.

Two main surgical techniques of donor insertion are used in our centre, namely with a glass injector and the EndoGlide, in which a thin layer of stromal layer is retained as a carrier for the thin donor graft to improve handling characteristics, before the donor is pulled through into the anterior chamber.
Unpublished data from our series have suggested better graft survival in DMEK over DSAEK and PK, with lower rates of graft rejection and postoperative elevation of intraocular pressure or glaucoma.

EMERGING THERAPIES
There is now mounting interest in medical, cell and gene therapies, which have emerged as potential alternatives to keratoplasty in the management of endothelial dysfunction over the past few years.8

Rho-associated Kinase (ROCK) inhibitors have been extensively studied as a novel pharmacological adjunct in the management of endothelial disease, in particular FECD.

The agent, Y-27632, first demonstrated efficacy in stimulating corneal endothelial regeneration via enhancement of endothelial cell proliferation, migration and adhesion in in vitro experiments. These effects were also replicated in subsequent in vivo animal models and ex vivo studies. However, the safety and efficacy of ROCK inhibitors have not yet been evaluated in adequately powered human clinical trials.

With the vast improvements made in techniques used to enhance both the quality and quantity of cultured human corneal endothelial cells, cell therapy with the introduction of engineered endothelial cells onto the posterior corneal surface to replace or reform the endothelial cell layer, represents a promising approach to treating corneal endothelial disease.

Different methods of delivery of these cells, either by direct injection into the anterior chamber or via a cell carrier, have been proposed.

With the cell carrier approach, synthetic or biological endothelial grafts may be constructed by seeding the cultured endothelial cells at physiological density (which may be controlled, hence overcoming the issue of biological variability of endothelial cell count in cadaveric donors) onto a thin, transparent biomimetic material. These tissue-engineered grafts may then be inserted into the recipient using techniques similar to DSEK or DMEK. A clinical trial to evaluate the safety and efficacy of this technique will soon be conducted at our centre.

Lastly, with advances made in our understanding of the genetic basis of FECD and drawing from the experience and clinically promising results of novel gene therapy modalities in the treatment of other trinucleotide repeat diseases, such an approach may also be applicable to FECD in the future.

CONCLUSION
Endothelial Keratoplasty (EK), which provides excellent clinical results in the form of improved visual outcomes, faster visual recovery, higher graft survival rate and a lower rate of postoperative complications compared to PK, will likely remain the mainstay of treatment for corneal endothelial diseases in the near future.

Various novel cell and gene therapies, as well as pharmacological adjuncts, are on the horizon in this rapidly evolving field.

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GPs can call for appointments through the GP Appointment Hotline at 6322 9399 or scan the QR code for more information.
Common Strabismus in Children: A Brief Overview

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Strabismus or squint is a condition where there is a misalignment of the eyes. The types of strabismus vary among different age groups and present differently in different parts of the world. In Asia, exotropias or divergent squints are the most common type of strabismus, consisting of 65%-85% of total childhood strabismus. On the flip side, esotropias or convergent squints are 2-4 times more common in the West than exotropias.

It is important to distinguish a comitant from an incomitant squint. A **comitant squint** is one where the angle of the ocular deviation is similar in all directions of gaze, whereas an **incomitant squint** is one where there is a difference in the angle of the deviation in different directions of gaze.

Comitant squints are characteristically found in patients with congenital or early-onset strabismus. On the other hand, incomitant squints are usually a result of a restrictive cause (a tight intraocular muscle in thyroid eye disease), or a paralytic cause (an acute sixth nerve palsy causing limitation in abduction of the lateral rectus muscle on the affected side). As a result, limitation of eye movement is usually present in such cases and is an important differentiating factor (Refer to Figure 1).

This article will focus mainly on comitant squints encountered in children, their features, and treatment and clinical assessment.

**ESOTROPIA**

**Pseudoesotropia**

In a survey performed at the Singapore National Eye Centre (SNEC) and KK Women’s and Children’s Hospital (KKH) from 2000-2002, pseudoesotropia was found to be the most commonly encountered ‘squint’ in our clinics. This is due to Asian babies having a flatter nose bridge and wider epicanthic folds, giving the false impression of a convergent squint (Refer to Figure 2).

While reassuring parents that their child does not have a true squint, this does not mean they will not develop an actual strabismus later in life, and parents need to be advised to return if there is a change in the eye alignment.

**Figure 1** Patient with a left sixth nerve palsy showing an incomitant esotropia. The esotropia is significantly larger in left gaze due to the limitation of abduction of the left eye.

**Figure 2** Pseudoesotropia in a child with prominent epicanthic folds. Note the eyes appear esotropic (top), but this improved with pulling of the epicanthic folds toward the nose bridge (bottom). Note the Hirschburg light reflex is also central.
Infantile Esotropia
Infantile esotropia is a constant, large angle esotropia (usually more than 30 prism diopters) that typically appears before the age of 6 months.

It is important to assess the ability of the eye to fully abduct, in order to differentiate it from a lateral rectus (sixth nerve) palsy that could be life-threatening. In children, where getting them to follow a target may be difficult, performing the doll’s eye manoeuvre can be useful (Refer to Figure 3).

Surgery is the treatment of choice in this condition, though the best time for it is still controversial.

However, the general consensus is that it should be performed before the age of 18 months to give the child a better chance of developing binocular function.

Accommodative Esotropia
This type of esotropia usually appears between the ages of 18-36 months, but can occur as early as 2 months and up to 6 years of age. It is related to excessive hypermetropia, resulting in overaction of the accommodative reflex.

Accommodative esotropia can be completely or partially corrected with glasses.

In a child with a fully accommodative esotropia, the convergent squint is eliminated completely with the use of glasses to correct the full amount of hyperopic refractive error (Refer to Figure 4). It is important that glasses are worn full-time.

In those with partially accommodative esotropia, glasses will only correct part of the squint and surgery will be required to correct the residual deviation.

Near vision involves both accommodation and convergence. In some cases of accommodative esotropia, the deviation at near is significantly larger than that at distance. This is due to a high Accommodative Convergence/Accommodation (AC/A) ratio, in which a unit of accommodation is accompanied by a disproportionately large amount of convergence.

Children with a high AC/A ratio have an esotropia which is larger angle at near, and require the use of executive bifocal glasses to help correct their near misalignment.
EXOTROPIA
Of the true squints that are seen in our clinics, intermittent exotropias are the most common and consist of approximately 60% of cases seen in our clinics.

Intermittent Exotropia
As its name suggests, this outward exodeviation tends to occur intermittently. At times, the child is able to control the exodeviation, and at other times is unable and breaks down into a manifest exotropia (Refer to Figure 5).

However, some patients may progress from exophoria to Intermittent Exotropia (IXT), and then to constant exotropia. The size of the exotropia can also change over time.

Patients with intermittent exotropia can present with varying degrees of control. If control is good, ocular alignment is often maintained and eyes do not dissociate or deviate easily. However, if control is poor, patients may frequently exhibit a manifest exotropia.

Intermittent exotropia can be broadly classified into 3 types:

1. Basic IXT: where the exotropia measures similarly at near and distance
2. Convergence insufficiency IXT: where the exotropia measures larger at near compared to distance
3. Divergence excess IXT: where the exotropia measures larger at distance compared to near (divergence excess)

The onset of IXT is usually in early childhood. It can be precipitated by illness, tiredness, and bright light or daydreaming.

Children may blink in order to regain binocular function or close 1 eye under bright light, the symptom that is sometimes first noticed by parents. Some children may also experience eyestrain or headaches as they try to maintain binocular fusion by accommodation and convergence.

Figure 5 Intermittent Exotropia. At times, either eye is divergent, (top/bottom) and at times the patient is orthotropic (centre).
TREATMENT

Treatments for IXT include convergence or fusion exercises, patching, over-minus lenses, and surgical correction. Generally, if control were good to moderate, non-surgical treatment would suffice.

The **MyEyeGym application** is an orthoptic eye exercise application developed by the Singapore National Eye Centre (SNEC) for people with an intermittent squint. It allows users to perform different types of fusional exercises using their handheld smart devices (Refer to Figure 6).

At the same time, there is also a progress and summary report with daily reminders that can motivate children to perform their exercises regularly. In general, these fusional exercises would be useful only in older children as a degree of understanding would be required.

**Figure 6** MyEyeGym Application

**CLINICAL ASSESSMENT OF A CHILD WITH A SUSPECTED SQUINT**

A thorough history is important. Important factors include:

1. The age of onset
2. The character of the squint: intermittent or constant
3. Its evolution: more or less frequent, whether there is a fixation preference (especially important in younger children less than 8 years old where there is a risk of amblyopia)
4. Any predisposing factors: trauma, illness etc.
5. Any other associated symptoms: such as diplopia (that may suggest an acute onset or an incomitant cause), headache, nausea or vomiting (that may suggest more dangerous causes, such as raised intracranial pressure resulting in a false localising sign)

In younger children whose vision is not yet fully developed (those under 8 years old), a frequent or constant deviation of 1 eye can result in amblyopia-decreased visual acuity, as a result of monocular suppression of the deviating eye. Hence an accurate visual assessment is important.

In older children, visual acuity can be assessed using the Snellen visual acuity chart. For preverbal children, specialised visual acuity tests that work on the basis of preferential looking (Refer to Figure 7) are available in our clinics.

**Figure 7** Teller Acuity cards. A quantitative measure of grating acuity can be assessed in infants.

Children who would benefit from surgery include those with poor or deteriorating fusion, increasing frequency of breakdown of their IXT, increasing size of the exodeviation or increasing symptoms of asthenopia. However, if possible, surgery should be performed when the child is older than 4 years of age to minimise problems encountered with over-correction.
Vision in these younger children can also be grossly assessed by the child’s fixation behaviour. The ability of a child to maintain central steady fixation, and fix and follow a target with their eyes can be assessed using a brightly coloured toy (or your face!). Occlusion of either eye at a time may reveal a preference for the use of 1 eye and a poorer visual acuity in the other, if a child objects strongly to the occlusion of 1 eye.

Observe the child for any gross ocular misalignment. A simple Hirschberg (pupil light reflex) can reveal the presence of a manifest squint (Refer to Figure 8). A cover uncover test can bring forth a latent squint (e.g. an intermittent exotropia with control). Ocular motility should be tested, and both versions and ductions assessed, to examine the range of eye movements and any limitations present.

All children with a squint will require a complete ocular examination to exclude any potential ocular causes of poor vision resulting in a squint, for example, a unilateral congenital cataract resulting in poor vision and hence, exodeviation of that eye. Therefore, in all children with suspected strabismus, a referral to an ophthalmologist should be made.

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Figure 8  Hirschburg light reflex showing a right esotropia (left), and a right exotropia (right)

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Impaired Colour Vision in Diabetics
Risk factors of this lesser known visual complication now brought to light

Visual complications in the form of diabetic retinopathy have long been established in patients with Type 2 Diabetes Mellitus (T2DM). What is lesser known is the higher risk for Impaired Colour Vision (ICV) that these patients are also subjected to.

A local cross-sectional study conducted by the Department of Research, SingHealth Polyclinics, found that one in five T2DM patients developed ICV, specifically tritanomaly or blue-yellow colour deficiency. And given that the prevalence of T2DM in our population is expected to rise to 15 percent in 2050, more individuals are likely to experience the poorer quality of life and reduced social functioning associated with ICV.

“The subtle effect on colour vision may not be noticed by the patients as adaptation sets in,” said Dr Tan Ngiap Chuan, principal investigator of the study.

“But we anticipate that selection of items for daily use, including fruits such as bananas, may be affected. Recognising traffic lights is potentially an issue, but affected patients can take cues from the blinking lights,” he added.

The study, which was published in BMC Endocrine Disorders, also found that the risk of ICV increased for each additional year after the onset of T2DM, with most patients developing it after 6 years.

The authors therefore suggest ICV screening after patients have had T2DM for 6 years or longer, following further feasibility and cost-effectiveness evaluation.

“In the meantime, clinicians can initiate screening using the Farnsworth D-15 instrument. They can also consider partnering with optometrists or exploring digital screening platforms,” suggested Dr Tan.

Ultimately, Dr Tan hopes that the study will help to increase awareness of ICV among clinicians, so that they can advise their patients appropriately.

“What they can do is to constantly remind patients to be prudent and keep their diabetes under good control to avoid any potential adverse visual or other vascular complications.”
Dr Oriana Ng  
Consultant  
Dept  
Anaesthesiology

Dr Sangeeta Mantoo  
Senior Consultant  
Dept  
Anatomical Pathology  
Sub-specialty  
Histopathology & Cytopathology

Dr Tan Wah Siew  
Senior Consultant  
Dept  
Colorectal Surgery  
Sub-specialty  
Minimally Invasive & Robotic Colorectal Surgery

Dr Chen Robert  
Senior Consultant  
Dept  
Diagnostic Radiology  
Sub-specialty  
Neuroradiology

Dr Chng Chiaw Ling  
Senior Consultant  
Dept  
Endocrinology  
Sub-specialty  
Thyroid Diseases, General Endocrinology

Dr Sachin Mathur  
Senior Consultant  
Dept  
General Surgery  
Sub-specialty  
Trauma & Acute Care Surgery

Dr Wong Ting Hway  
Senior Consultant  
Dept  
General Surgery  
Sub-specialty  
Trauma & General Surgery

Dr Wan Wei Yee  
Senior Consultant  
Dept  
Microbiology

Dr Constance Teo Ee Hoon  
Senior Consultant  
Dept  
Otalaryngology  
Sub-specialty  
Head & Neck Surgery

Dr Ng Chin Teck  
Senior Consultant  
Dept  
Rheumatology and Immunology  
Sub-specialty  
General Rheumatology, Rheumatoid Arthritis

Dr Desai Suneel Ramesh  
Senior Consultant  
Dept  
Surgical Intensive Care  
Sub-specialty  
Cardiothoracic Anaesthesia & Intensive Care Medicine

Dr Nanda Kumar Karaddi Venkatanarasimha  
Senior Consultant  
Dept  
Vascular & Interventional Radiology  
Sub-specialty  
Body & Ultrasound Imaging

Dr Phoon Hui Yi Priscilla  
Consultant  
Dept  
Anaesthesiology  
Sub-specialty  
Cardiothoracic Anaesthesia

Dr Xing Jieyin  
Consultant  
Dept  
Anaesthesiology

Dr Chng Tze Wei  
Consultant  
Dept  
Anatomical Pathology
SINGAPORE GENERAL HOSPITAL

PROMOTIONS - CONSULTANTS

Dr Lim Kok Hing
Consultant
Dept
Anatomical Pathology

Dr Wong Shing Lih
Consultant
Dept
Anatomical Pathology

Dr Viswanath Anand Chidambararam
Consultant
Dept
Diagnostic Radiology
Sub-specialty
Body Imaging

Dr Swee Du Soon
Consultant
Dept
Endocrinology

Dr Chong Chew Wei
Consultant
Dept
Hand Surgery
Sub-specialty
Micro-reconstructive Surgery

Dr Lim Wan Tin
Consultant
Dept
Internal Medicine

Dr Tan Poh Yong
Consultant
Dept
Internal Medicine

Dr Tan Yuyang
Consultant
Dept
Internal Medicine

Dr Lee Kong Hwee
Consultant
Dept
Orthopaedic Surgery
Sub-specialty
Sport Service

Dr Swee Du Soon
Consultant
Dept
Endocrinology

Dr Chong Chew Wei
Consultant
Dept
Hand Surgery
Sub-specialty
Micro-reconstructive Surgery

Dr Lim Wan Tin
Consultant
Dept
Internal Medicine

Dr Lee Cheah Hooi Ken
Consultant
Dept
Respiratory & Critical Care Medicine
Sub-specialty
Intensive Care Medicine

Dr Wong Jolin
Consultant
Dept
Surgical Intensive Care
Sub-specialty
Anaesthesia

Dr Zhuang Kun Da
Consultant
Dept
Vascular & Interventional Radiology
Sub-specialty
Interventional Radiology

PROMOTIONS - ASSOCIATE CONSULTANTS

Dr Ho Ying Ci
Associate Consultant
Dept
Anaesthesiology
Sub-specialty
Liver Transplant Anaesthesia

Dr Sim Yilin Eileen
Associate Consultant
Dept
Anaesthesiology
Sub-specialty
Perioperative Medicine & Regional Anaesthesia

Dr Kuan Ling Yee
Associate Consultant
Dept
Dermatology

Dr Chan Shi-En Joanna
Associate Consultant
Dept
Emergency Medicine

Dr Kang Yong Chiang
Associate Consultant
Dept
Hand Surgery

Dr Mothi Babu Ramalingam
Associate Consultant
Dept
Rehabilitation Medicine
NEW APPOINTMENTS

Assoc Professor Ho Yew Leng Aloysius
Senior Consultant;
Head, SingHealth Duke-NUS
Blood Cancer Centre
Dept
Haematology
Sub-specialty
Haematopoietic Stem Cell Transplantation, Myelodysplastic Syndrome, Acute Myeloid Leukaemia

Assoc Professor Chang Pik Eu Jason
Senior Consultant;
Head, Gastroenterology & Hepatology;
Director of Faculty Affairs,
SingHealth Duke-NUS Medicine Academic Clinical Programme;
Director, SingHealth Gastroenterology Senior Residency Programme

Dr Tan Siau Woon Jacqueline
Senior Consultant;
Head, Hand Surgery;
Director, Micro-Reconstruction Service;
Director, SingHealth Hand Surgery Residency Programme
Dept
Hand Surgery
Sub-specialty
Micro-Reconstructive Surgery & Brachial Plexus Surgery

SENGKANG GENERAL HOSPITAL

APPOINTMENTS - SENIOR CONSULTANTS

Prof C Rajasoorya
Senior Consultant
Dept
General Medicine, Internal Medicine

Dr Daniel Chan Nim Cho
Senior Consultant
Dept
Orthopaedic Surgery

APPOINTMENTS - CONSULTANTS

Dr Victor Alan Cooke
Consultant
Dept
Emergency Medicine

Dr Lee Chee Eng
Consultant
Dept
General Medicine, Palliative Medicine

Dr Chay Wai Mun
Consultant
Dept
Pathology
### SENGKANG GENERAL HOSPITAL

#### APPOINTMENTS - ASSOCIATE CONSULTANTS

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Lau Hong Khai</td>
<td>Associate Consultant</td>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>Dr Lee Chengjie</td>
<td>Associate Consultant</td>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>Dr Eunizar Bte Omar</td>
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</tr>
<tr>
<td>Dr Kuhan Venugopal</td>
<td>Associate Consultant</td>
<td>Emergency Medicine</td>
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<tr>
<td>Dr Marvin Chua Wei Jie</td>
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<td>General Medicine, Endocrinology</td>
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<tr>
<td>Dr Chuah Bingfeng Matthew</td>
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<td>General Medicine, Endocrinology</td>
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<tr>
<td>Dr Teh Guo Xiang Jonathan</td>
<td>Associate Consultant</td>
<td>General Medicine, Gastroenterology</td>
</tr>
<tr>
<td>Dr Raymond Goh Kai Heng</td>
<td>Associate Consultant</td>
<td>General Medicine, Geriatric Medicine</td>
</tr>
<tr>
<td>Dr Zheng Shuwei</td>
<td>Associate Consultant</td>
<td>General Medicine, Infectious Diseases</td>
</tr>
<tr>
<td>Dr Mayank Chawla</td>
<td>Associate Consultant</td>
<td>General Medicine, Renal Medicine</td>
</tr>
<tr>
<td>Dr Stanley Angkodjojo</td>
<td>Associate Consultant</td>
<td>General Medicine, Rheumatology</td>
</tr>
<tr>
<td>Dr Celeste Ann Chua Shu May</td>
<td>Associate Consultant</td>
<td>Otolaryngology Service</td>
</tr>
<tr>
<td>Dr Anna See Xinyin</td>
<td>Associate Consultant</td>
<td>Otolaryngology Service</td>
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<tr>
<td>Dr Edward Zhang Zhiyong</td>
<td>Associate Consultant</td>
<td>Otolaryngology Service</td>
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<tr>
<td>Dr Lee Yee Wah Margaret</td>
<td>Associate Consultant</td>
<td>Radiology</td>
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#### PROMOTIONS - SENIOR CONSULTANTS

<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Dr Chan Kim Poh</td>
<td>Senior Consultant</td>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>Dr Doctor Nausheen Edwin</td>
<td>Senior Consultant</td>
<td>Emergency Medicine</td>
</tr>
<tr>
<td>Dr Anupama Roy Chowdhury</td>
<td>Senior Consultant</td>
<td>General Medicine, Geriatric Medicine</td>
</tr>
<tr>
<td>Dr Mayank Chawla</td>
<td>Senior Consultant</td>
<td>General Medicine, Renal Medicine</td>
</tr>
<tr>
<td>Dr Raymond Goh Kai Heng</td>
<td>Senior Consultant</td>
<td>General Medicine, Rheumatology</td>
</tr>
<tr>
<td>Dr Celeste Ann Chua Shu May</td>
<td>Senior Consultant</td>
<td>Otolaryngology Service</td>
</tr>
</tbody>
</table>
SENGKANG GENERAL HOSPITAL

PROMOTIONS - SENIOR CONSULTANTS

Dr Foo Swee Sen
Senior Consultant
Dept
General Medicine, Geriatric Medicine

PROMOTIONS - CONSULTANTS

Dr Charn Tze Choong
Head & Consultant
Otolaryngology Service

Dr Jiang Kian Hong
Jackson
Consultant
Dept
Orthopaedic Surgery

Dr Lin Heng An
Consultant
Dept
Orthopaedic Surgery

Dr Ho Ming Li Leonard
Consultant
Dept
Surgery

KK WOMEN’S AND CHILDREN’S HOSPITAL

APPOINTMENT - SENIOR CONSULTANT

Prof Leung Wing Hang
Senior Consultant
Haematology/Oncology Service

APPOINTMENTS - ASSOCIATE CONSULTANTS

Dr Mervin Loi V-Ter
Associate Consultant
Children's Intensive Care Unit

Dr Chan Jiahui Charmaine
Associate Consultant
General Paediatrics Service

Dr Serene Thain Pei Ting
Associate Consultant
Division of Obstetrics & Gynaecology

Dr Eugene Huang Youjin
Associate Consultant
Division of Obstetrics & Gynaecology
KK WOMEN’S AND CHILDREN’S HOSPITAL

PROMOTIONS - SENIOR CONSULTANTS

Dr Sundararaghavan Sreekantan
Senior Consultant
Dept
Cardiology Service

Dr Lee Yien Sien
Senior Consultant
Dept
Diagnostic & Interventional Imaging

Dr Saumya Shekhar Jamuar
Senior Consultant
Dept
Genetics Service

Dr Manisha Mathur
Senior Consultant
Dept
Obstetrics & Gynaecology

Dr Suzanna Bte Sulaiman
Senior Consultant
Dept
Obstetrics & Gynaecology

Dr Mihir Ananta Gudi
Senior Consultant
Dept
Pathology & Laboratory Medicine

Dr Clement Kam Man Ho
Senior Consultant
Dept
Pathology & Laboratory Medicine

Dr Arun Kumar Pugalenthi
Senior Consultant
Dept
Respiratory Medicine Service

PROMOTIONS - CONSULTANTS

Dr Tan Qing Ting
Consultant
Dept
KK Breast

Dr Yan Zhiyan
Consultant
Dept
KK Breast

Dr Teng Sung Shin
Consultant
Dept
Emergency Medicine

Dr Wang Junjie
Consultant
Dept
Gynaecological Oncology

Dr Koh Seow Choon Daniel
Consultant
Dept
Maternal Fetal Medicine

Dr Satish Kumar Reddy Challa
Consultant
Dept
Paediatric Anaesthesia

Dr Sim Siam Wee
Consultant
Dept
Paediatric Surgery

Dr Merchant Khurshid Zarsis
Consultant
Dept
Pathology & Laboratory Medicine
## KK Women’s and Children’s Hospital

### Promotion - Associate Consultant

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Geetha Visvalingam</td>
<td>Associate Consultant</td>
<td>Division of Obstetrics &amp; Gynaecology</td>
</tr>
</tbody>
</table>

### New Appointments

1. **Dr Ong Kim Kiat**  
   Head  
   Cardiothoracic Surgery Service
2. **Dr Yeo Yen Ching**  
   Head  
   Cytology Service & Histopathology Service
3. **Dr Chay Pui Ling**  
   Head  
   Dental Service
4. **Dr Tan Ee Shien**  
   Head  
   Genetics Service
5. **Dr Soh Shui Yen**  
   Head  
   Haematology/Oncology Service
6. **Dr Tagore Shephali**  
   Head  
   Maternal Fetal Medicine
7. **Adj Assoc Prof Matthias Gotthard Maiwald**  
   Head  
   Microbiology Service
8. **Dr Thia Wee Hong Edwin**  
   Deputy Head  
   Dept  
   Maternal Fetal Medicine

## National Cancer Centre Singapore

### Promotions - Senior Consultants

1. **Dr Tan Kiak Mien Veronique**  
   Senior Consultant & Head  
   SingHealth Duke-NUS Breast Centre  
   Surgical Oncology  
   Sub-specialty  
   Oncoplastic Breast Surgery
2. **Dr Ravindran Kanesvaran**  
   Senior Consultant  
   Medical Oncology  
   Sub-specialty  
   Uro-oncology & Thoracic-oncology
3. **Dr Anuradha Thiagarajan**  
   Senior Consultant  
   Radiation Oncology  
   Sub-specialty  
   Thoracic-oncology

### Promotions - Consultants

1. **Dr Lo Tong Jen**  
   Consultant  
   Supportive and Palliative Care  
   Sub-specialty  
   Palliative Medicine
2. **Dr Neo Hui Shan Shirlyn**  
   Consultant  
   Supportive and Palliative Care  
   Sub-specialty  
   Palliative Medicine
3. **Dr Sim Yirong**  
   Consultant  
   Surgical Oncology  
   Sub-specialty  
   Breast
NATIONAL CANCER CENTRE SINGAPORE

NEW APPOINTMENTS

- **Prof Lim Soon Thye**
  - Head & Senior Consultant;
  - Deputy Medical Director, National Cancer Centre Singapore (Clinical)
  - Division of Medical Oncology

- **Dr Thng Choon Hua**
  - Head & Senior Consultant;
  - Director, Innovation & Analytics
  - Division of Oncologic Imaging

- **Dr Loh Wei-Jen Kiley**
  - Consultant;
  - Director, Cancer Education & Information Services
  - Division of Medical Oncology

PROMOTIONS

- **Dr Koh Si Ya Natalie**
  - Associate Consultant
  - Dept Cardiology

- **Dr Huang Weiting**
  - Associate Consultant
  - Dept Cardiology
  - Sub-specialty Echocardiography & Cardiac Magnetic Resonance Imaging

- **Dr Huang Zijuan**
  - Associate Consultant
  - Dept Cardiology

NATIONAL HEART CENTRE SINGAPORE

PROMOTIONS

- **Dr Asaia Nathalie**
  - Associate Consultant
  - Dept Cardiology

- **Dr Huang Weiting**
  - Associate Consultant
  - Dept Cardiology
  - Sub-specialty Echocardiography & Cardiac Magnetic Resonance Imaging

- **Dr Loh Wei-Jen Kiley**
  - Consultant;
  - Director, Cancer Education & Information Services
  - Division of Medical Oncology

NEW APPOINTMENTS

- **Prof Lo Yew Long**
  - Senior Consultant;
  - Chairman, Centralised Institutional Review Board (CIRB);
  - Director, Patient Safety & Clinical Quality
  - Dept Neurology (SGH Campus)
  - Sub-specialty Clinical Neurophysiology

- **Assoc Prof Tan Kevin**
  - Senior Consultant;
  - Education Director, National Neuroscience Institute
  - Dept Neurology (TTSH Campus)
  - Sub-specialty Neuroimmunology & Neuroinfectious Disease

SINGAPORE NATIONAL EYE CENTRE

APPOINTMENT

- **Dr Lim Hou-Boon**
  - Associate Consultant
  - Dept General Cataract & Comprehensive Ophthalmology
  - Sub-specialty Ophthalmology

PROMOTION

- **Dr Fong Chee Yang Allan**
  - Head & Senior Consultant
  - Dept General Cataract & Comprehensive Ophthalmology
  - Sub-specialty Ophthalmology
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Please email your CV to the respective institutions’ email addresses/online career portals with the Reference Number MN1807.

The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of SingHealth and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible, quality healthcare.

With 42 clinical specialties, a network of 4 Hospitals, 5 National Specialty Centres, 9 Polyclinics and Bright Vision Community Hospital, it delivers comprehensive, multidisciplinary and integrated care.

In 2018, SingHealth welcomes the assimilation of the Changi General Hospital in the provision of seamless patient care in the eastern region of Singapore.

The Sengkang General Hospital and the Sengkang Community Hospital will also be completed to better serve the north-eastern community.

To enhance community care, the new Outram Community Hospital on the SGH Campus will be completed in 2020.

- **Singapore General Hospital**
  Departments seeking Resident Physicians and Staff Registrars:
  - Surgical Departments (such as ENT and General Surgery)
  - Staff Clinic
  Website: www.sgh.com.sg
  Email: careers.medical@sgh.com.sg

- **National Heart Centre Singapore**
  Departments seeking Resident Physicians:
  - Cardiology
  - Cardiothoracic Surgery
  Website: www.nhcs.com.sg
  Email: hr_mgr@nhcs.com.sg

- **National Neuroscience Institute**
  Departments seeking Resident Physicians and Service Registrars:
  - Neurology
  - Neuroradiology
  - Neurosurgery
  Website: www.nni.com.sg
  Email: nni_hr@nni.com.sg

- **Singapore National Eye Centre**
  Department seeking:
  - Resident Physician, Opthalmology
  - Primary Eyecare Physician (Locum)
  - Medical Officer
  For more information, please visit the Career Opportunities section on the Singapore National Eye Centre website.
  Website: www.snec.com.sg
  Email: recruitment@snec.com.sg

- **SingHealth Community Hospitals**
  (Sengkang Community Hospital, Outram Community Hospital and Bright Vision Hospital)
  Departments seeking Resident Physicians and Staff Registrars:
  - Family Medicine
  Website: http://www.singhealthch.com.sg
  Email: schrecruitment@singhealthch.com.sg

- **KK Women’s and Children’s Hospital**
  Department seeking Resident Physicians and Staff Registrars:
  - Emergency Medicine
  Website: www.kkh.com.sg
  Email: medical.hr@kkh.com.sg

- **Sengkang General Hospital**
  Departments seeking Resident Physicians and Staff Registrars:
  - Anaesthesiology
  - Cardiology
  - Family Medicine
  - General Surgery
  - General Medicine (with interest in Endocrinology, Gastroenterology, Geriatric Medicine, Rehabilitation Medicine, Renal Medicine and Respiratory Medicine)
  - Intensive Care Medicine
  - Neurology
  - Orthopaedic Surgery
  - Plastic, Reconstructive, Aesthetic Surgery Service
  - Urology Service
  Website: www.skh.com.sg
  Email: careers@skh.com.sg

- **SingHealth National Eye Centre**
  Department seeking:
  - Resident Physician, Ophthalmology
  - Primary Eyecare Physician (Locum)
  - Medical Officer
  For more information, please visit the Career Opportunities section on the Singapore National Eye Centre website.
  Website: www.snh.com.sg
  Email: hrMgr@nhcs.com.sg

- **SingHealth Community Hospitals**
  (Sengkang Community Hospital, Outram Community Hospital and Bright Vision Hospital)
  Departments seeking Resident Physicians and Staff Registrars:
  - Family Medicine
  Website: http://www.singhealthch.com.sg
  Email: schrecruitment@singhealthch.com.sg

The SingHealth Duke-NUS Academic Medical Centre draws on the collective strengths of SingHealth and Duke-NUS Medical School to drive the transformation of healthcare and provide affordable, accessible, quality healthcare.

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The Sengkang General Hospital and the Sengkang Community Hospital will also be completed to better serve the north-eastern community.

To enhance community care, the new Outram Community Hospital on the SGH Campus will be completed in 2020.
Forum for Healthcare Professionals

15th Practice Update in Paediatrics

Old Issues, New Perspectives

Date
3 November 2018, Saturday

Time
1.00pm to 5.10pm

Venue
KKH Auditorium (Training Centre) Level 1, Women’s Tower

Fee
$11 per pax (Includes lunch, tea and parking)

CME Points Accreditation
CME, SNB-CPE and CDE points will be awarded

Organised by: Division of Medicine and Division of Surgery, KK Women's and Children's Hospital

PROGRAMME

<table>
<thead>
<tr>
<th>Time</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00pm</td>
<td>Registration and Lunch Reception</td>
</tr>
<tr>
<td>2.00pm</td>
<td>Current Knowledge and Practice in Food Allergy</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Assoc Prof Anne Goh</td>
</tr>
<tr>
<td></td>
<td>Head and Senior Consultant</td>
</tr>
<tr>
<td></td>
<td>Allergy Service, KKH</td>
</tr>
<tr>
<td>2.30pm</td>
<td>Current Knowledge and Practices in Kawasaki Disease</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Assoc Prof Thaschawee Arkachaisri</td>
</tr>
<tr>
<td></td>
<td>Head and Senior Consultant</td>
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<tr>
<td></td>
<td>Rheumatology and Immunology Service, KKH</td>
</tr>
<tr>
<td>3.10pm</td>
<td>Updates in Genetic Testing and Counselling</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Ms Breana Cham Wen Min</td>
</tr>
<tr>
<td></td>
<td>Senior Genetic Counsellor</td>
</tr>
<tr>
<td></td>
<td>Genetics Service, KKH</td>
</tr>
<tr>
<td>3.40pm</td>
<td>Tea Break</td>
</tr>
<tr>
<td>4.00pm</td>
<td>Management of Inguinoscrotal Swelling in Children</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Dr Rambha Rai</td>
</tr>
<tr>
<td></td>
<td>Consultant, Department of Paediatric Surgery, KKH</td>
</tr>
<tr>
<td>4.30pm</td>
<td>Upper Limb Fractures in Children – What We Need to Know</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Dr Kenneth Wong</td>
</tr>
<tr>
<td></td>
<td>Associate Consultant, Department of Orthopaedic Surgery, KKH</td>
</tr>
<tr>
<td>5.10pm</td>
<td>Paediatric Feet and Lower Limbs: When Physiological becomes Pathological</td>
</tr>
<tr>
<td></td>
<td><strong>SPEAKER</strong>               Dr Zackary Chua</td>
</tr>
<tr>
<td></td>
<td>Associate Consultant, Department of Orthopaedic Surgery, KKH</td>
</tr>
<tr>
<td></td>
<td>End of forum</td>
</tr>
</tbody>
</table>

REGISTRATION REQUIRED BY 31 OCTOBER 2018, WEDNESDAY.
For more details, please call 6394 8746 (Monday – Friday, 8.30am – 5.30pm) or log on to www.kkh.com.sg/events

Seats are confirmed upon full payment on a first-come, first-served basis. Registration fee is non-refundable.
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- DIGESTIVE SYSTEM
- FOOD & NUTRITION

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Courses

Forum for Healthcare Professionals

Inaugural Paediatric Respiratory and Sleep Medicine Symposium

Venue: KKH Auditorium, Training Centre, Level 1, Women’s Tower

<table>
<thead>
<tr>
<th>Paediatric Sleep Medicine Workshop</th>
<th>Paediatric Respiratory Medicine Symposium</th>
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</thead>
<tbody>
<tr>
<td>Date: 8 March 2019, Friday</td>
<td>Date: 9 to 10 March 2019, Saturday to Sunday</td>
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<tr>
<td>Time: 8.00am to 5.00pm</td>
<td>Time: 8.00am to 5.30pm</td>
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</table>

CME points will be accredited

KEY SPEAKERS

DR COLIN WALLIS
Division Lead and Consultant
Paediatric Respiratory Medicine
Great Ormond Street Hospital for Children,
London, United Kingdom

DR SADASIVAM SURESH
Consultant, Senior Staff Specialist
Paediatric Respiratory and Sleep Medicine
Lady Cilento Children’s Hospital,
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ASSOC PROF TEOH OON HOE
Head and Senior Consultant
Respiratory Medicine Service
KK Women’s and Children’s Hospital,
Singapore

DR MAHESH BABU RAMAMURTHY
Head and Senior Consultant
Paediatric Respiratory and Sleep Medicine
National University Hospital, Singapore

DR BIJU THOMAS
Senior Consultant
Respiratory Medicine Service
Programme Director
Inaugural Paediatric Respiratory and Sleep Medicine Symposium
KK Women’s and Children’s Hospital,
Singapore

PROGRAMME HIGHLIGHTS

- Paediatric sleep medicine workshop
- Chronic cough
- Difficult asthma
- Bronchiectasis
- Childhood interstitial lung disease
- Pulmonary hypertension
- Congenital lung anomalies
- Aspiration-related lung disease
- Respiratory problems in children with neuromuscular diseases
- Paediatric chest imaging
- Cardiopulmonary exercise test
- Hands-on sessions on
  - Paediatric polysomnography
  - Lung function tests
  - Home ventilation for technology-dependent children

REGISTRATION CLOSSES ON 5 MARCH 2019 (TUESDAY).

Early bird registration closes on 7 January 2019 (Monday).
Pre-registration is required. For more details, please call 6394-8746 (Monday to Friday, 8.30am to 5.30pm) or log on to www.kkh.com.sg/events

Seats are confirmed upon full payment on a first-come, first-served basis. Registration fee is non-refundable.