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# THE HONG KONG 香港醫訊 MEDICAL DIARY

VOL.25 NO.2 February 2020

*Cosmetic Ophthalmology*

# A TRUE RELIEF FOR YOUR DRY EYES & MGD\*

*Unblock your eye glands to unleash  
the natural oil to soothe your eyes<sup>1,2</sup>.*

The oil is  
the key for  
evaporative  
dry eye  
sufferers<sup>1</sup>.

Drug-free  
mechanism  
of action<sup>1</sup>.

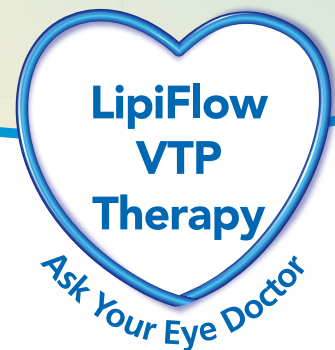
**86%**  
Dry eye  
sufferers are  
associated with a  
lack of oil<sup>3</sup>.

One therapy  
is effective for  
12 months<sup>1,2</sup>.

## LipiFlow Treatment Facts:

- Over 200,000 treatments in the US & worldwide<sup>4</sup>
- Proprietary Vectored Thermal Pulsation (VTP) Therapy<sup>1</sup>
- Indicated for evaporative dry eye disease<sup>5</sup>
- FDA endorsed treatment since 2012<sup>5</sup>

\*MGD = Meibomian Gland Dysfunction, a leading cause of dry eye<sup>1</sup>.







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## The Cover Shot



This photo was taken during a photo outing with fellow eye doctors last winter. We were out looking for light trails. A double-decker bus taking a turn happened to provide an opportunity for an interesting shot. The camera, set quite close to the side of the road at a low angle, gave fair centration and an almost three-dimensional contour to the light trails. Enjoy!

Our cover image reflects the vibrancy and aesthetics of Hong Kong, which Dr Eng-leong NEOH has skillfully captured with a camera. In finding beauty in a bus whizzing by, the photograph exemplifies attention to detail, a quality essential to Cosmetic Ophthalmology.



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# Chinese New Year Message from the President



## Dr Mario WK CHAK

President  
The Federation of Medical Societies of Hong Kong

Dr Mario WK CHAK

### 送豬迎鼠

祝大家鼠年進步！一團和氣！身體健康！

In an auspicious gesture to welcome the Chinese New Year, I would like to share with you what the Federation has accomplished in the past year.

The Federation of Medical Societies of Hong Kong, as an umbrella society of 142 medical, dental, nursing and allied health societies, has continued to pursue our mission of promoting high quality medical and health care, advancing knowledge, as well as steering various continuing educational activities.

For example, a total of 19 certificate courses have been held jointly with member societies this year, covering diverse topics and areas with encouraging attendance and positive feedback. Our publication, the Hong Kong Medical Diary, with review articles providing updated knowledge on specific topics monthly, has raised professional interest. Not only is the Hong Kong Medical Diary sent to all registered medical professional colleagues free of charge, its electronic version is also accessible through our website and the internet.

This year, the Federation collaborated with RTHK to run a 12-week series on medical information talk in “Healthpedia” 「精靈一點」. The issue editors and one of the authors of each monthly issue of the Hong Kong Medical Diary are invited to attend the interviews to disseminate advancing medical and healthcare knowledge on patient care to the general public.

In the Annual Scientific Meeting 2019 with the theme of “Innovative Medical Technology”, various experts were invited to address important latest knowledge and development in various innovative medical technology.

Apart from offering continuing education, the Federation also provides a lot of other support to our member societies. One of the services of the Federation that is greatly appreciated by members is our meeting and our conference organising services. In the past year, Federation has been invited to be the conference organiser of a total of twelve symposia and annual scientific meetings of our member societies.

On the charity side, the Federation's Foundation arm continues to sponsor the bereaved children for music lessons and organise music lessons for the disabled children.

With the support of the Presidents of our member societies, the Federation has successfully completed an election of officers and





exco members in the last Annual General Meeting in November 2019. A new group of EXCO and a similar group of officers were elected, for the coming tenure of two years. In the coming year, the Federation will celebrate her 55th anniversary and we look forward to a reunion party and dinner inclusive of all of our previous presidents and officers and exco members; there will also be on-stage performance by talents from member societies.

Finally, I would like to thank all for the effort and support from our Officers, EXCO members, Foundation directors, council members and staff of the secretarial board in the year 2019. We could not have succeeded without your collaboration. Riding on your continued support for and contribution to the Federation, we are confident in further excelling in the forthcoming Chinese New Year of Rat.

We look forward to working alongside with you all in the near future.

Once again, on behalf of the Federation, I wish you and your family all the best, and may you all have a happy, healthy, wealthy and prosperous Chinese Year of Rat.





# TREAT WITH FORESIGHT

ACHIEVE UNSURPASSED AND SUSTAINED VISUAL ACUITY (VA)  
GAINS WITH PROACTIVE EXTENDED DOSING<sup>1</sup>

**Q12 AND BEYOND: UP TO 50%  
OF wAMD PATIENTS REACHED AN  
INJECTION INTERVAL OF  $\geq$  12 WEEKS  
BY WEEK 52 IN THE ALTAR STUDY<sup>2</sup>**



#### Abbreviated Prescribing Information

**Eylea® 40mg/ml solution for injection in a vial (aflibercept) Prescribing Information** (Refer to full Prescribing Information before prescribing) Presentation: 1 ml solution for injection contains 40 mg aflibercept. Each vial contains 100 microlitres, equivalent 4 mg aflibercept. Indication(s): Indication(s): Treatment of neovascular (wet) age related macular degeneration (AMD), visual impairment due to macular oedema secondary to Branch or Central retinal vein occlusion (BRVO or CRVO), visual impairment due to diabetic macular oedema (DME), and visual impairment due to myopic choroidal neovascularization (mCNV) in adults. Posology & method of administration: For intravitreal injection only. Must be administered according to medical standards and applicable guidelines by a qualified physician experienced in administering intravitreal injections. Each vial should only be used for the treatment of a single eye. The vial contains more than the recommended dose of 2 mg. The extractable volume of the vial (100 microlitres) is not to be used in total. The excess volume should be expelled before injecting. Refer to full prescribing information for full details. Adults: The recommended dose is 2 mg aflibercept, equivalent to 50 microlitres. For wAMD treatment is initiated with one injection per month for three consecutive doses, followed by one injection every two months. No requirement for monitoring between injections. Based on the physician's judgement of visual and/or anatomic outcomes, the treatment interval may be maintained at two months or further extended using a treat-and-extend dosing regimen, where injection intervals are increased in 2- or 4-weekly increments to maintain stable visual and/or anatomic outcomes. If visual and/or anatomic outcomes deteriorate, the treatment interval should be shortened accordingly to a minimum of two months during the first 12 months of treatment. For CRVO, after the initial injection, treatment is given monthly at intervals not shorter than one month and continues until visual and anatomic outcomes are stable for three monthly assessments. Thereafter the need for continued treatment should be reassessed. Treatment may be continued with gradually increasing treatment intervals to maintain a stable visual and anatomic outcome. Continued treatment is not recommended if no improvement in visual and anatomic outcomes over the first three injections. If treatment is discontinued, monitor visual and anatomic outcomes and resume treatment if these deteriorate. Usually, monitoring should be done at the injection visits. During treatment interval extension until therapy completion, the monitoring schedule should be determined by the treating physician based on the individual patient's response and may be more frequent than the schedule of injections. For DME, initiate treatment with one injection per month for 3 consecutive doses, followed by one injection every two months. No requirement for monitoring between injections. After the first 12 months of treatment, the treatment interval may be extended based on visual and anatomic outcomes. The schedule for monitoring should be determined by the treating physician. If visual and anatomic outcomes indicate that the patient is not benefiting from continued treatment, treatment should be discontinued. For mCNV, the recommended dose is a single injection. Additional injection may be administered if visual and/or anatomic outcomes indicate that the disease persists. Recurrence should be treated as a new manifestation of the disease. Monitoring schedule should be determined by the treating physician. The interval between two doses should not be shorter than one month. Haemic and/or retinal impairment: No specific studies have been conducted. Available data do not suggest a need for a dose adjustment. Elderly population: No special considerations are needed. Limited experience in those with DME over 75 years old. Paediatric population: No data available. Contra-indications: Hypersensitivity to active substance or any excipient; active or suspected ocular or periorbital infection; active severe intraocular inflammation. Warnings & precautions: As with other intravitreal therapies endophthalmitis has been reported. Aseptic injection technique essential. Patients must report any symptoms of endophthalmitis without delay, increases in intraocular pressure have been seen within 60 minutes of intravitreal injection, special precautions are needed in patients with poorly controlled glaucoma (do not inject while the intraocular pressure is  $\geq$  30 mmHg). Immediately after injection, monitor intraocular pressure and perfusion of optic nerve head and massage appropriately. There is a potential for immunogenicity as with other therapeutic proteins, patients should report any signs or symptoms of intraocular inflammation or a pain, photophobia or redness, which may be a clinical sign of hypersensitivity. Reports of systemic adverse events including non-ocular haemorrhages and arterial thromboembolic events following intravitreal injection of VEGF inhibitors. Safety and efficacy of concurrent use in both eyes have not been systematically studied. Caution in patients with risk factors for development of retinal pigment epithelial tears including large and/or high pigment epithelial retinal detachment. Without treatment in patients with rhegmatogenous retinal detachment or stage 3 or 4 macular holes with retinal breaks and do not resume treatment until the break is adequately repaired. Without treatment and do not resume before next scheduled treatment if there is decrease in best corrected visual acuity  $\geq$  20 letters compared with the last assessment; central foveal subretinal haemorrhage, or haemorrhage  $\geq$  50% of total lesion area. Do not treat in the 28 days prior to or following performed or planned intraocular surgery. Eylea should not be used in pregnancy unless the potential benefit outweighs the potential risk to the foetus. Women of childbearing potential have to use effective contraception during treatment and for at least 3 months after the last intravitreal injection. Populations with limited data: There is limited experience of treatment with Eylea in patients with ischaemic, chronic CRVO. In patients presenting with clinical signs of irreversible ischaemic visual function loss, the treatment is not recommended. There is limited experience in DME due to type 1 diabetes or in diabetic patients with an HbA1c over 12% or with proliferative diabetic retinopathy. Eylea has not been studied in patients with active systemic infections, concurrent eye conditions such as retinal detachment or macular hole, or in diabetic patients with uncontrolled hypertension. This lack of information should be considered when treating such patients. Interactions: No available data. Fertility, pregnancy & lactation: Not recommended during pregnancy unless potential benefit outweighs potential risk to the foetus. No data available in pregnant women. Studies in animals have shown embryo-foetal toxicity. Women of childbearing potential have to use effective contraception during treatment and for at least 3 months after the last injection. Not recommended during breastfeeding. Direction in human milk: unknown. Male and female fertility impairment: Seen in animal studies with high systemic exposure not expected after ocular administration with very low systemic exposure. Effects on ability to drive and use machines: Possible temporary visual disturbances. Patients should not drive or use machines if vision is impaired. Undesirable effects: Very common: conjunctival haemorrhage. Phase II studies: increased incidence in patients receiving path from both agents; eye pain, visual scotoma, ocular. Common: retinal pigment epithelium tear, detachment of the retinal pigment epithelium, retinal degeneration, vitreous haemorrhage, cataract (nuclear or subcapsular), corneal abrasion or erosion, corneal oedema, increased intraocular pressure, blurred vision, vitreous floaters, vitreous detachment, injection site pain, foreign body sensation in eyes, increased lacrimation, eyelid oedema, injection site haemorrhage, punctate keratitis, conjunctival or ocular hyperaemia. Uncommon: injection site irritation, abnormal sensation in eye, eyelid irritation. Serious: Cataract, retinal detachment, vitreous detachment, endophthalmitis, and intraocular pressure increased. Consult the full prescribing information in relation to other side effects. Overdose: Monitor intraocular pressure and treat if required. Incompatibilities: Do not mix with other medicinal products.

**Special Precautions for Storage:** Store in a refrigerator (2°C to 8°C). Do not freeze. Unopened vials may be kept at room temperature (below 25°C) for up to 24 hours before use.

Date of preparation: Sep 2019 (ref: 180515 Eylea HK FR)

For further prescribing information, please contact Bayer HealthCare Limited, 14/F, Oxford House, Takko Place, 979 King's Road, Quarry Bay, Hong Kong. Tel: (852) 2814 7337. Fax: (852) 3526 4755

#### References:

1. EYLEA (aflibercept solution for injection) Full Prescribing Information. Hong Kong August 2018.
2. Ohji M. Two different Treat and Extend dosing regimens of intravitreal aflibercept for wAMD in Japanese patients: 52 weeks results of the ALTAR study.

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## Editorial

### Dr Marcus M. MARCET

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**Editor**



Dr Marcus M. MARCET

Thank you for your interest in Cosmetic Ophthalmology. We are honoured to be featured in the year 2020, as it's a special number in ophthalmology: 20/20 represents normal vision. In this issue, we cover two ophthalmic subspecialties, namely Oculoplastic Surgery and Refractive Surgery. Both are concerned with distinct aspects of cosmetic surgery and form part of the surgical training experience required by the College of Ophthalmologists of Hong Kong.<sup>1</sup>

**Oculoplastic Surgery** is an ophthalmic subspecialty that focuses on the ocular adnexa, i.e., the soft and bony tissues around the eyes. Oculoplastic surgery is also known as ophthalmic plastic surgery or oculofacial plastic surgery.<sup>2,3</sup> The field addresses aesthetic and functional conditions of the eyelids and surrounding face, such as the forehead and midface. The orbits and lacrimal system are also under the purview of oculoplastic surgeons. Cosmetic treatments are an integral part of the practice.<sup>4</sup>

Oculoplastic surgery became a recognised subspecialty of ophthalmology nearly 80 years ago.<sup>5,6</sup> During World War II, oculoplastic surgery developed rapidly out of necessity; with other surgeons overwhelmed by the sheer numbers of trauma and burn patients, the patients with eyelid and orbit injuries were assigned to the eye services.<sup>7</sup> In 1969, a group of oculoplastic surgeons formed the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS).<sup>8</sup> Such associations have since formed around the world.<sup>9-11</sup>

In Hong Kong, oculoplastic surgery has long existed through dedicated commissioned training in the Hospital Authority, meetings and symposia, and among the daily practices of both private and public ophthalmologists. The oculoplastics community formally organised with the formation of the Hong Kong Society of Ophthalmic Plastic and Reconstructive Surgery (HKSOPRS) in 2015.<sup>4</sup> The aim of HKSOPRS is to advance the practice, research and education in diseases of the eyelids and surrounding facial areas, orbit, and lacrimal system.<sup>4</sup>

With the support of all of our past presidents (Drs George Cheng, Hunter Yuen, Aaron Chu, Kelvin Chong, and Carol Yu), HKSOPRS has had organised teachings in injectable fillers, hands-on training in energy-based devices, live sessions in blepharoplasty and double eyelid surgery, invited international lecturers, CME in brow lift, and wet labs in oculoplastic surgery and anatomy to name a few. The HKSOPRS has also coordinated with other aesthetics-related groups to improve the safety and care of cosmetic patients in Hong Kong. Based on the current membership of HKSOPRS, there are about 50 ophthalmologists with a specific interest in and/or dedication to oculoplastic surgery. In parallel with similar developments internationally, the subspecialty's increasing numbers in Hong Kong have led to growth in the field's advancements, expertise, recognition and collaborations.<sup>12-15</sup>

**Refractive Surgery** is a type of cosmetic surgery to reduce dependence on visual aids such as glasses or contact lenses. With high prevalence rates of myopia around the world, especially in east Asia, refractive surgery is popular in the public's imagination about ophthalmology. However, refractive surgery as a subspecialty has had a briefer history compared to oculoplastic surgery, due to the former's

need for newer technologies and requisite micron-level measurements.

The modern era of refractive surgery began in the 1990's with the advent of laser-assisted in situ keratomileusis (LASIK) and continues to evolve at present with precision femtosecond laser LASIK, small incision lenticule extraction, and lens-based surgeries.<sup>16</sup> Refractive surgery is practised by many ophthalmic surgeons in Hong Kong. The field is sustained by widespread public interest, ongoing research, and technological advancements. Interestingly, studies in recent years have looked at myopic control in the very young.<sup>17</sup> Perhaps one day the degree and rates of myopia will decrease. However, presbyopia remains a universal problem and in some ways, poses the final frontier in refractive surgery.

Both Oculoplastic Surgery and Refractive Surgery are dynamic, evolving aspects of our field. We hope you enjoy the articles on Cosmetic Ophthalmology in this edition of the Hong Kong Medical Diary. Thanks again for the opportunity to share with you about cosmetic ophthalmic procedures!

#### References

1. Training Curriculum. College of Ophthalmologists of Hong Kong. <http://www.cohk.org.hk/wp-content/uploads/2014/12/Training-Curriculum-2016.pdf>. Accessed 20 December 2019.
2. What is an Oculoplastic Surgeon? British Oculoplastic Surgery Society. <https://www.bopss.co.uk/public-information/oculoplastic-surgeons/>. Accessed 21 December 2019.
3. The Oculofacial Plastic Surgery Education Center. American Academy of Ophthalmology. Clinical Education Web site. <https://www.aao.org/oculoplastics-center/oculoplastics-education-center>. Accessed 21 December 2019.
4. About HKSOPRS. Hong Kong Society of Ophthalmic Plastic and Reconstructive Surgery. <http://hksoprs.com/about-hksoprs/>. Accessed 17 December 2019.
5. Meltzer MA, Ostrovsky A. Ophthalmic Plastic Surgery: A History in the Making. In: Black EH, Nesi FA, Gladstone GJ, Levine MR, eds. Smith and Nesi's Ophthalmic Plastic and Reconstructive Surgery. 3rd ed. New York: Springer; 2012:81-96.
6. Mourits MP. A Short History of Contemporary Oculoplastic Surgery (and the Need for RCTs): Excerpts from the Mustardé Lecture 2011. Orbit (Amsterdam, Netherlands). 2012;31(4):270-273.
7. Patel BC, Anderson RL. History of Oculoplastic Surgery (1896-1996). Ophthalmology. 1996;103(8):574-595.
8. Callahan A. Fifty Years of Ophthalmic Plastic and Reconstructive Surgery Under the Auspices of the American Academy of Ophthalmology and the Development of ASOPRS. Ophthalmic plastic and reconstructive surgery. 1985;1:169-174.
9. About MEASOPRS. Middle East Africa Society of Ophthalmic Plastic and Reconstructive Surgery (MEASOPRS). <http://www.measoprs.org/about.htm>. Accessed 20 December 2019.
10. About APSOPRS. Asia Pacific Society of Ophthalmic Plastic and Reconstructive Surgery (APSOPRS). <https://apsoprs.org/page/about-apsoprs>. Accessed 2019.
11. The Society. European Society of Ophthalmic Plastic and Reconstructive Surgery (ESOPRS). <https://www.esoprs.eu/about-esoprs/the-society/>. Accessed 24 December 2019.
12. Cheng ACO, Li EYM, Chan TCY, et al. Hybrid procedure for orbital venous malformation in the endovascular operation room. Eye (London, England). 2015;29:1069-1075.
13. Chong KKL, Goldberg RA. Lateral Canthal Surgery. Facial plastic surgery : FPS. 2010;26:193-200.
14. Marcet MM, Setabutr P, Lemke BN, et al. Surgical Microanatomy of the Müller Muscle-Conjunctival Resection Ptosis Procedure. Ophthalmic plastic and reconstructive surgery. 2010;26(5):360-364.
15. Yu CS, Chan HH, Tse KK. Radiosurgery versus carbon dioxide laser for dermatochalasis correction in Asians. Lasers Surg Med. 2007;39(2):176-179.
16. Steinert RF. History, Technology, and Meta-analysis. Ophthalmology. 2006;113(11):1895-1896.
17. Yam JC, Jiang Y, Tang SM, et al. Low-Concentration Atropine for Myopia Progression (LAMP) Study: A Randomized, Double-Blinded, Placebo-Controlled Trial of 0.05%, 0.025%, and 0.01% Atropine Eye Drops in Myopia Control. Ophthalmology. 2018;126(1):113-124.



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12K+

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**Doubled** survival rate at 5 years with Optune® + TMZ versus TMZ alone<sup>2</sup>

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OPTUNE® + TMZ<sup>2</sup>

**5%** TMZ alone<sup>2</sup>

**Abbreviations:** GBM=glioblastoma multiforme; TMZ=temozolomide

**References:** 1. Data on file. Novocure. Last updated January 2019. 2. Stupp, R. *et al.* JAMA 318, 2306–2316 (2017).

**Indications for Use** Optune Treatment Kit is intended for the treatment of patients with newly diagnosed GBM and for the treatment of patients with recurrent GBM. **Newly diagnosed GBM** NovoTTF-200A (Optune™) Treatment Kit is intended for the treatment of patients with newly diagnosed GBM, after surgery and radiotherapy with adjuvant Temozolomide, concomitant to maintenance Temozolomide. The treatment is intended for adult patients, 18 years of age or older, and should be started more than 4 weeks after surgery and radiation therapy with adjuvant Temozolomide. Treatment may be given together with maintenance Temozolomide (according to the prescribing information in the Temozolomide package insert) and after maintenance Temozolomide is stopped. **Recurrent GBM** NovoTTF-200A (Optune™) Treatment Kit is intended for the treatment of patients with recurrent GBM who have progressed after surgery, radiotherapy and Temozolomide treatment for their primary disease. The treatment is intended for adult patients, 18 years of age or older, and should be started more than 4 weeks after the latest surgery, radiation therapy or chemotherapy. **Contraindications** Do not use Optune Treatment Kit if you are pregnant, think you might be pregnant, or are trying to get pregnant. If you are a woman who is able to get pregnant, you must use birth control when using the device. Optune Treatment Kit was not tested in pregnant women. Do not use Optune Treatment Kit if you have significant additional neurological disease (primary seizure disorder, dementia, Progressive degenerative neurological disorder, Meningitis or encephalitis, Hydrocephalus associated with increased intracranial pressure) Do not use Optune Treatment Kit if you are known to be sensitive to conductive hydrogels like the gel used on electrocardiogram (ECG) stickers or transcutaneous electrical nerve stimulation (TENS) electrodes. In this case, skin contact with the gel used with Optune Treatment Kit may commonly cause increased redness and itching, and rarely may even lead to severe allergic reactions such as shock and respiratory failure. Do not use Optune if you have an active implanted medical device, a skull defect (such as, missing bone with no replacement) or bullet fragments. Examples of active electronic devices include deep brain stimulators, spinal cord stimulators, vagus nerve stimulators, pacemakers and defibrillators. Use of Optune together with implanted electronic devices has not been tested and may lead to malfunctioning of the implanted device. Use of Optune together with skull defects or bullet fragments has not been tested and may possibly lead to tissue damage or render Optune ineffective. Ref: EU IFU Document number GSD-EUUM-001-EN (Rev 04)

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HK-OPT-201910-02





# Cosmetic Upper Eyelid Surgery

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*This article has been selected by the Editorial Board of the Hong Kong Medical Diary for participants in the CME programme of the Medical Council of Hong Kong (MCHK) to complete the following self-assessment questions in order to be awarded 1 CME credit under the programme upon returning the completed answer sheet to the Federation Secretariat on or before 29 February 2020.*

## INTRODUCTION

Throughout the ages, the eyes have been described as the "Mirror of the soul". While the eyes are one of the most expressive features of the face, their appearance evolves with age. The structural changes of the surrounding soft tissues are especially evident in the eyelids. As we age, our eyelid skin stretches, and the muscles supporting them also weakens. As a result, excess fat may gather above and below the eyelids, causing sagging eyebrows, droopy upper eyelids and eye bags under our eyes.<sup>1</sup>

Blepharoplasty is a surgical procedure in which the eyelid skin, orbicularis oculi muscle, and orbital fat are excised, redraped, or sculpted to rejuvenate the aesthetic look of the patient along with correction of any functional abnormality. In general, upper eyelid blepharoplasty can be done for both cosmetic and functional indications while the lower eyelid blepharoplasty is commonly performed for aesthetic rationales.

Cosmetic eyelid surgery is, by definition a surgical procedure that is not medically necessary and is performed solely to improve the appearance, making one look younger and more alert. On the other hand, functional blepharoplasty is eyelid surgery performed for medical reasons, for example, to remove loose skin from the upper eyelids if it droops so low that it impairs the peripheral vision, especially the upper and outer parts of the visual field. Other functional problems include difficulty wearing glasses or contact lens, irritation from excess folds of eyelid skin rubbing together, forehead discomfort from overused muscles that strain to lift the droopy eyelids.<sup>2</sup>

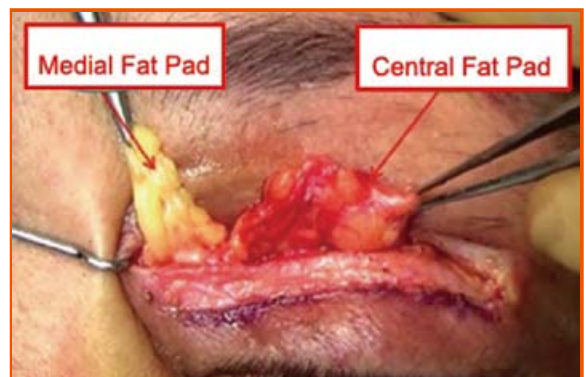
To achieve the best results for cosmetic blepharoplasty, it is important to consider the relevant eyelid anatomy and underlying structural change in the context of patients' concerns and expectations. There are many variations in upper eyelid blepharoplasty. In this article, the focus would be on Asian blepharoplasty and Blepharoplasty for dermatochalasis.<sup>3</sup>

## APPLIED ANATOMY

Eyelid skin is the thinnest in the body, measuring less than 1 mm in thickness and it has no subcutaneous fat. Given the constant movement with each blink,

laxity occurs with age. The pretarsal tissues are firmly attached to the underlying tarsus while, the preseptal tissues are loosely attached, which lead to potential spaces for fluid accumulation. The upper eyelid can be divided into tarsal and orbital portions at the level of the supratarsal fold, which is formed by the fusion of the levator aponeurosis, orbital septum, and orbicularis oculi fascia. The Caucasian eyelid holds this fusion approximately 3-5 mm above the upper tarsal border, while in the Asian eyelid, it lies a little lower, somewhere between the eyelid margin and superior border of the tarsus, commonly resulting in a single eyelid configuration.<sup>4</sup>

The orbital septum is a fibrous layer of which the function is to retain the orbital fat lies deep to the orbicularis fascia. It originates from the periosteum of the orbit and fuses with the levator aponeurosis 10-12 mm above the superior border of the tarsus. Posterior to the orbital septum and anterior to the levator aponeurosis is the preaponeurotic fat. This layer of orbital fat can be divided into the yellowish central fat pad and the whitish medial fat pad [Fig. 1]. Posterior to the preaponeurotic fat pads is the levator muscle and its aponeurosis. At about 10-12 mm above the superior tarsal border, the sympathetic muscle of Muller leaves the posterior surface of the levator aponeurosis and inserts at the superior border of the tarsus. During surgery, it is important to distinguish the preaponeurotic fat from the adjacent lacrimal gland located at the temporal side of the upper eyelid, by its pinkish appearance and glandular structure.



*Fig. 1 Preaponeurotic fat pads identified during upper eyelid blepharoplasty (Excerpted from IJO 2017 Jul; 65(7): 551-558.)*

## ASIAN BLEPHAROPLASTY

Asian blepharoplasty, also known as double eyelid surgery, is a procedure that aims to create an upper lid crease. The upper eyelid crease is an anatomical invagination of the eyelid skin along the superior tarsal border. It originates from dynamic interaction of vector forces among the levator muscle, the Mueller's muscle, the preaponeurotic fat, and the skin-orbicularis complex over the preseptal region.<sup>5</sup>

Caucasian upper lids with a crease are thinner than the Asian ones. Anatomically, there are higher points of fusion of the orbital septum onto the levator, less preseptal fat and thinner orbicularis oculi. In general, the Caucasian upper lids possess a greater number of distal fibres of the levator aponeurosis that terminate toward the skin along the superior tarsal border to form the eyelid crease. When the levator muscle contracts, it pulls the tarsus upward and the eyelid crease invaginates easily, and then the preseptal skin rolls down slightly to form the eyelid fold.<sup>6</sup> Asians who do not have an apparent lid crease bevelled have thicker eyelids because of the presence of a hypertrophied orbicularis oculi and may have fat in their pretarsal, preseptal and postseptal preaponeurotic space. The orbital septum fuses with the levator at a lower position compared with those who possess a crease. There are few or no terminal branches from the levator toward the skin along the superior tarsal border.

A successful Asian blepharoplasty, apart from merely creating a lid crease, should target to improve the eyelid's efficiency in its opening and crease formation. This targeted outcome can be accomplished by repositioning the tissues within the preseptal zone and by reducing any tissues that impede against crease formation. The surgery should be designed as a 3D remodelling of the preaponeurotic space such that the tissue interaction is more efficient and bearing in mind not to add impedance to the biodynamics of the upper eyelids. The following factors are to be considered in planning an Asian blepharoplasty.

### Fat Management

The presence of preaponeurotic fat would affect the function and dynamics of the upper eyelids. In a large case series by Chen et al., over 70% of the primary cases had preaponeurotic fat observed intraoperatively. More than 50% had this fat partially reduced through controlled excision to yield an optimal result. For revisional cases, over 60% had residual fat and 38% required further fat reduction.

### Aponeurotic Attachment to Skin Along the Superior Tarsal Border

Different levels of attachments during eyelid crease construction would result in various forms of creases:

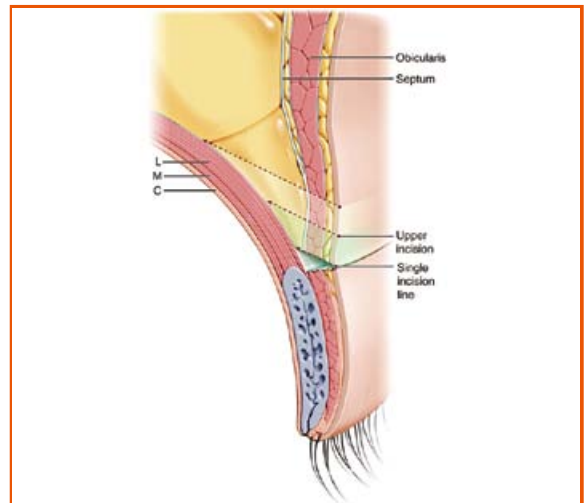
- Level 1: Skin-to-skin closure seldom yields a crease.
- Level 2: Skin-inferior orbicularis oculi-skin anchoring yields a crease yet the crease height is less predictable.

- Level 3: Skin-aponeurosis-skin closure yields a dynamic crease.
- Level 4: Skin-tarsus-skin closure yields a static crease.
- Level 5: Skin-tarsus & incorporate orbicularis-to-skin closure using either dissolvable or permanent buried sutures yields a deep, static crease.
- Level 6: Complete encircling of the levator-Mueller muscles complex yields a harsh static crease, and apparent dimpling of the skin may be seen on downgaze in some patients.

Therefore, one should direct a fraction of the levator aponeurotic fibres to the under-surface of the skin along the superior tarsal border to form a natural, dynamic crease.

### Block Resection (Trapezoidal Debulking) of Redundant Anterior Lamella

Using a bevelled approach, redundant tissues in the preaponeurotic space are selectively removed in a clean, trapezoidal cross-section. [Fig. 2] This reduces the impedance from the anterior lamella (skin, orbicularis oculi and preaponeurotic fat) and creates a greater space just above the superior tarsal border, thus facilitating crease invagination and the natural relaxation of skin fold above it.



*Fig. 2 The beveled approach allows a selective removal of tissues which may impede crease construction. After making the initial lid crease incision along the superior tarsal border, plus an upper skin incision separated from it by 1.5-2 mm of skin, the upwardly-beveled trans-orbicularis arrow and returning vector along the superior tarsal border form the asymmetric sides of a conceptual trapezoid, with the skin and anterior surface of aponeurosis being the two remaining sides essentially running parallel to each other. (Excerpted from "Chen WPD. Asian Blepharoplasty and the Eyelid Crease. 3rd ed. Elsevier Science; 2016").*

### Crease-positioning

The upper tarsus is normally tilted at 40-50 degrees from the horizontal when the subject is upright and looking ahead. With the eyes opened, the lid margin should rest





along the superior limbus, covering 1 mm of the cornea. Assuming a 45-degree tarsal-tilt angle, there is a 5:7 equivalence ratio between tilted crease height (measured with lids opened) and anatomic crease height (measured with lids closed, or tarsus everted). That is, if one wants to construct a 5-mm eyelid crease when observed face-on, a 7-mm anatomical crease should be implemented during the surgery.

The outcomes of Asian blepharoplasty to be judged include the height, the shape, the continuity and permanence of the lid crease as well as the incidence of various complications like the development of ptosis. The follow-up period of at least one year is preferred. Factors including aponeurotic attachment, selective block reduction of tissues, precise positioning of the crease-forming points and understanding of the 5:7 ratio of equivalence between tilted crease height to anatomic crease height are the important guiding principles that contribute to a successful upper Asian blepharoplasty.

## BLEPHAROPLASTY FOR DERMATOCHALASIS

Dermatochalasis is an involitional condition of the eyelid, mostly caused by ageing. It is defined as an excess of skin in the upper or lower eyelid. In addition to the presence of loose and redundant eyelid skin, there can be co-existing lid atrophy, orbital fat herniation, and aponeurotic ptosis. With an increase in life expectancy all over the world, the overall prevalence of dermatochalasis is on the rise, resulting in an increasing need for upper eyelid blepharoplasty, both for cosmetic and for functional indications.

Many patients with dermatochalasis present with “droopy eyelids” leading to a “tired-looking” or old-age appearance. Some might have ocular irritation secondary to chronic blepharitis and misdirected lashes associated with lateral lash ptosis with lateral hooding of the eyelid skin. A significant portion of patients also complain of obscuration of their peripheral temporal visual field due to the sagging eyelid skin. Therefore, some of the patients who undergo upper eyelid blepharoplasty for cosmetic reasons might gain improvement in their visual function after surgery.

### Excision of Redundant Skin

The most important aspects of blepharoplasty for dermatochalasis is the marking of the upper limit of skin excision and the skin crease. The common methods of marking are the “skin pinch” or “skin flap” techniques. The skin pinch method is done with the patient in an upright position and the eyes closed. Following the lid crease or the natural palpebral fold, the lower incision line is marked. A pair of blunt forceps is used to grasp the excess skin, and then the upper incision markings are made when the eyelid skin appears smooth with no traction of the upper eyelid.

For the skin flap technique, skin flaps are developed by separating the skin over the entire upper lid area from the underlying orbicularis muscle. The elevated eyelid skin is then carefully redraped over the orbicularis to produce an overlap of skins. The excess skin is

marked and excised. Some other reported techniques for skin marking include the Classic Rees incision, Scalpel-shaped incision and Bellinvia's incision for counteracting lateral hooding.

The main difference in the skin-marking technique for cosmetic versus functional blepharoplasty is the extension of lateral incision beyond the lateral canthus in functional blepharoplasty to manage the lateral hooding and lash ptosis, whereas in cosmetic blepharoplasty, the lateral incision should not extend beyond the lateral canthal area to avoid an unsightly cutaneous scar.<sup>7</sup>

In addition to the excision of skin, usually, a strip of preseptal orbicularis would be excised. A small incision could be made over the septum to provide direct access to the preaponeurotic fat pads. Both the medial and central fat pads could be pulled out gently through the small openings of the orbital septum and debulked using electrocautery or radiofrequency cautery, preferably with a clamp-cut-cautery technique to achieve optimal haemostasis.

Lid crease formation can be done by interrupted, horizontal mattress sutures with 6-0 absorbable sutures passing through the orbicularis oculi muscle, superior border of the tarsal plate or the levator aponeurosis to create a static or dynamic eyelid crease. The skin is then apposed with continuous or interrupted sutures.

### Brow Management

A good understanding of the eyebrow position is prerequisite for optimal cosmetic and functional outcomes in blepharoplasty for dermatochalasis.<sup>8</sup> Before deciding the amount of upper eyelid skin resection, the brow level and contour should be determined. Brow ptosis is the drooping of the brows caused by the loss of elastic tissue and involitional changes of the forehead skin. The eyebrow is composed of pilosebaceous units, muscle, and fat. The orbital orbicularis oculi, frontalis, procerus, and corrugator superciliaris muscles all contribute to the movement of the eyebrow, which is an important tool of facial expression.



Fig. 3 Upper eyelid blepharoplasty with and without brow management (Excerpted from IJO 2017 Jul; 65(7): 551-558.)

Brow ptosis can be medial, central, or lateral. If the eyebrow is markedly drooping, a browplasty must be considered to achieve a desirable cosmesis. In the elderly group, upper eyelid blepharoplasty is often accompanied by correction of brow ptosis either by external browplasty, internal browpexy or corrugator myectomy. If the temporal aspect of the eyebrow droops significantly, a small temporal direct external browplasty can be used to lift the eyelid; otherwise in minimal lateral brow ptosis, a transpalpebral internal browpexy can be done through the blepharoplasty incision [Fig. 3]. A browpexy is a suture fixation of the brow to the underlying frontal bone.<sup>9</sup>

## PERI-OPERATIVE CONSIDERATIONS FOR COSMETIC UPPER EYELID SURGERY

In evaluating patients for cosmetic upper eyelid surgery, a complete medical and ocular history must be obtained, along with a thorough ophthalmologic examination. A proper history of any prior surgery or trauma should be recorded. Patients should be evaluated for dysthyroid eye disease and dry eye disease. Seventh nerve function should be assessed. History of any bleeding disorder and use of any anti-coagulant should be noted. It is desirable to stop blood thinners one week before surgery if the patients' medical condition allows. Preoperative photographs should be taken with the eyes in primary position. The frontalis action, eyebrow position, levator function, palpebral fissure height, eyelid margin contour, upper eyelid position, eyelid crease, tarsal platform show, eyebrow fat span, margin-reflex distance should all be documented. Elaborate written and informed consent of the patient should be obtained before the surgery.<sup>10</sup>

Postoperatively, patients would be advised to do intermittent ice-packing (or cold compresses) and head elevation while sleeping to reduce soft tissue oedema and ecchymosis. The patient should avoid lifting heavy objects for one week and avoid eye makeup for at least one week. Avoidance of direct sunlight exposure and diligent use of sunscreens helps prevent scar pigmentation and scar irregularities. Digital massage, vitamin E cream and silicone-based gels may reduce scar hypertrophy.<sup>11</sup> In case of any ocular discomfort, suture-related problems should be ruled out. Generous use of lubricating eye drops can soothe exposure-related corneal dryness.

Possible complications of cosmetic upper eyelid surgery include hematoma/ecchymosis, wound dehiscence and infection, scar-related issues such as medial webbing, scar hypertrophy, scar pigmentation and persistent scar erythema, asymmetry, upper lid retraction, lagophthalmos, ptosis, dry eyes syndrome, lymphedema and diplopia. Patients should be alerted of the signs of rare complications such as orbital hematoma and compartment syndrome. In case there is sudden onset of severe pain along with proptosis and profound loss of vision during the early postoperative period, urgent medical attention should be sought.<sup>12</sup>

## CONCLUSION

Cosmetic upper eyelid surgery is one of the most commonly performed oculo-facial plastic procedures worldwide. To achieve desirable surgical outcome and patient satisfaction, the eyelid surgeon must have thorough understanding of the patient's need and wish, comprehensive knowledge of periorbital anatomy, meticulous planning and attention to details during surgery. Careful examination for any eyelid and ocular surface abnormalities should be done during the pre-operative assessment. The position, symmetry, and contour of the eyebrow, eyelid and eyelid crease all play a crucial role in the final postoperative appearance.

## References

1. Damasceno RW, Avgitidou G, Belfort R, Jr, Dantas PE, Holbach LM, Heindl LM. Eyelid aging: Pathophysiology and clinical management. *Arq Bras Oftalmol.* 2015;78:328–31.
2. Cahill KV, Bradley EA, Meyer DR, Custer PL, Holck DE, Marcet MM, et al. Functional indications for upper eyelid ptosis and blepharoplasty surgery: A report by the American Academy of Ophthalmology. *Ophthalmology.* 2011;118:2510–7.
3. Hollander MHJ, Schortinghuis J, Vissink A, Jansma J, Schepers RH. Aesthetic outcomes of upper eyelid blepharoplasty: a systematic review. *Int J Oral Maxillofac Surg.* 2019 Nov 10.
4. Cheng J, Xu FZ. Anatomic microstructure of the upper eyelid in the oriental double eyelid. *Plast Reconstr Surg.* 2001;107:1665–1668.
5. Chen WPD. Techniques, Principles and Benchmarks in Asian Blepharoplasty. *Plast Reconstr Surg Glob Open.* 2019 May 23;7(5):e2271.
6. Collin JR, Beard C, Wood I. Experimental and clinical data on the insertion of the levator palpebrae superioris muscle. *Am J Ophthalmol.* 1978;85:792–801.
7. Kasturi Bhattacharjee, Diva Kant Misra, Nilutparna Deori. Updates on upper eyelid blepharoplasty. *Indian J Ophthalmol.* 2017 Jul; 65(7): 551–558.
8. Rees TD. The surgery of aesthetics: A modern dilemma. *Aesthetic Plast Surg.* 1991;15:99–104.
9. Bellinvia G, Klinger F, Maione L, Bellinvia P. Upper lid blepharoplasty, eyebrow ptosis, and lateral hooding. *Aesthet Surg J.* 2013;33:24–30.
10. Nerad JA. *Oculoplastic Surgery: The Requisites in Ophthalmology.* St. Louis: Mosby; 2001.
11. Kalasho BD, Kikuchi R, Zoumalan CI. Silicone-Based Scar Cream for Post Upper Eyelid Blepharoplasty-associated Cicatricial and Hypertrophic Scarring. *J Drugs Dermatol.* 2019 May 1;18(5):440–446.
12. Klapper SR, Patrinely JR. Management of cosmetic eyelid surgery complications. *Semin Plast Surg.* 2007;21:80–93.



## MCHK CME Programme Self-assessment Questions

Please read the article entitled "Cosmetic Upper Eyelid Surgery" by Dr Emmy Yuen-mei LI and complete the following self-assessment questions. Participants in the MCHK CME Programme will be awarded CME credit under the Programme for returning completed answer sheets via fax (2865 0345) or by mail to the Federation Secretariat on or before 29 February 2020. Answers to questions will be provided in the next issue of The Hong Kong Medical Diary.

Questions 1-10: Please answer T (true) or F (false)

1. Blepharoplasty is a surgical procedure in which the eyelid skin, orbicularis oculi muscle, and orbital fat are excised, redraped, or sculpted.
2. Eyelid skin is the thinnest in the body, measures over 1 mm in thickness, and has subcutaneous fat.
3. The pretarsal tissues are loosely attached to the underlying tarsus, while the preseptal tissues are firmly attached.
4. The orbital septum retains the orbital fat that lies deep to the orbicularis fascia.
5. During surgery, it is important to distinguish the preaponeurotic fat from the adjacent lacrimal gland located at the temporal side of the upper eyelid.
6. Asian blepharoplasty is also known as double eyelid surgery.
7. A successful Asian blepharoplasty should lead to improvement in the efficiency of the eyelid's opening and crease formation.
8. Dermatochalasis is defined as a shortage of skin in the upper or lower eyelid.
9. Many patients with dermatochalasis present with "droopy eyelids" leading to a "tired-looking" or old-age appearance.
10. There is never a need for preoperative photographs before blepharoplasty, and they are not routinely obtained.

## ANSWER SHEET FOR FEBRUARY 2020

Please return the completed answer sheet to the Federation Secretariat on or before 29 February 2020 for documentation. 1 CME point will be awarded for answering the MCHK CME programme (for non-specialists) self-assessment questions.

### Cosmetic Upper Eyelid Surgery

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### Answers to January 2020 Issue

#### Role of Hyperbaric Oxygen Therapy in Carbon Monoxide Poisoning

1. F 2. T 3. T 4. T 5. T 6. F 7. F 8. T 9. T 10. F



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27 Feb, 2020	Common Heart Problems in Paediatric Patients	Dr. YUNG Tak Cheung Chief of Service Department of Paediatric Cardiology, Queen Mary Hospital
5 Mar, 2020	Management of Chest Pain and Coronary Artery Disease	Dr. CHENG Yue Hong, Victor Associate Consultant Internal Medicine – Division of Cardiology, Pok Oi Hospital
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# Aesthetic and Surgical Management of the Lower Eyelid

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An important aspect of periorbital rejuvenation is addressing the lower eyelid, with the most common complaint being lower lid fullness or presence of “eyebags”. Various surgical techniques and approaches have evolved over time. Non-surgical solutions have also gained popularity in recent years.

The cause of such a complaint can be a combination of the excessive lower eyelid skin, herniation of fat and the presence of fine rhytids. With ageing, the convex surface of the lower orbital rim, which gently transitions to the cheek and midface, becomes more concave in shape giving rise to a hollow and skeletonised appearance. The underlying orbital rim and fat pad also become more visible. The tear trough deformity contributes to the undesirable lower eyelid appearance and is due to several factors. One of the components is the orbital septum and its fixation to the arcus marginalis inferomedially<sup>1,2</sup>. Another, is the loss of fat and soft tissue at the level of the arcus marginalis<sup>3</sup>. The tear trough deformity is further accentuated by the downward migration of the neighbouring cheek tissue.

Good surgical techniques restore youthful appearance by addressing the underlying anatomical changes, while maintaining eyelid position and function. Historically, surgical approaches to the lower eyelid can be divided into the anterior transcutaneous approach, the posterior transconjunctival approach or a combination of both. Careful assessment to evaluate the presence of eyelid laxity, degree of skin excess, prominence of nasojugal groove and deep-set eyes is important. It is also essential to pay attention to the fat pads involved and the degree of fat herniation, which can be best assessed with the patient looking up. Pre-operative assessment should be clearly documented, and careful patient selection is key to post-operative success.

## SURGICAL BLEPHAROPLASTY

### Anterior Transcutaneous Approach Versus Posterior Tranconjunctival Approach

The transcutaneous approach is most commonly performed through a subciliary incision, which is a particularly useful technique in patients with excessive skin and eyelid laxity, usually found in the older population. In general, conservative skin removal is important to avoid the risk of lower eyelid ectropion or retraction. Lower eyelid tightening procedures, including lateral canthal tightening and canthopexy, can

reduce such risks and also avoid rounding of the lateral canthus, especially in patients with pre-existing canthal laxity<sup>4</sup>.

The transconjunctival approach has gained popularity in recent years. Its main advantages include reportedly a lower risk of lower eyelid malposition, potential avoidance of skin incision and theoretical reduction of mid-lamellar scarring. The posterior approach allows direct access to lower lid fat; the inferior retractor can also be released to raise the lower eyelid margin position<sup>5</sup>. Care needs to be taken to identify and protect the inferior oblique muscle which runs between the medial and central fat pads to avoid postoperative diplopia. Adjunctive techniques can be used to address mild skin excess and fine wrinkles including chemical peels, skin laser resurfacing, skin pinch excision and skin undermining. Chemical peels and ablative skin laser resurfacing such as with erbium and CO<sub>2</sub> lasers should be avoided in patients with a high risk of pigmentary scarrings, as in patients with Fitzpatrick skin types IV to VI. These patients may benefit from skin excision using the pinch technique instead. A small fold of pretarsal skin approximately 1-2mm below the lash line is identified with forceps and excised with scissors, ensuring skin only is removed. Non-ablative skin laser resurfacing such as Nd: YAG, intense pulsed light and pulsed dye laser avoids the epidermis and is directed at the dermis, increasing safety<sup>6</sup>.

### Fat Removal and Repositioning

The approach to orbital fat is an important aspect of lower lid blepharoplasty. Herniated orbital fat can be excised, often most easily through the transconjunctival approach. While there is still a role for fat excision, there has been a shift towards fat repositioning and fat enhancement to minimise tear trough deformities and to prevent the hollow and sunken appearance. Overaggressive fat removal can also lead to loss of orbital volume and result in deep superior sulcus deformity. Often a combination of fat excision and fat repositioning can achieve a more natural appearance. Fat repositioning aims to eliminate the bony prominence of the inferior orbital rim, which contributes to the tear trough deformity most commonly seen in individuals with medial and central fat prolapse. The orbital fat can be transposed into the suprapariosteal<sup>7</sup> or subperiosteal space<sup>8</sup>. The suprapariosteal space potentially provides better blood supply to the transposed fat pedicle. However, it is important during dissection to avoid injury to the buccal branch of the facial nerve which can lead to orbicularis motor dysfunction and lacrimal

pump failure. While subperiosteal dissection tends to be more time-consuming, it allows better direct visualisation of the infraorbital nerve intraoperatively. Despite the benefits and risks of both methods, a study comparing the two techniques found the aesthetic results between the two approaches to be comparable<sup>9</sup>. The transposed fat can be secured by sutures that are either externalised transcutaneously, directly sutured to the orbital rim, or not sutured at all<sup>9</sup>. In cases where additional fat enhancement is desirable, fat grafting or lipofilling can be performed<sup>10</sup>. Selective release of the orbital retaining ligament may further improve the tear trough deformity<sup>10</sup> but its role remains controversial<sup>11</sup>.

## Autologous Fat Injection

Autologous fat graft injection can reduce hollowness and volume loss and also improve the lid-cheek junction contour. It can also be used to fill the nasojugal groove and orbital rim depression. It is especially useful in patients with limited fat available for repositioning. The fat is often harvested from the abdomen and thighs using a low-pressure system. After centrifuging, the fat is decanted and isolated. It can be injected using a microcannula in the inferior orbital rim and upper cheek region. The effect of autologous fat injection is longer lasting than filler injection. It can also be used in cases with lid malposition as a complication of lower eyelid blepharoplasty<sup>12</sup>.

## Suborbicularis Oculi Fat lifting

The suborbicularis oculi fat (SOOF) is at the level of the arcus marginalis at the inferior orbital rim. It descends with age and contributes to tear trough deformity and mid-face descent<sup>13</sup>. It also plays a role in lower eyelid retraction and rounding of the lateral canthus. SOOF lifting improves tear trough deformity by filling the defect from below and improves the appearance of the lid-cheek junction, giving a more youthful appearance<sup>14</sup>. The SOOF can be approached either transconjunctivally or transcutaneously. Dissection is performed until the arcus marginalis and past the orbital rim to identify the descended SOOF. The SOOF is then lifted and suspended to the periosteum of the inferior orbital rim by sutures<sup>3</sup>. A technique of anchoring the SOOF to the inferior orbital rim through drilled holes has also been described<sup>15</sup>.

## Eyelid Tightening and Canthoplasty

As previously mentioned, the pre-operative assessment of eyelid laxity is crucial in surgical planning. Any eyelid laxity needs to be adequately addressed during surgery. The risk of eyelid malposition is theoretically lower in the transconjunctival approach and SOOF lifting, but higher after anterior transcutaneous blepharoplasty. Lid tightening procedures that can be performed during lower eyelid blepharoplasty include lateral canthopexy, lateral tarsal strip and lateral canthus suspension. These can be done through an upper, lateral or lower eyelid incision<sup>16</sup>.

## Postoperative Complications

Complications after lower eyelid blepharoplasties are often a result of excessive removal of fat or skin. Post-operative complications can include lower eyelid malposition such as eyelid retraction and ectropion, hematomas, scarring, skin contour abnormalities, diplopia, ocular trauma and even blindness. A detailed pre-operative assessment can greatly reduce the risk of complications. Good surgical technique with meticulous hemostasis and good exposure to allow clear dissection and identification of important structures is also key to success.

## NON-SURGICAL TECHNIQUES

### Filler Injections

Synthetic filler injections are an alternative to surgery as a less invasive and potentially reversible option with minimal downtime, although results are temporary. It has been shown that the effects of filler tend to last longer than expected in the periocular region<sup>17</sup>. Secondary surgery is still an option after filler injections, although prior filler injections may have an impact on subsequent lower eyelid blepharoplasty<sup>6</sup>. Similar to fat augmentation, the filler can be used to fill the tear trough deformity and can add volume to the inferior orbital rim and malar fat pads giving a more rejuvenated appearance. When used correctly, complications can be low while providing high patient satisfaction<sup>18</sup>. In particular, hyaluronic acid type synthetic fillers are preferred for their versatile nature, low immunogenicity, biodegradability, and ability to be dissolved with hyaluronidase. Injections can be given through a needle or cannula. It is important to place the filler in the suborbicularis plane at the inferior orbital rim, rather than at the preseptal plane in order to avoid lumpiness and skin colour changes. Small amounts of filler should be injected as the needle is withdrawn along the suborbicularis tract to provide a smooth contour<sup>19</sup>. The filler can be massaged and molded immediately after injection to obtain the desired effect. Despite its benefits and ease of use, filler injection is not without risk and complications. Potential complications include skin lumpiness, contour abnormalities, Tyndall effect, infection, hematomas and bruising, formation of nodules, malar oedema or even vascular occlusion and blindness<sup>20</sup>. Although some of these effects can be potentially reversed with timely use of hyaluronidase, irreversible complications can still occur. Once again, careful patient selection, safety considerations, and good injection technique are important in maximising the satisfactory results.

### Energy-based Devices

Although ablative and non-ablative skin resurfacing procedures may have a role in improving skin laxity, texture and fine wrinkles<sup>21</sup>, its effect on the deeper structures such as the orbital septum and orbicularis muscle layer is likely to be more limited. The Ulthera system (Fig. 1) uses intense focused ultrasound to produce thermal effects through acoustic waves which cause vibrations, generating heat of greater than 60°C<sup>22</sup>.





This creates thermal injury and collagen denaturation associated with new collagen synthesis. It penetrates beyond the epidermis to the dermis and can reach the orbicularis muscle and orbital septum. This may have a tightening effect on the orbital septum as well as shrink bulging fat pads to improve overall lower lid appearance<sup>23</sup>. However, treatment response can differ depending on individual patient response and treatment protocols<sup>24</sup>.

Monopolar radiofrequency devices such as Thermage® (Fig. 2) can induce heat and stimulate fibroblast activation for tissue remodelling<sup>25</sup>. As a result, there is new collagen synthesis and skin tightening. This technology has been shown to be effective for eyebrow lifting and also lower eyelid tightening, but to a lesser extent<sup>26</sup>. Improvement often takes 3 to 6 months after treatment to become more apparent<sup>27</sup>. It appears to have a role in improving skin laxity, but its efficacy in addressing fat herniation and the other aspects of the ageing lower lid is less clear, warranting larger prospective studies in the future<sup>27,28</sup>.



Fig. 1 High intensity focused ultrasound: Ulthera system (With approval from Ulthera)



Fig. 2 Monopolar radiofrequency device: Thermage system (With approval from Thermage)

## SUMMARY

There are many surgical and non-surgical techniques available to improve the aesthetic appearance of the

lower eyelid. However, careful patient selection, thorough pre-operative assessment and clear communication with patients are essential to patient satisfaction and good treatment outcome. Regardless if such techniques are used individually or in combination, special attention should be paid to good technique to avoid potential risks and complications.

## References

- Loeb R. Naso-jugal groove leveling with fat tissue. *Clin Plast Surg.* 1993;20(2):393-400; discussion 1.
- Hamra ST. The role of the septal reset in creating a youthful eyelid-cheek complex in facial rejuvenation. *Plast Reconstr Surg.* 2004;113(7):2124-41; discussion 42-4.
- Freeman MS. Transconjunctival sub-orbicularis oculi fat (SOOF) pad lift blepharoplasty: a new technique for the effacement of nasojugal deformity. *Arch Facial Plast Surg.* 2000;2(1):16-21.
- Maffi TR, Chang S, Friedland JA. Traditional Lower Blepharoplasty: Is Additional Support Necessary? A 30-Year Review. *Plast Reconstr Surg.* 2011;128(1):265-73.
- Hashem AM, Couto RA, Waltzman JT, Drake RL, Zins JE. Evidence-Based Medicine: A Graded Approach to Lower Lid Blepharoplasty. *Plast Reconstr Surg.* 2017;139(1):139e-50e.
- Taban MR. Lower Blepharoplasty in Eyelids Previously Injected With Hyaluronic Acid Gel Filler. *The American Journal of Cosmetic Surgery.* 2017;34(2):103-6.
- Mohadjer Y, Holds JB. Cosmetic lower eyelid blepharoplasty with fat repositioning via intra-SOOF dissection: surgical technique and initial outcomes. *Ophthalmic Plast Reconstr Surg.* 2006;22(6):409-13.
- Goldberg RA. Transconjunctival orbital fat repositioning: transposition of orbital fat pedicles into a subperiosteal pocket. *Plast Reconstr Surg.* 2000;105(2):743-8; discussion 9-51.
- Yoo DB, Peng GL, Massry GG. Transconjunctival lower blepharoplasty with fat repositioning: a retrospective comparison of transposing fat to the subperiosteal vs suprapariosteal planes. *JAMA Facial Plast Surg.* 2013;15(3):176-81.
- Rohrich RJ, Ghavami A, Mojallal A. The five-step lower blepharoplasty: blending the eyelid-cheek junction. *Plast Reconstr Surg.* 2011;128(3):775-83.
- Chan NJ, Nazemzadeh M, Hartstein ME, Holds JB, Massry CG, Wulc AE. Orbicularis Retaining Ligament Release in Lower Blepharoplasty: Assessing Efficacy and Complications. *Ophthalmic Plast Reconstr Surg.* 2018;34(2):155-61.
- Skippen B, Bernardini FP, Fezza J, Hartstein ME. Autologous Fat Grafting for Treating Blepharoplasty-induced Lower Eyelid Retraction. *Plastic and reconstructive surgery Global open.* 2016;4(12):e1190-e.
- Rohrich RJ, Arbiqwe GM, Wong C, Brown S, Pessa JE. The anatomy of suborbicularis fat: implications for periorbital rejuvenation. *Plast Reconstr Surg.* 2009;124(3):946-51.
- Jeon YR, Rah DK, Lew DH, Roh TS, Kim YS, Choi HL. Pretarsal Augmented Lower Blepharoplasty. *Plast Reconstr Surg.* 2016;138(1):74-82.
- Kim JH, Jung GY, Shin HK, Lee DL. New lower blepharoplasty technique for elderly patients using bony fixation of the sub-orbicularis oculi fat pad. *Arch Aesthetic Plast Surg.* 2019;25(2):79-82.
- Taban M, Nakra T, Hwang C, Hoenig JA, Douglas RS, Shorr N, Goldberg RA. Aesthetic lateral canthoplasty. *Ophthalmic Plast Reconstr Surg.* 2010;26(3):190-4.
- Iverson SM, Patel RM. Dermal filler-associated malar edema: Treatment of a persistent adverse effect. *Orbit.* 2017;36(6):473-5.
- Morley AM, Malhotra R. Use of hyaluronic acid filler for tear-trough rejuvenation as an alternative to lower eyelid surgery. *Ophthalmic Plast Reconstr Surg.* 2011;27(2):69-73.
- Goldberg RA, Fiaschetti D. Filling the periorbital hollows with hyaluronic acid gel: initial experience with 244 injections. *Ophthalmic Plast Reconstr Surg.* 2006;22(5):335-41; discussion 41-3.
- Murthy R, Roos JCP, Goldberg RA. Periocular hyaluronic acid fillers: applications, implications, complications. *Curr Opin Ophthalmol.* 2019;30(5):395-400.
- Tierney EP, Hanke CW, Watkins L. Treatment of lower eyelid rhytids and laxity with ablative fractionated carbon-dioxide laser resurfacing: Case series and review of the literature. *J Am Acad Dermatol.* 2011;64(4):730-40.
- Brobst RW, Ferguson M, Perkins SW. Ulthera: initial and six month results. *Facial Plast Surg Clin North Am.* 2012;20(2):163-76, vi.
- Pak CS, Lee YK, Jeong JH, Kim JH, Seo JD, Heo CY. Safety and efficacy of ulthera in the rejuvenation of aging lower eyelids: a pivotal clinical trial. *Aesthetic Plast Surg.* 2014;38(5):861-8.
- Gutowski KA. Microfocused Ultrasound for Skin Tightening. *Clin Plast Surg.* 2016;43(3):577-82.
- Hsu TS, Kaminer MS. The use of nonablative radiofrequency technology to tighten the lower face and neck. *Semin Cutan Med Surg.* 2003;22(2):115-23.
- Biesman BS, Baker SS, Carruthers J, Silva HL, Holloman EL. Monopolar radiofrequency treatment of human eyelids: A prospective, multicenter, efficacy trial. *Lasers in Surgery and Medicine.* 2006;38(10):890-8.
- Ruiz-Esparza J. Noninvasive lower eyelid blepharoplasty: a new technique using nonablative radiofrequency on periorbital skin. *Dermatol Surg.* 2004;30(2 Pt 1):125-9.
- Araújo ARd, Soares VPC, Silva FSd, Moreira TdS. Radiofrequency for the treatment of skin laxity: myth or truth. *Anais brasileiros de dermatologia.* 2015;90(5):707-21.

# Rejuvenation of the Forehead and Eyebrows

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## INTRODUCTION

The upper one-third of the face is a key region for facial expressions. The skin in this area is one of the thinnest skin in the body hence allowing easy visual perception of the muscular contractions over the face as creases and wrinkles. As the face ages, accompanied by worsening of skin quality, the facial tissue descends and deflates causing obvious wrinkles and folds over the frontalis muscle, glabellar region and the lateral part of the brow.<sup>1</sup>

This article explores the different options of rejuvenation of the eyebrow and upper one-third of the face. Over the years, there has been a slow shift from the use of open surgery to minimally invasive means of local injection of neuromodulators and fillers.<sup>2</sup> However, all such procedures are essentially based on the understanding of the layered concept and three-dimensional anatomical structure of the face. A good understanding of the anatomy is essential for safe, natural and long-lasting effects.

## ANATOMY OF THE UPPER LID, BROW AND FOREHEAD

The position of the brow is governed by the balance between the brow elevator and the brow depressors. The frontalis muscle is the only elevator of the brow. It originates anterior to the galea aponeurotica, extends down the forehead, then attaches to the central and medial parts of the brow and upper part of the nose. Its main function is to elevate the medial and central parts of the eyebrow. The lateral one-third to one-quarter of the eyebrow is not influenced by the frontalis, therefore is more prone to descend by ageing. This creates increased lateral hooding in aged faces.<sup>3</sup> There are four depressor muscles of the brow. Their contractions create frown lines in the glabellar region. Medial brow depressor muscles include the corrugators, depressor supercilii, procerus and the medial orbicularis muscle. The lateral orbicularis is the sole depressor of the lateral brow.<sup>4</sup>

It is important to note that the brow and the lid exist as a brow-lid continuum. The position of the brow is directly influenced by the anatomy of the eyelid.<sup>5</sup> The ideal brow height varies among different gender and ethnicity.<sup>6-7</sup> In general, when the eyes are opened, the central brow height should not be lower than 10 mm from the lid crease. The lateral brow should be at least 12 mm from the lateral canthus.<sup>8</sup> When there is ptosis present, brow elevation can help elevate the lid by about 2mm.

The facial nerve controls the contraction of all the muscles of facial expression. There is a risk of facial nerve damage during brow surgery. In addition, the supratrochlear nerve and the supraorbital nerve lies respectively from medial to lateral at the medial region of the superior orbital rim must be carefully preserved to prevent forehead paresthesia after surgical brow lifts.<sup>9</sup> Lateral to the brow, there is also the sentinel vein which has to be avoided during endoscopic brow lifts.<sup>10</sup>

## PREOPERATIVE ASSESSMENT

It is important to assess patient expectations and aesthetic goals prior to surgery. Patients with unrealistic expectations should be discouraged from receiving any aesthetic treatments. Photographs should be taken before and after surgery to show subtle changes that the patients may not be able to appreciate.

The most common five types of deformity due to ageing are: dermatochalasis, hypertrophy of the orbicular muscle of the eye, herniated orbital fat, and ptosis of the eyebrow and senile lid.<sup>11-12</sup> A simple blepharoplasty is not effective in patients with eyelid and brow ptosis. These patients should be offered brow lift and ptosis correction with the blepharoplasty surgery to correct multiple problems in one surgical setting.

In preoperative examinations, the usual lid measurements that are routinely obtained are: the marginal reflex distance, palpebral fissure height, levator function, lid crease height, and the brow height. The forehead and the eyebrows should be reviewed for asymmetry. If there is any ptosis present, it should be discussed with the patient to have simultaneous surgery to correct the ptosis with the elevation of the brow. Fatigability, poor eye closure and bell's reflex should be noted. Lastly, a complete eye examination, including visual acuity, cover and uncover test, pupil examinations and extra-ocular motility examination should be done before any periocular surgery.

Medical and medication history, including allergies and swelling, history of thyroid eye disease, heart disease on antiplatelets or anticoagulants, bleeding tendencies and hypertrophic scarring, should be taken note of before surgery.

## SURGICAL VERSUS NON-SURGICAL TECHNIQUES

There are many methods for brow and forehead lifting.





The first forehead lift was described by Pissot in 1919, in which he attempted to excise musculocutaneous ellipsoids around the hairline for treatment of forehead rhytids.<sup>13</sup> As time passed, the use of extensive incisions has shifted toward localised skin incisions and small incision endoscopic surgery. In recent years, the use of non-surgical options has become largely popular.<sup>14</sup> Oculoplastic surgeons may use a mixture of these techniques to achieve the patient's desired brow position. If the medial brow is stable and the lateral brow is ptotic, a direct or indirect lateral brow lift is indicated. When frown muscles should be addressed, options can include an endoscopic approach from the hairline, a lid crease or sub-brow approach from below, or simply injection of botulinum toxin can be considered. When the medial brow is also ptotic, frown muscle excision and frontalis lifting could be offered endoscopically or from a coronal incision.<sup>15</sup>

### Direct Brow Lift

The external browlift is the most direct method to lift the brow. After local anaesthetic injection, incisions are made directly above the brow down to the periosteum. The skin is lifted to a desirable location and the subcutaneous muscular layer is sutured directly onto the periosteum with non-absorbable sutures. (Fig. 1). This method is most effective in lifting the mid to lateral brow as dissection too medially can damage the supraorbital and supratrochlear nerves and vessels. It is a straightforward method for patients with severe brow hooding. The drawback of this surgery is that there will be a visible scar or dimple at the site of the incision.<sup>16</sup>



*Fig. 1 Direct Brow Lift. (Photos from personal collection)  
Left to right: The lateral brow incisions are made and the brow is lifted with 5-0 polypropylene suture.*

### Internal Brow Lift

The internal brow lift is performed in conjunction with an upper lid blepharoplasty. Usually, patients with brow ptosis will have concomitant dermatochalasis. If the eyelid skin is over-resected in a blepharoplasty with the brow unaddressed, a blepharoplasty alone will cause a decreased brow to lash line distance and worsen the brow ptosis. The internal brow lift is done with a lid crease incision. Dissection should be carried out under the orbicularis plane to the mid and lateral orbital rim. The brow is lifted to an ideal height and internally sutured with non-absorbable suture to the periosteum near the superior temporal region of the brow. In order to lift the brow adequately, sometimes the orbital retaining ligament has to be dissected.<sup>17</sup> This technique can be used with a usual blepharoplasty or a sub-brow blepharoplasty. (Fig. 2)



*Fig. 2 Transblepharoplasty Internal Brow Lift. (Photos from personal collection)*

*Left to right: Internal brow lifting via blepharoplasty incision. A small incision is made at the site where a polypropylene suture can exit and re-enter the skin.*

### Endoscopic Brow Lift

The endoscopic brow lift is a minimally invasive procedure performed under general anaesthesia. A series of small incisions are made beyond the hairline for scar concealment. There is one midline incision, two paramedian incisions usually at markings extended from the ideal peak of the brow. Temporal incisions are also made superficial to the temporalis muscle for lateral brow lifting (Fig. 3). Upon completing the paramedian incisions, a periosteal elevator is used to reach the subperiosteal plane. At the subperiosteal plane, the frontalis is lifted from the frontal bone. Endoscopic assistance is used as the orbital rim is engaged. The supraorbital nerve and supratrochlear nerves are identified and avoided after the periosteum is incised endoscopically from the subperiosteal plane. The frown muscles are incised and separated from their insertions. Laterally, dissection can be done to lateral canthus above the zygomatic arch. However, any dissection beyond the zygomatic arch should be avoided to prevent damage to the facial nerve. After sufficient dissection, the frontalis can be lifted and fixed by sutures with an intraosseous tunnel made in the frontal bone. There are many options in how to fixate the frontalis muscle.<sup>9,18</sup>



*Fig. 3 Endoscopic Brow Lift Incisions (Photos from personal collection)*

*Left to Right: Incisions made at the midline, Paramedian, and temporal regions.*

### Non-Surgical Brow Rejuvenation

The shift toward non-surgical methods of periorcular rejuvenation continues to develop over the years. Neurotoxins and soft tissue fillers are attractive because they often have lower risks and minimal downtime. The most common neurotoxins used commercially include products like Botox Cosmetic (Allergan, Irvine, CA, USA). Dysport (Medicis, Scottsdale, AZ, USA) and Xeomin (Merz Aesthetics, San Mateo, CA, USA). The neurotoxin works by inhibiting acetylcholine release at the presynaptic neuromuscular junction causing a temporary and localised decrease in muscle contractions. Other injectables, such as tissue fillers can be used to fill facial hollows and grooves that arose from the deflation and descension of the ageing face.



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For the periocular and brow area, the most commonly treated sites with neurotoxins are the glabella, forehead, and lateral nasal dorsal contraction lines (“bunny lines”). Usually, neurotoxins are required every three to six months to have a continued effect. Fillers can be injected in the sub-brow, lateral brow and in the sub-temporalis plane to elevate the brow. Usually, a mixture of fillers and neurotoxins are injected in one session for a good result.<sup>14,19</sup>

## COMPLICATIONS

Complications are not common. From a review of 326 publications in regard to complications of brow lifting, the most common persistent complications include alopecia, asymmetry, numbness, and revisions. (Table 1). There were no severe detrimental complications or deaths reported when comparing open brow lifts (Coronal, Direct, Hairline, Temporal, Transblepharoplasty) endoscopic brow lifts, and Nonsurgical brow rejuvenation techniques. However, the possible complications from filler injection are not included in the review. Severe complications of filler injections can include nose tip necrosis and permanent visual loss from central retinal artery occlusion.<sup>20</sup>

**Table 1 Comparison of Complication Rates of surgical procedures (highest and lowest complication rates and procedures)<sup>20</sup> (Excerpted from M Cho, J Carboy, R Rohrich. Complication in Brow Lifts: A Systemic Review of Surgical and Nonsurgical Brow Rejuvenations. *Plast Reconstr Surg Global open* 2018 Oct; 6(10): e1943.)**

Complication	Complication rate	Type of brow lift
Alopecia	Highest 2.8%	Endoscopic browlift
	Lowest 0.8%	Temporal/lateral
Asymmetry	Highest 1.5%	Temporal/lateral
	Lowest 0.7%	Transblepharoplasty and endoscopic
Numbness	Highest 5.5%	Direct
	Lowest 0.3%	Temporal/lateral
Revision	Highest 7.4%	Hairline
	Lowest 0.1%	Transblepharoplasty

## CONCLUSION

The demand for rejuvenation procedures in Asia has persistently been on the rise. South Korea is reported to be the second most popular place in the world for cosmetic procedures followed by many other places in Asia, including Taiwan, Japan, Thailand and China.<sup>21</sup> Patients are commonly curious about rejuvenation in daily practice, it would be beneficial for medical practitioners to appreciate the effects and limits of rejuvenation of the upper face.

### References

1. Cotofana S, Fratila A, Schenck TL et al. The Anatomy of the Aging Face: A Review. *Facial Plast Surg* 2016; 32:253-260.
2. American Society of Plastic Surgeons. 2018 Plastic Surgery Statistics Report. Available at: <https://www.plasticsurgery.org/news/plastic-surgery-statistics>. [Last access on Dec 2019]
3. Flowers RS, Caputy GG, Flowers SS. The biomechanics of brow and frontalis function and its effect on blepharoplasty. *Clin Plast Surg* 1993;20(2):255-268
4. Starkman S, Sherris D. Association of Corrugator Supercilii and Procerus Myectomy with Endoscopic browlift Outcomes

5. Lam VB, Czyz CN, Wulc AE. The brow-eyelid continuum: an anatomic perspective. *Clin Plast Surg*. 2013 Jan;40(1):1-19.
6. Somenek M. Gender-related facial surgical goals. *Facial Plast Surg* 2018;34:474-479
7. Sedgh J. The Aesthetics of the upper face and brow: male and female differences. *Facial Plast Surg* 2018;34:114-118
8. Park. Aging Asian upper Blepharoplasty and Brow. *Semin Plast Surg* 2015;29:188-200
9. Lee H, Quatela, VC. Endoscopic Browplasty. *Facial Plast Surg* 2018:139-144
10. Garritano F, Quatela V. Surgical Anatomy of the Upper Face and Forehead. *Facial Plast Surg* 2018;34:109-113.
11. Castanares S. Blepharoplasty for herniated intraorbital fat; anatomical basis for a new approach. *Plast Reconstr Surg* (1946) 1951; 8(1): 46-58
12. Castanares S. Classification of baggy eyelids deformity. *Plast Reconstr Surg* 1977;59(5):629-633
13. Passot R. Chirurgie Esthetique des rides du visage. *Presse Med.* 1919;27:258
14. Hwang C, Golan S, Goldberg R. Nonsurgical Brow and Eyelid Rejuvenation. *Master techniques in facial rejuvenation*, pp. 101-106. e1.
15. Bayrak S, Kriet J, Humphrey C. Selecting the Best eyelid techniques. *Facial Plast Surg* 2018;24:497-504.
16. Chi J. Periorbital Surgery Forehead, Brow, and Midface. *Facial Plast Surg Clin N am* 24 (2016) 107-117.
17. Pham T. Upper Blepharoplasty: Management of the Upper Eyelid and Brow Complex via Transblepharoplasty Approach. *Facial Plast Surg* 2018;34:183-193
18. Rohrich R, Cho M. Endoscopic Temporal Brow Lift: Surgical indication, Technique, and 10-year Outcom Analysis.
19. Lighthall JG. Rejuvenation of the Upper Face and Brow: Neuromodulators and Fillers. *Facial Plast Surg* 2018;34:119-127
20. M Cho, J Carboy, R Rohrich. Complication in Brow Lifts: A Systemic Review of Surgical and Nonsurgical Brow Rejuvenations. *Plast Reconstr Surg Global open* 2018 Oct; 6(10): e1943.
21. International Society of Aesthetic Plastic Surgery (ISAPS). ISAPS international survey on Aesthetic/cosmetic procedures performed in 2017. <https://www.surgery.org/sites/default/files/ASAPS-Stats2017.pdf> [Last access Dec 2019]

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# Corneal Refractive Surgery for Management of Myopia

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## INTRODUCTION

Refractive error is highly prevalent in our locality and is almost generalised in the young adult population. Myopia and astigmatism are highly prevalent, with previous studies showing prevalence of up to 83% for myopia and 48% for astigmatism in Hong Kong Chinese<sup>1-3</sup>. As simple and effective refractive correction can be achieved by traditional spectacles and contact lenses, myopia or other refractive errors have not been regarded as a genuine health issue but more of a “normal life inconvenience”<sup>4</sup>. In more recent decades, along with the rapid evolution of refractive surgery, such surgical approach has become increasingly accepted worldwide as a safe and effective treatment for refractive error correction.

Refractive surgeries target at the two main refractive components of the human eye: the cornea and the lens. In corneal surgeries, laser or incisional methods are employed to reshape the cornea for alteration of refraction. For lens surgeries, the placement of artificial intraocular lens with removal of the natural lens, known as refractive lens exchange, and without natural lens extraction, known as phakic intraocular lens, are two typical surgical methods used. Since laser corneal refractive surgery is the most commonly performed technique, the term “refractive surgery” is often used to represent this technique for convenience. Among all, photorefractive keratectomy (PRK), laser in-situ keratomileusis (LASIK) and small-incision lenticule extraction (SMILE) are the three most commonly performed refractive procedures worldwide for myopic correction.

As the cornea is readily accessible for surgery, most surgical efforts have concentrated on changing the corneal focusing power using laser. In myopic correction, the central cornea is flattened to decrease its focusing power to allow light rays to be precisely focused onto the macula for sharp vision. Currently, majority of corneal refractive surgeries performed involve the use of laser<sup>5</sup>. Excimer and femtosecond laser are the two laser types utilised. Laser stands for light amplification by stimulated emission of radiation, which is a technique derived from microwave amplifying devices in the late 1950s.

## PHOTOREFRACTIVE KERATECTOMY (PRK)

PRK was the first excimer laser technique for the treatment of refractive errors. It is a surface ablation

surgery in which the central corneal epithelium is removed and the anterior stromal lamella is severed with an excimer laser. After the cornea was cooled, 0.02% mitomycin C is applied to the corneal stroma followed by placement of a bandage contact lens.

The introduction of mitomycin C and modern surface ablation techniques has lowered the risk of haze after PRK<sup>6</sup>. Other surface ablation procedures include laser-assisted subepithelial keratectomy (LASEK) and epithelial laser in situ keratomileusis (epi-LASIK), which differ in terms of how the epithelial tissue is removed. In PRK, the epithelium is mechanically scrapped off or is chemically loosened using 20% ethanol. In LASEK, the epithelium is removed similarly using 20% ethanol, but is later repositioned after laser ablation. In epi-LASIK, a complete epithelial sheet is created and removed using an epi-keratome<sup>7</sup>.

PRK can be used to treat myopia, hyperopia and astigmatism. Despite its invasiveness, it remains an acceptable option for patients with corneal abnormalities such as thin, irregular, very flat or very steep corneas. Dry eyes and eyes with higher risk of trauma such as in contact sports players are also more suitable to undergo PRK (or SMILE) because of more stable corneal biomechanics created by the flapless technique<sup>8</sup>. The major drawbacks of PRK are prolonged recovery and higher chance of post-operative discomfort and pain. Furthermore, time required for visual recovery is longer in PRK (few months) when compared to LASIK (few days) and SMILE (few weeks)<sup>9</sup>.

## LASER IN-SITU KERATOMILEUSIS (LASIK)

In contrast to surface ablation procedures where the epithelium is removed, LASIK involves creation of a partial-thickness corneal flap that includes both the epithelium and part of the stroma for stromal tissue access. The flap is created with either a microkeratome or femtosecond laser, the latter usually being preferred due to its ability to create a more precise and uniform flap. Similarly, the stromal layer is then reshaped with excimer laser, and the flap is repositioned. Femtosecond laser allows the creation of thin and uniform LASIK flaps with better predictability of flap thickness<sup>10</sup>. Sub-Bowman's keratomileusis (SBK) is a variation of LASIK with a targeted flap thickness of 90 to 110  $\mu\text{m}$ <sup>11</sup>. It allows treatment of higher refractive errors because of its reduced flap thickness and has been shown to have results comparable to LASIK<sup>12</sup>.



LASIK has been the most widely performed refractive surgery worldwide in correcting myopia, hyperopia and astigmatism. It gives effective, predictable visual results with rapid visual recovery. It is associated with less post-operative discomfort. However, this type of surgery is specifically associated with higher chance of dry eye and flap-related complications<sup>13,14</sup>.

## SMALL-INCISION LENTICULE EXTRACTION (SMILE)

The use of femtosecond laser in corneal refractive surgery has gone through different generations<sup>15</sup>. It was first employed in LASIK flap creation in replacement of microkeratome, giving rise to a procedure known as femtosecond laser-assisted LASIK. With further development, stromal ablation could be avoided; instead, an intrastromal lenticule was cut and removed from the cornea. This kind of procedure was known collectively as refractive lenticule extraction. The first to emerge was femtosecond lenticule extraction (FLEx). It involved creating a corneal flap and an intrastromal lenticule using femtosecond laser. The lenticule is then extracted after lifting the corneal flap. Later on, investigators developed another approach in which the lenticule was extracted via a small arcuate incision without the need of a corneal flap, which is termed SMILE<sup>16</sup>. Currently, SMILE is approved by FDA for correction of myopia and astigmatism only. The software for treatment of hyperopia has not been released.

The advantages of SMILE are largely based on its flapless approach and minimal disruption to the corneal architecture, resulting in a stronger cornea with theoretical biomechanical advantages. There is less corneal denervation and a better preservation of corneal sensitivity. Moreover, patients experience less dry eye symptoms and a quicker recovery. Post-operative pain and discomfort typically resolves in few hours after surgery<sup>9</sup>.

## CLINICAL OUTCOMES AND COMPLICATIONS

The percentage of eyes achieving an uncorrected distance visual acuity (UDVA) of 20/20 or better postoperatively and the efficacy index (postoperative UDVA / preoperative corrected distance visual acuity [CDVA]) are measurements of efficacy. In terms of myopia correction, a network meta-analysis in 2017 demonstrated no significant differences in UDVA among PRK, LASIK and SMILE<sup>17</sup>. Safety measures of refractive surgeries are generally referred to the proportion of eyes that lost one or more lines of CDVA postoperatively relative to before operation or the safety index (postoperative CDVA / preoperative CDVA). There was no significant difference between the safety profiles of PRK, LASIK and SMILE in myopia correction<sup>17</sup>. The postoperative spherical equivalent and the percentage of eyes within  $\pm 0.5D$  or  $\pm 1.0D$  of the targeted refraction correction are the predictability measures. For myopia correction, up to 90% of eyes can achieve  $\pm 0.50D$  of target refraction in PRK, LASIK and SMILE<sup>16,18,19</sup>. However, the network meta-analysis

reported better predictability using femtosecond-assisted LASIK compared to other laser treatment modalities<sup>17</sup>.

Undercorrection and overcorrection occur more frequently in patients with higher refractive errors. While enhancement procedures may be necessary in undercorrection, observation is preferred for overcorrected vision because of potential regression<sup>20</sup>. Other less serious complications such as visual complaints and dry eyes are commonly reported. Glare and haloes happen as a result of spherical aberration of iatrogenic flattened cornea. Presence of higher order aberrations and reduction in contrast sensitivity contribute to worsened visual quality observed in all refractive surgical techniques<sup>17</sup>. This may affect the visual performance in low illuminated environment. Dry eye syndrome is another common postoperative complication occurring in more than half of the patients, especially after LASIK surgery. However, the effect is often transient and resolves spontaneously in a few weeks to months<sup>21</sup>. Artificial tears and punctal plugs are given for symptomatic relief.

Infective keratitis is a rare but sight-threatening complication after refractive surgeries<sup>22,23</sup>. Routine post-operative topical antibiotics can reduce the risk of microbial keratitis. Early recognition of warning signs is essential for prompt treatment. Corneal ectasia is another rare but devastating complication with difficult treatment<sup>24,25</sup>. It occurs as a result of disrupted corneal architecture following refractive surgery. The Ectasia Risk Score System can be used as a screening tool to identify risk factors such as corneal irregularity, thin cornea, young age and high myopia<sup>26</sup>. Detailed ophthalmic assessment is warranted to prevent the occurrence of corneal ectasia.

## CONCLUSION

PRK, LASIK and SMILE are the common types of corneal refractive surgery with comparable outcomes. Patients should consult an ophthalmologist for the details of surgery so that they can understand potential surgical complications and have a reasonable expectation of the surgical outcome.

## References

1. Edwards MH, Lam CS. The epidemiology of myopia in Hong Kong. *Ann Acad Med Singapore*. 2004;33(1):34-8.
2. Fan DS, Rao SK, Cheung EY, Islam M, Chew S, Lam DS. Astigmatism in Chinese preschool children: prevalence, change, and effect on refractive development. *The British journal of ophthalmology*. 2004;88(7):938-41.
3. Lam CS, Lam CH, Cheng SC, Chan LY. Prevalence of myopia among Hong Kong Chinese schoolchildren: changes over two decades. *Ophthalmic & physiological optics : the journal of the British College of Ophthalmic Opticians*. 2012;32(1):17-24.
4. Gupta N, Naroo SA. Factors influencing patient choice of refractive surgery or contact lenses and choice of centre. *Contact lens & anterior eye : the journal of the British Contact Lens Association*. 2006;29(1):17-23.
5. McAlinden C. Corneal refractive surgery: past to present. *Clinical & experimental optometry : journal of the Australian Optometrical Association*. 2012;95(4):386-98.
6. Hofmeister EM, Bishop FM, Kaupp SE, Schallhorn SC. Randomized dose-response analysis of mitomycin-C to prevent haze after photorefractive keratectomy for high myopia. *Journal of cataract and refractive surgery*. 2013;39(9):1358-65.
7. Reynolds A, Moore JE, Naroo SA, Moore CB, Shah S. Excimer laser surface ablation - a review. *Clin Exp Ophthalmol*. 2010;38(2):168-82.

8. Reinstein DZ, Archer TJ, Randleman JB. Mathematical model to compare the relative tensile strength of the cornea after PRK, LASIK, and small incision lenticule extraction. *Journal of refractive surgery*. 2013;29(7):454-60.
9. Ganesh S, Brar S, Arra RR. Refractive lenticule extraction small incision lenticule extraction: A new refractive surgery paradigm. *Indian journal of ophthalmology*. 2018;66(1):10-9.
10. Santhiago MR, Kara-Junior N, Waring GO. Microkeratome versus femtosecond flaps: accuracy and complications. *Current opinion in ophthalmology*. 2014;25(4):270-4.
11. Farjo AA, Sugar A, Schallhorn SC, Majmudar PA, Tanzer DJ, Trattler WB, et al. Femtosecond lasers for LASIK flap creation: a report by the American Academy of Ophthalmology. *Ophthalmology*. 2013;120(3):e5-e20.
12. Wong RC, Yu M, Chan TC, Chong KK, Jhanji V. Longitudinal comparison of outcomes after sub-bowman keratomileusis and laser in situ keratomileusis: randomized, double-masked study. *American journal of ophthalmology*. 2015;159(5):835-45 e3.
13. Raoof D, Pineda R. Dry eye after laser in-situ keratomileusis. *Seminars in ophthalmology*. 2014;29(5-6):358-62.
14. Shah DN, Melki S. Complications of femtosecond-assisted laser in-situ keratomileusis flaps. *Seminars in ophthalmology*. 2014;29(5-6):363-75.
15. Ang M, Mehta JS, Chan C, Htoon HM, Koh JC, Tan DT. Refractive lenticule extraction: transition and comparison of 3 surgical techniques. *Journal of cataract and refractive surgery*. 2014;40(9):1415-24.
16. Reinstein DZ, Archer TJ, Gobbe M. Small incision lenticule extraction (SMILE) history, fundamentals of a new refractive surgery technique and clinical outcomes. *Eye and vision*. 2014;1:3.
17. Wen D, McAlinden C, Flitcroft I, Tu R, Wang Q, Alio J, et al. Postoperative Efficacy, Predictability, Safety, and Visual Quality of Laser Corneal Refractive Surgery: A Network Meta-analysis. *American journal of ophthalmology*. 2017;178:65-78.
18. Moshirfar M, McCaughey MV, Reinstein DZ, Shah R, Santiago-Caban L, Fenzl CR. Small-incision lenticule extraction. *Journal of cataract and refractive surgery*. 2015;41(3):652-65.
19. Vestergaard AH, Hjortdal JO, Ivarsen A, Work K, Grauslund J, Sjolie AK. Long-term outcomes of photorefractive keratectomy for low to high myopia: 13 to 19 years of follow-up. *Journal of refractive surgery*. 2013;29(5):312-9.
20. Yan MK, Chang JS, Chan TC. Refractive regression after laser in situ keratomileusis. *Clin Exp Ophthalmol*. 2018.
21. De Paiva CS, Chen Z, Koch DD, Hamill MB, Manuel FK, Hassan SS, et al. The incidence and risk factors for developing dry eye after myopic LASIK. *American journal of ophthalmology*. 2006;141(3):438-45.
22. de Rojas V, Llovet F, Martinez M, Cobo-Soriano R, Ortega-Usobiaga J, Beltran J, et al. Infectious keratitis in 18,651 laser surface ablation procedures. *Journal of cataract and refractive surgery*. 2011;37(10):1822-31.
23. Moshirfar M, McCaughey MV, Reinstein DZ, Shah R, Santiago-Caban L, Fenzl CR. Small-incision lenticule extraction. *Journal of cataract and refractive surgery*. 2015;41(3):652-65.
24. Randleman JB, Russell B, Ward MA, Thompson KP, Stulting RD. Risk factors and prognosis for corneal ectasia after LASIK. *Ophthalmology*. 2003;110(2):267-75.
25. Pallikaris IG, Kymionis GD, Astyrakakis NI. Corneal ectasia induced by laser in situ keratomileusis. *Journal of cataract and refractive surgery*. 2001;27(11):1796-802.
26. Randleman JB, Woodward M, Lynn MJ, Stulting RD. Risk assessment for ectasia after corneal refractive surgery. *Ophthalmology*. 2008;115(1):37-50.

## Radiology Quiz

Dr Jeremy Man-leung YU



Dr Jeremy Man-leung YU

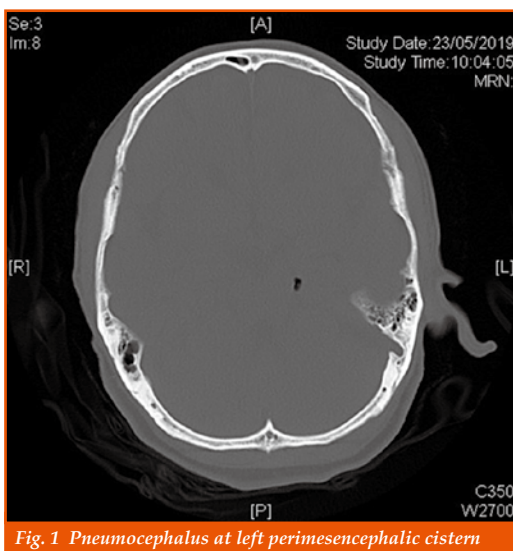


Fig. 1 Pneumocephalus at left perimesencephalic cistern

A 72 year-old gentleman presented to AED with loss of consciousness and unwitnessed fall. No focal neurological symptoms and signs were evident. CT brain was performed for suspected head injury (Fig. 1).

### Questions

1. What were the CT findings?
2. What is the differential diagnosis?
3. What imaging features suggested one differential over the other?
4. How would the patient present with this condition?
5. What treatment can be offered if indicated?

(See P.36 for answers)





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# Surgical Management of Presbyopia with Intraocular Lens

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## INTRODUCTION

Presbyopia is an irreversible loss of accommodation power in the lens in the elderly population. It is a global burden negatively impacting the general well-being and quality of life. With the emergence of the global ageing population, it is expected that presbyopia would become an important eye condition in this modern era. The pathophysiology of presbyopia is not clearly elucidated. In normal circumstances, the lens is connected to zonula fibres which are linked to ciliary muscles. As we focus on near objects, ciliary muscles contract, zonular fibres are loosened and the lens becomes more convex to adjust for the accommodation. The common presentation of presbyopia is the incapability to focus on near objects at near distance, giving rise to common complaints such as dizziness, easy fatigue and poor concentration while reading. Presbyopia is slowly progressive until the age of 65, when the accommodation power of the lens is fully lost. Conservative management for presbyopia including reading glasses prescription, use of bifocal or multifocal progressive lenses or contact lenses. Common surgical procedures for presbyopia include corneal laser refractive surgery and lens extraction with the implantation of intraocular lenses (IOLs). This article focuses on the use of IOLs for improving spectacle-free near vision after lens surgery.

After lens extraction, there is a loss of accommodation, which was present in the native lens. The implantation of the standard monofocal IOLs can only provide clear vision at one distance; therefore, patients will still need to rely on glasses for other distances. The use of monovision makes use of monofocal IOLs with different target refractions between fellow eyes to reduce spectacle dependency over a range of distance. On the other hand, presbyopia-correcting IOLs were developed to compensate for the loss of accommodation.

## MONOVISION AND MINI-MONOVISION

Monovision functions by using standard monofocal IOLs to correct distance vision in the dominant eye and to intentionally focus for near to intermediate vision in the non-dominant eye. Monovision requires a process of neuroadaptation, which is how the brain adapts to use the dominant eye for distance image and the non-dominant eye for near image in order to achieve a wide range of vision enabling spectacle independence<sup>1</sup>. Monovision is usually achieved when the non-dominant

eye targets at roughly -2.50 D or more<sup>2</sup>. However, larger degrees of intended anisometropia, which is referred to the difference in refraction between two eyes, come at a price, as it leads to compromised visual function such as stereopsis or perception of three dimensions and contrast sensitivity. Therefore, this technique is not appropriate for all patients. To address this, mini-monovision is a technique to aim at a smaller range of anisometropia, where the non-dominant reading eye aims between -0.75 to -1.25 D, thus providing a good distance and intermediate vision, better stereopsis, fewer optical side effects but requiring spectacle wear for certain near tasks such as reading fine prints or computer work<sup>3</sup>. Studies have compared the effects of bilateral implantation of multifocal IOLs with the effects of the mini-monovision technique; multifocal IOLs demonstrated better near vision and higher spectacle independence rate but also more likely to undergo IOL exchange, whereas mini-monovision technique reported fewer visual disturbances with acceptable rates of spectacle independence<sup>4-6</sup>. The greatest challenge of using monovision technique is patient selection. Ideally, potential patients should undergo a contact lens trial to ensure good neuroadaptation for the technique. Mini-monovision technique is a choice to consider, as it creates a lesser degree of anisometropia and provides a good balance between spectacle independence and better stereopsis. It is also more cost-effective when compared with multifocal IOLs. However, patients should be warned of the potential need for spectacles for specific near tasks.

## MULTIFOCAL IOLs

Multifocal IOL functions by generating different foci by either a diffractive or a refractive design; this addresses the visual limitation in monofocal IOLs. Diffractive IOLs are created by the use of concentric rings of decreasing height on the posterior surface of the IOL, which causes diffraction of light at both near and distance<sup>7</sup>. Apodisation is a filtering technique that is used to improve focus in an optical system. Apodized diffractive IOLs allows for a smooth transition of the distribution of light energy between different foci, so it allows more light to near when the pupil is small, this is usually the case when carrying out near tasks, and more light to distance when the pupil is large, this is usually seen when looking at distance<sup>8</sup>. Apodisation helps to improve image quality and to minimise visual disturbances such as halos and glares and night vision problems. Refractive IOLs function by the use of concentric refractive zones of different powers to allow for viewing at all distances<sup>9</sup>. When comparing



diffractive and refractive IOLs, diffractive IOLs can provide a slightly better near vision and less halo and glare; however, it has a slightly worse intermediate vision. Refractive IOLs are more dependent on pupil diameter and may lead to night vision problems, and this is probably due to the zonal design of the IOL<sup>9,10</sup>.

Multifocal IOLs can be bifocal or trifocal. Bifocal IOLs are made of concentric rings that form two primary focal points, aiming at providing a clear vision for both near and distance. Trifocal IOLs are a newer type of multifocal IOL and are designed to form three focal points to provide a better intermediate vision than bifocal IOLs, while preserving clear vision for both near and distance ranges. Although trifocal IOLs seem ideal, the addition of an intermediate focus results in an additional defocused image instead of one, which may lead to symptoms of glare and haloes<sup>11</sup>. A recent meta-analysis compared the visual performance of bifocal and trifocal IOLs; trifocal IOLs offer a clear advantage over bifocal IOLs in intermediate vision; however, both IOLs carry similar near and distance visual performance, spectacle independence and postoperative satisfaction<sup>12,13</sup>.

Despite aiming to provide a good vision at all distances, multifocal IOLs have their drawbacks. Multifocal IOLs have been shown to cause a decrease in near contrast sensitivity under both mesopic and photopic conditions, and a decrease in distance contrast sensitivity under mesopic conditions<sup>14</sup>. This is because redirection of light from different focal points could lead to coexisting images and lower contrast sensitivity. A recent systematic review and meta-analysis compared multifocal IOLs with standard monofocal IOLs, and with multifocal IOL, a higher proportion of patients were able to achieve spectacle independence but at a greater risk of unwanted visual phenomena<sup>15</sup>.

## EXTENDED DEPTH OF FOCUS IOL

Extended depth of focus (EDOF) IOLs provides a single elongated focal point to enhance the depth of focus or range of vision. The principle behind EDOF IOLs is to focus light rays in an extended longitudinal plane as opposed to monofocal and multifocal IOLs, which focus light rays on one single point or multiple points respectively. This elongated focus aims to eliminate the overlapping of near and far images created by multifocal IOLs and therefore significantly reduces potential halos and glares<sup>16</sup>. A recent study has shown that EDOF IOLs provide better optical quality than monofocal and multifocal IOLs<sup>17</sup>. One large prospective multicenter study reported successful visual restoration across all distances and a minimal level of disturbing halos and glares, as well as high levels of patient satisfaction<sup>18</sup>. Recently, the use of 'blended EDOF' has also been discussed. Blended EDOF aims at implantation of an EDOF IOL in one eye and a multifocal IOL in the fellow eye. A recent study comparing visual outcomes between bilateral implantation of a diffractive multifocal IOL with blended EDOF showed that blended EDOF exhibited better performance for uncorrected distance visual acuity but slightly worse in uncorrected near and intermediate visual acuity, while blended EDOF also showed better contrast sensitivity under photopic conditions<sup>19</sup>. EDOF IOLs have demonstrated promising

results; however, larger clinical trials are needed for better evidence to support clinical implantation.

## REFRACTIVE ROTATIONAL ASYMMETRY IOL

To overcome the drawbacks of multifocal IOLs, a new single-piece refractive IOL has been introduced. A refractive rotational asymmetry IOL aiming at providing high-contrast sensitivity and minimising halos and glare has been introduced. The IOL provides multifocality by having two sectors with a seamless transition in between; there is an aspheric sector for distance vision and a near sector in the lower IOL segment for near vision. This IOL is based on the concept of rotational asymmetry to reduce any potential sources of light scattering. Light is refracted to the near focus specifically in the lower sector and the rest of the lens acts as a monofocal IOL, thus allowing for more light to the distance focus without being scattered by diffraction; such a design improves contrast sensitivity, causes less halo and glare and achieves better image quality<sup>20</sup>. A study reported that bilateral implantation of this new generation multifocal IOL was able to provide adequate distance, intermediate and near vision with high rates of spectacle independence<sup>21</sup>.

## ACCOMMODATIVE IOL

Accommodative IOL is designed by simulating the natural accommodative process by changing optical power in response to ciliary muscle contraction<sup>22</sup>. A recent systematic review and meta-analysis confirmed that accommodative IOLs can provide better distance-corrected near visual acuity and results in higher levels of spectacle independence than standard monofocal IOLs<sup>23</sup>. Accommodative IOLs also produce minimal unwanted visual disturbances when compared with multifocal IOLs.

After an accommodative IOL is placed into the capsular bag, the anterior capsule fibres and contracts. This induces pressure on the optic plate and cause it to vault posteriorly. When the ciliary muscle contracts, it moves the optic forward and causes an axial positional change in the IOL thus adjusting its optical power. Approximately 1mm of movement is equivalent to a two diopters power change<sup>24</sup>. The main drawback of this design is that it is very dependent on the function of the capsular bag. With time, anterior capsule fibrosis may develop; this may limit the axial movement of the IOL and progressively loses its accommodative ability. Furthermore, the degree of refractive change differs according to the axial length in each eye, which may lead to an unpredictable outcome.

## CONCLUSION

With the evolution of IOLs, there is currently a large diversity of IOLs available in the market. Although newer IOLs seem to show favourable outcomes, they will need larger clinical trials for better evidence in support of clinical usage. The decision to implant multifocal IOLs should be based on consideration of the patient's motivation to achieve spectacle independence; if so, preoperative counselling on patient's expectation



is of vital importance. Patients should be notified on the possible side effects such as halos, glares, starburst, night vision problems, a decrease in contrast sensitivity, and the need for visual adaptation.

### References

1. Greenstein S, Pineda R, 2nd. The Quest for Spectacle Independence: A Comparison of Multifocal Intraocular Lens Implants and Pseudophakic Monovision for Patients with Presbyopia. *Semin Ophthalmol.* 2017;32(1):111-5.
2. Greenbaum S. Monovision pseudophakia. *J Cataract Refract Surg.* 2002;28(8):1439-43.
3. Hayashi K, Ogawa S, Manabe S, Yoshimura K. Binocular visual function of modified pseudophakic monovision. *Am J Ophthalmol.* 2015;159(2):232-40.
4. Labiris G, Giarmoukakis A, Patsiamanidi M, Papadopoulos Z, Kozobolis VP. Mini-monovision versus multifocal intraocular lens implantation. *J Cataract Refract Surg.* 2015;41(1):53-7.
5. Wilkins MR, Allan BD, Rubin GS, Findl O, Hollick EJ, Bunce C, et al. Randomized trial of multifocal intraocular lenses versus monovision after bilateral cataract surgery. *Ophthalmology.* 2013;120(12):2449-55 e1.
6. Mu J, Chen H, Li Y. [Comparison study of visual function and patient satisfaction in patients with monovision and patients with bilateral multifocal intraocular lenses]. *Zhonghua Yan Ke Za Zhi.* 2014;50(2):95-9.
7. Lichtinger A, Rootman DS. Intraocular lenses for presbyopia correction: past, present, and future. *Curr Opin Ophthalmol.* 2012;23(1):40-6.
8. Portney V. Light distribution in diffractive multifocal optics and its optimization. *J Cataract Refract Surg.* 2011;37(11):2053-9.
9. Barisic A, Dekaris J, Gabric N, Bohac M, Romac I, Mravcic I, et al. Comparison of diffractive and refractive multifocal intraocular lenses in presbyopia treatment. *Coll Antropol.* 2008;32 Suppl 2:27-31.
10. Montes-Mico R, Ferrer-Blasco T, Charman WN, Cervino A, Alfonso JF, Fernandez-Vega L. Optical quality of the eye after lens replacement with a pseudoaccommodating intraocular lens. *J Cataract Refract Surg.* 2008;34(5):763-8.
11. Carson D, Hill WE, Hong X, Karakelle M. Optical bench performance of AcrySof((R)) IQ ReSTOR((R)), AT LISA((R)) tri, and FineVision((R)) intraocular lenses. *Clin Ophthalmol.* 2014;8:2105-13.
12. Jin S, Friedman DS, Cao K, Yusufu M, Zhang J, Wang J, et al. Comparison of postoperative visual performance between bifocal and trifocal intraocular lens based on randomized controlled trials: a meta-analysis. *BMC Ophthalmol.* 2019;19(1):78.
13. Yoon CH, Shin IS, Kim MK. Trifocal versus Bifocal Diffractive Intraocular Lens Implantation after Cataract Surgery or Refractive Lens Exchange: a Meta-analysis. *J Korean Med Sci.* 2018;33(44):e275.
14. Montes-Mico R, Espana E, Bueno I, Charman WN, Menezes JL. Visual performance with multifocal intraocular lenses: mesopic contrast sensitivity under distance and near conditions. *Ophthalmology.* 2004;111(1):85-96.
15. Khandelwal SS, Jun JJ, Mak S, Booth MS, Shekelle PG. Effectiveness of multifocal and monofocal intraocular lenses for cataract surgery and lens replacement: a systematic review and meta-analysis. *Graefes Arch Clin Exp Ophthalmol.* 2019.
16. Akella SS, Juthani VV. Extended depth of focus intraocular lenses for presbyopia. *Curr Opin Ophthalmol.* 2018;29(4):318-22.
17. Gallego AA, Bara S, Jaroszewicz Z, Kolodziejczyk A. Visual Strehl performance of IOL designs with extended depth of focus. *Optom Vis Sci.* 2012;89(12):1702-7.
18. Cochener B, Concerto Study G. Clinical outcomes of a new extended range of vision intraocular lens: International Multicenter Concerto Study. *J Cataract Refract Surg.* 2016;42(9):1268-75.
19. de Medeiros AL, de Araujo Rolim AG, Motta AFP, Ventura BV, Vilar C, Chaves M, et al. Comparison of visual outcomes after bilateral implantation of a diffractive trifocal intraocular lens and blended implantation of an extended depth of focus intraocular lens with a diffractive bifocal intraocular lens. *Clin Ophthalmol.* 2017;11:1911-6.
20. Alio JL, Pinero DP, Plaza-Puche AB, Chan MJ. Visual outcomes and optical performance of a monofocal intraocular lens and a new-generation multifocal intraocular lens. *J Cataract Refract Surg.* 2011;37(2):241-50.
21. Munoz G, Albarran-Diego C, Ferrer-Blasco T, Sakla HF, Garcia-Lazaro S. Visual function after bilateral implantation of a new zonal refractive aspheric multifocal intraocular lens. *J Cataract Refract Surg.* 2011;37(11):2043-52.
22. Doane JF. Accommodating intraocular lenses. *Curr Opin Ophthalmol.* 2004;15(1):16-21.
23. Zhou H, Zhu C, Xu W, Zhou F. The efficacy of accommodative versus monofocal intraocular lenses for cataract patients: A systematic review and meta-analysis. *Medicine (Baltimore).* 2018;97(40):e12693.
24. Alio JL, Alio Del Barrio JL, Vega-Estrada A. Accommodative intraocular lenses: where are we and where we are going. *Eye Vis (Lond).* 2017;4:16.



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## The Relaxation of Speed

### Dr John So-min CHANG

Specialist in Ophthalmology  
Honorary Associate Professor, Department of Ophthalmology, Hong Kong University  
Clinical Associate Professor (Honorary), Department of Ophthalmology and Visual Sciences, Chinese University Hong Kong  
President, International Society of Refractive Surgery  
Advisor, Hong Kong Society of Ophthalmic Plastic and Reconstructive Surgery



Dr John So-min CHANG

Accelerating halfway through the turn, I picked up speed at the Motorway in Zuhai. From the hum of the engine's pistons to the grip of the tires on the asphalt, at 250 kilometers per hour you become one with the road. It is close to the focus needed for cataract and refractive surgery. As I have found helping patients attain clear vision very satisfying professionally, a hobby which requires similar concentration was a natural fit.

Interestingly after my drive, although physically tired, I am mentally relaxed. One advice to our younger colleagues: once you lose control of the car, you are a passenger of fate and faith, and you can only hope you will still be intact after the crash. So if you want to race, do it on the race track, not in the streets, because you, in your car in the streets, may hurt an innocent pedestrian – it is completely beyond your control!

Although I have driven on the track and raced with my friends for many years (Fig. 1), I have never raced officially. My coach keeps telling me to join the races but competitive car racing is too time-consuming. Choosing between racing or going away to attend ophthalmology conferences, I would always choose the latter.



Fig. 1 The race car (Photo from personal collection)

Over time, I wanted to incorporate nature in my speed hobbies, this wish forming the basis for my taking up downhill skiing (Fig. 2). I could go fast down the mountain and be surrounded by snow-covered pines and the crunch of fresh powder snow. Besides getting closer to the beauty of nature, when you are on the top of the mountain, you feel like you are on the "top of the world". Taking in the fresh air and looking as far as the eyes can see takes away all your troubles and worries. Furthermore, I have discovered that skiing keeps my reflexes and balance sharp, in surgery or otherwise, as in a few times I slipped while I was walking and I managed to regain my balance without falling.



Fig. 2 Downhill skiing. (Photo from personal collection)

While I started downhill skiing at 15 years of age, it is only more recently that I have become a serious skier. Just outside of Beijing is one of the most convenient places to reach from Hong Kong. After finishing the Saturday clinic, I take the 5 p.m. flight to Beijing. A car picks me up early Sunday morning, and takes me to the slopes for all-day skiing. I then take the 7:30 pm flight





back to Hong Kong and be ready for work on Monday. I can get a lot of research work done during the 3 hours of flight each way! I have skied in other areas, such as Niseko. However, the staff at Park City, Utah (one of my favourites) demonstrates the prompt responsiveness akin to well-trained operating theatre staff. Both are hard to beat.

Just as in ophthalmic surgery, staying up to date with developments and techniques is key. In this way, I have kept making progress in my hobbies. Staying physically fit has always been part of my regimen. Whether it is preparing for a complex eye surgery case or anticipating a mountain's double black diamond or challenging mogul slopes, staying in top shape helps me achieve my best work. My typical workout involves high-intensity interval training (HIIT), usually with running sprints or treadmill work 3-4 times per week.

I try to keep the work hard play HARDER strategy: on weekdays I spend my lunchtime talking to my research team, and after work I exercise, then after dinner, I spend 1-2 hours answering emails, research and writing papers. Writing papers keeps me up to date and it is an excellent way to assess how well I am doing. I very much enjoy attending international conferences (Fig. 3), where not only can I share the insights from my work, but I also get to meet the top ophthalmologists around the world and to learn from them a lot!



*Fig. 3 The American Academy of Ophthalmology conference. Chairing a session (Photo from personal collection)*



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## Federation News

### Dr Chun-kong NG

2nd Vice-President,  
The Federation of Medical Societies of Hong Kong



Dr Chung-kong NG

## Dinner Symposium: Go Beyond the Status Quo with PCSK9 Inhibitors: The Challenging Journey after a CV Event

On 28 May 2019, a dinner symposium on PCSK9 inhibitors was held at the Alexandra House, Central. The symposium was well attended by doctors and health professionals.

The lecture topic was "Go beyond the status quo with PCSK9 inhibitors: The challenging journey after a CV event". The Federation was glad to have Dr Yehuda HANDELSMAN, Specialist in diabetes, obesity, dyslipidemia, and the prevention of cardiovascular disease, as our speaker; with Prof Bernard Man-yung CHEUNG, the First Vice-President of the Federation as the chairman of the symposium. Dr HANDELSMAN provided us with a comprehensive understanding of the characteristics of PCSK9 inhibitors and shared with us his experience in facing the challenges after a CV event. The lecture ended with questions from participants and much fruitful discussion. The Federation would like to thank Amgen Hong Kong Limited for sponsoring this event and looks forward to organising more educational activities on various topics for our professionals in the future.



## Lunch Symposium: How Low to Go with LDL-cholesterol

On 4 July 2019, a lunch symposium on LDL-cholesterol was held at the Alexandra House, Central. The symposium was well attended by doctors and health professionals.

The lecture topic was "How low to go with LDL-cholesterol". The Federation was glad to have Dr Norman CHAN, Specialist in endocrinology, as our speaker; with Prof Brian TOMLINSON, the Chair of Asia-Pacific Federation of the International Atherosclerosis Society as the chairman of the symposium. Dr CHAN provided us with a comprehensive understanding of the characteristics of LDL-cholesterol and shared his experience with us. The lecture ended with questions from participants and much fruitful discussion. The Federation would like to thank Amgen Hong Kong Limited for sponsoring this event and looks forward to organising more educational activities on various topics for our professionals in the future.







Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

**1**

\* Refresher Course for Health Care Providers 2019/2020 - Diabetes, Obesity and SGLT2 inhibitor

**8**

**7**

\* Structural Heart Intervention for Stroke Prevention: Role of Left Atrial Appendage Occlusion (LAAO) Patent Foramen Ovale (PFO) Closure

**15**

\* LUTS Management Update: Myth and Reality

**6**

\* Improving Dyslipidaemia Management: An Update on International Guideline and More  
 \* Use of Thread Suture in Brow Lift: A Short Talk on the Use of Absorbable Thread in Brow Lift

**13**

\* Advance Care Planning & Advance Directive  
 \* Certificate Course on Cardiology 2020

\* Radiology and Intervention Musculoskeletal, Pain and Oncology Management  
 \* Common Eye Disease - Cases & Photos Sharing  
 \* FMSHK Executive Committee Meeting  
 \* Certificate Course on Cardiology 2020  
 \* FMSHK Council Meeting

**20**

**27**

**5**

\* HKMA Choir Family Concert

\* The Hong Kong Neurosurgical Society Monthly Academic Meeting - To be confirmed  
 \* Update on the Management of Asthma  
 \* Basic Life Support  
 \* Certificate Course on Update in Clinical Sleep Medicine 2020

\* Common Household Agent Poisoning and Management  
 \* Certificate Course on Update in Clinical Sleep Medicine 2020

**12**

**19**

**4**

\* HKMA Council Meeting

\* Treatment of External Genital Wart

\* Update on Hypertension Guidelines: Focus on Single-pill Combination of CCB+Diuretic  
 \* 1) Roles of Novel Wireless Continuous pH Monitoring for Management of GERDs, Bravo/ Bravo !!  
 2) Update on Hoarseness of Voice



Date / Time	Function	Enquiry / Remarks
<b>4 TUE</b> 9:00 PM	<b>HKMA Council Meeting</b> Organiser: The Hong Kong Medical Association; Venue: HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, HK	Ms. Christine WONG Tel: 2527 8285
<b>5 WED</b> 8:00 PM	<b>HKMA Choir Family Concert</b> Organiser: The Hong Kong Medical Association; Chairman: Dr. CHONG King Yee & Dr. YEUNG Hip Wo, Victor; Venue: Hong Kong City Hall Theatre, 5 Edinburgh Place, Central	Miss Janice LEUNG Tel: 2527 8285
<b>6 THU</b> 1:00 PM	<b>Improving Dyslipidaemia Management: An Update on International Guideline and More</b> Organiser: HKMA-KLN East Community Network; Speaker: Dr. LI Cho Shan, Eric; Venue: Lei Garden Restaurant, Shop No. L5-8, apm, Kwun Tong, No. 418 Kwun Tong Road, Kwun Tong, Kowloon	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>6 THU</b> 1:00 PM	<b>Use of Thread Suture in Brow Lift: A Short Talk on the Use of Absorbable Thread in Brow Lift</b> Organiser: HKMA-New Territories West Community Network; Speaker: Dr. LUK Wang Lung; Venue: Pak Loh Chiu Cow Restaurant, Shop A316, 3/F, Yoho Mall II, Yuen Long	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>8 SAT</b> 2:15 PM	<b>Refresher Course for Health Care Providers 2019/2020 - Diabetes, Obesity and SGLT2 inhibitor</b> Organiser: Hong Kong Medical Association, HK College of Family Physicians & HA-Our Lady of Maryknoll Hospital; Speaker: Dr. Hoi Sze LEUNG; Venue: Lecture Halls A&B, 4/F, Block G, Wong Tai Sin Hospital	Ms. Clara TSANG Tel: 2354 2440 2 CME Point
<b>11 TUE</b> 1:00 PM	<b>Treatment of External Genital Wart</b> Organiser: HKMA-YTM Community Network; Speaker: Dr. CHAN Yung, Davis; Venue: Crystal Ballroom, 2/F, The Cityview Hong Kong, 23 Waterloo Road, Kowloon	Ms. Candice TONG Tel: 2527 8285 1 CME Point
<b>12 WED</b> 7:30 AM	<b>The Hong Kong Neurosurgical Society Monthly Academic Meeting -To be confirmed</b> Chairman: Dr PO Yin Chung; Organizer: Hong Kong Neurosurgical Society; Speaker(s): Dr YEUNG Shu Yan, Jennie; Venue: Seminar Room, G/F, Block A, Queen Elizabeth Hospital	Dr. WONG Sui To Tel: 2595 6456 Fax. No.: 2965 4061 1.5 CME Point
<b>12 WED</b> 1:00 PM	<b>Update on the Management of Asthma</b> Organiser: HKMA-Shatin Community Network; Speaker: Dr. WONG King Ying; Venue: Sapphire Room, Level 2 Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Candice TONG Tel: 2527 8285 1 CME Point
<b>12 WED</b> 1:00 PM	<b>Basic Life Support</b> Organiser: HKMA-Central, Western & Southern Community Network; Speaker: Dr. CHOI Yim Ping; Venue: The HKMA Central Premises, Dr. Li Shu Pui Professional Education Centre, 2/F, Chinese Club Building, 21-22 Connaught Road, Central	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>12 WED</b> 7:00 PM	<b>Certificate Course on Update in Clinical Sleep Medicine 2020</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Vienna LAM Tel: 2527 8898
<b>13 THU</b> 1:00 PM	<b>Advance Care Planning &amp; Advance Directive</b> Organiser: HKMA-HK East Community Network; Haven of Hope Christian Service Speaker: Dr. CHEN Wai Tsan, Tracy; Venue: The HKMA Wanchai Premises, 5/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai	Ms. Candice TONG Tel: 2527 8285 1 CME Point
<b>13 THU</b> 7:00 PM	<b>Certificate Course on Cardiology 2020</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Vienna LAM Tel: 2527 8898
<b>14 FRI</b> 1:00 PM	<b>Structural Heart Intervention for Stroke Prevention: Role of Left Atrial Appendage Occlusion (LAAO) Patent Foramen Ovale (PFO) Closure</b> Organiser: HKMA-KLN City Community Network; Speaker: Dr. CHEUNG Shing Him, Gary; Venue: President's Room, Spotlight Recreation Club, 4/F, Screen World, Site 8, Whampoa Garden, Hungghom, Kowloon	Ms. Candice TONG Tel: 2527 8285 1 CME Point
<b>19 WED</b> 1:00 PM	<b>Common Household Agent Poisoning and Management</b> Organiser: HKMA-Central, Western & Southern Community Network; Speaker: Dr. TANG Chung Leung; Venue: The HKMA Central Premises, Dr. Li Shu Pui Professional Education Centre, 2/F, Chinese Club Building, 21-22 Connaught Road, Central	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>19 WED</b> 7:00 PM	<b>Certificate Course on Update in Clinical Sleep Medicine 2020</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Vienna LAM Tel: 2527 8898
<b>20 THU</b> 1:00 PM	<b>Radiology and Intervention Musculoskeletal, Pain and Oncology Management</b> Organiser: HKMA-New Territories West Community Network; Speaker: Dr. WAI Man Wah; Venue: Atrium Function Rooms, Lobby Floor, Hong Kong Gold Coast Hotel, 1 Castle Peak Road, Gold Coast, Hong Kong	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>20 THU</b> 1:00 PM	<b>Common Eye Disease - Cases &amp; Photos Sharing</b> Organiser: HKMA-KLN East Community Network; Speaker: Dr. LEUNG Tsz Wang; Venue: V Cuisine, 6/F, Holiday Inn Express Hong Kong Kowloon East, 3 Tong Tak Street, Tseung Kwan O	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>20 THU</b> 7:00 PM	<b>FMSHK Executive Committee Meeting</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Nancy CHAN Tel: 2527 8898
<b>20 THU</b> 7:00 PM	<b>Certificate Course on Cardiology 2020</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Vienna LAM Tel: 2527 8898
<b>20 THU</b> 8:00 PM	<b>FMSHK Council Meeting</b> Organiser: The Federation of Medical Societies of Hong Kong; Venue: Council Chamber, 4/F, Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong	Ms. Nancy CHAN Tel: 2527 8898
<b>21 FRI</b> 1:00 PM	<b>LUTS Management Update: Myth and Reality</b> Organiser: HKMA-Shatin Community Network; Speaker: Dr. FU Kam Fung, Kenneth; Venue: Park Galleria, Level 1, Royal Park Hotel, 8 Pak Hok Ting Street, Shatin	Ms. Candice TONG Tel: 2527 8285 1 CME Point
<b>25 TUE</b> 1:00 PM	<b>Update on Hypertension Guidelines: Focus on Single-pill Combination of CCB+Diuretic</b> Organiser: HKMA-KLN West Community Network; Speaker: Dr. YEUNG Kwok Kit, Lawrence; Venue: Fulum Palace, Shop C, G/F, 85 Broadway Street, Mei Foo Sun Chuen	Miss Antonia LEE Tel: 2527 8285 1 CME Point
<b>25 TUE</b> 1:00 PM	<b>1) Roles of Novel Wireless Continuous pH Monitoring for Management of GERDs, Bravo!! Bravo!! 2) Update on Hoarseness of Voice</b> Organiser: HKMA-Tai Po Community Network; Speaker: Dr. LAU Cham Yat, Vincent & Dr. WONG Han Qian; Venue: Jade Garden, Shop 302, 3/F, Tai Wo Plaza Phase 1, 12 Tai Wo Road, Tai Wo	Ms. Candice TONG Tel: 2527 8285 2 CME Point

## Answers to Radiology Quiz

### Answers:

1. Focal bony defect was noted at the lateral wall of the left sigmoid sinus (sigmoid plate). Air-on-sinus sign, i.e. direct contact of air within the mastoid air cells with the sigmoid sinus, was evident. Pneumocephalus was detected at left perimesencephalic cistern. (Fig. 2) No fluid was seen in the mastoid air cells (Fig. 3). No acute intracranial haemorrhage was seen.
2. Sigmoid sinus dehiscence vs fracture mastoid bone.
3. Mastoid fracture should appear as linear lucent lines and should be associated with blood product in mastoid air cells, which would manifest as hyperdense opacification of the mastoid air cells, and possibly other intracranial injury. A wide bony gap at this typical location in an asymptomatic patient favours dehiscence of sigmoid sinus. Pneumocephalus may be alarming at first glance in a patient with suspected head injury, but it could be explained by the dehiscence of sigmoid sinus.
4. Many of the patients are asymptomatic. Some could present with pulsatile tinnitus.
5. Sigmoid sinus wall reconstruction and resurfacing are viable surgical options for symptomatic individuals.

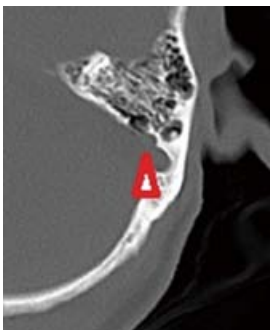


Fig. 2 Red arrow head indicating the site of dehiscence

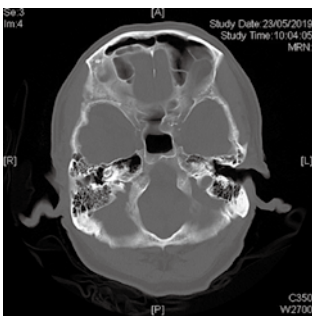


Fig. 3 Mastoid air cells are clear

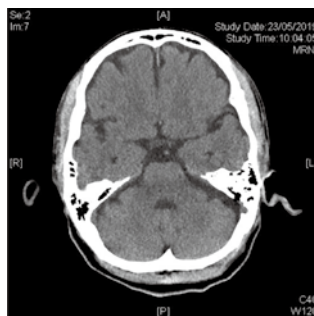


Fig. 4 No associated intracranial injury

Dr Jeremy Man-leung YU

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# Certificate Course on Update in Clinical Sleep Medicine 2020

Jointly organised by



The Federation of  
Medical Societies of  
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Hong Kong Society of  
Sleep Medicine

**Objectives:**

This course aims to give an update on clinical sleep medicine for those who would like to develop and enhance their competence in the management of sleep disorders and sleep related breathing conditions in our daily practice.

Date	Topics	Speakers
12 Feb	Introduction of sleep study and polysomnography	Mr. Crover HO Registered Polysomnographic Technologist Shatin Hospital
19 Feb	Insomnia and psychological intervention of sleep	Dr. Joyce LAM Specialist Psychiatrist Private Practice
26 Feb	Sleep disorders in infants and children	Dr. Steve WONG Specialist Paediatrician Private Practice
4 Mar	Obstructive sleep apnea: diagnosis, complication and management	Dr. Kah-lin CHOO Chief of Service Department of Medicine North District Hospital
11 Mar	How to set up a sleep nurse clinic	Ms. Wing-chi CHAN Advance Practice Nurse North District Hospital
18 Mar	Update on surgical management of snoring and obstructive sleep apnea syndrome	Dr. Yat-bong YEUNG Specialist Otorhinolaryngologist Private Practice

**Date :** 12, 19, 26 February & 4, 11, 18 March, 2020 (Every Wednesday)

**Time :** 7:00 pm – 8:30 pm

**Venue :** Lecture Hall, 4/F., Duke of Windsor Social Service Building, 15 Hennessy Road, Wanchai, Hong Kong

**Language Media :** Cantonese (Supplemented with English)

**Course Fee :** HK\$1,000 (6 sessions)

**Certificate :** Awarded to participants with a minimum attendance of 70%

**Enquiry :** The Secretariat of The Federation of Medical Societies of Hong Kong

Tel.: 2527 8898

Fax: 2865 0345

Email: [vienna.lam@fmsmk.org](mailto:vienna.lam@fmsmk.org)

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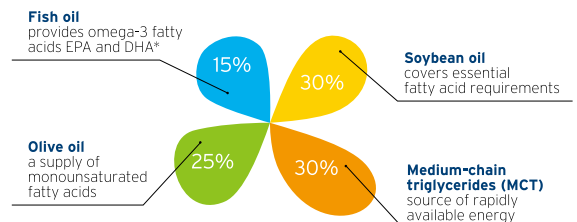
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### References :

1. L. Pradelli et al. /Clinical Nutrition 33 (2014) 785-7 92
2. Singer et al. (2009) ESPEN Guidelines on parenteral nutrition: Intensive Care, Clinical Nutrition 28: 387-400
3. Braga et al. (2009) ESPEN Guidelines on Parenteral Nutrition: Surgery, Clinical Nutrition, 28: 378-386
4. Blesalski HK. Gastroenterology 2009;137(5):92-104  
<http://www.espen.org/espenguidelines.html>

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