However, the data does provide a useful insight into current pass rates and indicates that most trainees attempt examinations in a timely fashion, benefits of OST are seen in Part 1 pass rates and may be seen in Part 2 Oral pass rates.

Conflict of interest

The authors declare no conflict of interest.

References

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Sir,
SIA-formula: an easy way to calculate surgically induced astigmatism

$$\mathrm{SIA} = \sqrt{\left(A_f \cos\alpha_f - A_0 \cos\alpha_0\right)^2 + \left(A_f \sin\alpha_f - A_0 \sin\alpha_0\right)^2}$$

where:

SIA = corneal surgically induced astigmatism (in D),
A_f = final corneal astigmatism (in D),
α_f = final angle of cornea steepest meridian,
A_0 = initial corneal astigmatism (in D),
α_0 = initial angle of cornea steepest meridian.

The evolution and perfecting of cataract surgery technique poses an increasing relevance on refractive success. Astigmatism management is hence key. The knowledge and application of one's surgically induced astigmatism (SIA) is essential for toric IOL implantation and an important step for any phaco surgeon striving for cataract surgery proficiency.

This formula enables single case quantitative calculation of the change in corneal astigmatism after cataract phacoemulsification surgery. It can also be applied in any other surgery or situation when astigmatism is regular. It works for with the rule and against the rule astigmatism. It has been obtained by means of basic trigonometry calculations (Figure 1) and to the knowledge of the author and after extensive research it has not been published before in this or an equivalent form. It is based on vector calculations but obviates the need of drawing while providing more exact results.

Excellent applications that allow multi-patient analysis of SIA are available for download[1] (https://sia-calculator.com) and surgeons are encouraged to use them. There may be circumstances, however, when a quick case calculation is needed or such resources are simply not available. In such cases this formula enables anyone with a scientific calculator, online or else, to quickly determine the SIA. The only required data are initial corneal astigmatism magnitude and axis and final corneal

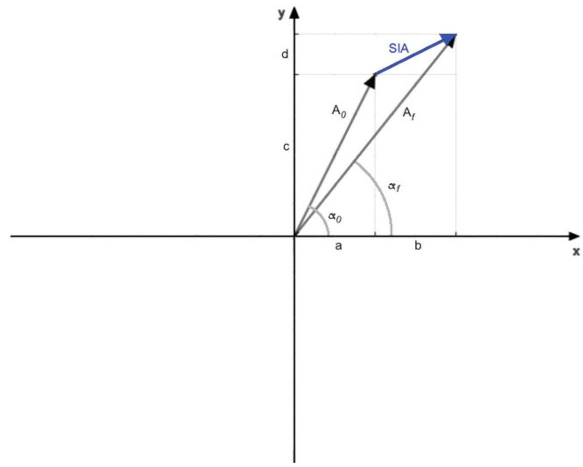

Figure 1 Initial and final astigmatism can be represented as vectors A_0 and A_f. Parallel lines to the axis are drawn with resulting right-angle triangles. By the trigonometric functions of sine and cosine:

$\cos\alpha_0 = \frac{a}{A_0} \rightarrow a = A_0 \cos\alpha_0,$

$\cos\alpha_f = \frac{\mathrm{a+b}}{A_f} \rightarrow \mathrm{b} = A_f \cos\alpha_f - A_0 \cos\alpha_0,$

$\sin\alpha_0 = \frac{\mathrm{c}}{A_0} \rightarrow \mathrm{c} = A_0 \sin\alpha_0,$

$\sin\alpha_f = \frac{\mathrm{c+d}}{A_f} \rightarrow \mathrm{d} = A_f \sin\alpha_f - A_0 \sin\alpha_0.$

SIA, b and d form another right-angle triangle where SIA is the hypotenuse. Applying Pythagoras' theorem:

$\mathrm{SIA}^2 = \mathrm{b}^2 + \mathrm{d}^2$

$\mathrm{SIA} = \sqrt{\mathrm{b}^2 + \mathrm{d}^2},$

$\mathrm{SIA} = \sqrt{\left(A_f \cos\alpha_f - A_0 \cos\alpha_0\right)^2 + \left(A_f \sin\alpha_f - A_0 \sin\alpha_0\right)^2}.$

Angle determination of the SIA can be obtained by the tangent function:

$\tan\alpha_{\mathrm{SIA}} = \frac{\mathrm{d}}{\mathrm{b}},$

$\alpha_{\mathrm{SIA}} = \tan^{-1}\frac{\mathrm{d}}{\mathrm{b}},$

$\alpha_{\mathrm{SIA}} = \tan^{-1}\frac{A_f \sin\alpha_f - A_0 \sin\alpha_0}{A_f \cos\alpha_f - A_0 \cos\alpha_0},$

where α_{SIA} is the angle of the meridian where more steepening occurs, the most flattened meridian will be perpendicular to it, at ±90°.

astigmatism magnitude and axis, determined by optic biometry or corneal topography.

Conflict of interest

The author declares no conflict of interest.

Reference

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