

CHANGING THE DIRECTION OF RECTUS MUSCLE TRACTION ON THE SCLERA CAN ALTER THE REFRACTIVE STATE — AN ANIMAL EXPERIMENT

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Keratorefractive surgery has been widely utilized to compensate myopia and astigmatism but complications of the cornea remain underlying concerns. This preliminary animal experiment was conducted and presented to provide a possible alternative to keratorefractive surgery in reducing myopia and astigmatism without surgery on the cornea itself. The insertion of a wire ring under the extraocular rectus muscles can alter the direction of the muscular traction away from the sclera. As such, the cornea would be flattened and the refractive state altered. The results of two rabbits' eyes in this study revealed concurrent increase with the refraction, leading to increased hyperopia in the hyperopic condition of the rabbit eyes (i.e. reduced myopia in myopic eyes). The with-the-rule astigmatism became the against-the-rule astigmatism.

Keywords : Rectus muscle traction angle, myopia, astigmatism.

INTRODUCTION

To compensate for myopia and/or astigmatism, current keratorefractive surgeries (e.g. radiokeratectomy and anterior laser keratomileusis) flatten the corneal optical zone, which result in a reduction of the optical corneal power. These procedures yield satisfactory results. However, complications of the cornea^{2,3,4,5} are not uncommon, since these procedures are performed on the cornea directly. An alternative to keratorefractive surgery is presented with this experiment. A ring is used to change the direction (traction angle) of the extraocular rectus muscles to achieve a

reduction of the myopia and/or change of the astigmatism without direct contact on the cornea.

MATERIALS AND METHODS

Two rabbits were used in this study (rabbit A and B). The left eye of each rabbit was used as the control. Under local anaesthetic eyedrops (Proparacaine gutt 0.5%), the conjunctiva of each right eye was opened and a suture-wire was passed under the superior and inferior rectus muscles around the eyeball. The suture-wire was then tied at each end to create a ring anterior to the equator of the eyeball with the inner diameter approximately 2mm larger than the equator (Figure 1,

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