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Review

Strabismus-associated myopia. Review☆

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ABSTRACT

Introduction: The treatment of strabismus associated with myopia is often a therapeutic challenge for the ophthalmologist.

The strabismus associated with myopia has certain peculiarities and there are even certain types of strabismus that occur exclusively in myopia, such as strabismus fixus, requiring treatments with specific surgical techniques.

Materials and methods: It is important to make a correct differential diagnosis, because there are many conditions described with this association.

A review is presented of strabismus associated with myopia, together with its treatment adjusted to refractive error.

Results: Measurements of strabismus may be altered by the prismatic effect of the spectacles.

Surgical results may be unpredictable if myopia is not taken into account.

Better results were obtained with the techniques of anatomical replacement described by Yokoyama than with traditional retro-insertion-resection.

Conclusion: For the diagnosis and appropriate treatment of strabismus, it is important to make a correct measurement of the angle of deviation, and perform image tests prior to surgery in certain cases. The anatomical characteristics of the myopic eye should also be taken into account during surgery.

Revisión del estrabismo en miopes

Palabras clave:
Miopía
Estrabismo
Exotropía intermitente
Estrabismo fijo

RESUMEN

Introducción: El tratamiento del estrabismo asociado a la miopía representa, en muchas ocasiones, un reto terapéutico para el oftalmólogo.

El estrabismo asociado a la miopía tiene ciertas peculiaridades y existen incluso ciertos tipos de estrabismo que se producen exclusivamente en miopía, como el estrabismo fixus que requiere tratamientos con técnicas quirúrgicas específicas.

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Cirugía
Oftalmología

Material y métodos: Es importante hacer un diagnóstico diferencial correcto, porque hay muchas entidades descritas con esta asociación.

Se presenta una revisión del estrabismo asociado a la miopía con su tratamiento ajustado al error refractivo.

Resultados: Las medidas del estrabismo pueden ser alteradas por el efecto prismático de las gafas.

Los resultados quirúrgicos pueden ser impredecibles si no se considera la miopía.

Hemos obtenido mejores resultados con las técnicas de reemplazo anatómico descritas por Yokoyama que con la retroinserción-resección tradicional.

Conclusiones: Es importante para un diagnóstico y tratamiento adecuados del estrabismo asociado a miopía hacer una correcta medición del ángulo de desviación, realizar pruebas de imagen previo a la cirugía en determinadas entidades y tener en cuenta las características anatómicas propias del globo ocular miope que requieren una especial atención durante la cirugía.

Myopia is a refractive condition in which light beams are focused in front of the retina, related to increased axial length.

The prevalence of myopia is increasing worldwide. Several studies have found a positive association between myopia, education and tasks performed at a short distance, whereas others have identified a negative association with outdoor activities.[1] Prevalence rates vary broadly between different populations, ranging from 0.8% to 75%, with myopia being more prevalent in the Asian population. Different models show that genetic association has greater weight than environmental factors in the development of myopia.[2,3] Children with 2 myopic progenitors exhibit longer axial length, indicating a higher risk of developing myopia, than those with a single myopic progenitor or none at all.[4]

It is estimated that from the year 2000 to 2050 the prevalence of myopia and high myopia will increase to 5 and 1 billion people, respectively.[5]

Strabismus associated to myopia can be explained through one or several of the following mechanisms: due to anisometropia, alterations in the accommodation/accommodation convergence ratio (AC/A) and/or alterations in the path of horizontal and vertical strata muscles.[6] Patients with progressive axial myopia, i.e., due to high axial length, exhibit increased accommodation amplitude in relation to an increased AC/A quotient.[7–9]

Myopia associates an increased incidence of various ophthalmological disorders including cataracts, glaucoma, macular degeneration, choroidal neovascularization (myopic neovascular membrane), peripheral retinal degeneration, retina detachment and extrinsic ocular motility alterations. This brings about different types of strabismus associated to myopia which could also appear without myopia, including:

1. Childhood and adult strabismus.
2. Intermittent and constant strabismus.
3. Strabismus fixus of myopia magna.

In general, strabology surgeons are faced with a challenge when treating a patient with strabismus and associated myopia because it is necessary to take into account some aspects in examinations as well as to plan adequate surgery. These include:

1. The necessity of measuring the exact deviation angle to avoid post-surgery surprises.
2. To consider the prismatic effect of optical correlation on the deviation measurement due to the prismatic effect of high-power lenses.
3. To consider requesting orbital imaging tests prior to surgery in specific situations.
4. To take into account the larger range of described surgical techniques which translates the complexity of conditions.
5. To maintain specific precautions during surgery taking into account the anatomy of the myopic ocular globe.
6. To consider the influence of refractive surgery and its effects on fusion in patients with strabismus and associated myopia.
7. To consider concurrent pathologies such as myopic neovascular membrane that could interfere in fusion capacity.
8. To consider the esthetic results in strabismus associated to myopia which in some cases could reach large angles.

Classification

In order to classify strabismus associated to myopia, we should classify it as comitant, incomitant and infrequent. Schematically, this classification is as follows:

1) Comitant
   I. Primary
      1. Intermittent divergent strabismus (IDS)
      2. Child exotropia
      3. Child endotropia
   II. Secondary
      1. Sensory strabismus
      2. myopia associated to prematurity and retinopathy of prematurity (ROP)
2) Incomitant
   I. Strabismus fixus