

Review Article

Premature presbyopia: causes, diagnosis, and management strategies - an overview

K. M. Sonali, Gaurav Dubey*, Kamal Pant, Aditya Tripathi, Priti Yadav

Department of Optometry, Faculty of Paramedical Sciences, UPUMS, Saifai, Etawah, Uttar Pradesh, India

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*Correspondence:

Dr. Gaurav Dubey,

E-mail: gauravopto25@gmail.com

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ABSTRACT

Premature presbyopia refers to the early onset of age-related vision changes typically associated with presbyopia, a condition characterized by the loss of near vision accommodation. This review article aims to provide an overview of the causes, diagnosis, and management strategies for premature presbyopia. The database collected from PubMed, PubMed Central (PMC), Cochrane library, and Google scholar and research gate. This review discusses the potential underlying mechanisms contributing to premature presbyopia, including genetic factors, environmental influences, and ocular conditions. Additionally, the diagnostic criteria and assessment methods used to identify premature presbyopia and differentiate it from other vision disorders. Finally, this review examines various management options for premature presbyopia, including corrective lenses, pharmacological interventions, surgical procedures, and emerging treatments. By understanding the factors contributing to premature presbyopia and implementing appropriate management strategies, healthcare professionals can effectively address the needs of individuals experiencing early onset age-related vision changes.

Keywords: Premature presbyopia, Age-related vision changes, Accommodation, Diagnosis, Management strategies

INTRODUCTION

Presbyopia is a common age-related vision disorder characterized by the progressive loss of near vision accommodation, typically occurring around the age of 40-45 years. Premature presbyopia is defined as a person who has presbyopia aged less than 40 years or present with difficulties in near vision.¹ Premature presbyopia, accommodative ability become insufficient for the patient's usual near vision task at an earlier age than expected, due to environmental, nutritional, disease related or drug induces causes.² However, some individuals may experience symptoms of presbyopia at a younger age, a phenomenon known as premature presbyopia. Despite its prevalence, premature presbyopia remains relatively understudied and poses unique challenges in diagnosis and management.³ This review article aims to consolidate existing knowledge on premature presbyopia, including its aetiology, diagnostic criteria, and treatment options. This

review aims to find out the conditions of premature presbyopia and its associated factors including management strategies.

METHODS

The information is collected from standard databases such as PubMed, PubMed Central (PMC), Cochrane library, Google scholar, and research gate. The search in PubMed, PubMed central was conducted using the Boolean operators.

CAUSES OF PREMATURE PRESBYOPIA

Premature presbyopia may result from a combination of genetic predisposition, environmental factors, and underlying ocular conditions. Genetic studies have identified several candidate genes associated with early-onset presbyopia, suggesting a hereditary component to the

condition.⁴ Environmental factors such as prolonged near work, excessive screen time, and exposure to ultraviolet radiation may also contribute to the development of premature presbyopia.⁵ Additionally, ocular conditions such as high myopia, astigmatism, and certain corneal abnormalities have been implicated in accelerating the onset of presbyopia symptoms.³

DIAGNOSIS OF PREMATURE PRESBYOPIA

Diagnosing premature presbyopia requires a thorough evaluation of the patient's visual symptoms, refractive status, and accommodative function. Common symptoms include difficulty reading small print, eyestrain, and headaches when performing near tasks. Refractive assessment may reveal hyperopia or hyperopic shift, along with reduced near visual acuity. Objective tests of accommodative function, such as dynamic retinoscopy and accommodative amplitude measurement, can help confirm the diagnosis of premature presbyopia and assess the extent of accommodative insufficiency.⁶

DISCUSSION

Premature presbyopia, characterized by the early onset of age-related vision changes typically associated with presbyopia, presents a significant challenge for affected individuals and eye care professionals. This discussion aims to delve into the underlying causes, diagnostic considerations, and management strategies for premature presbyopia.

Underlying causes

Several factors contribute to the development of premature presbyopia. Genetic predisposition plays a significant role, with studies identifying candidate genes associated with early-onset presbyopia.⁴ Additionally, ocular conditions such as high myopia, astigmatism, and certain corneal abnormalities have been implicated in premature presbyopia.³ Environmental factors such as prolonged near work, excessive screen time, and exposure to ultraviolet radiation may accelerate the onset of presbyopia symptoms.⁵

Diagnostic considerations

Diagnosing premature presbyopia requires a comprehensive evaluation of the patient's visual symptoms, refractive status, and accommodative function. Common symptoms include difficulty reading small print, eyestrain, and headaches when performing near tasks. Refractive assessment may reveal hyperopia or hyperopic shift, along with reduced near visual acuity.

Objective tests of accommodative function, such as dynamic retinoscopy and accommodative amplitude measurement, can help confirm the diagnosis of premature presbyopia and assess the extent of accommodative insufficiency.⁶

Management strategies

Management of premature presbyopia aims to alleviate symptoms and improve near vision function. Non-invasive options include corrective lenses, such as reading glasses, bifocal or multifocal spectacles, and contact lenses designed for presbyopia correction. Pharmacological interventions, such as topical miotic agents or accommodative training exercises, may also be considered to enhance near vision accommodation.⁷ In cases where conservative measures are ineffective, surgical interventions such as corneal refractive surgery, intraocular lens implantation, or scleral expansion procedures may be recommended.⁸ Emerging treatments, including pharmacological agents targeting the crystalline lens or novel refractive technologies, hold promise for future management of premature presbyopia.

CONCLUSION

Premature presbyopia presents a significant challenge for affected individuals, impacting their near vision function and quality of life. Understanding the underlying causes and risk factors for premature presbyopia is crucial for accurate diagnosis and effective management. Healthcare professionals play a key role in implementing appropriate treatment strategies tailored to the individual needs of patients with premature presbyopia, ultimately improving their visual outcomes and overall well-being. Further research is needed to advance our understanding of premature presbyopia and develop innovative approaches for its prevention and treatment.

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