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**RISK FACTORS FOR KERATOCONUS IN CHILDREN AND
ADOLESCENTS: THE ROLE OF ALLERGY AND EYE RUBBING**

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Background. Keratoconus is a progressive corneal ectatic disorder characterized by biomechanical weakening, corneal thinning and changes in corneal curvature. Its onset during childhood and adolescence is of particular clinical importance because younger patients may present with more advanced disease and may require closer monitoring for progression. The pathogenesis of keratoconus is multifactorial and involves genetic susceptibility, environmental influences and mechanical factors [1,2].

Objective. To analyze current evidence regarding ocular allergy and habitual eye rubbing as potentially modifiable risk factors for the development and progression of keratoconus in children and adolescents and to emphasize the importance of early identification of patients at increased risk.

Materials and Methods. A narrative analytical review of contemporary scientific literature was performed, including systematic reviews, meta-analyses and clinical studies addressing keratoconus risk factors, ocular allergy, atopy, eye rubbing and corneal imaging. Particular attention was given to evidence concerning the relationship between allergic symptoms, chronic ocular itching, mechanical eye rubbing and corneal structural changes.

Results. Available evidence supports a multifactorial model of keratoconus development. Genetic predisposition represents an important background factor, while environmental and behavioral factors may influence disease expression and progression [1,2]. Recurrent eye rubbing has received particular attention because repetitive mechanical stress may contribute to corneal deformation in susceptible individuals. A systematic review and meta-analysis reported a significant association between eye rubbing and keratoconus, although the available studies were heterogeneous and predominantly observational, limiting conclusions regarding a direct causal relationship [3].

Allergic conditions may increase the likelihood of eye rubbing by producing chronic itching and ocular discomfort. A large systematic review and meta-analysis demonstrated significant associations of keratoconus with eye rubbing and allergy; however, the strength of association varied according to the specific allergic condition examined [2]. Therefore, allergy should not be considered an isolated direct cause of keratoconus, but rather a clinically relevant factor that may facilitate repetitive mechanical trauma through persistent itching and rubbing.

Early identification of children and adolescents at increased risk is particularly important. Progressive or unexplained astigmatism, reduced best-corrected visual acuity, a





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family history of keratoconus, persistent ocular itching and habitual eye rubbing should prompt detailed corneal assessment. Corneal topography and tomography provide objective information about corneal curvature, elevation and thickness and are important tools for detecting early ectatic changes [4,5]. In pediatric patients, close follow-up is warranted because documented tomographic progression may occur during adolescence.

Conclusion. Ocular allergy and habitual eye rubbing should be regarded as potentially modifiable factors within the multifactorial pathogenesis of keratoconus rather than as independent causes of the disease. Early recognition of high-risk children, adequate management of allergic ocular symptoms, prevention of habitual eye rubbing and timely corneal topographic or tomographic assessment may facilitate earlier diagnosis and appropriate monitoring of keratoconus progression.

Keywords: keratoconus, children, adolescents, ocular allergy, eye rubbing, atopy, cornea, corneal topography, corneal tomography, risk factors.

References

1. Gomes J.A.P., Tan D., Rapuano C.J. et al. Global consensus on keratoconus and ectatic diseases. *Cornea*. 2015;34(4):359–369.
2. Hashemi H., Heydarian S., Hooshmand E. et al. The prevalence and risk factors for keratoconus: a systematic review and meta-analysis. *Cornea*. 2020;39(2):263–270.
3. Sahebjada S., Al-Mahrrouqi H.H., Moshegov S. et al. Eye rubbing in the aetiology of keratoconus: a systematic review and meta-analysis. *Graefe's Archive for Clinical and Experimental Ophthalmology*. 2021;259(8):2057–2067.
4. Duncan J.K., Belin M.W., Borgstrom M. Assessing progression of keratoconus: novel tomographic determinants. *Eye and Vision*. 2016;3:6.
5. Hashemi H., Heydarian S., Hooshmand E. et al. The association between keratoconus and allergic eye diseases: a systematic review and meta-analysis. *Clinical & Experimental Optometry*. 2023;51(4)–O16.

