WG 8 (Aerospace Medicine)

Ophthalmic Evaluation Following Corneal Cross-Linking Procedures and Implications for Aircrew Return to Flight

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Background:
Keratoconus is a progressive eye condition where the cornea thins and forms a cone-shaped protrusion, leading to visual distortions. It is common among young individuals and can severely affect visual acuity. For pilots and aircrew, who rely on sharp vision for their duties, keratoconus presents significant challenges, including difficulty reading instruments, identifying distant objects, and adjusting to changing light conditions, especially during night flights or in low-visibility situations.
This case study aims to evaluate the impact of corneal cross-linking (CXL) treatment on aircrew members diagnosed with keratoconus and assess their readiness to return to flight duties. The goal is to determine the effectiveness of CXL in stabilizing the condition and ensuring that affected aircrew can safely resume their duties.
Methods:
The study involved two Israeli Air Force aircrew members diagnosed with keratoconus. Both underwent corneal cross-linking treatment and were grounded for approximately two months. During this period, they received continuous monitoring and comprehensive medical evaluations, including corneal topography and visual acuity assessments, to determine their recovery and visual stability.
Results:
After undergoing the prescribed recovery period and undergoing rigorous evaluations, both individuals demonstrated significant improvements in corneal structure and visual stability. Following confirmation that their vision met the required standards; both aircrew members were cleared to return to active flight duty.
Keratoconus can be effectively managed with early diagnosis and modern treatments like corneal cross-linking. The study highlights the importance of continuous monitoring and post- treatment evaluations to ensure aircrew members with keratoconus can safely return to flight. The findings contribute to best practices in aviation medicine and offer valuable insights into managing ocular health for military aviators. Further research may refine protocols and improve recovery guidelines for affected personnel.

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Axial Length Progression and Refractive Change in Pilots and Flight Cadets

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Background:
Myopia prevalence is rising worldwide, driven partly by progressive axial elongation. While many studies address axial length (AL) changes in children, data are limited for healthy young adults, particularly military pilots and cadets.
Purpose:
To investigate AL progression and refractive changes among active pilots and flight cadets undergoing routine aeromedical evaluations.
Methods:
A retrospective study (June 2018-December 2024), including 3,398 Israeli Air Force personnel (mean age 31.2±10.6 years) with at least two AL and refractive measurements ,>1 year apart, were included. Autorefraction was measured upon each encounter. AL was measured at baseline and upon the last follow-up. Statistical analyses assessed progression-inflicting factors.
Results:
Mean follow-up was 2.73±0.84 years. Overall, AL increased significantly by 0.018±0.126 mm ($p<0.001$) in the total cohort. Younger adults (<20 years) and baseline myopes showed greater progression (0.043±0.113 mm, $p<0.001$). Significant correlations were observed between AL elongation and changes in the sphere ($p=0.028$). Subgroup analyses indicated accelerated AL progression among those who developed new myopia or exhibited worsening myopia.
Conclusions:
Even in healthy young adults, axial elongation persists beyond childhood, with younger individuals and baseline myopes at higher risk. Aeromedical personnel should remain aware of subtle ongoing refractive changes in pilot populations.
Discussion:
These findings underscore the importance of routine refractive monitoring in aircrews, particularly among baseline myopic candidates. Recognizing these trends informs aeromedical policy, ensuring long-term visual readiness in military aviation environments and candidate selection.