

# 5-min versus 10-min Accelerated Corneal Cross-linking Protocols for Keratoconus: A Systemic Review and Meta-Analysis

Rand Alazaz<sup>1,5</sup>, Ahmed Aldubaikhi<sup>1,5</sup>, Abdulmalik Alsaif<sup>2</sup>, Mohammad Karam<sup>2</sup>, Meshaal Aljebreen<sup>1,5</sup>, Nahla Alkhowaiter<sup>1,4</sup>, Tariq Almudhaiyan<sup>1,3,5</sup>

<sup>1</sup>College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

<sup>2</sup>School of Medicine, University of Leeds, Leeds, United Kingdom <sup>3</sup>Department of Surgery, Division of Ophthalmology, National Guard Hospital, Riyadh, Saudi Arabia

<sup>4</sup>Optometry and Vision Sciences, Optometry Doctor, Riyadh, Saudi Arabia <sup>5</sup>King Abdullah International Medical Research Center, Riyadh, Saudi Arabia

## Introduction

Keratoconus is a progressive thinning and steepening of the cornea resulting in irregular astigmatism. Cross-linking (CXL) is used to slow the progression of keratoconus. Accelerated cross-linking has been developed to replace the conventional method with longer duration. Several studies have compared the effectiveness of 10min and 5min protocols. However, there are currently no systemic reviews or meta-analyses comparing the outcomes of the two interventions. This study will be the first in the literature to report on these outcomes.

## Aim of the study

To compare the outcomes of two accelerated CXL protocols, 18mW/cm<sup>2</sup> (5-min) vs 9mW/cm<sup>2</sup> (10-min).

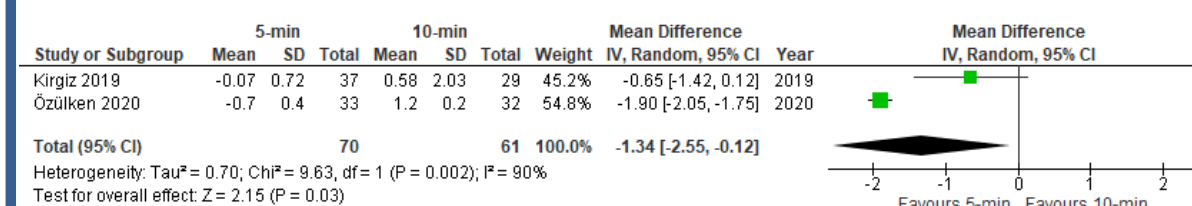
## Methods

A meta-analysis was performed as per the PRISMA guidelines. A search of databases identified studies comparing 18mW/cm<sup>2</sup> (5-min) and 9mW/cm<sup>2</sup> (10-min) accelerated CXL protocols.

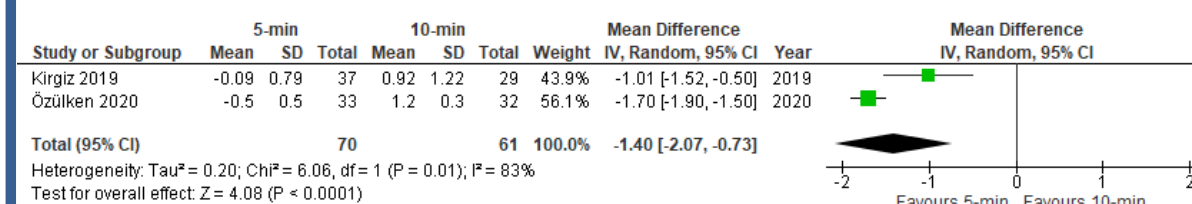
Primary outcome measured the findings of topography (K1, K2, Cylindrical, and Thinnest) and Higher-order Aberration (HOA) (Coma, Trefoil, Spherical, and total HOA). Secondary outcomes included visual acuity (Un-corrected Visual Acuity (UCVA), and Best-corrected Visual Acuity (BCVA)). Fixed and random effects models were used for the analysis.

## Results

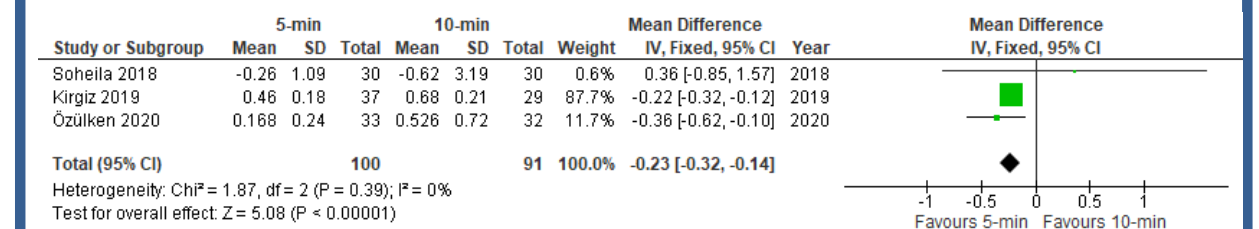
Four studies were included. The 10-min protocol had significantly improved outcomes in terms of the mean changes in K1 and K2 ( $P = <0.00001$ ), corneal total HOA ( $P = 0.0002$ ) and corneal coma ( $P = 0.00001$ ). For secondary outcomes, no statistically significant differences were found in UCVA, BCVA, cylinder, Thin, spherical aberration and trefoil.



Forest plot of comparison: 5-min versus 10-min Accelerated Corneal Cross-linking Protocols, outcome: **Mean Change K1 (D)\***.



Forest plot of comparison: 5-min versus 10-min Accelerated Corneal Cross-linking Protocols, outcome: **1.6 Mean Change K2 (D)\***.



Forest plot of comparison: 5-min versus 10-min Accelerated Corneal Cross-linking Protocols, outcome: **Mean Change Coma (RMS, µm)\***.

## Conclusion

Accelerated CXL 10-min protocol had improved K1, K2, and HOA outcomes, but no significant difference in terms of the other outcomes.

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For Contact: [Randalazzaz@gmail.com](mailto:Randalazzaz@gmail.com)