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Which clinical parameters result in a corneal crosslinking indication?

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Purpose

- To evaluate which clinical parameters resulted in a corneal crosslinking (CXL) indication
- To provide insight in time to progression for these clinical parameters and their mean differences

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Material and Method

- Retrospective descriptive analysis of 87 eyes (58 patients)
- Defined 8 types of CXL indication *(Table 1. Patient Demographics)*
- Measured applicable clinical parameters at 2 time points to detect progression (except pedriatic and monoculus cases)
- Corneal topographics made with Oculyzer (Wavelight) in all cases of `keratometric progression`
- Descriptive statistics for CXL indication type *(Table 1. Patient Demographics)* and applicable clinical parameters *(Table 2. Mean DIFF and Time-to-progression)*

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Results

Most frequent diagnosis: Keratoconus (KC) (n=85)
Most frequent CXL indication type: keratometric progression (50,6%); child (20,7%); refractive cilinder progression (13,8%)

Table 1. Patient Demographics			
	All patients	Child	Adults
Number	87	20	67
Mean age yr (st dev)	25,03 (9,03)	14,50 (1,96)	28,18 (7,8)
Male n (%)	65 (74,7)	17 (85,0)	48 (71,6)
Diagnosis KC, PLE, PMD			
KC n (%)	85 (97,7)	20 (100,0)	65 (97,0)
PLE n (%)	1 (1,1)	0 (0,0)	1 (1,5)
PMD n (%)	1 (1,1)	0 (0,0)	1 (1,5)
CXL indication			
child n (%)	18 (20,7)	18 (90,0)	0 (0,0)
keratometric progression n (%)	44 (50,6)	1 (5,0)	43 (64,2)
low pachymetry n (%)	7 (8,0)	0 (0,0)	7 (10,4)
monoculus n (%)	1 (1,1)	1 (5,0)	0 (0,0)
myopic progression n (%)	3 (3,4)	0 (0,0)	3 (4,5)
post laser ectasia n (%)	1 (1,1)	0 (0,0)	1 (1,5)
refractive cilinder progression n (%)	12 (13.8)	0 (0,0)	12 (17.9)
topographic astigmatism progression n (%)	1 (1,1)	0 (0,0)	1 (1,5)

(KC = Keratoconus; PLE = Post Laser Ectasia; PMD = Pellucid Marginal Degeneration)

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Table 2. Results

Type of indication	n	Mean Difference T1 and T2	Mean @ moment CXL indication	Mean time progression (months)
Keratometric progression	44	K1 1.3 D K2 1.6 D Kmax 3.3 D	Kmax 60.1 D TL 449 µm	7 – 8
Pediatric cases	18	n.a.	Age 15 Yrs Bilateral 64% of patients Kmax 58.4 D TL 472 µm	n.a.
Refractive astigm progression	12	Refr cilinder -2.0 D	Kmax 53.5 D TL 474 µm Refr Cil -3.9 D	9
Low pachymetry	7	No DIFF n.a.	Kmax 63.7 D TL 416 µm	n.a.
Myopic progression	3	Refr Sphere -1.92 D Subj VA loss over time	Refr Sphere -5.00 D Refr Cilinder -2.67 D	12 – 15
Monoculus cases	1	n.a. note: (Fellow eye: corneal scar Snellen CDVA 0.2 (Scleral lens	Astigm cornea 8.0 D Kmax 60.4 D TL 455 µm	n.a.
Post-laser ectasia	1	K2 1.0 D Astig cornea 1.6 D Note: Myopic LASIK 2003	Snellen CDVA 0.77 Refr +4.75 / -8.0 x 63°	17
Placido topographic astigm progression	1	Astigm cornea 1.5 D	Kmax 52.1 D TL 430 µm	12

(K1 = flat keratometry; K2 = steep keratometry; TL = thinnest location)

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Conclusions

- Defining specific indication groups can be helpful in order to detect progression and to make a timely CXL indication
- We recommend to always collect all data at every check-up, and specify the indication type
- Further research is needed to assess whether there are significant differences in means per indication group