RLES AI® KERATOCONUS TREATMENT REPORT

COMPLEX CASE: RING + CXL PLAN IN A PROGRESSIVE CONE — DEMO

REFRACTIVE LASER EYE SURGERY – ARTIFICIAL INTELLIGENCE ASSISTED

DEMO REPORT — FICTITIOUS PATIENT

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1 · THE CASE — LASER CLOSED, A TREATMENT ROUTE OPEN

DEMO PATIENT C (fictitious) · 19 · progressive keratoconus. Kmax 49.1 → 50.6 D in 12 months (+1.5) · posterior elevation +9 µm · thinnest 402 µm → 2/3 consensus progression criteria met. BAD-D 4.1 and ART 205 pathological; retinoscopy scissoring POSITIVE (Rule 14) → established disease, corneal laser contraindicated. From here the report moves to TREATMENT PLANNING: halt progression and reshape vision.

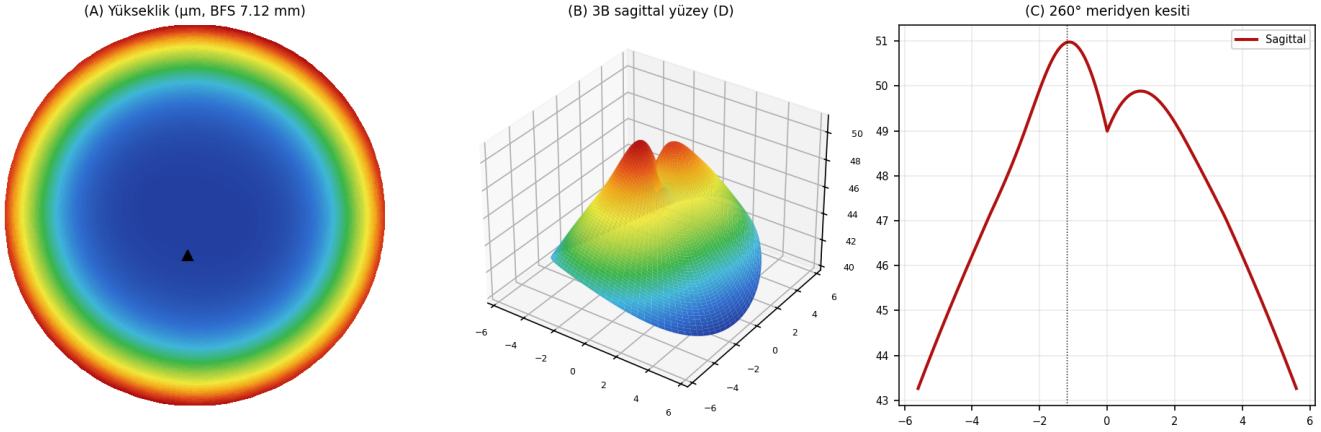

Figure 1 — Surface reconstruction (Rule 13 standard visual): (A) elevation map · (B) 3-D surface — inferotemporal cone apex 50.6 D · (C) 260° meridian section (1 D ≈ 10 µm). This visual is a reconstruction from the device map, not raw device output.

REKONSTRÜKSİYON DİPNOTU

Bu görsel, cihaz çıktısındaki sayısal değerlerden türetilmiş bir rekonstrüksiyondur; ham cihaz çıktısı değildir. 1 D ≈ 10 µm.

1b · THE FULL INDEX SET — BOTH EYES (OS: FORME FRUSTE)

Index	OD	OS	Bands
BAD-D	4.1	2.2	OD PATHOLOGICAL (>2.6) · OS BORDERLINE (1.6–2.6)
ART max	205 µm	288 µm	OD pathological (<260) · OS borderline (260–340)
Kmax	50.6 D	46.8 D	OD pathological (>48.5) · OS upper-normal
IVA · ISK	0.44 · 2.3	0.27 · 1.3	OD pathological · OS at the normal edge
Posterior elevation	+31 µm	+11 µm	OD pathological · OS normal
Thinnest pachymetry	402 µm	489 µm	both <500 — under surveillance
CBI / TBI	0.61 / 0.88	0.31 / 0.42	OD pathological · OS BORDERLINE — Corvis catches subclinical weakness in the normal-topography fellow eye (TBI's strongest validation)

1c · RULE 14 — THE CLINICAL CONFIRMATION SET (OD)

Test	Finding	Reading
Retinoscopy	scissoring POSITIVE	established disease — not a yes/no test: oil-droplet/irregular reflexes also count POSITIVE early on
Biomicroscopy	fine Vogt striae	ectasia sign ✓ — Fleischer/Munson/Rizzuti also sought
History	eye rubbing + · atopy + · family −	rubbing is the strongest modifiable factor — counselling written into the report
Epithelial map (OCT)	doughnut pattern	thinnest epithelium = thinnest corneal point — cone-masking sign ✓

2 · WEIGHING THE TREATMENT OPTIONS

Route	In this patient	Verdict
CXL	402 µm ≥ 400 → both Dresden and accelerated 9 mW/10 min feasible	IN PLAN ✓
ICRS	device card verified: VisuMax 500 femto tunnels SUPPORTED · brand reported: Keraring SI-6 → a segment plan can be produced	IN PLAN ✓
CAIRS	feasible alternative (CCT ≥320–350; markedly lower extrusion; no universal nomogram)	RESERVE
DALK/PK	not needed — Kmax < 70, no central scar	—

2c · THE CAIRS ASSESSMENT — COMPARED AGAINST ICRS

Criterion	CAIRS	ICRS (Keraring SI-6)
CCT eligibility	≥320–350 µm → at 402 in this eye ✓ FEASIBLE	tunnel at 70–80% depth → ✓ at 402
Tunnel	35–70% or fixed 200–250 µm · width ~1.5 mm · femto OR manual dissection	75% · femto required (VisuMax 500 ✓)
Safety profile	extrusion/melt MARKEDLY LOWER — allogenic tissue lacks the erosion risk of a synthetic segment	extrusion/melt are known risks; deep tunnels reduce them
Nomogram status	NO UNIVERSAL NOMOGRAM — Jacob · Istanbul · Awwad schemes vary by centre; RLES does NOT generate a CAIRS segment plan, it asks for the surgeon's scheme	manufacturer nomogram AVAILABLE → segment plan produced ✓
Tissue access	requires eye-bank allogenic ring tissue — needs supply planning	off-the-shelf — same-session ready

WHY ICRS LEADS IN THIS CASE — AND WHEN CAIRS WOULD TAKE THE LEAD

ICRS leads in this eye because: a published manufacturer nomogram makes the segment plan verifiable + femto tunnel capability is on the device card + no tissue-supply delay (time matters in progressive disease). CAIRS would take the lead if: no femtosecond tunnel were available (it can be done with manual dissection) · CCT were borderline for segment depth · synthetic-segment extrusion risk were judged especially high (thin/peripherally thinned corneas) · or the surgeon works with CAIRS experience and a scheme. The report documents BOTH routes as FEASIBLE; the choice is the surgeon's (Rule 11).

3 · SURGICAL PLAN — SAME-SESSION RING + CXL

Step	Plan
Sequencing	ring + CXL in the SAME SESSION for progressive disease — after prior CXL the segment effect drops in stiffened stroma
Femto tunnel	VisuMax 500 · depth 75% (≈300 µm at 402 µm) · OZ 5.5 mm
Segment	Keraring SI-6 · incision on the steep meridian — final arc/thickness from the manufacturer's nomogram screen, with surgeon approval
CXL	epi-off accelerated 9 mW/10 min · MANDATORY intraop pachymetry ≥ 400 µm before UVA · if <400, switch to the hypoosmolar protocol
Follow-up	d1/w1/m1/m3/m6/m12 — Kmax · thinnest point · BAD-D series (has progression stopped?)
Next step	phakic-ICL assessment for residual refraction after ≥6–12 months of stability (Rule 10)
OS (forme fruste) plan	NO surgery — serial tomography every 3 months + strict no-rubbing; CXL considered if progression documented; corneal laser contraindicated in OS too (borderline CBI/TBI + KC in the fellow eye)

AGE NOTE (RULE 11)

Age 19 — the 18–21 band: progression runs faster in young corneas, which does NOT delay CXL (progression is documented). Decision and consent belong to the surgeon.

CONCLUSION — A PROGRESSIVE CONE, TREATABLE IN ONE PLANNED SESSION

Where laser closes, treatment does not end: the same-session ring + CXL plan is approval-ready on verified device and brand data, and the second stage of visual rehabilitation (ICL) is already mapped.

SURGEON'S SIGNATURE & AI VERIFICATION

This report is clinical decision support; the plan is finalised by surgeon approval. Signature: _____ Date: _____