Femto Flap Optimization

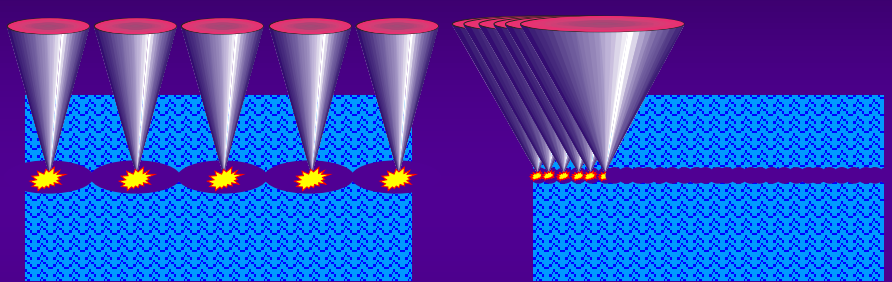
- **Energy**
- **Flap geometry**

S. MAHJOUB, K. BEN AMOR ,
A. BEN SAID, K. MGHAIETH,
O. TRABELSI, B. BOUASSIDA & A. TRABELSI

Les Ophtalmologistes Associés de Tunis
Clinique Ophtalmologique de Tunis (ISO 9002)

Cairo '2019

Energy Dependent Mechanisms in Photodisruption



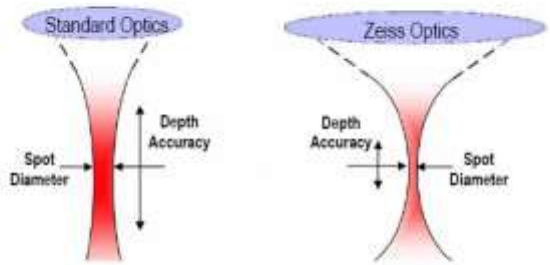
FEMTEC
INTRALASE CORP
ZEISS VisuMax
ziemer FEMTO LDV

"**High**" Pulse **Energy** (µJ)
"**Low**" Pulse **Frequency** (kHz)

(nJ) "**Low**" Pulse **Energy**
(MHz) "**High**" Pulse **Frequency**

VisuMax Femtosecond System

Zeiss high performance optics key for optimum cut



▼ low	Numerical aperture	high ▲
▼ large	Spot diameter	small ▲
▼ low	Depth accuracy	high ▲
▼ high	Single pulse energy	small ▲

20

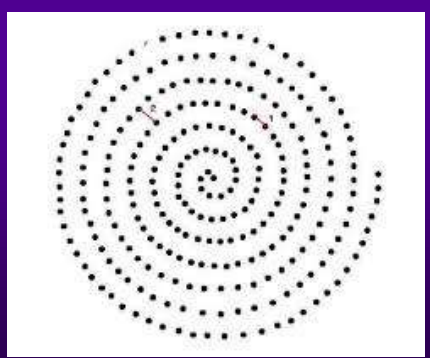
ENERGY (Threshold)

- Energy complications / thin flap

Thresholds for interface haze formation after thin-flap femtosecond laser in situ keratomileusis for myopia. Rocha , Kagan, Smith, Krueger. Am J Ophthalmol. 2009

ENERGY (Threshold)

- Energy complications / thin flap
- Time / spot spacing

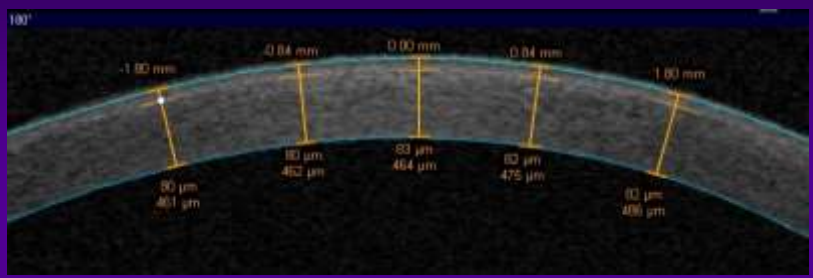


Settings:

19/05/2009	Energy (nJ)	Spacing (µ)	Duration
Défault	180	4.5	
Fast	190	4.5	
Enhanced	200	4.5	
Fast+Enhanced	210	4.5	31 sec

	Energy (nJ)	Spacing (µ)	Duration
01/10/2009	140	3.5	40 sec
01/01/2019	110	2.8	47 sec
500 KHz	< 100		

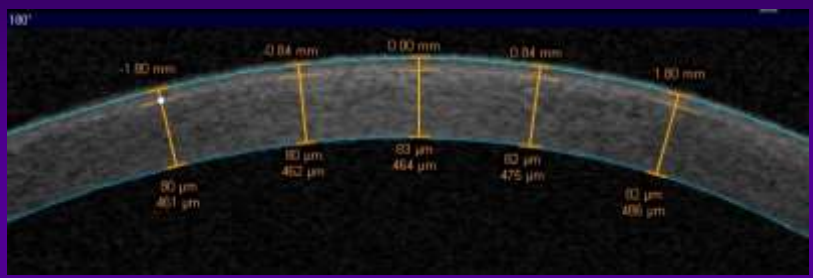
Depth (sub-Bowman)



- Thin / Safe : 80 µ (low energy)

80 µ Flap Lifting (low energy)

Depth (sub-Bowman)

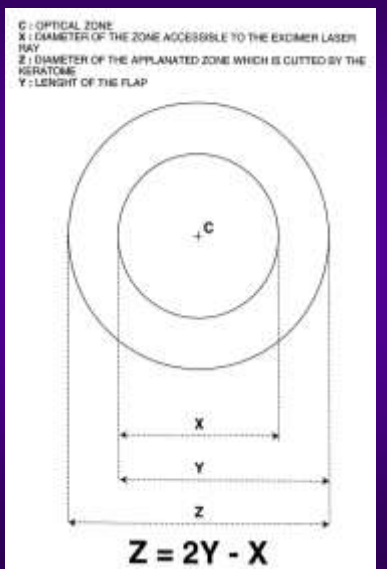


- Thin / Safe : 80 µ (low energy)
- Optimized Ablation / Bio-mechanic Stability

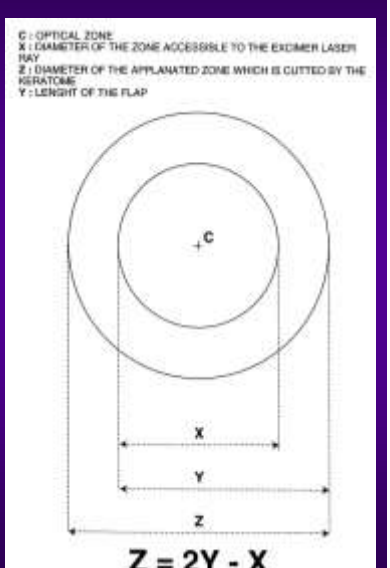
Diameter (Laser Zone)

	Total	>20/20 > 2 lignes	>20/20 > 2 lignes	Mean HOA RMS pre-op	Mean HOA RMS post-op	Induced HOA
TSA	13	1	**8**%	0.37	0.51	**+37**%
ASA	59	28	**57**%	0.36	0.40	**+11**%

Diameter (Laser Zone)



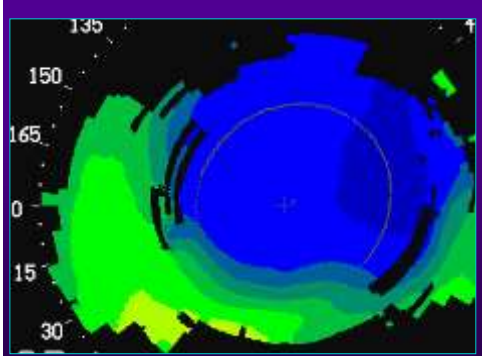
Diameter (Laser Zone)

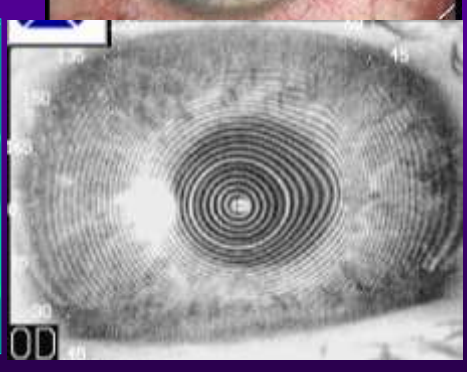


Laser Zone (Largest)

Hinge (Smallest)

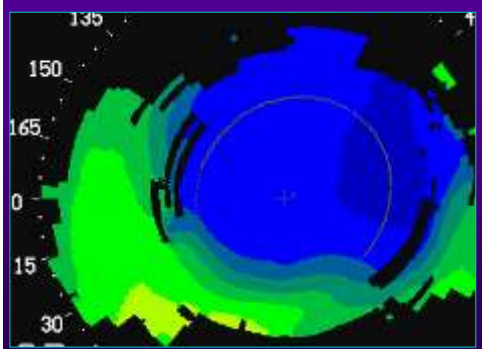
- Hinge Syndrome

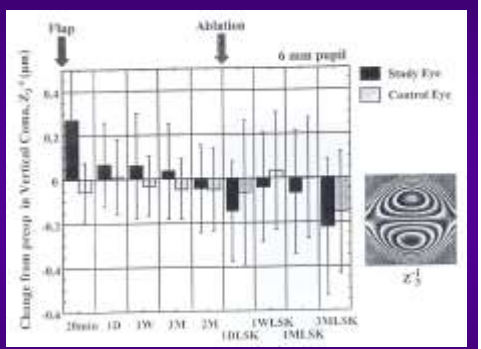




Hinge (Smallest)

- Hinge Syndrome
- Coma Induction



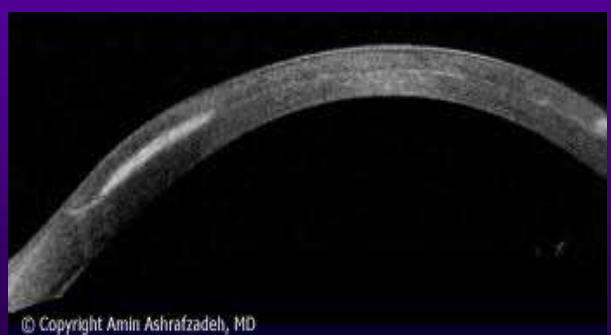


Side Cut (Bevel In)

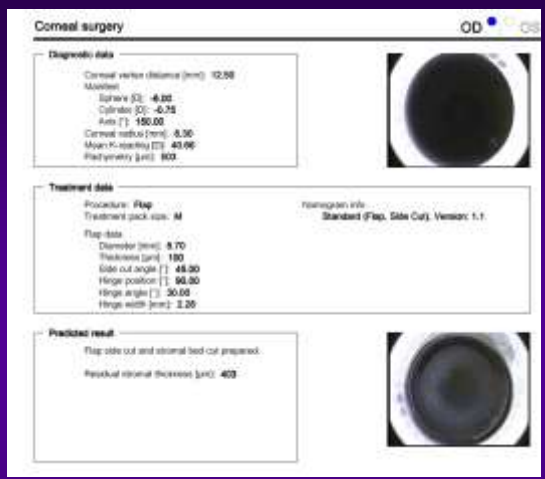
- Bevel In : 45°

Side Cut (Bevel In)

- Bevel In : 45°
- Epithelial invasion



Bevel in (Reposionnning)



110 nJ
45° side cut
8.7 mm
2.2mm hinge
80 µ

No keratectomy & lift incidents
No side effects (Haze , SOS , TLSS)

80 / 100 µ Flap (1 month)

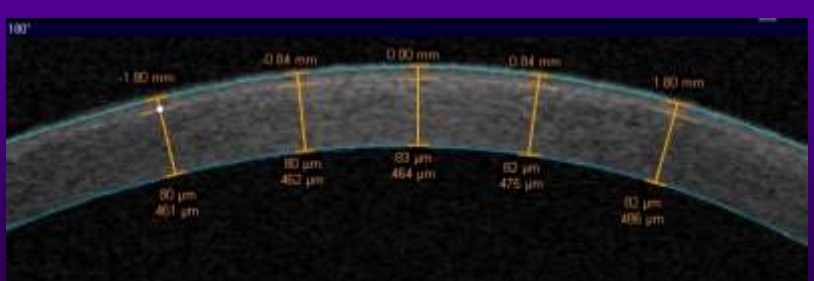
Pre B.C.V. :	9.14 / 10	9.17 / 10
Post U.C.V. :	9.85 / 10	10.46 / 10
Pre H.O.A. :	0.30	0.30
Post H.O.A :	0.34	0.33

80 / 100 µ Flap (1 month)

- Pre B.C.V. : 9.14 / 10 9.17 / 10
- Post U.C.V. : 9.85 / 10 10.46 / 10
- Pre H.O.A. : 0.30 0.30
- Post H.O.A : 0.34 0.33

Femto LASIK Flap

- Low energy : interface complications
- Thin flap : stromal saving



Femto LASIK Flap

- Large diameter : laser zone
- Bevel in side cut : wound architecture
- Small hinge : coma