FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

JANUARY
MONDAY
009-357 / Wk 02

09

1. Rubella Syndrome — Jan 13
8 am — Lowe — 25
Nyphanic dystrophy — 26
9 — Fabry's disease — 27
Ehler Danlos — 29
10 — Weil Marchesani — 30
Homocystinuria — Feb 2
11 — Marfan's — 4
Coagen — 9
12 — Arthropathics — 11
Syndromic RP — 16
1pm — Smart phone fn Ophthal — March 02
Operating scope. — 7
2 — OCT — 16
OCTA — 31
3 — Laser devices — April 4
SLO
4 — CSLO
Spectralis
5 — SLP
RTA
6 — Fundus Camera — May 04
Wide field Imaging — 09
7 — Ophthalmoscopy — 14
Slit lamp — June 02 ✓
✓ Optic Pachymetry — 26 ✓
Specular Microscope — Nov 16
✓ Confocal — 26
ORA — 30
Gonioscopy — Dec 03
Femto Assisted Keratoplasty — 18
9 — A Scan — 21
0

FEB MAR APR MAY UN

10 JANUARY
TUESDAY
010-356 / Wk 02

DECEMBER 2011

M	T	W	T	F	S	S
•	•	•	01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

IOL Master — Dec 24
LI
PAM

9

Corneal Topography — Feb 18
ORBSCAN
Pentacam

10

11

UBM — Sept 17.

12

Keratometer — Oct 25

1pm

2

3

4

5

6

7

8 am

Refractive Sx

Myopia

RK — July 01, 02, 11

LASIK — 23

LASEK — Aug 16

Epi LASIK — 21

C. LASIK — 23

9

Wavefront guided system — 26

LASIK - Extra — 27

10

~~RLE~~ (SMILE) — Sep 02

Orthokeratology — 07

Intacs — 11

11

12

1pm

Lens based Refr Sx.

RLE — Oct 02

2

PIOL — 06

Combined procedures — 11

3

Hyperemetropia — 16

Conductive Keratoplasty — 20

4

5

Presbyopia — Nov 02

6

7

FEB

MAR

APR

MAY

JUN

Rubella Syndrome

8 am

9 Ocular.

10 Cong Cataract.

11 Salt & pepper Chorioretinopathy

12 Micro-ophthalmos

1pm Cloudy Cornea

2 Poorly dilating pupil.

3

4

5

6

7

Ear defects

Deafness due to destruction of Organ of Corti

Heart defects

PDA
PS
VSD.

8 am — Hallermann Streiff Francois Syndrome
- Congenital Membranous Cataract.

9

10 — Rothmund Syndrome — R
- Zonular Cataracts

11

12 — Werner. Syndrome — PSC.

1pm

Reinke Syndrome — Ocular Contusion Syndrome
- Subluxation of Lens
- Mydriasis.
- Tear of Iris

2

3

4

Stickler Syndrome — Ectopia Lentis

5

6

7

XR

Lowe's Syndrome

Oculo - cerebro - renal

8 am

9

Ocular

C. Cataract

10 C. glaucoma

Blue Sclera

11 Microphakia

Thin / disc like Cataract

12

♀ - Multiple punctate lens opacities.

1pm

Systemic

Mental Retardation.

Dwarfism.

Osteomalacia.

Mal hypotonia.

Frontal prominence

2

3

4

5

6

7

DECEMBER 2011

M	T	W	T	F	S	S
•	•	•	01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Myotonic Dystrophy

AD
Myosin.

Ocular

Ptosis
Cataract
- Christmas tree
- Pre-Senile

Systemic

- Delayed relaxat^n of contracted mal
- Weakness of facial musculature
- Cardiac Conduction defects
- Proximal frontal baldness

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Fabry's Disease

α galactosidase.

Systemic

CVS. Impairment.
Renal Impairment.
Angiokeratoma.
Severe pain in finger & toes.

Ocular

Spoke like lens Opacities
Cornea Verticillata.

28 JANUARY
SATURDAY
028-338 / Wk 04

DECEMBER 2011

M	T	W	T	F	S	S
•	•	•	01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Ehlers Danlos Syndrome

Fibrodysplasia Hypelelastica

AD.

8 am

9

Systemic

Ocular

10 Hyperextensibility

Loose skin & folds

Subluxation of Lens

Blue Sclera

11 Angoid Streaks

Keratoconus

12 Epicanthus

Ptosis

1pm Strabismus

Yeterica's Sign

2

3

4

5

6

7 SUNDAY 29

8 am

Weil Marchesani Syndrome

AR.

Mesodermal dysplasia.

9

Systemic

Ocular

10 Skeletal – Brachycephaly

Short Stature

Brachydactyl

Broad Thorax.

Hyperextenable joints

Microspherophakia.

Lenticular Myopia.

11 Forward subluxation of lens.

12 Pupil block glaucoma.

- Paradoxical
- Inverse.

1pm

Mental retardation.

2

3

4

5

Rx

- Laser Peripheral Iridotomy
- Miotics

6

7

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

Homocystinuria

AR.

8 am — Inborn error of Methionine Metabolism
def of Cystathione synthetase

9

10 — Systemic — Ocular

Bil Subluxation of Lens — Inferio Nasally
Accomodation power ↓
Glaucoma
Myopia.
Retinal detatchment.

11

12

1pm

2

3

4 — Skeleto-Mal — CNS — CVS

5 Tall ≤ typical facies — Seizure — Thrombo-embolic episodes

6 fair Complexion
Malar flush.

7 light coloured hair

Mal weakness
Spastic gait
Scoliosis

~~Marfans~~

Dx

8 am Homocysteine in Urine — Na. Nitroprusside test
Homocysteine & Methionine levels in Serum

9

10

Rx

11 Medical — Rx of ectopia Lentis

12 ↓ Methionine
↑ Cysteine diet
Wt B6 supplementation

1pm

2

3

4

5

6

7

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

#

Marfan's

AD ⊆ complete penetrance bt variable expressivities

New Mutat^n ↑ Paternal age

Mesodermal dysplasia — fibrillin. — Suspensory lig of Lens

Chr 15 — Long arm.

⊗ Mental Retardation.

Ocular

- Ant Seg
  - Ectopia Lentis — ST
  - Keratoconus
  - Pupil — poor dilating
  - Iridodonesis
  - Heterochromia Iridis
  - Leiger Anomaly
  - Secondary glaucoma
- Post Seg.
  - RD
  - Thin choroid
  - Peripheral retinal deg
  - RAO.
- Other ocular related anomalies
  - Lenticular myopia
  - Anisometropia ⊆ amblyopia
  - Strabismus
  - Acquired Brown Syndrome
  - Nystagmus
  - Down slanting palpebral fissure
  - Enophthalmos

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Systemic

Cutaneous
- Skin folds
- Stretch marks

CNS
Dural Ectasia
Dilated CM
ADHD
Learning disability
Schizophrenia.

Pulmonary
- Pneumothorax
- Bullous emphysema
- Sleep Apnoea

Mal Skeletal
Dolichostenomelia
Arm Span > 1.05
US < LS (0.86)
Arachnodactyl.
Chest Wall abnormality
Hyperextenability of joints
Scoliosis > 20°
Thumb Sign.
Wrist Sign.
Pes planus

CVS
Aortic dissection.
MVP, MR
PA dilatation
TIA, Stroke

SUNDAY 05

MAR APR MAY JUN

8 am — Brown Mc Lean Syndrome — Peripheral Corneal Edema + clear central cornea occuring after Cataract Sx

9 — Punctate Braun pigments underlies edematous iris.

10

11 — Irvine Gass Syndrome — Viteoretinal adherance, Persistent Corneal Edema, CME] following ICCE or Compli ECCE

12

1pm

⇓

2 — Vitrectomy.

3

4

5

6

7

Cogan's Syndrome

8 am

Multisystem Vasculitis

9

10

- **Vestibulo auditory**
  - Deafness
  - Tinnitus
  - Vertigo
- **Ocular Symptoms**
  - Redness
  - Pain.
  - photophobia
  - Blurred vision
- **Ocular signs**
  - Bil peripheral Ant stromal opacities
  - Deeper "
  - Corneal NV. (Mid stromal Vascular loops)

11

12

1pm

2

3

4 ESR

CRP

5 MRI — Inner Ear Atn

6

7

Susac Syndrome — Retinocochleocerebral Vasculopathy.

D.D of Cogan.

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

familial VR disorders

8 am
- Optically empty vitreous cavity ≤ sparse interwoven memb & bands

9
- degenerative pigment epithelial alterations
10
- lattice like changes in retina.
- subnormal ERG

11

Ocular features — + Systemic

12

1pm

cspg2.

COL2A1

2

Jansen — Wagner — Stickler

3

AD.

4

< RD predisp »

5

6

Simple RD mx by buckling

7

✎ × Systemic ✓

Dutch — Swiss

» Progress ↓ Simple

Sticker

Wagner.

Type I COL ZA I
8 am II COL IIA1
like COL IIA2

AD.

Recard gene Cs PG2.

9

10

11

CF

Ocular Others

Empty VC
Sparse Intravitreal memb
↑ Myopia
Dev Cataract / Ectopia lentis
OAG
RD »

Anterior / Post Costcal Cat.
Mild - moderate Myopic
Bone spicules.

4

5

6

Mx

Periodic fundus Examinat^n.
Cataract / extraction
Buckle ← → Px & Mg of retinal tears
Genetic Counselling as → SUNDAY 12

25%. affected
25%. Un "
50%. asymptomatic Carriers

MAR
APR
MAY
JUN

13 FEBRUARY
MONDAY
044-322 / Wk 07

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

8 am

9

10

11

12

1pm

2

3

4

5

6

7

(*) → Oro facial Abn. — flattening of nose

Pfeffe Robin malformation

Micrognathia

Cleft palate — Glassoptosis

→ SNHL

→ Skeletal Abn — Hyperextensibility
Precocious Arthritis
Mild spondyloepiphyseal dysplasia

→ RD

→

15 FEBRUARY
WEDNESDAY
046-320 / Wk 07

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

Syndromic RP

8 am Usher Syndrome

AR.

I II III

SNHL

Extinguished ERG

Progressive Vestibular dysfxn.

Late onset pigmentary retinopathy

- Premature Ageing
- Skeletal Anomalies
- Mental handicap
- Salt & pepper fundus
- OA.

Kearns Sayre Syndrome

Mitochondrial Inheritance

CPEO

✓

Choroidal atrophy or Choroideremia

8am Bassen Kornweig Syndrome. — Refsum disease

9 AR — AR.

10 ↳ beta lipoproteinemia — Infantile — Adult forms

11 PTT.

Spinocerebellar Ataxia

12

Acanthocytes – Thorny red cells

1pm

2

3 Ptosis — Skin

4 Ophthalmoplegia — Neurological

5 Strabismus — Visceral features

6 Nystagmus.

7

Scattered white dots. — ⁂.

17 FEBRUARY
FRIDAY
048-318 / Wk 07

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

Bardet Biedl Syndrome

8 am

Polydactyl

9

Mental handicap

10

Bull's Eye Maculopathy.

11

12

1pm

2

3

4

5

6

7

Corneal Topographer

8 am

9

10

11

12

1pm

2

3

4

5

6

7

- Placido based
  - Tomey CA 200 F
  - Eyesys
  - AsteraPax
- Scheimflug based
  - Pentacam AXL
  - Oculyzer
  - Precisio
  - Galilei
  - TMS-5
  - Sirius
- Horizontal slit scanning
  - Orbscan III
    - ↓
    - Precorneal tear film
    - ↓
    - Endothelium

(x tear film)

- Pasteurography based
  - PAR
- Very high freq USG based
  - Artemis 3
- OCT based
  - Visante Omni
  - RT Vue
  - IOL Master 700
  - Cirrus HD OCT

CT + Abberometer

↓

iTRACE.

MAR

APR

MAY

JUN

20 FEBRUARY
MONDAY
051-315 / Wk 08

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

a) ORBSCAN III

8 am

1995 — I

1999 — II

2014 — III

9

III — slit Scanning (Projective)

10 + Placido based (Reflective)

11

12 40 Scanning slits

240 data pt / slit

1pm 20 L — 20 R

2

23,000 data pt. compared to 9000

3

4 & assumption of spherical.

5 Eye tracking (+)

6

Calculate — Ant Corneal.
Post Corneal
WTW
Ant lens surface.
Pachymetry
AC

7

Calculate BFS.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Quad Map

- Ant elevation
- Post
- Curvature Map → Placido based.
- Pachymetry Map → Precorneal tear film → Endothelium

) give KC Criteria.

22 FEBRUARY
WEDNESDAY
053-313 / Wk 08

JANUARY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

PentaCam

50 image in < 2s.
500 true elevation pt
Total 25,000 true pt.

2 Cameras

- Detection & Measurement of pupil → Fixation & Orientation
- Visualization of Ant Segment

Image — both Ant & Post Surf.

Pentacam AXL — Oculus
→ HR → AL Measurements

5 fxn:
- Pachymetry
- Scheimflug image of Ant Seg
- Corneal tomography
- Cataract Analyser
- 3D AC Analyser
- Measurement of AL of eyeball

8 am

Tech Data

9 Blue light — Rotating Scheimflug Camera — Processor

10

475nm

11 to illuminate eye

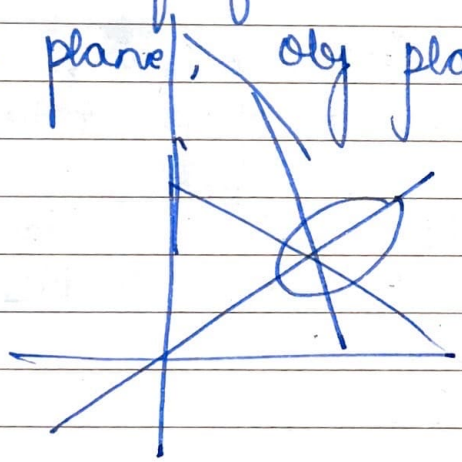
12

1pm

Working principle

2 Scheimflug + Placido Ring

3 Picture plane, Obj plane, film plane



4

5

6

7

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

Application

Output

8 am

9 a) Scheimpflug Image

10 b) Corneal Topography

11 L Quad Map

12 L KC detection

1pm L Corneal Wavefront — Zernicke polynomial

2 BAD, BAD II

3 c) Pachymetry — Thinnest pacy
At pupil Centre
apex

4 L PTI
L CT&P

L ART < Max
Ave

Ectasia
>391
512

5 L PPI

6

d) 3D AC Analyser

7

e) Densitometry of lens — Evolution of Cataract
Classificat^{n} of C.
Lens Lasy
thickness

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

FEBRUARY
SATURDAY
056-310 / Wk 08

25

8 am

9

Apply — KC Detection
PEDP · KR Sx.
Progression of C. Sx

11

IOL calculation Post LASIK

12

1pm

2

3

KR Sx planning
Glaucoma Screening
IOP · modification ⇔ CCT.
KC Detection

x LASIK.
<400
<400

4

5

6

SUNDAY 26

7

Phakic IOL.
Glaucoma Screening

MAR
APR
MAY
JUN

27 FEBRUARY
MONDAY
058-308 / Wk 09

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

8 am f) Improved IOL calculation post LASIK

9 g) AL Measurement

10

11

12

1pm

2

3

4

5

6

7

01 MARCH
THURSDAY
061-305 / Wk 09

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

	No.	Topic	Page No.
8 am	1.	Smart phone in Ophthal	March 02.
9	2.	Operating Microscope	Mar 07.
10	3.	OCT	March 16.
11			
12			
1pm			
2			
3			
4			
5			
6			
7			

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

MARCH
FRIDAY
062-304 / Wk 09

02

Smart phone in Ophthalmology

8 am

9 Patient assessment tools

10

- Testing tool
- Eye Handbook
- Peek acuity
- Snellens by Dr Bloggs
- Eyetest by Bokan Tech
- PL light & pen light
- Paediatric fixation targets

Smart phone Ophthalmic Imaging

(B)

Education & Ref tools

- Colour coded retinal drawing
- Colour attack
- Clinical trials
- All classification & grading system
- Application for access to database
- For track of medical advancements
- Normal lab values
- Skyscape Rx Drugs
- MedMath for calculating scores

Patient education tools.

- 3D application for anatomy
- My eye drops

Smart phone based Calculators

- IOL Calculator
- TORIC.
- glaucoma risk Calculator
- IOP-CCT Calculator

APR

MAY

JUN

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am

Office tools for patient record & administration

- HIS
- DrCheano EHR
- OsiriX, Meditech – hospital PACS Pufo use.

Tool for Vision Researchers

- Specialized Basic Science application
- Animated Tutorial.

1pm

- ICD coding

2

- TeleOphthalmology

3

Smart phone Ophthalmic Imaging.

4

5 Image Transfer & Display device

As Digital Camera

6

7 from Conventional fundus Camera

Telemedicine

OsiriX Meditech

PACS Picture archiving & Communication System.

→ Ant Seg Imaging.

→ Smart phone fundoscopy

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

MARCH
MONDAY
065-301 / Wk 10

05

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Smart phone fundoscopy

- i Examiner.
- Smart phone assisted video IDO.
- Direct Ophthalmo & Smart phone
- Fl. Angio

- MII-Fetcam.
- For Central fundus Imaging
- Peripheral Imaging
- Filmic Pro-app.

APR

MAY

JUN

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

MARCH
WEDNESDAY
067-299 / Wk 10

07

Operating Microscope

Min demand — Enlarged, Upright & unreversed Image.

fulfilled by Prism. Binocular loupes.

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Components

- Observation System.
  - Objective lenses
  - Binocular tubes
  - Eyepieces
- Illumination System.
- Mechanical Support

Observation System.

- Inverting prism system.
- Magnification changer
  - Galilean Step Magnification changer
  - Zoom Magnification changer

APR
MAY
JUN

08 MARCH
THURSDAY
068-298 / Wk 10

Observation System

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am
9
11
12
1pm
2
3
4
5
6
7

Objective lenses

Dist b/t obj lens & pt eye = focal length of objective lens

150, 175, 200 mm

Working dist imp for surgery
↳ strain during lengthy operation.

Objective focal l ∝ Magnification of uscope.

Binocular tubes.

Straight | Inclined → comfortable view

Tube obj ⇒ image at f (eyepiece)

125 mm
160 mm

f(tube) ∝ Overall tube length ∝ magnification

Size of image (tube) << original obj at obj lenses

⇓

Everything to maintain proper distance b/t surgeon & working zone.

Eyepieces

Astronomical telescope system.

Total = x of various components

10x, 12.5x
16x 20x

Choice of eyep ∝
- Magn
- field of view

Range 4x to 40x

Std = 12.5x

Binocular tubes

8 am

9

10

11

12

1pm

2

3

4

5

6

7

- Inverting Prism Systems.
  - Porro Abbe Prism
    - To correct Inverted image produce by eyepiece
  - Galilean step Magnification changes.
    - 2 optical components
      - \+ , − lens
      - 2 telescope
        - 2·5 X
        - 1·6 X
      - 2 optical component reversed
        - 0·4 X
        - 0·63 X.
    - One face path = Magnificat^n 1
    - ∴
    - Range 0·4, 0·63, 1, 2·5, 1·6
    - Can change by turrette system.
- Magnification Changes
  - for Req. Magnification
  - Contnous change in Magnification 0·5x to 2·5x
  - foot control
  - Difficult
  - Expensive.

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am

Magnification

Total Magnificat^n = $\frac{f_T}{f_O} \times V_e$.

f_T = Tube lens focal length

f_O = " " objective.

V_e = Magnificat^n of eyepiece.

9

10

11

Magnificat^n changes in b/t

12

1pm

$= \frac{f_t}{f_O} \times V_e \times$ Magnification factor.

2

Field of view = $\frac{f_O}{V_e}$.

3

4

Parfocality = To remain in focus
5 & change of Magnification.

6 Highest Magnific — Up & down focusing

↓

7 Object viewed comes in. SUNDAY 11
focal plane of objective lens.

↓

change to lowest Magnification

↓

Adjust eyepiece

Illumination System

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Incandescent lamps

4% emit light of fed system.
Infrared emission

* Comply ≤ video recording.

Halogen lamps
12V, 100W
appears whiter.
Cool light Illuminators
Lot of Heat

» Sensitive to voltage fluctuation
» Expensive

↙ → ↑ intensity light.
↑ colour temp.
↑ % of blue light.
↑ contrast of objects

Binocular. vs Integral vs Co-axial vs Oblique

↓ Heat
» easier change of bulb

↓
Post Capsule Uveitis Sx

13 MARCH
TUESDAY
073-293 / Wk 11

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am

Mechanical support system

- floor model.
- Table mounted model
- Celling models
- fast, controlled X-Y coupling.
- Up & down focussing.
- Zoom. Magnifier changers.

9

10

11

12

1pm

2

3

4

RoA — Ingenuity 3D Heads Up.

5

6

7

8 am

Optical Coherence Tomography
10μ axial resolution.

9

Basic Principle

10

Interferometry

Low Coherence light
- Near infrared range.

11

↓
820nm.

12

Probe beam

Reference beam

1pm

2

3

reflected back beam

4

Interference

5

detected by Photodetector.

6

2nm depth tomogram

7

Axial resolution

Transverse resolution

↓

low Coherence light source

↓

probe beam diameter

↓

20μ

1/2 OCT 3

↓ ↓

10μ 7μ

APR

MAY

JUN

17 MARCH
SATURDAY
077-289 / Wk 11

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

OCT Machine

- Fundus viewing unit
- Interferometric unit
- Computer display
- Control panel
- Printers.

Generations

	OCT 1	OCT 2	OCT 3
	20		
	10	4.	7-8μ.
		Improved user interface	
		100 vertical scan	512

Commercially available

- Post seg
  - Zeiss Stratus
  - + Non Mydriatic Retinal Camera
    - Topcon
- Spectral
  - Optopol
- Ant seg
  - Zeiss Visante
- SL-OCT
  - Heidelberg
- Dual (OCT + SLO)
  - OTI, OCT/SLO
- OCT
  - Topcon

SUNDAY 18

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

MARCH
MONDAY
079-287 / Wk 12

19

Types

8 am

Post Seg Imaging

Ant Seg Imaging

9

10

11

12

Macular Scan

Glaucoma

ED-OCT

Enface OCT

1pm

2

OCT-Angio

Swept Source OCT.

3

OCT SLO

4

5

Macula Protocol

Optic Disc

6

OD

RNFL

7

Line Scan

Radial line

Macular Thickness Map (MTM)

Fast MTM

Repeat

Pastel lines

Macular Scan

APR

MAY

JUN

20 MARCH
TUESDAY
080-286 / Wk 12

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am

Procedure

Activation — data

↓

9 Pt position — fixation target

10 Protocol for scan — 19 in Zeiss

11 Production & display of Image.

12

1pm

2

3

4

5

6

Colour Coding

7

Red yellow — Blue black

↓ ↓

Max Optical reflection — area of min signals.

Back scattering

Interpretation

8 am

Vitreous — Black.

9

Vit-retinal interface

10

Retinal layers - Ant boundary — RNFL — Red due to back scattering

11

12

Post " — RPE/Choroid Capillary — Red

1pm

Outer segments of retinal photoreceptors
└ dark layer.

2

3

Different layers of NS retina.

4

5

6

7

22 MARCH
THURSDAY
082-284 / Wk 12

Macular Scan

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Line scan
0° L.
5mm scan

Radial scan
6-24 line scan
Retinal Thickness/
Vol analysis

Macular thickness Map
6mm
M. thickness measure.

Fast macular thickness Map
1.92s to acquire 6 scan.
6mm length
Comparitive

Raster line
6-24
Copy.

Repeat
Repeat earlier protocol

Macular scan
6 linear scan
Spoke 30° apart
Blue — Thin
yellow green — Thick
fovea — depression

8 am — OD scan
4mm length
30°

RNFL assesment.
& OCT

9

OCT 3.

10 OD boundaries & — choio
diameter terminate at
lamina Cribrosa

RNFL 1lv cross scan
fast circle scan
Conc 3 ring protocol.

11

• Optic Cup — NFL
12 terminates

RNFL Map
Circles
Circular Scan 1.34mm
radius

1pm All parameter

Various disorder

2

3 Post Seg

glaucoma.

4 – Macular hole

RNFL detection
(Pre-perimetric)

5 – Macular Edema

(2) Macular changes
L Hypotony
induced maculopathy

6 – ARMD

7 – CSR.

~~8~~ – ERM

(3) Cystoid Macular Edema
after Cataract &
glaucoma Sx.

– Solar Retinopathy

APR
MAY
JUN

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am

9

10

11

12

1pm

2

3

4

5

6

7

SUNDAY 25

ED-OCT

Deep penetration

- Improved eye tracking
  Long λ.
  ↓ Signal to noise ratio.
  Better Image avg Capability

Healthy
Speckles

Tissues
HD OCT

Retinal & Uveal pathology

Pachychoroid states.

Choroidal hyperpermeability

Disease
&
Chorioretinal atrophy.

Choroidal thickness Measurement

Tx not detected by USG

Disease dx

Rx modality

Swept Source OCT

8 am

3D

890μ

SS

1050μ

9

CCD Camera

Photodetectors

10

2*

1 lac A scan/s

A scan speed

50,000

11

12

6-9 mm

B Scan

12 mm (wide)

1pm

2

✓

Cataract
x FP
PPV
Clouquet Canal
PCV

3

4

5

Broad Super luminescent diode.

Wavelength tunable laser & dual balanced photodector.

6

Spectrometer

7

↑ speed line Scan Camera

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

En face OCT.

8 am — different software to reconstruct C scan images

9 — Subtle pathology
Precise localization of lesion
Retinal vessels landmark

MEWDS
CME
GA
PCV
PCV.

10

11 — Used in Ant seg
glaucoma
Infectious disease
Retina.

12

1pm

2 — Derived from spectral domain

3 — SD OCT + transverse confocal analysis

4 — ∴ transverse section of retinal & choroidal layers at specified depth

5 —

6 — A scan → B scan → C scan

7 — ∴ 3 d block formed.

8 am

OCTA

Non Invasive, To visualize vasculature & out P.V by of colour/ contrast

9

Conventional OCT vs OCT - SLD.

10

Exact site of pathology in AP terms

11

SLD + OCT

12

- Coronal images along various depths

1pm

Long axial — 8µ

2

Tx — 20µ.

scanning field - 25°

3

depth 0.5 - 6 mm

4

detect ONH & RNFL characteristic

5

goes

6

B Scan C Scan

7

Cross Sectional Coronal.

APR MAY JUN

29

MARCH
THURSDAY
089-277 / Wk 13

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

Limitation of OCT

8 am

Min pupillary dia — 4mm eq.

9

× in poor media clarity

10

× good in ↑ Astig
decentered IOL.

11

Limited transverse sampling

12

1pm

2

3

4

5

6

7

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

MARCH
FRIDAY
090-276 / Wk 13

30

OCT for Ant Seg Imaging

8 am

Distante

9

- Ant Seg Imaging

10

- Corneal Imaging & Pachy

11

- New Lasik Information

12

- IOL & Implant Imaging

1pm

2

3

4

5

6

7

APR

MAY

JUN

31 MARCH
SATURDAY
091-275 / Wk 13

OCT A

FEBRUARY 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	•	•	•	•

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Non Invasive Imaging

↓

Visualize Vasculature of retina Choroid.

X Injection of Coloured & Contrast subs.

Principle

Phase based system

↓

Phase Variance OCT.

Amplitude based System

↓

SSADA.

Split Spectrum decorel Angio

↓

Angio Vue software of Optovue.

Zeiss Angioplex

Topcon DRI OCT

Heidelberg Spectralis OCT2.

01 APRIL
SUNDAY
092-274 / Wk 13

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

✓ → In vivo. imaging of Vasculature

Use RBC movemⁿ in 6s image

9

Surface Images to see at various levels

10

Quantify Vascular Compromise & DR. severity

11

OCT → EN face OCT
OCTA.

12

Time domain

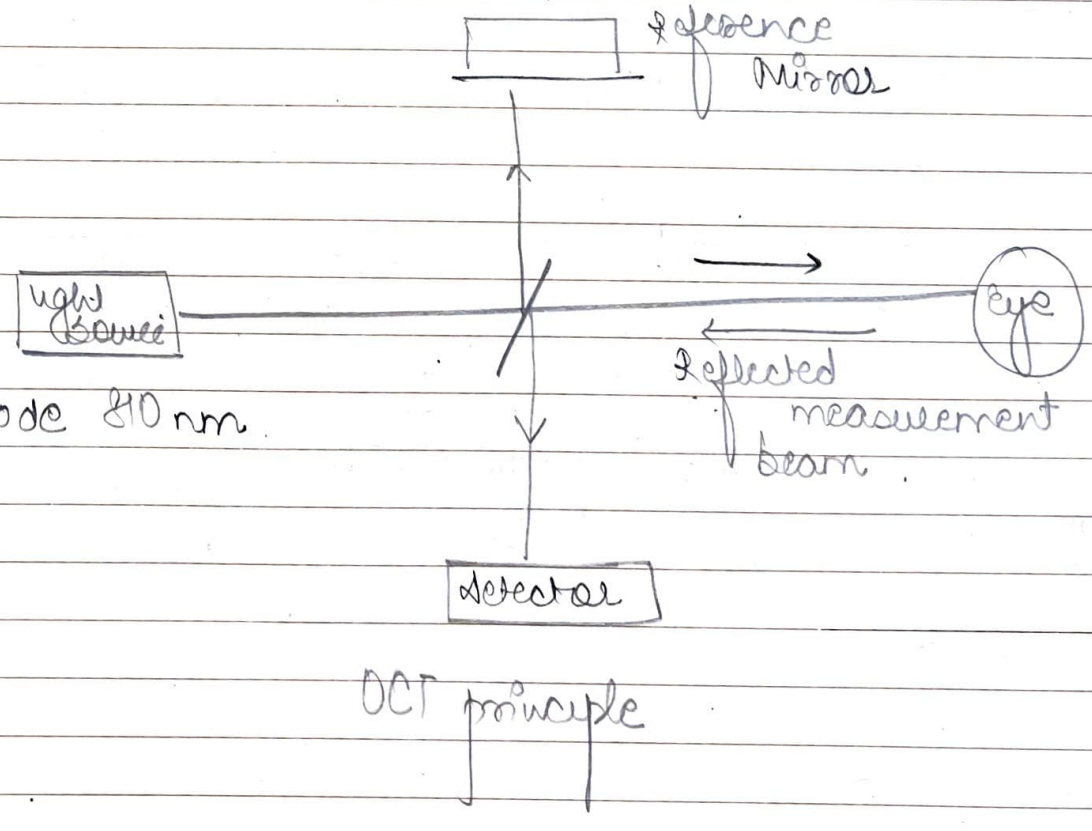
Fourier domain

1pm

Spectral

Swept Source.

2



3

4

5

6

7

OCT principle

Last pages diff

APRIL
MONDAY
093-273 / Wk 14

02

Time Domain

Low Coherence light

fibre coupler

Moving reference Mirror

photo detector

Computer

Scanning Mirror

Scan lens

Eye

Dichroic Mirror

Ocular lens

Spectral

Low Coherence light source

dispersion compensation

fixed

Stationary Ref mirror

fibre coupler

diffraction grating

Collimator

Lens

CCD

Spectrometer

Scanning Mirror

Scan lens

Eye

Dichroic Mirror

Ocular lens

03
APRIL
TUESDAY
094-272 / Wk 14

55

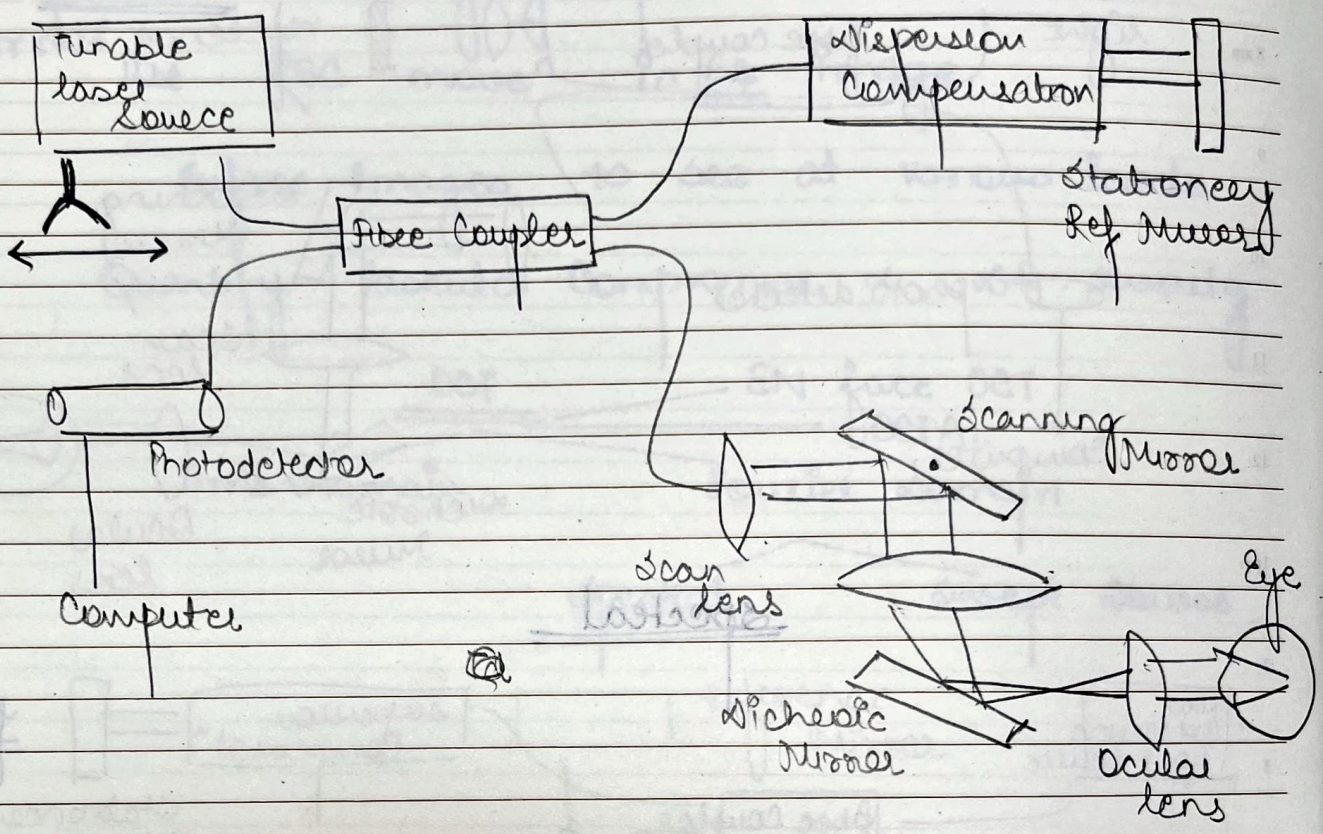
MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2
3
4
5
6
7



Uses tunable short Cavity swept LASER.
c centre λ of 1050 nm

λ ∝ degree of penetration

↓ Ref facts.
dampens effect of cataractous lens

faster scanning speed.
denser scan pattern
larger scan areas > SD OCT

Resolution ↓
speed = 2 * SD OCT (1 lac A scan)

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

APRIL
WEDNESDAY
095-271 / Wk 14

04

8 am

SLO

CSLO

Spectralis
HRA
+
OCT

9

10

11

Laser Scanning
Imaging
Technique

12

1pm

RTA. →

← SLP.

2

3

4

5

6

7

MAY

JUN

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Scanning LASER Ophthalmoscopy

8 am

Illumination system — samples retina pt by point

9

10

Principle — Inverted IDO.

11

Small aperture — Illuminate

12

Large " — View & collects all light

1pm

Small beam — bypass all opacities

2

3 Applications

- Scanning LASER acuity potential test E
  - foveal to extrafoveal eccentric fixation
  - In total loss Quantify how much by retina
- Microperimetry / scotometry
  - Seeing
  - Non seeing areas
- High speed FA ICGA — choroidal filling, R in AMD - Laser ≤ pinpoint accuracy

4

5

6

7

8 am

SLO.

Conventional fundus Camera.

Retina pt by point

As whole

9

10

11 < 1,000,000th of a

Illuminates for

millisec.

12

Temporal image

Spatial image

1pm

2 Laser

White light.

3

4

↓ level light
↑ light efficiency

5

6 Continous imaging
Large depth of field

7

Instantaneous image
availability for review

↑ Capture speed
Excellent image in media opacities.

Confocal &LO

8 am

Confocal

9

Conjugate Focal.

10

location of focal plane in retina. Image sensor] Conjugate positions

11

12

↓

Achieved by pinhole in front of detector

1pm

Size of pinhole ∝ Degree of confocality

2

3

HRT. Top SS.

4

5

6

7

MAY
LCN

MARCH 2012
M T W T F S S
• • • 1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31 •

APRIL 2012
M T W T F S S
30 • • • • • 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29

Heidelberg Retinal Tomographer

HRT

I II.

8 am

670nm λ

Source - He Neon diode LASER.

9 One reference plane is decided & then scan at X-Y plane. till depth of fundus.

10 Instrument Profile.

11 32ms - Image. Repetition - 20Hz.

12 Ref plane - // to peripapillary retinal surface 50μ posterior to retinal surface at

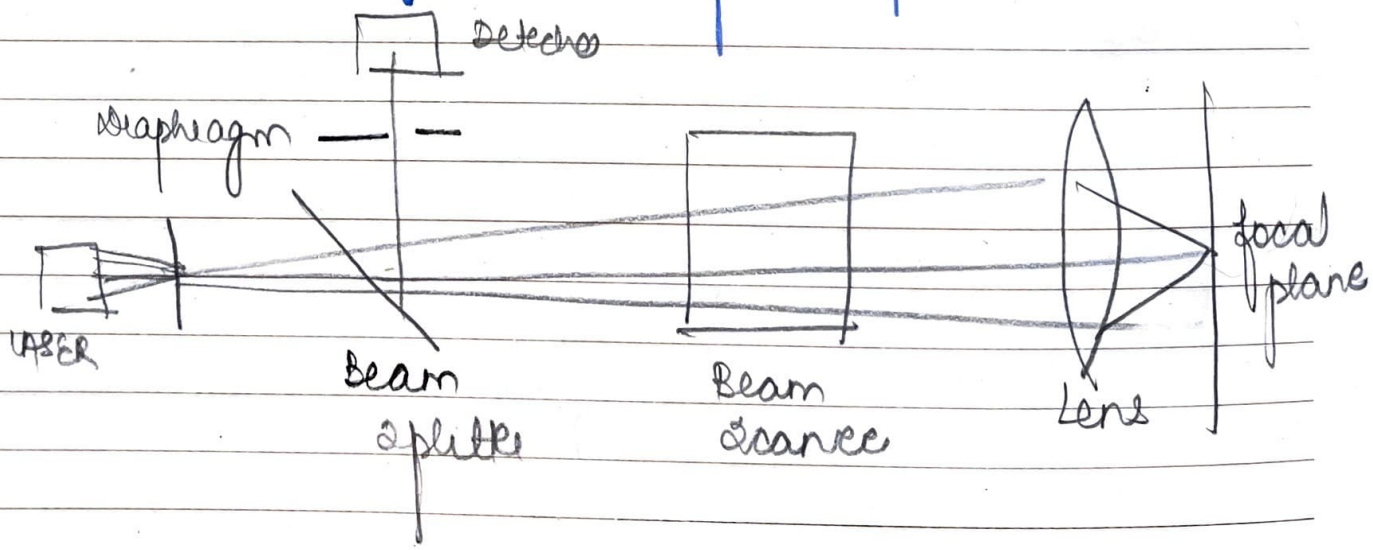
1pm papillomacular bundle.

2 ~~Retina~~

PMB - Intact longest & NFL is 50μ thick

3 at this level

4 ↓ Below is cup ↑ abv is rim.



Voxel

HRT - 1

8 am

32 scans

field of view — $10^\circ \times 10^\circ$
$15^\circ \times 15^\circ$
$20^\circ \times 20^\circ$

9

depth values in 0·5mm steps

10

Camera at 15mm 4m pt eye

11

3 Optimum Image series obtained.

12

32 Images — 256×256 pixel.

1pm

2 profile gives — symmetrical distribution

2

fed. 1 → decreasing → 32 white

3

4

Topographic image — Reflective image.

5

6

7

MAY

JUN

12 APRIL
THURSDAY
103-263 / Wk 15

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

HRT-II

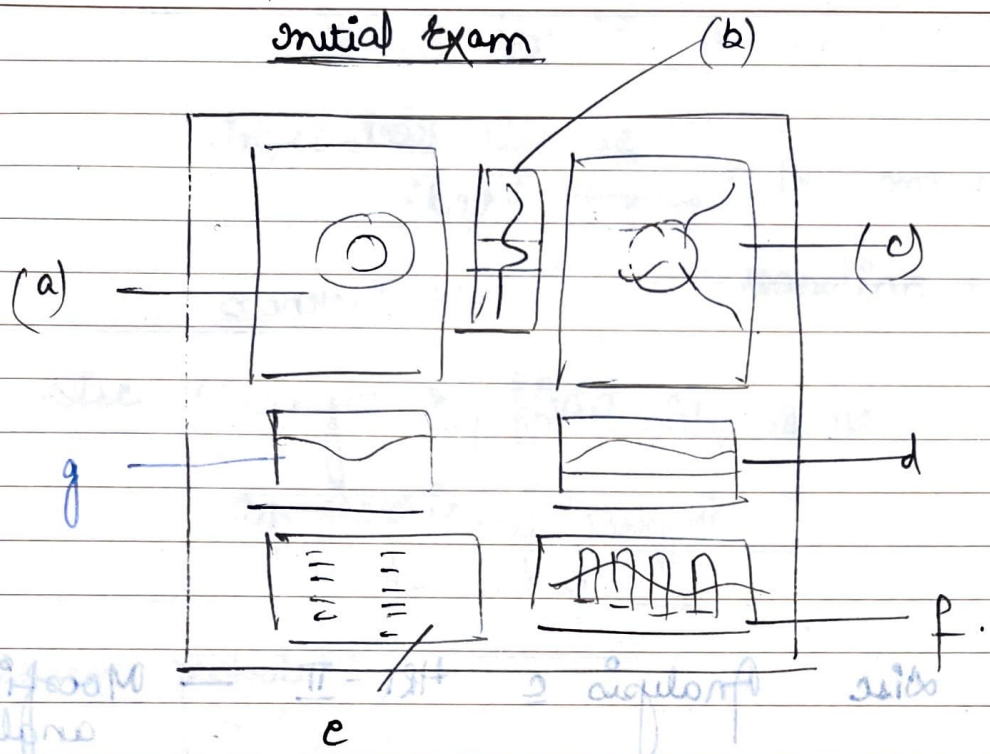
	HRT - I		HRT - II
			~675 nm
	256 x 256	resolution	384x384
	3	field of view	1 — 15°
	ONH + Macular scans		ONH only
			Semi-automated image acquisition
	32		16 images/mm

Uses

- SLT in glaucoma
  - Initial Exam.
  - Follow up.
- SLT in Macular disease
  - ~ 147,456 pt
  - OCT = 600-700 pt

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Initial Exam

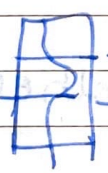


(a) Topographic image — colour coded, red – tall, white – deeper

(c) Reflectivity image — 6 sectors compared to normal database
- Rim (green & blue)
- disc area (green, blue, red)

LWNL → Borderline → Outside NL.

b, g — horizontal & Vertical Ht profile, ref line – red



border of the disc

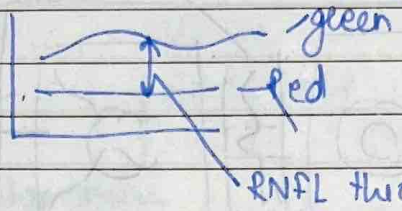
MAY

JUN

MARCH 2012
M T W T F S S
• • • 1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31 •

APRIL 2012
M T W T F S S
30 • • • • • 1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29

(d) Mean Ht Contour graph



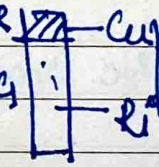
(e) Stereometer Analysis

Disc area
Cup/Rim area.
etc.

f Disc Analysis ⊆ HRT - II — Moorfield anglysis

% of rim area
Cup area

green
red



Rim > Cup 99% Normal

%Rm b/t 95 - 99.9% — Boedeline

% Rim < 95% — Outside Normal limit

SUNDAY 15

Cup shape measure — Thied moment
↓
Most useful indicater
Rim Volume — x affected by other parameters

Follow Up Exam

8 am

9

10

11

12

1pm

2

3

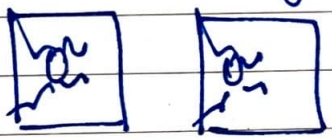
4

Progressive disease
∴ 3 consecutive reading
└ Baseline + 3 follow up.

Disc changes > field changes.

Topographic Analysis

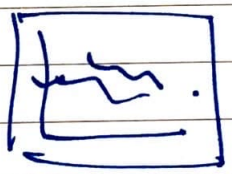
Change probability analysis



Red - depression
green - elevation

Ht change significant
├ If on 2 exam
└ in region of 20 connected super pixels.

Parametric change



>0.05↓ in 2 consecutive exam
↓
Suspected
↓ 3 exam
Confirmed.

MAY

JUN

Spectralis HRA+OCT

SD OCT + HRA.

8 am Spectral domain (Fourier domain)

9 Super luminescence diode (SLD) scan Cross sectional B scan

10 768 B scan Average λ = 870nm

11 SLO foll → FA

ICGA.

12 Infrared reflectance Imaging (IRI)
Red | Blue Reflectance.

1pm FAF

2 Simultaneous
- FA, ICGA
- FA, IRI
- ICG + IR
- AF + IR.

3

Principle

4 SD-OCT allows high speed / OCT.

5 high resolution

6 Laser beam focused on retina

7 ↓ Oscillating mirror → deflected beam

→ intensity measured

In Confocal system — any reflectance outside adjusted focal plane

⇓

Supressed ∴ ↑ Contrast

19
APRIL
THURSDAY
110-256 / Wk 16

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2
3
4
5
6
7

3 diff λ emited

for excitation of fluorescein.

ICG.

2nd diode LASER.

In Simultaneous FA – 488 nm LASER on ICG – 790 nm.

8 am
9
10
11
12
1pm
2
3
4
5
6
7

VCC
GSX 780
HRT 11 670
OCT3 830 nm.
Mode

		X	↑	89 %	310 N	
				98 %	262 g	
	30	X	↑	96 %	112 N	
				84 %		
	8-10	V	↑	95 %	328 N	
				89 %		

Light source
Resolution
Pupil dilated
Reproducibility
Repeatability
Send specificity
Normative database

MAY
JUN

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

APRIL
MONDAY
23

Retinal Thickness Analyser

Talia Tech

8 am

9 Mapping & Quantitative measurement of Optimal thickness & disc topography

10 ↓

RT at central 20° of Macula.

11

He-Ne laser — projected at ∠.

12 ↓

return at 2 peaks

1pm

Viteo-retinal. interface — Chorio-retinal Interface.

2

3 3x3mm scan — 16 total

4 5 (Macula) 3 (Disc.) 5 (Peripapillary area)

5

measures 16 data point at 187.5μ apart

6 Dx

DME

7 ARMD

CME

Macular hole

ERM

24 APRIL
TUESDAY
115-251 / Wk 17

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2 •
3
4
5
•
6
7

ONH Topographic Analysis

Disc topography

Rim/cup area Map.

Pseudo 3D. representation of disc topography

NFL thinning in glaucoma
∴ Early glaucoma damage.

OCT Imaging

Anatomical damage at Macula & Peripapillary — before symptoms

Obj assessment of all 3 components ± M D Peripx1

Scanning LASER Polarimetry.

8 am

Objective assessment of peripapillary RNFL

⇓

RNFL analyser GDx.

9

GDx ECC — VCC

10

fixed — Corneal Compensation — Variable

11

Principle

12

1pm

Retardation of polarized laser light passing through tissue possessing physical property of form birefringence.

2

3

Form birefringence → Light wave → split by polar material

4

5

∴ phase shift. ← diff velocity (Retardation)

6

Amt of Retardation α Thickness of polar tissue

7

diameter of polar structure ≪ λ of light used to image it

RNFL — Polar tissue — Microtubules present in highly ordered // axon bundles

No. of Microtubule α Retardation.

Optics

8 am — Near Infrared laser light 780nm used

9 — RNFL

2 ½ days

10 — Retardation.

11 — Birefringence

12

1pm — Total. RNFL.

Ant seg Am Cornea → Compensating Ant seg.
Lens
RNFL.

2

3

4

5 — FCC VCC.

6 — Corneal birefringence → measure & individually compensate for Ant seg birefringence

7 — Axis: 15°. Magnitude: 60nm.

Still wide variation. In healthy & glaucomatous eye.

yox VCC

8 am

OCLD + Integrated Ellipsometer.
(To measure retardation).

9

Procedure

10

2mm undilated pupil
780 nm LASER used
0.7s. Chair time < 3s for both eyes

11

12

Image & out Compensation (Total retard)

Macular region

1pm

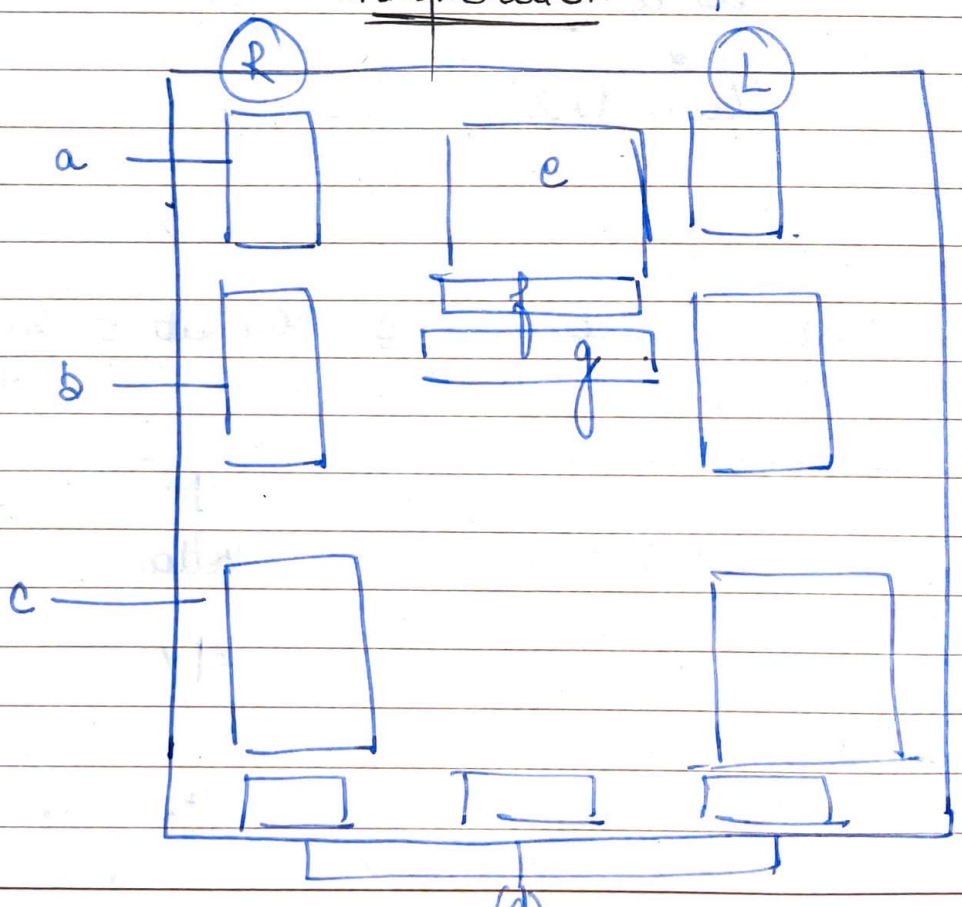
Ant Seg bifeigence as. uniform & symmetric bifi due to radial distribution of Henle's layer

2

3

Interpretation

4



5

6

7

MAY

JUN

28 APRIL
SATURDAY
119-247 / Wk 17

MARCH 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	•

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

(a) Colour fundus Image — 20° x 20°
Disc & peripapillary area
>16,000 data pt 4m scanned area

10 (b) Thickness | Polarization Map – RNFL is colour coded

Thick — Bright
Thin — Dark
Normal pattern — Bright / Dark

1pm

Dark.

Abn pattern → ↑RNFL Thickness NT.

- Diffuse loss — yellow.
- Focal ↓ Conc dark
- Asymmetry b/t SI
- Asymmetry in 2 eyes

6

(c) Deviation Map. Compare & narrative data

7 SUNDAY 29

- Dark blue — <5% tile
- Light blue — 2%
- yellow — <1%
- Red — 0%.

Quick look — give idea of wedge defect
Pattern of defect

(d) TSNIT graph along Calculation ellipse

8 am

9

Normal

10

11 Double hump pattern.

12

flat.

Loss of RNFL.

Symmetry graph

Normal — Max overlap b/t. 2 eyes

1pm

⇓

dip in 1 curve of 1 eye indicative of RNFL loss.

2

3

- TSNIT Seual graph — for progression analysis

4

5 (e) TSNIT parameters — < NFI indicator (f)

6

TSNIT avg — around entire ellipse

7 Sup avg — 12° region of Superior region

Inter eye Symmetry =0.9

NFI — Indicator of likelihood of eye has glaucoma

Value & glaucoma

1-30 — 30-50 — > 50

Normal — If suspect. — ↑↑ likelihood of G

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

Normal Value

8 am

TSNIT avg - 54·8 ± 4μ.

9

Sup avg - 66·8 μ

10

Inf 62·1μ.

NFL = 17·2 μ.

11

Ston at p <1%.

12

Borderline at p <5%

Other parameters

1pm

2 Symmetry = 1500 Thickest pixel S & I

3 Sup ∴ = S ∴ Temp

4 Inf = I ∴ T.

5 SN = S ∴ N

6 Max Modulation = Thickest vs Thinnest
1< indicate loss

7

Ellipse Modulation = Thickest/Thinnest in ellipse area

01 MAY
TUESDAY
122-244 / Wk 18 ✓

GDx VCC

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Easy Operate
× pupil dilate
good | reproducibility
× ref plane.
1st exam + detect glaucoma.
Early detection before std visual field.
Comparison d/t age matched normative data

X actual RNFL thickness
↓ sensitivity & specificity
× diff true from Benign variability
↓ used in Mod & Adv glaucoma.
× Indian pop database
affected by Ant & Post Segment lesions

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Fundus Camera & Related devices

MAY
FRIDAY
125-241 / Wk 18
04

8 am
9
10
11
12
1pm
2
3
4
5
6
7

IDO

based on Gullstrand's Ophthalmoscope
Ill path & obs path — diff pathway to avoid reflection from cornea & surface of crystalline lens

Optical System

Illumination System.

2 light source

Incandescent lamp.

Viewing fundus & focusing instrument

Taking photo.

Electronic flashtube

power

In lens — Combined.

Thr semireflecting surface

diaphragm at surf of holed mirror

Obj lens image it

form annulus ring of light

Obs & photographic system.

Holed mirror

entrance pupil

Illumination beam

Viewing beam

Annulus region

Central region.

Separated in plane of pt's pupil

flip mirror

film carrier & a shutter mech

* 2¼ — 35mm electronic motorized camera system.

stand Hand held

+OCT

-OCT

Mydriatic

Non

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

Commercially available Fundus Camera

8 am

9

Hand held FC.

Smart phone attachment-

10

Canon Power Shot G1

11 Nikon Cool PIX set.

D Eye Portable Eye & Retinal imaging System

12 +

200 for adequate focus

1pm

2

3

4

5 Mydriatic

Stand Mounted FC

20, 30, 50° field.

Zeiss FF450

Topcon TRI

Nidek.

Non Mydriatic

Stand mounted Camera

2 CCD.

6

Black.

White

7

Infrared Low Resolution

Alignment of pt retina

Colour Image of retina

Wide Angle

Heidelberg Spectralis

OPTOS.

Canon CR4-45 NM

Nidek Non mydriatic afc-330

Advantages

8 am

- Colour photography
- Monochromatic photography

9

10

11

Red free → Hmeg | Abn Retinal Vessels.

12

green free → CNVM — white, RV — Black.

Blue free → NFL.

1pm

2 ° ~~FAF~~ FAF
FFA
ICG

3

Modifications

4 ~~FFA~~ FFA.

5

6

7

- DFA
- Wide field Digital FFA
- Wide ∠ fundus Camera 148°. Contact type lens
- SLO
- Television Ophthalmoscopy
- Now Mydriatic fundus Camera → Infrared light used

× film — Uses CCD detector in camera.

08
MAY
TUESDAY
129-237 / Wk 19

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

DFA

✓

8 am Immediate Monitor display

9 Recorded on Hard drive

10 Print ✓

11

12

1pm

2

3

✗

Inferior to film based

Expensive

Additional space

Training & Maintanence

4

Commercially available System

5

Zeiss FF 450 +

50° 30° 20°

6

11× 19× 29×

7

Filters

10× eyepiece

Montage View +

Topcon.

Nidek FP10

Confocal

↓ abberation

4 diff lengths

Wide field Imaging

8 am 200° field of view in 1 picture as compared to 30-60° field of view

9

10

11

12

1pm

2

Retcam II & III	Panoret 1000A	Panoramic 200	Optomap Optos Cameca.
3	Trans-Scleral Illumination	Non Contact Non Mydriatic.	UWF + 200° view
4	✓✓ → ✓ in media opacity	2000x2000 pixel digital image	QLO ! ∴ wide peripheral view without Corneal lens Pupil dilation
5	✗ pupil dilate ✓ Adult FA + ICG.	✓ → ARMD DR. glaucoma	Bright illumination
6	✗ → ✗ in heavily pig uvea.	200° field of view	✗ = Small child & Uncooperative on table mounted
7	✗ Exposure Experience		

10 MAY
THURSDAY
131-235 / Wk 19

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

Retcam

II

- 3 chip CCD medical grade digital video cameras
- Hand held Image Capture unit
- High Index Corneal CL
  - RDP 130°
  - Children 120° Paed – adult
  - High Magnificatn lens 30°
  - 80° Lens ↑ contrast Paed & adult Imaging
  - Poteaut lens ↓ Ocea/Ext Imaging
- Image peocessing unit
- flat LCD
- Fn°ixn foot conteol.
  - Cone shaped lens
  - Wide field
  - digital format
  - → Comprehensive database
  - large storage device
  - FA.

III

- fully dilated pupil
- Anaesthesia
- speculum
- fixation of head
- coupling device
- Image capture unit

8 am

Limitation

Pupil dilated.

Other pt — .

Lack of stereopsis

× Adult — >>

scattering.

Advantages

- Mobile, self contained.
- Easy to use
- Avoid stress & expertise
- Inter observer Variability
- Teaching tool for students
- Easy case Hx.

Applications

- Paediatric retinal disorder
- Any eg Paedia
- FA

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	•
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Ophthalmoscopy

MAY
MONDAY
135-231 / Wk 20

14

8 am

Babbage 1848

↓

Helmholtz 1850

9

10

11

(a) Distant Direct Opt.

12 Semi dark room 20-25 cm

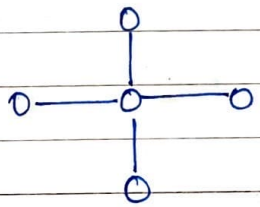
1pm Application → To dx opacities in refractive media
- To diff b/t mole & hole.
- To dx retinal detachment & tumors arising from the fundus

2

3

To determine the site — Use parallax method.

4



5

6

7

(b) Direct Opt

8 am

9

Optics

10

Convergent beam into eye of pt

11

// rays come out & brought to focus on retina

12

1pm

Hypro

&

M

2

divergent emerging rays

// rays

Convergent rays

3

4

focus by Convex as accomodation.

Concave lens

5

6

°° desired lenses interposed.

7

17 MAY
THURSDAY
138-228 / Wk 20

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

8 am

Characteristics of Image formed

Erect, Virtual, 14-15 * Magnified. in E

> Myopes ↓ Hyper.

9

10

11 $\frac{\text{Image}}{\text{Obj}} = \frac{B_2N_1}{B_1N_1}$

12

$= \frac{250\text{ mm}}{17\text{ mm}}$ Min distance of distinct vision (Nodal pt)

1pm

2 $= 14.9 \approx 15$

3 **field of Vision.**

always smaller than field of Illumination.

4

5 affected by :- $\propto$ size of pupil

$\propto$ axial length of eye

6 $\propto \frac{1}{\text{dist b/t observed \& observer eye}}$

7

$\propto \frac{1}{\text{size of sight hole.}}$

Technique

8 am

Rt eye ⊆ Rt hand
Lt eye ⊆ Lt hand

9

Observer at Ant focal plane of pt's eye 15.4 mm. from Cornea.

10

11 focus — Reskos disc.

12

Aperture	Use
1pm	
large spot	view dilated pupil
2	
small spot	viewing thru small pupil
3	
Red free fibre	RNFL, haemorrhage & vascular anomalies
4	
slit	for evaluating contour
5	
reticule / grid	Measure vessel calibre 0.2 mm increments
6	
7 fixation target	testing fixation pattern
Reskos disc —	+/- for focussing retina

Monocular Indirect Ophthalmoscopy

- Illumination rheostat at base
- focusing lever for image refinement
- filter dual red free & yellow filters
- forehead test
- iris diaphragm

Ix

Need for ↑ field of view
- Small pupils
- Uncooperative children
- Pt's intolerance of bright light
- Basic fundus screening

Extent of view

40° field of view.

Adv

↑ field of view

Erect real imaging

Disadv

- lack of stereopsis
- Limited illumination
- fixed Magnification
- Fair to good resolut

Binocular Indirect Ophthalmoscope

Nagel

Exam of post segment

8 am

9

10

11

Optics

12

Make eye — highly myopic by placing strong convex lens

1pm

⇓

2

∴ emergent rays from pt eye are made to focus b/t lens & observer's eye.

3

↳ real inverted image.

4

Binocularity → IPD for 60mm ——prisms——→ 15mm

5

6

field of illumination

M H.

7

↓ ↓

» ⇊

✎

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Image formation

Hypo | E | Myope.

Emergent rays

//

∴ focus at focus Prna

Divergent | Convergent

appears 4m.

imaginary Parge upright Pmage

inverted image.

inverted in front of eye

Inverted

Pn front of principal focus

C in its own focal length

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

steeng lens $\propto \frac{1}{\text{image}} \propto$ Bright $\propto$ field of vision

Real Inverted Magnified.

Characteristics of Image

Refractive status

Position of lens

Hypo | E | Myope

Condensing lens at its own f.

(a) Relative position

Emergent rays

divergent // Convergent

focus

further 4m. f. f. Near to lens than f

(b) Size of Image.

Position of Condensing Lens

Same size

f.

v = f.

Larger v < f Near Small

Small f > v far Large.

Principal Art focus of eye

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

(c) Image Magnification.

8 am

Power of eye / Power of Condensing lens $\frac{60}{20D} = 3\times$

9

10

Seen at 25 cm.

11 Received Magnification $\propto \frac{1}{\text{viewing distance}}$

12 field of observat^{n} $\propto$ Magnification

1pm

Practice

2

Pre-Requiste.

3 90D.
Dark room.

4 +20D.
Dilated pupil

5

6

Tech

7 Explain to pt
Sitting // supine

SUNDAY 27

Move away lens to focus

to see extreme gaze to examine Quad-

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY
MONDAY
149-217 / Wk 22

28

Scleral inderdation.

8 am — Depressor

9 — Most sensitive → Superonasal

10

11

12

Small pupil OphT. — 0.6mm pupil ≤ 28D / 30D

1pm

2

3

4

5

Fundus drawing — Angles chart inverted, laterally reversed

6

7 — 3 circles — Eq, Ora, PP.

Anatomical landmarks → Vortex vein, Long ciliary Vein, short ciliary Vein

Symbols & lesions

29
MAY
TUESDAY
150-216 / Wk 22

APRIL 2012

M	T	W	T	F	S	S
30	•	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	••	•

✓ | X

8 am
- larger field of retina (10*)
- ↓ distortion of image of retina
- easier to examine
- Easy eval – fnt to fq.
  - Hole
  - deg
- 3D view
- » hazy media

X
- 5* Magnification
- x in small pupil
- Uncomfortable
  - Intense light
  - Scleral indentation
- Cumbersome procedure
- Reflex sneezing

9 10 11 12 1pm 2 3 4 5 6 7

Difficulties faced

- difficult
- corneal reflexes → ↓ by lens at fi
- Reflexes 4m surf of lens → x tilting lens
  Use of aspheric lens

01 JUNE
FRIDAY
153- 213/ Wk 22

Biomicroscopy (in) exam of fundus

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am — Slit lamp + Lens.

9 — full Mydriasis

10

11 — **Hruby lens**

12 — Plano Concave lens — -58.6D. (~60D) of eye neutralized

1pm — Virtual, erect Image

2

3 — ↓ field — ↓ Magnificat° — Upto Equator

4 — 10° — 12 ×.

5

6

7

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

JUNE
SATURDAY
154-212 / Wk 22

02

stereopsis
↑ illumination
↑ Magnificatn
≤ slit beam

Contact Lens B

8 am

9 Modified Koeppe lens

Goldmann's 3 Mirror Contact Lens

10

↓

↓

11 Post fundus Lens

1 Central
3 peripheral

12 Virtual / Erect image

Rotate ↷ LA ↷ Visco

1pm

Lens tilt α 1/pt look α. 1/Area of retina

2

3 Inverted Image. Mainly Laser.

4

1		Central Circle	Post pole
2	59°	Trapezoid	Equator
3	67°	Rectangle	Ant peripheral fundus
4	73°	Dome	Ora & PP

5

6

7

Indirect fundus BioMicroscopy

8 am

Now Contact FB.

9

+78D +90D Double aspheric lens.

10

Real, Inverted image b/t lens & obj of slit

11

90D Mag = $\frac{60}{90}$ = 0.75 x

12

slit lamp 10 x

1pm

∴ 7.5*

2

3 field of view ∝ Diopter ∝ $\frac{1}{\text{Magnification}}$.

4

Slit lamp 10* 16*

5 4mm wide slit

Co-axial Illumination

6 Hold +78D, +90D 5-10mm 4m Cornea

↑ width of Beam.

7 ↑ Magnification for greater details

For appropriate gaze ask pt to look.

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

JUNE
THURSDAY 07
159-207 / Wk 23

SLIT Lamps · Biomicroscopy

8 am

Exam of living eye by means of corneal biomicroscope & a slit lamp.

9

10

11

12

Parts

1pm

- Observation system.
- Magnification system.
- Illumination system.
- Mechanical support system.

2

3 2 optical elements

4 Obj — Eyepiece

5

• gives enlarged image of near object

6

7 • long working dist

Obj → 2 plano Convex lens +22D.

Eyepiece — +10D
Converged at 10-15°

Prisms — To overcome problem of Inverted Image.

08 JUNE
FRIDAY
160-206 / Wk 23

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

Magnification System.

6x to 40x

8 am
9
10
11
1pm
2
3
4
5
6
7

Cazapkiscope
≤
rotating
obj.

Littmann.
galilean telescope
principle.

Zoom
System

∴ Variable
continuous
degree of
Magnification.

b/t obj & eyepiece
+ & − lens
- Relay lens
- Prism erector

Eg
Haag Streit Model
B & L.
Thorpe.

Eg
Zeiss
Rodenstock.
American

Nikon
Zeiss

Illumination system.

8 am

Gullstrand's.

- Light source
  - Nernst
  - Nitka
  - Hg
  - Halogen lamp
  - $2 \times 10^5 - 4 \times 10^5$ lux.
- Condenser system.
  - Plano Convex lenses & Convex surf in apposition
- Slit & other diaphragm
  - 2mm
  - 0.5mm
  - slit
    - Horiz
    - Vertical
- Filters
  - Cobalt blue
  - Red free
- Projection lens.
  - image of slit at eye
  - dia very small
    - Abberation of lens down
    - ↑ depth of focus.
- Reflecting mirrors & Prisms

SUNDAY 10

when req. narrow beam

Coincide & viewing axis.

11

JUNE
MONDAY
163-203 / Wk 24

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

Mechanical support system.

8 am

- Joystick arrangement

9

- Up & down move^{n}. arrangement

10

- Patient suppat "

11

- Fixation target.

12

- Mech. Coupling

1pm

2

3

4

5

6

7

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

JUNE
TUESDAY
164-202 / Wk 24

12

Tech

8 am

Pt adjustment
↓
Instrument adjustment
↓
Beginning of slit lamp exam
- Semi dark room
- diffuse illumination used
- Min exposure of retina to light
- ↓ Magnification to locate pathology

9

10

11

12

1pm

2

3

4

5

6

7

13 JUNE
WEDNESDAY
165-201 / Wk 24

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Methods of illumination.

- Diffuse I.
- Direct focal
  - Optical Section
  - Parallelo piped.
  - Conical
- Indirect
- Peteoillumination
  - Direct
  - Indirect
- Specular Reflection
- Sclerotic Scatter
- Oscillating Illumination of Koeppe

Diffuse Illumination

8 am

Microscope 0°

9

Achromatic light on out of Cornea

10

∠ b/t μscope & Illumination System
30-45°

11

12 diffusing filter used

1pm Magnification ↓ to Med
Illum Med - High

2

✓ 3 — General view — gross Inspection
Corneal Scars
Irregularities of lids
Tear debris

4

5 — CL fitting

6 — Cobalt blue filters & Fluorescein staining

7 — Rose Bengal staining

15 JUNE
FRIDAY
167-199 / Wk 24

Slit beam coincide ⊆ focus of illum light
30-45° ∠.

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am

Direct focal.

9 Optical section. Parallelopiped Conical

10

Narrow slit beam · 0·1-0·25mm ↔ 2-3mm. Flare
focus obliquely L 7-9mm ↕ Small Circular
direct Pn feeont

Small ∠. 45-60° temp & outo pupil 45-60°

Magnf — 7×10× 7×10× 16 → 20×

Dark room b/f. Cornea & lens

knife like histo section.

3 • Pathology of epi & stroma.

Cornea · Lens Ant 1/3 of uveous

• C. Scar / infiltrates

• H_2O clefts.

Tear film Ca

6 Nucleus • Cells & flare Pn 2×4mm

BM

7 Ca — Ant Capsule • KPs
C_{1a} — Subcapsular • Specular
clear zone

Curvature Thick $C_{1\beta}$ — first zone of disjunction

Locatn of f.b. C_2 — 2nd Cortical clear zone

AC's C_3 — Light scattering zone of deep cortex

C_4 — clear zone

N — Nucleus

flare - grey.

Cells — white dots.

Indirect Illumination

focus just behind area to be examined

30-45° angle.

2-4 mm Beam Width

Illumination ↓, M, H.

Slit lamp — offset.

C. Infiltrates
Microcysts
Vacuoles.
Epithelial cells.

18 JUNE
MONDAY
170-196 / Wk 25

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

Retroillumination

Reflected off Pris & fundus provide Info of form, refractive index & Consistency.

- **Direct**
  - 1-2mm wide
  - 4-5mm high
  - uscope & light in direct alignment
  - observer in direct pathway.
  - Illuminated.
- **Indirect**
  - at right ∠
  - ∴ Not in light.
  - Background.
  - Non illuminated dark.

Pathology

- **Obstructive**
  - Opaque to light
  - dark on light
  - Pigment
  - Bld filled vessel
  - Infiltrates / Focal — Reticent
  - D. Less — Responsive
- **Responsive**
  - Scatter light but do not obstruct
  - Bright on dark
  - Epi edema
  - ppts
- **Refractile**
  - distort view of fxn of illuminated & dark area
  - bdry of diff Ref index
  - Vacuole

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	

JUNE
TUESDAY
171-195 / Wk 25

19

Specular reflection

8 am

9

DR

IR

Vacuole : Illuminated area bordered by dark line

Black area with bright surface toward ill area (Unreversed ill)

10

11

12

Solid/Opaque ppt : Dark

Reversed ill

1pm

2

Reflex from fundus

3

10-16 *

4 Cornea, lens, vitreous pathologies

5

- Cataract grade
- Lattice Corneal dystrophy.

6

7

20 JUNE
WEDNESDAY
172-194 / Wk 25

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am

Sclerotic Scatter.

Oscillatory illumination of Koeppe.

9

10 focus at limbus

Slit beam in oscillary move^n.

11 Total Int ref

12 illuminate opposite side of limbus

1pm

- Corneal opacity
2 - highlight faintest pathology

3 6*10 *

uscope ste ahead.

4

5

Accessory devices

6 gonio
Fundus Exam
Pachy
AT.

7 Photo.

Video..

Laser delivery

Interferometry

Potential acuity meter test

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

JUNE
THURSDAY
173-193 / Wk 25

21

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Direct | Oblique | Parallelopipped | Convergent

Angle: 30-45° | Small L | 45-60° temp | 45-60°

Slit size: medium | Narrow 0.1-0.25mm 7-9mm | 45-60° temp auto pupil 2.3mm | small circular

Magnification: → to Med | 7-10 x | 7-10 x | 16-20 x

Scope position: 0° | | | Directly in front

Illumination: Med-high | | Dark room |

Filter: diffusing filter.

22 JUNE
FRIDAY
174- 192/ Wk 25

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

	Indirect	Direct R.	Indirect R.
8 am			
Angle	30-45°	Fuscope & light in direct alignment	
9			
10			
Slit size	2-4mm wide	1-2mm ↔ 4-5mm ↕	
12			
1pm		In direct pathway	Observer at right ∠
Magnification			
2			
3		Illuminated	Background Now illuminated dark.
Fuscoscope position	offset.		
5			
6	↓, Med, high.		Magnifi — 10×16× In fundus area.
Illumination	focused just behind area to be examined		
7			
filter			

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

JUNE
SATURDAY
175-191 / Wk 25

23

	Specular	Sclerotic	Oscillatory of K.
8 am	60°	focus at limbus illuminate opp side.	
9			
10			
11	light from opp side 30° temporally		
12			
1pm	↑	6-10 *	
2		Total Int reflection	
3			
4			
5			
6	3-4 mm from limbus		
7			SUNDAY 24

25 JUNE MONDAY 177-189 / Wk 26

Specular Reflection

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am — light incident on zone of discontinuity.

Such zones in Cornea & lens

9

observer placed in pathway of reflected light

10 ↓

dazzling / specular reflection

11

Surf is cld — Zone of specular R.

12

look 30° temp.

1pm light — opp! side.

Optical block — focused ↓ high magnification

2 3-4mm 4m lumbus

60° ∠ of inci = ∠ of refle

3

deeper — Endothelial mosaic

4 (+) parallelopipped ↑ ↓ fashion

5) Next to 2nd Purkinje Image.

6 Specular — Cornea

Lens, Ant Capsule

7 Post "

- Count endothelial cell
- Study tear film.

Optical Pachymeter

Measurement of CCT mainly for refractive Sx

8 am

9

10 **Methods**

11

12

1pm

2

3

4

5

6

7

- Ultrasonic Tech
  - Conventional
  - UBM
- Optical Tech
  - Manual specular
  - Scanning slit Tech
  - OCT
  - Optical low coh interferometry
  - Confocal Tech
  - Laser doppler interferometry
- Optical pachy & Corneal topo
  - Orbscan
  - Pentacam
  - Pachycam
- Pachy & Ocular Response Analyser (ORA)

27 JUNE
WEDNESDAY
179-187 / Wk 26

Manual

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Instrument description.

⊆ slit lamp
One eye occluded
2 glass plate ⊆ // sides

Optical principle

Optical image doubling

Measures distance b/t Posterior & Anterior corneal surface

Optics

Slit beam – illuminated

Image viewed ½ thr Orthogonal plate.
½ thr angle.

Displacement laterally d = ∠ of rotation

align endothelium of one ½ to other

Value of CT – read on Calibrated scale

In Hrg steep. ∠ b/t slit lamp & microscope 40°

CCT α Angle.

Measurement of Corneal thickness

8 am

Pachymetry

9

USG | Optical | Others

10

11 Contact

12 - Conventional
- USM

1pm

2

Contact

3

- Slit lamp
- Specular
- Confocal

Non Contact

- Specular
- Slit scanning
- OCT
- ASOCT
- SL-OCT

Non Contact

Pachycham (Slit lamp)

Pentacam

ORA

Laser Doppler Interferometer

USG

ORBSCAN
>5%
28 (+) Normal
13 (+) Post LASIK

0.92 conversion factor

29 JUNE
FRIDAY
181-185 / Wk 26

MAY 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

CCT

8 am

9

10

11

12

1pm

2

3

4

5

6

7

N

Megalcornea

Corneal Edema
SWS
Aniridia
Aphakia
CHED

Haab's
Buphthalmos

01 JULY
SUNDAY
183-183 / Wk 26

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Refractive Surgery Classification

Back.

8 am
9
10
11
12
1pm
2
3
4
5
6
7

- Keratorefractive procedures
  - Incisional Refractive Tech (RT)
    - Radial Keratotomy
    - Astigmatic "
    - Hexagonal
    - LRI
    - OCCI
  - Lamellar Corneal (RT)
    - Freeze keratomileusis
    - Non freeze "
    - Epikeratophakia
    - K in situ (BKS)
    - Automated Lamellar K (ALK)
    - SMILE
    - Concoplastique.
  - Laser Ablation
    - Surface
      - PRK
      - LASEK
      - E-LASIK
    - Stromal
      - LASIK
      - C-LASIK
- Lens bases
  - PRL
  - RLE
- Combined Cornea + Lens based
  - Bioptics
  - Trioptics

- Cornea shrinkage
  - Thermal Laser keratoplasty (TLK)
  - Conductive K (CK)
- Corneal Implants
  - Intracorneal CL
  - INTACS.
- Corneal tissue moulding
  - Orthokeratology

MYOPIA

Refractive Surgery for Myopia.

8 am
9
10
11
12
1 pm

KRP

- Incisional
  - RK
- Lamellar
  - ✓
  - ✓
  - X
  - ✓
  - ✓
  - ✓
  - ✓
- Laser Ablation
  - Surface
    - ✓
    - ✓
    - ✓
  - Stromal
    - ✓
    - ✓
    - ✓ Intralase LASIK
    - ✓ LASIK + C3R.

3
4
5
6
7

- X
- Intra Corneal Implants
  - ✓
  - ✓
  - yet Injectable adjustable K.
- ✓✓

03 JULY
TUESDAY
185-181 / Wk 27

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Algorithm

Algorithm

8 am

9

10

11

12

1pm

2

3

4

5

6

7

- to Moderate Myopia
  - -1 to -8D
    - -1 to -8D
      - LASIK or C-LASIK
    - Epi LASIK
      - Thin Cornea
        - -1 to -6D
      - Normal Cornea
        - -1 to -10D
    - INTACS
      - -1 to -3D
    - Orthokeratology
      - -1 to -3D
      - below <18yr of age
- High Myopia
  - >8D

8 am

9

Age < 40 — PRL.

10

Age > 40 → RLE

11

12

Combined as per Condition

1pm

2

3

4

5

6

7

05 JULY
THURSDAY
187-179 / Wk 27

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Rx for Astigmatism

- Incisional
  - Astigmatic keratotomy
  - LRI
- LASER based
  - Photoastigmatic Refractive keratotomy
  - Astigmatic Epi LASIK
  - Astigmatic C-LASIK

Rx of Post PK Astigmatism

- Suture Removal
- Relaxing Incision
- Astigmatic LASIK
- Relaxing incision & Compression sutures
- Corneal Wedge Resection
- Ruiz Procedure

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Rx of Astigmatism in Cataract Sx

- On Axis incision
- LRI
- OCCI
- Toric IOL.

07 JULY
SATURDAY
189-177 / Wk 27

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

Patient selection

1. Pt. motivation, Occupation
   - Cosmesis
   - CL Intolerance
2. Age of pt → >18
   → <45 → ↑ risk of overcorrection
   - Presbyopic glasses → stable for 1 yr.

1pm

3. Refractive Error
4. Occupation of pt → Driver
   → Sports person
5. Ocular Asn.
   - Absolute
     - KC
     - CL Warpage.
     - glaucoma
     - HSK, CTS
   - Rel.
     - Blepharitis
     - Dry Eye.
     - DM
     - 1 Eyed.
6. Informed Consent
7. Pt expectation.

Pre-Op Evaluation

1. Slit lamp
2. Cycloplegic
3. Pupil Size – Mesopic (< 5 Lux)
   - Infrared pupillometry
   - Aberrometer

   dark adapted pupil 6 mm
4. IOP
5. PS — RD in Myope
6. Corneal Topography
7. Corneal thickness
8. ⇓
   Use pachymetry.

SUNDAY 08

8 am

Why Keratorefractive procedures

- Cornea contributes to 2/3 power
- Easily accessible
- Curvature easily modified as ExtraOcular procedure
- Small changes ⟺ Large results.

9

10

11

12

1pm

2

3

4

5

6

7

-1.5D ↔ -6.0D

10 JULY
TUESDAY
192-174 / Wk 28

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Radial Keratotomy

8 am 90% deep Cuts radial incisions 4mm. zone left.

9

Theory → IOP pushes thinned peripheral cornea & flattens it

10

11

12

1940 → Sato JAPAN → 40 in anterior surface → Bullous Keratopathy

1pm

40 in DM

1970 → Russian → Fyodorov → Only Ant.

1978 → USA → Refinements

2

3

4

5

6

7

X → Weaken Cornea. — Trauma Sports

→ Irregular Astigmatism

→ Pt feels glare

⇓

Abandoned ⇒ LASIK.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Sx Keratoconus

ARK — Asymmetric Radial Keratotomy

↓

M1 1·5-2mm diamond shaped scalpel on extroverted cornea
- outside field of pupil
- 30° ↑ from 90° L 270°

→ Refractive fxn recovery
→ ↓ progression

Alini

ASRK — Asymmetric Selective RK

↓ operative area

↓ length & no. of incisions made

SACL. → C3R

2 -2·5D. 1-1·5D

× epithelium removed

SACL - Selective asymmetrical Cross Linking.

14 JULY
SATURDAY
196-170 / Wk 28

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

	PRK	LASIK	LASEK
8 am	MC Donald	Pallikaris	
9	Raw healing surface [	» Pt comfort Visual recovery early ↓ Complications	
10			
11	» Thinner Cornea × flap related complic		
12			
1pm	↓ Haze & regression. ≤ 4dy Mito C.		
2	CI		
3	• Beg → × haze, reg	. flat cornea <40D . Steep "	
4	• CTD → Epi healn ↓ • C/I to Refr Sx	. RBI <250μ . Deep Set eyes . Epi BM dystrophy . Ref error ≤ superficial corneal opacity	
5			
6			
7	× globe weakening like RK :		SUNDAY 15 × globe weakening × flap complication

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY
MONDAY
198-168 / Wk 29

16

	PRK		LASIK	LASEK
8 am	++	Postop Pain	↓	
	2-3d	Ocular patching	x	
9	late.	Visual rehab	Early	
	4-8m	Stability in refr	c 1m	
10	+	Steomal haze	-	
	+	Long term regression	↓	
11	↓	Predictability	↑	
	1-12D	Correctable range	1-30D.	
12	4-8m.	Topical eyedrops	2-3 wk.	
	1yr later	Repeat Prodedure	3mth	
1pm	↓↓	Surgical skill	»	
	None.	Potential risk of.	+	
2		flap complication		
	-	Microkeratome	+	
3				
4				
5				
6				
7				

AUG SEP OCT NOV DEC

17 JULY
TUESDAY
199-167 / Wk 29

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2
3
4

ASA

Advanced surface ablations

Ix for ASA

Myopia 6D
Astig 4D
Hyper 3D

Residual Ref error of LASIK / PI.

Def

- better tech of epi removal
- larger ablation zone
- Use of Mito C to ↓ proliferative haze

Epithelium Removal method.

- PRK
  - Advanced
    - epi removed Mech
      - Beaver knife
      - Spatula
      - Sp. Brush.
  - Transepithelial
    - epi removed in PTK mode
    - ⇓
    - Steamo removed in PRK mode
- LASEK
  - LASEK
    - flap ± alcohol
    - incision
      - Microtome 8mm × 70µm
  - Epi LASEK
    - Blunt epikeratome

↓ alc effects

Mech. Photo ablative Alc. Blunt

Steps of Sx

1. Topical Anaesthesia
2. Epi removal — 0.5-1mm → ablative zone
3. Ablation zone dia — >6.5mm in Myopia
4. Fixation & centration of ablation zone.
   - Hand held suction
   - Self fix by pt
5. Corneal ablation
   - Multizone & Multistep
     - 1.5mm transition zone
     - 4mm optical zone
     - overall 6-7mm dia
   - Fluence & repetition rate ∝ 1/
   - Scanning Laser beam
   - Aspheric ablation → Myopia
   - Myopic Astig — Toric photoablation
6. Application of Mitomycin C - 0.02% for 12s
7. Reposition of epi flap.
8. Application of BCL.

BCL
Topical NSAIDs
" steroids
" artificial tear drops

19 JULY
THURSDAY
201-165 / Wk 29

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Complication

8 am • Decentration of ablative zone
• Corneal Haze
9 • Night glare & halos
• Delayed epithelial healing
10 • Recurrent " erosions
• Corneal Infiltration
11 • C. Ulceration.
• Decreased Corneal Sensations ✓
12 • Central Island
• Subretinal Hmrg
1pm • ↑IOP.

2

Retreatment

x repeat if

3 Slight undercorrection
Before 6m of 1st Rx
steroids stopped >3mth
Ref not stable
follow Central island 6-12m
Haze x ≤ Regression

4

5

6

7 **Central Islands** Theories - shock wave formation & plum of gases interfere
- undesired optics of LASER
- differential hydration of C. tissue postop leading to
- Non uniform healing greater epi hyperplasia

Decentation

8 am

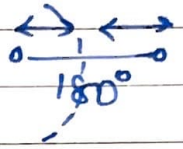
9 Causes
- Poor alignment
- Eye move°

10

11

Symptoms
- Diplopia
- glare
- Halos
- Induced Astig

Management
- Time
- 2 Ablation done made



12

1pm

Corneal Haze

2

Cause
3 >6D Myopia
Pre Exis any eye
4 Atopic dis
C. Scar

C/F
1-3 mts
Seiler & Fantes Criteria

Mx
- Topical steroids
- Excimer laser Pe treatment

5

↑ no. of activated
6 keratocytes deposit new collagen & proteog

7

Grade 0 – Clear Cornea
0.5 – Barely
1 – Mild haze & normal vision
2 Moderate & that Interfere & reduce
Scar 3 Marked & Obscure Iris
4 Severe

AUG SEP OCT NOV DEC

21 JULY
SATURDAY
203-163 / Wk 29

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

✓✓ | ✗

8 am × globe reaking. | • slower than Lasik.

9 × flap related complications. | • pain/ discomfort

10 Excellent results | • residual Rage ✓✓

11

12

1pm

2

3

4

5

6

7 SUNDAY 22

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JULY
MONDAY
205-161 / Wk 30

23

8 am

9

10

11

12

1pm

2

3

4

5

6

7

UASIK

AUG

SEP

OCT

NOV

DEC

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

LASIK

- Intro → Excimer lasers photoablation

+

Intrastromal procedures that maintain integrity of Bowman layer & overlying Corneal epithelium.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Rx

Myopia < 8D.

Astigmatism < 6D.

Hypo < 4D.

Machine Req.

Microkeratome

Excimer LASER.

Components

- Corneal shaper head.
  - → Oscillating blade
  - → Thickness plate
    - Varied → ALK
    - fixed → Hanoatome
      - 160μ
      - 180μ.
- Suction Ring.
  - ↓ fixing glose
  - 10P-65mm
- Stop Mech.
- Control unit.
  - ↳ electrical sources
  - ↳ Suction pump.

Classification

8 am

9

1st — Linear cutting — Plane — 0° — Thickness — fixed.

2nd — Rotational cutting — 26°

3rd. Pendulum.

1pm

2

3

4th. → Blade. Less

Epi. for EPI-LASIK

LASER.

4

5

Intralase femtosecond. LASER.

Novatec LASER.

6

7

Commercial → Nidek.

→ Zyoptix XP.

AUG SEP OCT NOV DEC

26 JULY
THURSDAY
208-158 / Wk 30

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am
9
10
11
12
1pm
2
3
4
5
6
7

FEMTO LASER

No LASER ∞. No Blade LASIK.

- ↓ dry eye
- x Black out.
- ↓ suction Requised
- wide range of flap. thickness
- reliable flap. thickness
- » optono Pm. flap diameter.
  side cut ∠.
  Hinge position.
  Hinge length.
- ↓ chances of epithelial ingrowth.

Patient selection

8 am

- Adequate globe exposure

9

- CT >450µ

10

- IOP ← tolerate 65mmHg. ∴ × [glaucoma, Vascular disease

11

12 - Pupil size — Large 02.

1pm - CL wear — × Soft — 2wk
× Rigid — 3wk.

2

3 Ix - VA / UCA. \ BCVA

4

- Refraction — Subjective / Manifest. Cycloplegic.

5

6

- Bio Microscopic Exam.

7 - Indirect Ophthalmoscopy

- IOP.
- Corneal topography & pachymetry.

28 JULY
SATURDAY
210-156 / Wk 30

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

9

10

11

12

1 pm

2

3

4

5

6

7

Topography

Criteria

- Steepness > 48D
- Diff in K > 1D.
- Irregular astigmatism.
- Asymmetry – I-S at 3mm > 1.4D.
- Non-orthogonal axis
- Skew of steep axis – Lazy C appearance of Bow tie or Claw pattern in ATR.

Uses

- Rule out Ectatic disorders
- Verify Astig axis of refraction
- Dx irregular Corneal surface.
- Analyze centration of ablation.
- Post LASIK ectasia.

SUNDAY 29

Surgical Workup & Tech

8 am
- Ab deop.
- Lilocaipine 1%.
9
- Anaesthesia.
- Cleaning & deaping
10
- Exposued
- C. | Marking
11
- fixation of Suction Ring
- Separation of C. flap.
12
- Stromal ablation.
- Reposition of C. flap.

1pm
- Removal of Speculum & deape.

2

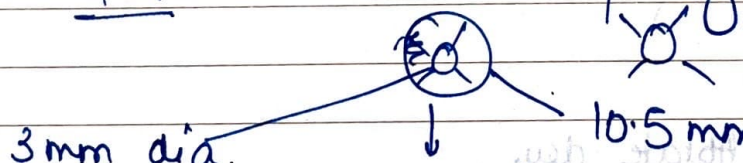
3

Corneal Marking

4 gential Violet.

Maker — Lu & Mendez.

5



6 2 radial &
1 paramedian mark.

7

Inner - Concentric to pupil — Corneation.
Outer — " " Suction Ring
aid correct- alignment in free flap.
situation.

JUNE 2012

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	•

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

8 am

Fixation of Suction Ring

Suction ring decentered toward hinge side
↓.

9

Suction On IOP - 65 mm of Hg

10

Ix for ↑ IOP → • Barraquer's Tonometer
• No Vision.
• Dilation of pupil.
• Reading of gauge.

11

12

1pm

2

3

Separation of Corneal flap.

4

Using automated Microkeratome — Femtosecond.
↓.

5

+ BSS

6

Cut Wet, Ablate dry.

7

Nasal ↷ Sup ↷ Nasal hinge.
↓ ↓
Easy ↓ damage to Corneal nerves.

X — flap displaced by eye movement

01 AUGUST
WEDNESDAY
214-152 / Wk 31

JULY 2012

M	T	W	T	F	S	S
30	31					
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Release suction immediately ON → damage ↓ after procedure

Using femto. → Parameter can be changed
- flap dia
- depth
- hinge location
- width
- side cut architecture

- Bevelled edge flap — alignment & repositioning is precise.

Recommendations for achieving a good quality
- Bepare utome before Sx.
- New blade
- Ideal flap 130 +60μ thickness
- Thickness of flap α speed of pass
- Oscillation of blade

↓ Speed ↑

Rough surface — Damage to C. tissue by friction

- IOP — 60 - 65 mm.
- Well irrigated. Cornea.
- Adequate exposure of eye.

8 am

Stromal ablation × fluid

protect hinge.

>80 — 2 zone ablation.

9

after ablation — × < 250μ.

flap ⟶ Ablation
30s

10

Use Eyetrackco.

11

↓No.

12

Thoston Ring.

1pm

2

Reposition of C. flap

3

dry ⟶ remove debris

Reposition.

4

↓

5

check by steioc test for proper apposition

6

7

03 AUGUST
FRIDAY
216-150 / Wk 31

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

8 am

Post Op Mx

- Dark goggles
- Systemic Analgesics
- Ab eyedrops
- Topical steroids.
- Artificial tear drops
- Home advice
  - x rub
  - x Swim 1 mth
  - x Strong light exposure.
  - x Occlude eye
  - x Drive.
  - Repeat to Dr SOS.

Follow Up

1 day
1 wk
1 mth
3 mth
6 mth
1 yr.

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Post Op

Intra Op.

(8)

1) Poor adhesion & anchoring / Malleolar
2) Flap stripe ——— / Malleolar
3) Infectious keratitis
4) Sands of Sahara.
5) Epithelial ingrowth
6) Flap slip
7) Central Island
8) Undercorrection / Overcorrection
9) Regression
10) Induced Astigmatism
11) Haloes & glare
12) Hoge at interface.
13) Ectasia
14) Dry eyes
15) Loss of corneal density

Complications

- Inherent risk.
- Inaccurate IOP measure
- " IOL power calculation.
- Difficult CL fitting.

SUNDAY 05

SEP
OCT
NOV
DEC

06 AUGUST
MONDAY
219-147 / Wk 32

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Removal of eye speculum
- Dislodged.

Femb. related.

during lapl sepectomy
- Migration "Conjunctival"
- Interface of peak
- Increased displacement of
- Wrinkling on R.
- Damage to F.

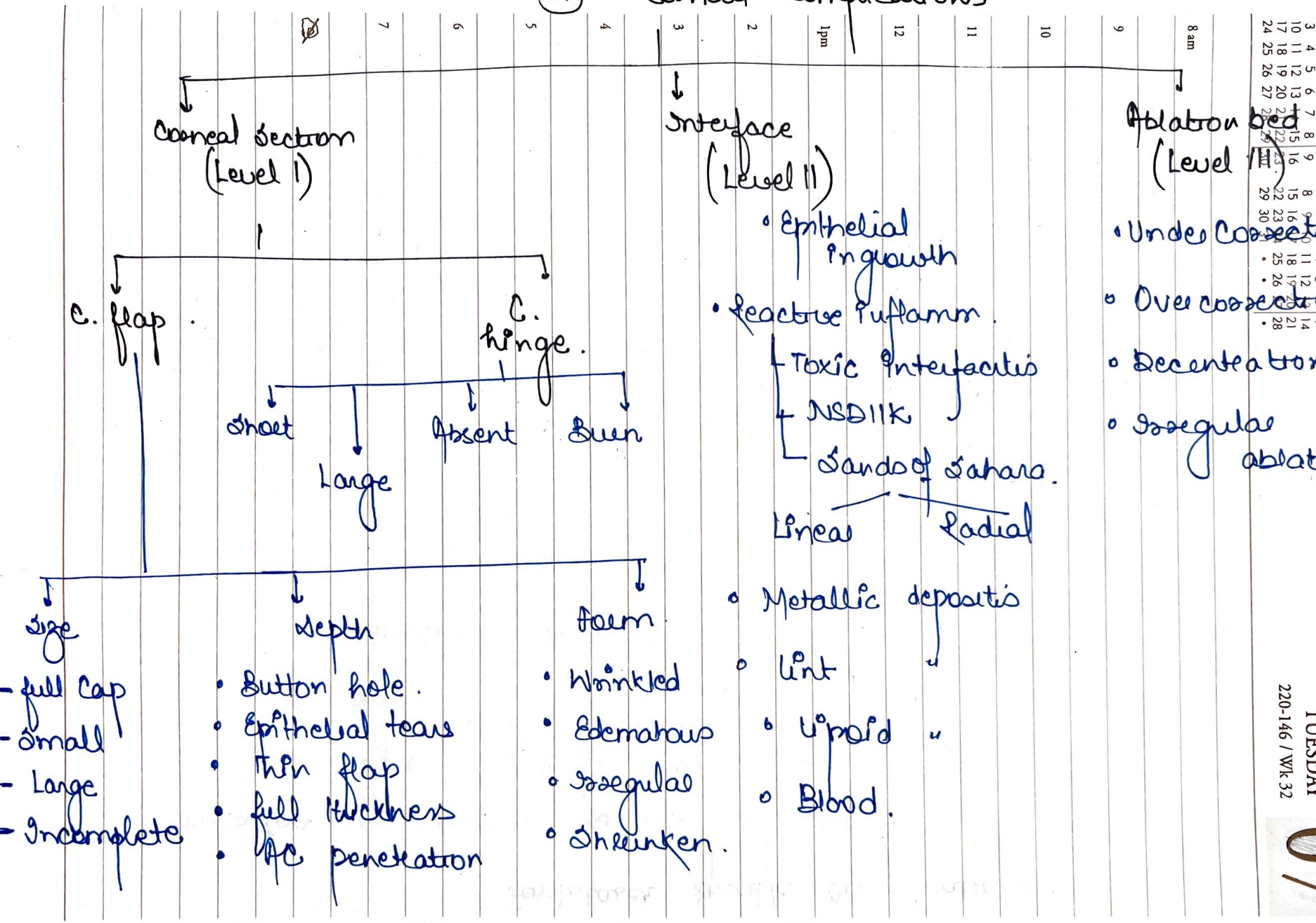
during laser ablation of dermal bed
- Decantation of A.
- Increased A.
- A. of Ridge
- Interruption of A.
- Poor A.

Separation of C. flap.
- Variable flap.
- Incomplete
- Button hole
- C. perf
- Pedicle flap
- Histocyte of F.
- Loss of F.
- Irregular.
- Dermal bed
- Hypoactive & desiccation
- Interface contaminant" of surface

Application of suction ring
- Daily chemosis
- Severe hypotension.

Microkeratome use.

Corneal Complications



SEPTEMBER 2012
M T W T F S S
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30

OCTOBER 2012
M T W T F S S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31

AUGUST
TUESDAY
220-146 / Wk 32
07

08 AUGUST
WEDNESDAY
221-145 / Wk 32

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

8 am

9

10

11

femtolaser specific complications

- cavitation gas bubbles (known as opaque bubble layer)
- transient light sensitivity syndrome
- rainbow glare
- diffuse interstitial keratitis.

3

5

6

7

Complications

8 am

- Severe hypotension — due to ciliary body shut down bcos of vaccum created.

9

- Variable flap — IOP 60-65mm x achieved
  Blade poor Quality
  speed of pass — Not Optimal

11

12

- Incomplete flap — foreign material, debris
  Suction loss
  Motor failure.

1pm

2

- Tear / button hole — Steep Cornea.
  x proper Suction
  poor Blade Quality.

3

4

- Free flap — flat Cornea
  <IOP.
  Small Cornea <10.5mm.
  Not fixing Keratome stopper.

5

6

7 Hydration — if time lapse >30s.

Intraop. Contamination — Prevent by :-

- Avoid use of powdered glass
- Instruments on plastic surf
- " Clean
- Vigorous Irrigation
- x excessive use of Topical Anaesth
- x touch pat surf of flap.

8 am

Irrigation complications — Edema of flap
- ↓ adherence due to excessive irrigation.

9

10

Flap steiae

11

Macrofolds
↓
result of flap slipping
↓
Visual deterioration
↓
flag tenting

Microfolds
Wrinkling in BM or Epithelial BM
↓
rel to flap setting

12

1pm

2

3

4 Diffuse lamellar keratitis / Sand of Sahara
└ Interstromal / Interlamellar keratitis
& anti Inflamm. & Antimetabolites.

5

6

7 Epithelial Ingrowths

Centre.
↓
↓VA

Periphery
↓
Thickening of 1 edge of flap.
↓
Astigmatism

• Lost flap post op

8 am

↓

Caplen tech → Epithelium grows over

9 residual stroma.

10 • central islands — induce topographical alteration

↓

>3mth

↓

11

x resolve

↓

12

Mobilize Original lamellar flap.

1pm

2

• • Induced Astig

3

4 Regular

Irregular

↓

5 Decentration of Ablation zone.
Variation in flap healing
+ Epi cells under flap

Eccentric ablation.
Suturing of flap
Interface remnants
Epithelial islands
Irregularly deposited flap.

6

7

SUNDAY 12

• Haloes/glare

High order Aberration

Optical Zone

Irregular Astig

↓

< Size of pupil during mesopic condition

flap fold

SEP

OCT

NOV

DEC

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

Any types → ↓ Sensations.

8 am

- Cavitation gas bubbles [Steay laser pulses in Aq
  ↳ Migration of Corneal stromal

9 bubbles retrograde through Schlemm's Canal into AC

10

✓ → Modification in flap design.

11 → Alterations in pulse duration that ↓ collateral tissue damage → ↓ formation of

12 Cavitation bubbles.

1pm

- TLSS → Photophobia ± C. Inflamm

2

- Response of keratocytes to UVSER.

3 - Inflam response of Adj tissues to gas bubbles

4

- Rainbow glare — Induced 4m light scattering

5 at posterior surface of Interface

↓

6 4-12 bar of colour.

7 - Diffuse Interstitial Keratitis —

» Energy

» gas bubbles → ↑ Ant stromal keratocytes activation.

• SAT → Wrong estimate ∴ Correct for Corneal Thickness

8 am

9 (CTEN) Topography guided Custom transepithelial NOT Touch Technique.

10 ↓

11 Tech of Ablation using excimer LASER.

12 ℞ → Corneal regularizaton.
Regularizaton of underlying flap pathology
Usually distubing. Irregular Astig.

1pm

2 CTEN done using iVIS suite
- Topographer
Pupillometer
CIPTA
IRCs Excimer LASER

3

4

5

6 Aim → Reshape detected irregular C. surface
↓
Regular Aspheric surface.

7

SEP

OCT

NOV

DEC

15 AUGUST
WEDNESDAY
228-138 / Wk 33

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

Adv & disadv → On July 16.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

LASEK

PRK + LASIK advantages

8 am

Remove epithelial flap ⊆ alcohol

↓

9

Ablating Corneal stroma ⊆ Excimer LASER.

10

Surgical parameters ⊎ PRK.

11

(a) Epithelium Removal

12 in form of hinged flap

1pm Trephining — 8.5 - 10.5mm trephine ⊆ 2mm blunt edge (hinge)

↓

2

3 Alcohol ℞ 20% ethyl alcohol for 60s

↓

4 Wash

5 Seperation of Epi flap → Microhole to prick Epi

↓

6 Hockey shaped Spatula — Roll Epi flap.

⇓

7

Corneal Stromal Ablation

⇓

Reposition of Epi flap.

⇓

BCL.

17 AUGUST
FRIDAY
230-136 / Wk 33

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

LASEK + Mitomycin C also used.

8 am

LASIK

LASEK

PRK.

9

↓ Post op pain.

10

Early Recovery.

11

↓ Post-op haze

12

1pm

Corneal Ectasia ↓↓.
as RBI »

2

flap related complicat" ↓↓

3

Correction LASIK + 5D.
as 90µ Corneal stroma available for ablation.

4

5

6

Thin Cornea »
<490µ. 6D.

7

✓ ↑ in high order aberration. ✗.

Post op day eyes ↓↓

Large Zone ℞ ✓✓

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

AUGUST
SATURDAY
231-135 / Wk 33

18

LASIK vs ~~LASER~~

LASEK

Adv.

↓

Can correct >8D Myopia.

Thin Cornea.

Disadv.

Post op pain >>

delayed recovery

Corneal haze similar to PRK.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

SUNDAY 19

SEP

OCT

NOV

DEC

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

Epi-LASEK

AUGUST
TUESDAY
234-132 / Wk 34

21

8 am

⇒ LASEK lot × Alcohol
✓ epikerahome

9

Tech ⇒ LASEK.

10 epikeratomes → Centurion Epredge
Amadeus II
Moria Epi K.
Jasaucr Epilift

11

12

1pm Slow than μkeratome ∴ better control.

2

✓✓ × Alcohol.
3 ↓ pain
fast heal.
4 ↓ corneal haze.

5

6

7

SEP

OCT

NOV

DEC

22 AUGUST
WEDNESDAY
235-131 / Wk 34

C-LASIK

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

Conventional — Custom

8 am ↓ Order Abberations — Corrects
↑↑ high "

9

Other cases of irregular astigmatism not amnable to Rx.

10

11

12

CLASIK

1pm Optimize pt's Optical system.

2 Corrects inherent abberations.

3

Types

CLASIK

4 Wavefront guided ablation.

CLASIK

Corneal topography guided.

5

6

- Measurement of Optical Abberation of eye
- Puking measured abberation to LASIK Machine
- Creation of flap

7

microkeratome. — femtosecond LASER

- LASER ablation.

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

AUGUST
THURSDAY
236-130 / Wk 34

23

- High Quality vision × haloes in Night
- Supervision 6/4, 6/3
- ↓ invasive
- Can correct. Irregular astigmatism.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

SEP

OCT

NOV

DEC

24 AUGUST
FRIDAY
237- 129 / Wk 34

JULY 2012

M	T	W	T	F	S	S
30	31	•	•	•	•	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

iLASIK

Wavefront guided LASIK.

↓

flap ⊆ femosecond used

8 am

9

10

11 ✓ ✗

Avg recovery 2d – 1wk.

12

25 * » precise.

» expensive

1pm

2

3

4

5

6

7

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

AUGUST
SATURDAY
Day 238 / Wk 34

25

Wavefront guided LASIK Systems

8 am

9 Corneal topographer.
Wavefront aberrometry

flexible laser delivery system.

Excellent eye tracking system.

10

11

12

1pm

Zyoptix
B & L.

Advanced Personalized Tech.

Nidek NAVEX LASIK system & OPD scan

2

Zywave
Zylink
Obscan II

Technolas 217 Excimer LASER

Zywave & NoDizy (No pupil dilate)
Obscan
Zyoptic & Calculator
Z. Zulink

NIDEK OPD Scan
accurate info of C. wavefront map
N. Software
Nidek EC-5000 Excimer LASER.

7

SUNDAY 26

SEP
OCT
NOV
DEC

8 am

Visx Custom Vue.

Broad beam platform

0.65 - 6mm.

Astig. & by ↓ duo of ablating zone.

-6D - sph
3D - Astig
OZd = 6mm

LADAR vision. Custom Cornea.

flying spot USER & actroc tracking

-7D
<0.5D Astig
6.5mm OZ.

Allegretto.

Gaussian beam profile

0.95mm spot size.

& = localized abberations

Schwind ORK Corwave System

Optikon keratron Scout Topographer — placido disc based

ORK wavefront analyser

↓

S. ORK custom Manager Software

↓

Schwind. Excimer USER ESIRIS

200Hz = n

330 Hz — Eye track

0.8mm scanning spot.

LASIK Extra

LASIK + CXL.

8 am

creat LASIK flap.
↓
Excimer ablation
↓
CXL ⊆ riboflavin
↓
Reposition of flap.

12

1pm

✓

↓ KC progression & KC.

↑ longevity of LASIK results.
↓ need of touch up.

↓ risk of long term vision changes

X

↑ risk of infection due to contamination of riboflavin.

» Expensive.

SEP
OCT
NOV
DEC

01 SEPTEMBER
SATURDAY
245-121 / Wk 35

AUGUST 2012

M	T	W	T	F	S	S
•	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Refractive Lenticule Extraction

8 am

Bladeless femtosec Tech

- Basic features of femtosec LASER.

10 Commercially available :-

VisuMax. — Zeiss
IFS Advanced — Abott
WaveLight FS200 — Alcon

11

12

VisuMax — 500kHz ↓ energy setting < 200nJ

1pm

Easy seperation. Smooth lamellar surf.

2

3 Surgical Tech — attempts to remove, add, modify.
C. Steepha

4 ↓

To alter radius of curvature.

5

Types

6

7 FLEX.
femtosecond Lenticule extraction.

↓

making full Corneal flap.

SMILE
small incision lenticule extraction.

↓

small cut in Ant flap

SUNDAY 02

Surgical step.

8 am

9 1st photodisruption plane

along post surf.
pulses 4m periphery to centre

6-7mm OZ.

2nd photo....

360° vertical side cut along periphery of proposed lenticule

3rd

Ant surface
Centre to periphery
0.5mm - 1mm
beyond vertical side cut of Lenticule

Ant Corneal flap

12

1pm

⇓ Step 4 4th →

2

FLEX

250 - 300°

Ringed flap
(VASIK)

SMILE.

Ant side cut
40° - 60°

3

Step 4

4

5

6

removed using FLEX. manipulator

lifted to side as VASIK

lenticule seperated all along peripheral edge

flap reposited

Removal of lenticule & reposition of Ant. Corneal flap.

Periphery & post surf seperated using FLEX manipulator from side cut

7

Spatula forcep inserted & lenticule pulled out

Pressure to oppose Ant ↔ Post surface of tunnel

OCT

NOV

DEC

04 SEPTEMBER
TUESDAY
248-118 / Wk 36

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Overall advantage over LASIK (Smile spl)

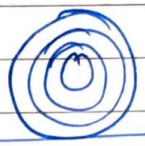
x Excimer laser related complication.
x Microkeratome related ↓.
-6 to -10 D. more accurate results
↓ steamal drying
↓ Optical Abberation
x ↓ OZ. occurs
↓ potential for flap misalignment.
In case of suction → Less procedure completed on same day.
↓ risk of Corneal ectasia.

>> Healing
Better BioMech. as x flap strength
↓ dry eye
x flap related
↓ C. ectasia

Post Op

Topical Antibiotics	Topical Steroids	T. lubricants
1wk	2-3wk.	4-6wk.

Reverse geometry design of Ortho-K, LK lenses



8 am

9

10

12

2

3

4

5

6

7

(1) Corneal (BOZR) Back Optic Zone Radius → flat K - Correct° - 0.75D

(2) Reverse 2nd Curve.

(3) Alignment curve → 3 & 4th → flatter than Reverse Curve → Centration.

(4) Peripheral Curve → Lens lift. Adequate tear Exchange Removal of lens

↑ Dk Value >85 ⟶ ∴ to prevent hypoxia

Age — Juvenile to adult Myopes.

Range -1.00D to -6.00D.

Cylindrical error = -2D WTR
ATR - 0.75D.

7-8 Hrs wearing.

AUGUST 2012
M T W T F S S
• • 1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31 • •

SEPTEMBER 2012
M T W T F S S
• • • • • 1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30

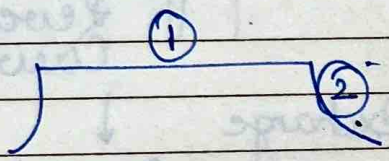
George Jessen — PMMA

Earlier — Now

Conventional flat fitting RGP → WTR, toricity due to decentration

Now → Reverse geometry → ↑ Dk Value → Wlodyga & Hoyan

Reverse geometry lenses



(1) — flat B.C → Pressure on central & Zone → ∴ sphericalization of Prolate Cornea → Myopia

(2) To aid Centration
Steeper than Central Base Curve.

& It Works

1

Tear film Meniscus → Hydraulically distribute Epi Cell under lens from Centre towards periphery

a) Pressure → Thinning of Cornea

b)

2

Annular tear pool → neg pressure → Mid peripheral Corneal epithelial & Stromal thickening

Ophthokeratology

Corneal refractive therapy

Non Sx method of moulding cornea using RGP CL. to correct Myopia

8 am

9

10

Procedure

Meticulous refraction

↓

C. Topography

↓

Calculation of parameter of corrective CL.

↓

11 Manufacturing of special CL

↓

12 Wearing schedule.

8hrs | Overnight

↓

1pm few hrs for 3days.

2

3

4

5

6

✓

Non Sx method.

Available for all age grps

freedom from constant CL wear.

Better Vision Improvement

Reversible method.

7

✗.

Longer result time.

× permanent sol.

↑ start up cost

Only for Myopia

Indications

spherical < -4D

Astig < -1.5D

- Too young for LASIK.
- Continously changing prescription
- sports.

flat centre

reverse geometry ← steep

edge lift.

OCT

NOV

DEC

08
SEPTEMBER
SATURDAY
252-114 / Wk 36

↓ CCT 20μ in 3 mths

∝ Age

Result → ↓ Corneal Curvature & Sagittal Corneal height.

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

8 am

9 fitting process → Evaluate.

10 Corneal size — Flat K value. — Eccenteicity

11

Ajust flat K ∝ eccenteicity

12 E. Range 0.46 – 0.54.

1pm good fluorescein = Bull's Eye pattern

2 – Central zone of light touch 3.5 – 4mm

– Mid peripheral ring of Fl. pooling / Tear reservoir under steeper 12° Curve

3 – Peripheral circular band of alignment tapering to edge lift

4

5 1mm move' only

6 e ∝ effect

7 SUNDAY 09

Mention of BOSTON XO system – Sept 5

IntraCorneal Implants

- IntraCorneal Rings
- IntraCorneal Contact Lens
- Gel Injectable adjustable Keratoplasty.
- Plastic Inlay PAI - LASIK.

8 am
9
10
11
12
1pm
2
3
4
5
6
7

IC CL

× papular

Gel injectable adjustable Keratoplasty

-1 to -4 D

Polyethylene oxide

↓

injected in Paracentral Stroma

✓

Easy Manipulation
Adjustability
Reversibility

PAI - LASIK (Plastic Inlay LASIK.

~~Hea~~ Photo - ablative Inlay

↓

× ablation no LASIK problem.

Plastic inlay is left b/t flap & stroma.

Early stage concept

OCT
NOV
DEC

Arc shortening effect.

11 SEPTEMBER TUESDAY 255-111 / Wk 37

INTACS

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

8 am USA fda approved for correction of low Myopia

9 Implanted in peripheral cornea → Produce vaulting effect that flattens central cornea → Corrects Myopia upto 3D.

10 **Features**

11 PMMA.

Outer dia - 8.1 mm

12 Inner 6.7 mm.

Arc length = 150°

1pm Positioning hole dia = 0.28 mm.

Hexagonal ring cross-section.

2 2 rings

3 R L.

Types

4

5 **Nomogram**

6 Female Rings

Keramngs

7 Intacs. Intacs SK

Myopring

Corneal Ring

Barraquer & Slowiatskava postulate

↓

Thickness ∝ flattening ∝ 1/diameter

5Dr = 0.7D flat

8 am

Ix

- Myopia — ↓ of Myopia -1D to -3.5D

Highly motivated

- KC.
- PMD
- Post LASIK, Corneal Ectasia.

CI

- Collagen Vasc Disease
- Immunodef disease
- Preg ♀
- Corneal Dystrophy
- Future Compli. w
  - Isotretnoin.
  - Amiodarone
  - Sumatriptan.
- > 7mm pupil size

✓

+ve. Asphericity → Prolated Cornea ✓
LASIK — Oblate "

→ Preserve C. Stroma.
~~→~~ Reversibility
- Changeable
- Safe
- Rapid Visual recovery.

✗

- ✗ effective in Myopia >4D

- NV
- Extension
- glare.
- Under/Over Correction

OCT
NOV
DEC

13 SEPTEMBER
THURSDAY
257-109 / Wk 37

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Surgical Tech

LA.

↓

Mark geometric centre of cornea – Sinskey hook (11mm zone Mark)

↓

Measure CCT

↓

Incision — 1.2mm. 12 O clock. 2mm from limbus

↓

Corneal tunnel pockets 2/3 stromal depth

└ pocketing hook

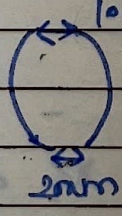
Stromal spreader.

Dissection glides ↻ Clock, Anti Clock.

use femtoLASER

effect ∝ 1/width of channel ∝ ↑ difficulty of dissection

2mm x 2/t ends at 6 O clock



1 suture for incision closure

↓

Remove 1wk after Rx

– AB/ steroid QID x 2-3 wk.

8 am – preservative free lubricants 2-3 wk.

9

10

11

12

1pm

2

3

4

6

7

	Intacs	Perla Ring	Keraring
Arc length	150	160	90 – 240
Cross Section	Hexagonal	Δ	Δ
Thickness mm	0.25 – 0.45	0.20 – 0.35	0.15 – 0.36
Inner Radius	6.77	4.40	5
Outer Radius	8.10	5.60	6

OCT

NOV

DEC

UBM

↑ freq USG transducer

8 am

9

USG Probe — UBM Probe

10

10 MHz. — Freq — 35-50 MHz.

11

12

4 cm — Depth — 4mm.

1pm

940μ — Resolution — 40μ

2

3

Ix

- Opaque Media
- Glaucoma
- Uveitis
- Trauma
- Tumour
- Scleritis

4

5

6

7

Limitation

- × > 4mm
- × if Open Wound

OCT

NOV

DEC

18 SEPTEMBER
TUESDAY
262-104 / Wk 38

AUGUST 2012

M	T	W	T	F	S	S
•	•	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	•	•

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

8 am

a) Scleritis — Progress of disease.
— Acct posibility of scleral necrosis

9

Choroidal Hucken.
CMemb ass.

10

11

b) Tx — Cause of Scleral Nodules

12

c) glaucoma — DoD of Angle Closure

1pm

2

RPB

Plateau Iris

Pseudoplateau

Lens related ∠ Closure.

Malignant glaucoma

Pigment dispersion.

3

4

5

6 → Quantitative Analysis

7 — Post glaucoma Surgery status
└ Iridectomy
Internal Ostium
Bleb

— CS
— IOL position
— Ant Seg Trauma

01 OCTOBER
MONDAY
275-091 / Wk 40

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Lens Based Refractive Surgeries

RLE

RLE PRL.

Refractive Lens Exchange

Phakic Refractive Lenses

(a) Refractive Lens Exchange

Myopia -16 to -18D Unilateral] Fucala's Operation

8 am

9

CLE ⟶ IOL imp] RLE

clear lens exchange

10

- IOL imp — Zero power lens also accepted
  - Retards PCO
  - Minimizes incidence of RD

11

12

1pm

↑ in VA by 2 lines → removal of minification effect of high concave glasses.

2

3

Ix

Refractive error + Associated lens Opacities esp in Presbyopic age

4

5

6

High Myopia > 10D, Hyper > 5D, >40yrs, Presbyopia + HyperM — Best

NO Cataract / NO Phaco — CLE

7

CI → RD, Occupational, Night driver, Unrealistic pt

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Choice of IOL

- Monofocal
  - Req + glasses
- Multifocal
  - Refractive
    - AMO array
    - dependant Pupil
    - (-) did
  - Diffractive
    - AMO Technis
    - ×
    - glare.
    - Haloes.
- Accomodative IOL
  - Pseudo Acc
    - Acusof Restor from Alcon
    - Apodized diffractive optics + pupil dependant
    - ✓✓ Night vision
    - X → Intermediate vision
  - Accom.
    - Eyeonics Crystalens
    - Human Optics
    - (X) → Unpredictable Ampl. of Acc.
    - PCO
    - Long term centration.

Imp Considerations

- Thorough Pre-Op Ocular examination
  - ↑ IOP
  - Vitreous deg
  - Retinal deg
  - Rule out Macular deg.
- IOL power Calculation
  - → Immersion Biometry is better
  - → Optical Interferometry based Biometry (Zeiss IOL master)
  - → Nyopia – SRK-T
    Hyperm – Holladay II
- Surgical Tech
  - Capsulorhexis Small than IOL Optic for proper centration
    - ↳ Emphasis to control DIA.

Femto assisted Lens extraction.

(Femtosecond assisted Lens extraction)

fs ALEx

Available —
- LenSx (Alcon)
- LenSar
- Catalys
- Victus. Technolas

Phakic Refractive Lens

× touch Original lens ∴ × disturb accomodation

℞ M & Hyper M

→ 8D → 6D.

8 am
9
10
11
12
1 pm
2
3
4
5
6
7

- ✓ 2 PI → PC PRL. (ICL)
  - Back of Iris & in front of Lens
  - ICL.
  - Implantable Contact Lens
  - → Vault the lens
  - ∴ ↓ Cataract formation
  - Always make PI
  - ✗ Intra Ocular Inflammation, Late Cataract formation, Adhesions
- ✗ PI → Angle supported PRL.
  - ↓ NUVITA MA 20 & B&L Phakic 6
  - ↓ Vivarte/Duet
  - derivatives of Kelman lens
  - Optic portion – 5mm
  - ℞ — −7D – −20D
  - ✗ Endothelial damage, Shrinkage of iris periphery, Elongation of pupil, Inflamm, glaucoma
- Var dee Heijde Nomogram → Iris supported PRL.
  - Artisan Lens
  - UV abs PMMA
  - ICARE Acrysof
  - ✗ −8-5mm, ✓ 02 −5-6mm
  - −0·5 to −20D
  - +3 to +12D.
- One size → No angle related problems

SUNDAY 07

NOV

DEC

08 OCTOBER
MONDAY
282-084 / Wk 41

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

(A)

8 am

IC ↓

Steel surgical

↓

Collamer — UV absorb^{n}

Plate haptic design

≤ ↓ touch.

Foldable :. 3mm Incision

-3D — -20D

+3D — +20D

PRL.

↓

IVI Medennium

Silicon.

foldable.

-4 to -22D.

+3 to +16D

✓

Safe.

Reductable

Reversible

Inexpensive

Bioptics for residual refractive errors (Bioptics)

✗.

Potential complication

↓

Endothelial decomposition

Cleanc Nodules

Cataract formation

RD.

Endophthalmitis.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Ix

Age >18

>9D (M) >4.5D (H)

LASIK CI
Thin Cornea
Steep/flat C.

EC — 2250 – 2500.
Pupil < 6mm in Scotopic luminance
Stable refraction for a year
AC depth = 2.8mm
L width = 30° atleast
No Eye pathology
No Systemic "

Phakic 6

Vivarte
Duet.
↓
Haptic & Optic
Injected seperately
inside

ICARE
Acrysof
↓
Outside
only

NOV
DEC

10 OCTOBER
WEDNESDAY
284-082 / Wk 41

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

Problems

8 am

AC IOL

- Inverted Implantation
- Endothelial Cell damage
- Inflammation
- Pigment dispersal
- ↑ IOP
- Cataractogenesis
- Decentration.

AC IOL

- Endothelial Cell loss
- Pupillary Ovalisation
- Iris depigmentation
- Haloes & glare
- SIA.

Iris fixated

- AC Inflamm
- glaucoma
- Iris atroph
- Implant dislocation
- Decentration
- Endothelial Cell loss
- Cystic Macul

	ICL (STAAR)	PRL (CIBA Vision)	Stickulens (IOLTech)
	← Single piece →		
	Planosphercal		Meniscus
	Collamer	Hydrophilic Si	H. philic acrylic
	Toric Custom	No	No.
Power Calculat^n	Olsen Feingold	Holladay Refractive	Van der Heyde
Incision Size	2.5mm	1.8mm	3mm.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Combined Lens Based & Cornea based refractive procedures.

Bioptic.

RLE + LRI (Astig)

RLE + Post op LASIK. (residual Ref error)

Phakic IOL + LASIK. (")

Trioptics.

Toric IOL in bag
Multifocal IOL (in sulcus
⇓
LASIK for residual error.

→ Piggyback IOL ↷ LASIK.
⇓
Residual error.

NOV

DEC

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER
TUESDAY
290-076 / Wk 42

16

8 am

Refractive Sx for Hypermetropia

9

10

Algorithm

11

12

1pm

2

3

4

5

6

7

NOV

DEC

17 OCTOBER
WEDNESDAY
291-075 / Wk 42

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

Intro Diagnostic Procedures

Classification

(A)

Keratorefractive Procedures

8 am

9

Incisional

Lamellar.

Laser Ablations

10

Hexagonal Keratotomy

11

H. PRK.

H. { LASER. / Epi LASIK. / LASIK / C-LASIK

12

1pm

2

3

Corneal shrinkage procedures

Hyperopic Smile

4

5

PLK

CK

6

7

(B)

PRL

RLE.

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	B	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER
THURSDAY
292-074 / Wk 42

18

8 am A

PRK — doughnut shape ablation
Large epi defect 9mm or >

9

Spots 3D H = 3 * 3D Myopia

10

x → Lengthy
Dehydration
Decentration

11

Prolonged epithelial healing time.

12

1pm

2

LASIK — 1-8D.

3

4

5

6

7

NOV

DEC

19 OCTOBER
FRIDAY
293-073 / Wk 42

SEPTEMBER 2012

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Corneal shrinkage procedures

8 am

9

TLK — CK

10 Non destructive LASER based modality

11 ↓ Rx Hypermetropia & Presbyopia

12 Mid Infrared Coherent energy on Thallium Holmium Chromium (THC) : YAG

1pm LASER in a simultaneous emissions by means of Slit lamp

2 ↓ In 6 & 7 mm zone

3 ⇓ Contraction of collagen matrix

4 ⇓ Constriction band.

5 ⇓ Steepening of front surface radius Rx of HyperM

6

7 Rx > 40yrs +0.75 – 2.5D

Time = 2.8s

Conductive Keratoplasty

Non laser procedure for. Hyper
Presbyopia

Radiofreq energy ↓
To create tightening band.

Ix

>40y c stable refraction.

- Hyperopia +0.75 to +3.25 D.
  Astig — -0.75D or <.
- Presbyopia

Equipment

- Corneal Marker
- Lid Speculum
- View Point CK device
  - Console
  - Handpiece
  - ~~Lid speculum~~ foot pedal
  - Keratoplast tip
    - 90μ deep
    - 450μ long

deliver current to stroma.

Pre-Op Work up.

- Slit lamp Biomicroscopy
- Keratometry
- Pachymetry
- Corneal topography
- Glare assessment
- Near & distance vision
- Refraction — far
  near
- Monovision tolerance assessment

22 OCTOBER
MONDAY
296-070 / Wk 43

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER 2012

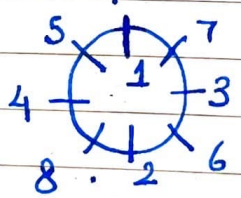
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Procedure

Topical Anaesthesia
↓
Corneal exposure
↓
Marking of Cornea.
↓
Application of Radiofreq. Energy

•) Keratoplast ⊥ to corneal surf to ensure full depth penetration
↓
Min pressure (Light touch technique)
↓
spots shd be smoothly applied
↓
0.6s/spot
↓



2 & 3 rd ring align precisely c 3rd ring

foot prints — 80% depth

Post op Rx

8 am

AOB | steroid QID x 10-15d

9

Artificial tears QID x1m/h

10

visit 1, 3, 6, 12.

11

12

1pm

2

Advantage

Min Invasive
Safe

3

H & Prs of 3D

4

x disadv of monovision

5

Q Presbyopic ck
└ Contrast better.

6

7

Disadvantage.

x for H > 4D &
Astig > 0.75D

Regression. 1D / 2-3yrs

Not reversible

Complication of recurrent
Corneal erosion
Mild Infxs

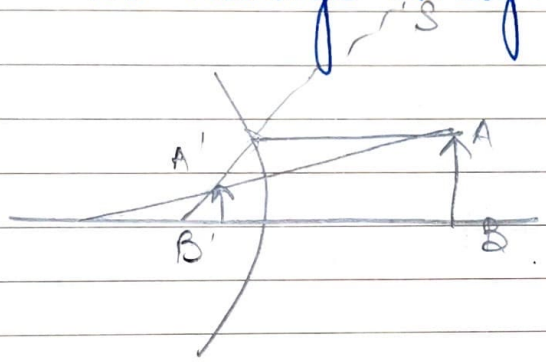
Keratometer

8 am Principle

Surf of Cornea = Convex Mirror

Curvature $\propto \frac{1}{\text{Image size}}$.

1st Purkinje Image.



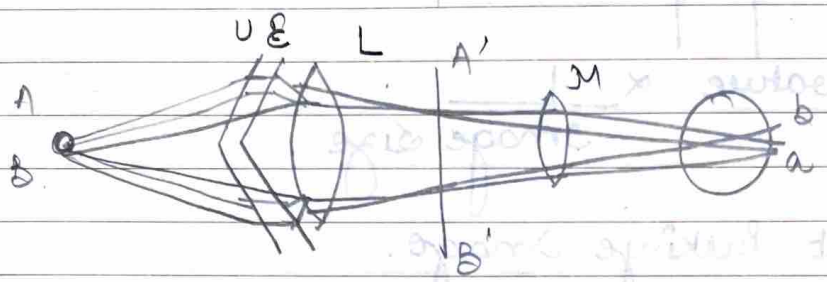
(b) Eye movement — Overcome by Principle of Visible Doubling.

Types
- Sx
  - Automated
    - Javal Schiotz
- Helmholtz
- B & L
  - ↓
  - Constant object
    Variable Image size
    - ↓
    - Variable object size
      Constant image size

NOV
DEC

Helmholtz

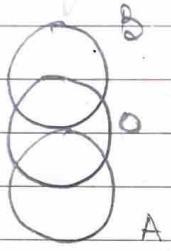
8 am



9

10

11



12

1pm

2

B & L

Constant obj Variable Image size

3

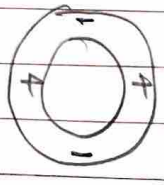
Optical system

4 1 Mirror
Mirror — light
Obj lens
Diaphram
BU & BO
Double Image
Eye piece
Obs Eye (Magnified Image)

5

6

7



One Position
Keratometer

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER
SATURDAY
301-065 / Wk 43

27

8 am

~~Regular Astig~~

Spherical

Astigmatism
↓
Oval
WTR → Horizontally oval mires
ATR → Vertically oval

Irregular Cornea
↓
– Irregular Mires
– Doubling of mires

9

10

11

12

1pm

2

KC — Pulsating Mires
Mirification

3

4

5

6

7

SUNDAY 28

NOV

DEC

29 OCTOBER
MONDAY
303-063 / Wk 44

SEPTEMBER 2012

M	T	W	T	F	S	S
•	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

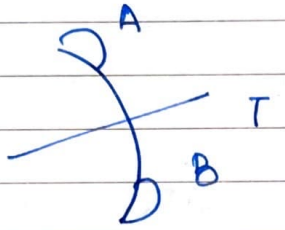
OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

Javal Schiotz

8 am — Variable object size
Constant image

9

10 — 

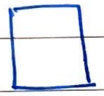
11

12

1pm — Mires

Stepped & green filter

2



3 — Rectangular & Red filter

4

2 mires
↓
Image
↓
Obj lens
↓

Wollaston type doubling prism

↓
Doubled image
↓
Eyepiece
↓
Observer's Eye.

5

6 — Astigmatism
↓
7 — Overlap — white colour (R+G)
↓
1 step = 1 D.

8 am

9

10

11

12

1pm

2

3

4

5

6

7

Relation of

$\alpha = \frac{n-1}{r}$

I.C : $r = \frac{337.5}{D}$ mm.

Range : 36 - 52D (30 - 61D extended upto)

Clinical Use | Limitation | Sources of Error

3 - Astig

4 - CL fit

5 - KC

6 - Hazy Medium R.E

7 - IOL Calculat^n

- Diff b/t Axial & Curvatural Astig

- RGP flexure detect.

01 NOVEMBER
THURSDAY
306-060 / Wk 44

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Presbyopia

- Corneal Based.
  - Non ablative Corneal procedures
  - Laser ablation Corneal procedures
  - Corneal inlay
  - Intracor Treatment
- Lens Based.
  - RLE
  - PRL
  - Monovision & IOLs
- Sclera Based
  - Ant. ciliary sclerotomy & tissue barriers
  - Scleral spacing procedures
  - Scleral ablation with Erbium: YAG LASER.

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

NOVEMBER
FRIDAY
307-059 / Wk 44

02

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Intracor treatment

Corneal Inlay
↳ Acufocus Inlay
↳ Bio Vision
↳ Presbylens
↳ Refractive annular & Lenticule
↳ Multifocal refractive Inlay
↳ Presbyopic allogeneic refractive lenticule (PEARL)
↳ Kamra deep Near vision inlay

Laser Ablative Corneal procedures
↳ C-LASIK / Epi LASIK
↳ Presbyopic Bifocal LASIK & LASIK PARM.
↳ Pres... Multifocal LASIK (PML)
↳ Presbyond LASER Blended vision

Mow Ablative Corneal procedure
↳ Monovision CK.
↳ Laser thermal keratoplasty

DEC

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

- CK done in Non dominant eye.

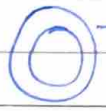
8 am

C-LASIK → 1 - distance. 1 - near.

9

LASIK PARM —.

10



— 2 Conc Zones

Near & distance

11

8.5 - 9.5 mm flap

12

↓

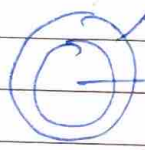
Hyperopic ablation → Prolate Cornea — for Near vision Make Cornea Myopic

1pm

Myopic " — Oblate 4mm Zone distance.

2

3



4

↓

5

Reposition flap

6

- PML — Multifocality created using multistep treatment

7

SUNDAY 04

Corneal flap 8.5 - 9.5mm

↓

Astig ablation

↓

Central Corneal ablation — distant defect &

↓

Multiple paracentral zonal ablation — Near & Intermediate

8 am

Presbyopia

Dominant — distance
Non " — Near

9

10

↳ Monovision + Spherical aberration (+ve) in Non dominant eye

11

⇓

12

Image disparity smaller

⇓

Brain blends images together

1pm

⇓

Blend zone

2

3

V. good visual acuity
Contrast sensitivity in intermediate range.

4

5

6

7

DEC

06 NOVEMBER
TUESDAY
311-055 / Wk 45

CORNEAL INLAYS

→ Mir Intrastromal Mir Side effects

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

Easily reversible

(*) **Femtosecond Corneal pocket Advantage**

8 am
- Precise & safe dissection

9
- Computerized parameters programming

10
- Inlay movement are not there.

11
- Inlay does not produce corneal topographic changes

12
- No Astigmatism Induction

1pm
- Good day eye related to flap
- Prevent Neurotropic Keratopathy.

2

3

Acufocus

4 ↳ Camera lens to ↑ range of vision
5μ thin 3.8 mm Outer dia
1.6 mm pinhole

5

6 Central aperture ↓ blur when viewing near objects.

7

Injected below LASIK flap
under corneal pocket.

8 am

Biovision

9 Inovue inlay

Hydrogel lens
dia 3.6 - 3.8mm
Thickness = 10μ
Power Incorporated

12 clear zone

1pm

Nucolens – Multifocal
2 Cornea by adding + power to Corneal
3 ∝ Pupil action
4 distance Near
5 dilates Pupil constricts
light

Pocket → 0-Inlay Inserted.

Presbylens
Corneal Inlay

Correct Presbyopia
↓
changes topography
polymer 1.5mm dia
Ultrathin

120-130μ flap
↓

PEARL

Presbyopic
Allogenic
Refractive
Lenticule

Shape changing
↓
Human Corneal tissue use
↓
Smile lenticule
Rx -2.5 to -3D
of Myopia

✓ ↑ depth of focus by ↑ central radius of curvature

Creat hyperprolateness on Cornea.
└ surrounded by Normal topography

✓ Easy lenticule implantation.
Lenticule BioCompatible

✗ Manual Cutting
↓
Potential risk of stromal rejection.

DEC

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER

M	T	W	T
31	•	•	•
3	4	5	6
10	11	12	13
17	18	19	20
24	25	26	27

8 am

9

10

11

12

1pm

2

3

4

5

6

7

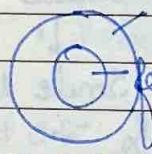
Refractive
Annular
Add lenticule

Flexivue . Nicolens

Hydrophilic acrylic
polymer

3mm dia .

edge thickness 20mm

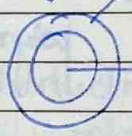


Multifocal
Refractive
Inlay

Most recent .

hydrophilic acrylic
hydrogel lens

DK 35.



Multifocal IOL

Raindeep
Near vision
Inlay

Prolate shaped
Cornea under
femtosecond
laser flap

Hydrogel material

2mm dia.
32μ thick.

Placed in
Non dominant
eye. Eg.
- Near
- Intermediate

vision

→ As transparent as natural tears ∴ zero.
Cosmetic issues

→ Well suited for dim light

→ Rain drop resembles tiny water droplet

→ Bio-Engineered to facilitate transport of nutrient & fluid to eye

Intacs Rx

8 am

9

10

11

12

1pm

2

3

4

5

6

7

femtosecond to correct — topography] status
refractive

of central portion of Cornea

↓

Creation of several concentric Intrastromal rings

Scleral based procedures

↑ distance b/t lens equator & ciliary mol

↓

Reverse Presbyopia

vision

DEC

Specular Microscopes

In vivo — clinical & morphological study of corneal endothelial cells.

8 am

9

10 Reflected light uscope → projects slit of light on Cornea

11 ↓ utilizes light reflected from an optical interface tissue for image formation.

12

Diff b/t refractive indices b/t endothelial cells & Aq. humour — give rise to specular

1pm reflection at flat post. surface.

2 Reflected light — 0.02% of incident light

3 Image in 4 distinct zone :- Zone 1 - Epithelium

4 Bright boundary [2 - Corneal stroma
3 - C. Endothelium
[4 - Aq. humour

5 dark boundary.

6

7

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

Types

8 am

Contact

9

Kelle, Konan.

10 EM-1000 (Tomey)

To eliminate Corneal Surf. reflection

11 ↓

12 CL + Coupling fluid.

1pm ↓

CT = + CL

2

Good resolution & Magnification

3

4

↓ Comfort

5 >> Infection spread

Artefacts ✓

6

7

Wide field specular μscope.

Sroj dia is viewed → ↑ angle of incidence

↓

↑ speed of. mirror. Contact.

Non Contact

Automated SM (Topcon)

↑ $\angle i^{\circ}$ ⇒ bothersome ant reflection moved to side

>> pt tolerance.

>> acceptability

x risk of eye trauma

Broader view

↓ resol

↓ Magni

✓✓

Field of view - 10-15 *

Resolution — ↑

Image Quality ✗ 'eye Move"

Endothelial layer - Readily evaluated

Resolution of Endothelium - unproved

Annoying reflection 4m incident light ↓

SUNDAY 18

Procedure

8 am

4 eyes

whole Corned scanned to ensure complete evaluation

↑ S
T ← ○ → N
↓ I

9

10

75 cell counted

Methods of Analysis

11

12

Cell density

fixed frame Analysis

Tracing Analysis

1pm

/mm².

Drawing of endothelial mosaic of known size

individual cells made

2

Adults - 3500 cells/mm².

⇕

Analysed for cell areas

3

Age - 2000/mm²

photograph of endothelial cells

4

< 1000 cell/mm² - poor tolerate IO Sx

5

6

Analysis of digested cells.

Computerized image Analysis

7

MCD

DEC

20 NOVEMBER
TUESDAY
325-041 / Wk 47

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

Analysis

8 am

Quantitative Analysis

10

Mark ady border

Mark centre of ady cells

11

Mean cell area.

12

Max cell area.

1pm Min cell area.

2 Number of cell actually analyzed.

Mean Cell density

3 Std deviation

4

5

6

7

Qualitative Analysis

Polymegathism

Pleiomorphism

→ Co-efficient of variation

$$\frac{SD}{MCA}$$

CV = 0.25

↑ Polymegathism

different shapes

% of Hexagonal Cells

70-80%

↓ in hexa ≤ ↑ no. of cells

Pleiomorphism

Clinical Use

8 am • Assessment of endothelium in donor Cornea & effect of preservation

9

• Assessment of Naturally occuring dis.

10 deg — dysteophy

11

• Ass of long effect of Sx procedures

12

• Measurement of CT.

1pm • Ass of Epi Cornea & Crystalline lens

2 • Assessment of changes in endothelium

→ with age

→ following surgical procedures

→ ⊆ use of Intracameral drugs, irrigating solutions with associated conditions

3

4

5

6 • Corneal grafting
• Cataract Sx ⊆ ∞ ⊆ ow IOL Implant.
• Newer procedures

7

- Glaucoma
- Uveitis
- CL wear
- Trauma

DEC

Confocal Microscopy of Cornea

8 am Bio Imaging tech which enables non invasive analysis of C. structure & fxn.

9

- Light source focused on to small volume in specimen tissue.

10

11 - detector — To collect resulting signal to produce an image & enhanced lateral & axial resolution.

12

1pm

Illumination & observation systems focused on single points ⇒ Confocal.

2

3 Lat resolution. → 1-2μ

Axial resolution → 5-10μ

4

5 Magni → 600 *

6

7

27 NOVEMBER
TUESDAY
332-034 / Wk 48

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

Types

8 am

Tandem Scanning

9

1000 light beams moved over fixed.

10 Obj

11

Nipkow wheel

12

1pm

High speed spin

2 ≤ 1000 of pinhole.

Scanning slit

1D spot scanning

Laser Scanning

HRT II

+

RCM (Rostock Cornea Module)

- 4,0 Contact objective.
- Diode laser beam of 670nm

↑ resolution
Uniform illumination
Precise depth measure^{n}

3

4

5

6

7

uscopy of Naural Cornea

- Superficial epithelial cells — hexagonal.
  Bright cyto & Black Nuclei

8 am

9 • Intermediate layer of Wing cells - Smaller than superfic
  Uniform in size

10

- Basal epithelial cells - just abv. BM., distinct mosaic
  smallest

11

12 • Bowmann layer — Homogeneous acellular + NF of
  subepithelial nerve plexuses

1pm

- Kerahocyte. Nuclei — Bright reflector in steama

2

3 Ant Kerahocyte Nuclei — Post K. Nuclei

4 ↓ Abundant Oval — ↓ Oblong

5

6

- Endothelial cells — Bright cell bodies
  dark cell boundaries
  Hexa shape

7

DEC

29 NOVEMBER
THURSDAY
334-032 / Wk 48

OCTOBER 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	•	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

uscopy of C. pathologies

8 am
9
10
11
12
1pm
2
3
4
5
6
7

Keratoconus
Multiple steiae represented by thin hyporeflective lines oriented vertically.

Measurement of flap thickness in LASIK.

Intracorneal deposits

Exogenous.
Acanthamoeba Cyst/Ova.
drug deposits.
deposit ~~over CL~~. after CL use
Rf Sx
VRS x using Oil.

Endogenous
Wilson
Hyperlipidaemia
Fabry Disease
Haemosiderosis

Corneal dystrophy
granular dystrophy
Limbus
Palizades of Vogt
PPD
Multiple round vesicles
FCED — Cornea guttata. appear dark.

C3R
Imaging of filtering bleb

Ocular Response Analyzer

8 am — Measures biomechanical property of Cornea

9 — Useful in comparing LASIK, Surf ablation.

10 — Effect of flap on Corneal steength

11 — Measures IOP / CCT

12

It takes into account — Corneal hydration. CT. compensation. Bio-elasticity

1pm

2

3 — ✓ Non Contact procedure — Sup Anaesthesia x req. — Speedy Tech ⊆ ↑ accuracy & repeatability — Dx Corneal ectasia earlier

4 — ✗ ↑ Cost of Equipment — Doubts in std.

5

6

7

DEC

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Gonioscopy

Tech to examine structures in ∠ angle.

8 am

9 **Principle** — Direct view not possible because of overhanging opaque scleral shelf

10 ↓

Phenomenon of Total Int reflection

11 $\angle i > \angle c$ (critical ∠ of Cornea air Interface) 46°

12 ↓

CL of Index = Cornea. (eliminate optical effect of front Corneal surface)

1pm

2

3 **Types**

4 ↓

Direct

5 Indirect (Gonio-Prism)

6 $\angle i < \angle c$ → says refracted at CL-air Interface

Indirect → reflected by mirror in CL (Goniopism)

7 SUNDAY 02

Leave the lens at ⊥ to CL-air interface

Direct

8 am Steep Convex lens
exit the eye ⊗ ⊥
9 at lens air interface.

10

Indirect

⊥ exit
» useful on slit lamp.

Types

- Koeppe/Goniolens — 50D Concave

12 Infants ↓ 16mm. Adults ↓ 18mm.

1pm

- Hoskin Barkan's — Gonioscopy
- Swan Jacob — Dx.
- Richardson Shaffer — Small Koeppe lens for Infants.
5
- 6 Neath — ½ Vacuum.
- 7 Sickback — floats on Cornea.
- Thorpe — Dx & diagnostic lens
- Layden — Dx for Neonates

Coupling agent

\+ ↓ Goldmann
- 3
- 2 mirror
- 1

Allen Thorpe

- Zeiss
- Posner
- Sussman
- Tokel
- Ritch trabeculoplasty lens.

NOVEMBER 2012

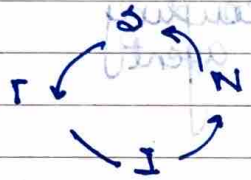
M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Direct

8 am
↓ LA
9 Supine position.
Examiner sitting on side of leye
10
Nasal lip — raised
11 Saline drops instilled



12
1pm
2 Head towards L viewed
3
4
5

Indirect

Technique

↓ LA
Coupling fluid
Inverted but not laterally reversed
3 illumination
- Diffuse
- Sclerotic scatter.
- Direct focal illumination

Disadvantages

6 Inconvenient
7 Annoying light reflexes
Time Consuming

Benefits of slit lamp.

× Comparison

Limited positioning of light rays
Difficult to perform in horizontal meridian
Mirror image confusing
↑↑ of ∠ closure
Excessive pressure may open or close ∠.

	Direct	Indirect
8 am	Advantages	
9	» flexible	Easier to learn.
10	Panoramic view obtained	Faster to perform.
11	Angle becomes deep in supine	Req. ↓ instrumentation & space
12		
1pm	Detailed exam of minor structures	Better optics & lighting
2	↓ distortion of AC.	Corneal wedge can be used to localize ∠ structure
3	Can be used in sedated patients as in infants	Indentation gonioscopy can be done.
4		
	Provides straight view.	Magnified stereoscopic view of OD can be obtained.
5		
	Using 2 lenses, both eyes exam. simultaneously	
6		
7	Can be used for Sx. procedure like goniotomy	

06 DECEMBER
THURSDAY
341-025 / Wk 49

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

8 am
9
10
11
12
1pm
2
3
4
5
6
7

gonioPoism

Adv

Easy to use
Excellent view.
Stabilizes globe ∴ used in ALP
Peripheral retina can be seen.
2 mirror gives best in situ view

Disadv

Coupling agent req.
∴ blur subsequent exam.
1 mirror is there, needs to be rotated by 360°
× used for indentation gonio
Blood contact causes artefactual closure

Less

× Coupling
Easy to perform.
all 4 Quad at same time ∴ 11° rotation req.

Indentation gonio can be done

Can visualize fundus

Less

Difficult to master
× stabilize the globe
May open the angle if pressure is applied.

Is angle open / close

Tech

Abnormalities in angle.

8 am

9

Gonioscopy in situ.

10

11

2 mirror

1pm

x light on pupil ∴ x pupil constrict

3

Reason of closure

4

5

Optical/apparent

6

Appositional

7

Synechial

↑ illumination

To assess other structures

Manipulative

x visualized in steep iris config & narrow L.

Dynamic by Goldman lens by asking pt to look into lenses

Look for PAS

Indentation.

Sussman 4 mirror

Synechial vs Appositional closure

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Gonioscopic View of L & H

8 am Schwalbe's line — DM ends. identified by locating Corneal wedge

9

chances of error in Pigmentation ant Hazy Cornea

10

11 TM ⟨ A / P .

12

• Scleral Spur → Argon laser burn × beyond it
↳ ↑ Inflam response
↳ ↑ IOP.

1pm

2

• CBB Width → Narrow in HyperM
Wide — Myopes & Aphakics

3

4

Root of iris

5

Other St → Iris processes
B.V
Schlemm's Canal

6

7

SUNDAY 09

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

DECEMBER
MONDAY
345-021 / Wk 50

10

grading of L

- Scheie
- Shaffer
- RP Centre gonio grading
- Modified gonio.

8 am
9
10 Scheie

11	Wide	Open	All ste visible over	
12	II	Narrow	Hard to see iris root into recess	
1pm	II		CBB obscured.	
2	III		PTM "	
3	IV		Only SL visible	
4				

Shaffer's

			L closure chances	ste visible
5				
IV	35-45°	Wide open	x	SL - CB
6				
III	20-35°	Open L	x	SL - SS
7				
II	20°	Moderately narrow	Possible	SL - TM
I	10°	Very Narrow	High.	SL.

11 DECEMBER
TUESDAY
346-020 / Wk 50

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Spaeth's grading →

8 am

9

Ins insertion ∠ approach Peripheral Pig

10

A Ant to SL regular flat 0 — x pig

11

B SL-SS bowed 1+ Mild

12

0-50° deep ∠ Ant. 2+ Mod

C SS flat Ins 3+ Mod

1pm

D — Deep to CB 4+ Inte

grees — concave

2

E — >1mm

3

visible

4

5

6

7

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

DECEMBER
WEDNESDAY
347-019 / Wk 50

12

8 am

9

10

11

12

1pm

2

3

4

5

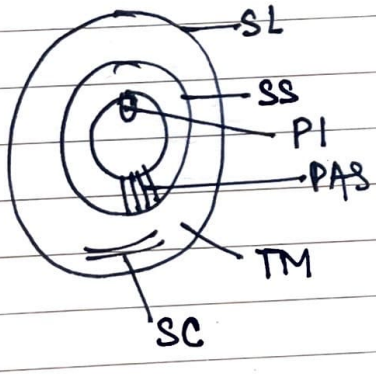
6

7

Uses of gonio

- Dx.
  - PACG vs POAG
  - Provide prognosis of Cong G
    - 2° glaucoma → Tx → ∠ recession
    - CBB, IOFB, KF rings
  - Pseudophakic Pigmentary G
- Therapeutic
  - Indentation G → To break att.
  - Goniotomy

Drawing



Iridectomy - Black
PAS - Orange
Rg Block
∠ recession - Beaver cross hatched

NOVEMBER 2012
M T W T F S S
• • • 1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 •

DECEMBER 2012
M T W T F S S
31 • • • • 1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30

Femto assisted keratoplasty

8 am — Pulse duration 10^{-15} s.

9 — λ = 1053 nm.

Spot size = 2.5 mm.

10 — Pulse repetition rate = 15-16 Hz.

Pulse width — 600 - 800 femtosecond

11

12 — Intralase → USA

Femtec → Germany

Femto LDV → Switzerland.

1pm

2

3

3 cuts

4

5 — Post side cut.

Lamellar cut.

Ant side cut

6

7 — Cuts can be used to create pattern

- Top hat
- Mushroom.
- Zig-Zag.
- Christmas tree.

Max dia = 9.5mm.

Side ∠ Cut — 30 - 150° vary.

20 DECEMBER
THURSDAY
355-011 / Wk 51

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

A Scan

- Calibration check
- Gain / Sensitivity setting — 70% — Normal
  - ↑ Dense Cataract. Ocular Opacities High Myopia
  - ↓ Si Oil filled Pseudophakic.
- ∴ Mode selected accordingly.
  - Normal
  - Cataract.
  - Aphakic
  - Pseudophakic
    - Si
    - Acrylic.

Instruction — point probe toward Macula
- × fluid bridge b/t probe & Cornea
- × Cornea depressed.

Mode Setting
- Manual
- Automatic

Characteristic of good Scan →
- C. Echo is seen as a tall single peak
- Aq chamber does not produce any echo
- Ant & Post Lens Capsule — produce tall echoes
- Vitreous Cavity — few to no echoes

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

DECEMBER
FRIDAY
356-010 / Wk 51

21

Scan. & Max AL. is selected

8 am

Take AL of both eyes if. <22mm
>25mm.

9

10 diff b/t 2 > 0.3mm.

11

12

1pm

2

3

4

5

6

7

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

DECEMBER
MONDAY
359-007 / Wk 52

24

IOL Master

Non Contact tech.

8 am

9

10

12

1pm

2

3

4

5

6

7

- AL
- K
- ACD
- WTW

Partial Coherence Interferometry

Adv of IOL Master

- Operative.
  - Patient Comfort.
  - User friendly
  - Single instrument
  - Cross infection
- Tech.
  - LC display
  - Safety features
  - More accurate AL measurement
    - Specific in certain ocular condition
      - ↑ Myopia ≤ type I peripapillary post staphyloma.
      - Small corneal scars
      - Ant cortical opacities
      - PSC
      - Other localized Media. Opacities

25 DECEMBER
TUESDAY
360-006 / Wk 52

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Tech — - Incaporates 5 IOL power calculating formulae

8 am

9 - Individual optimization of formulae

10 - Possible in pt ≤ Corneal refractive Sx Post

11

RL method. Haigis L formula

12

1pm

2

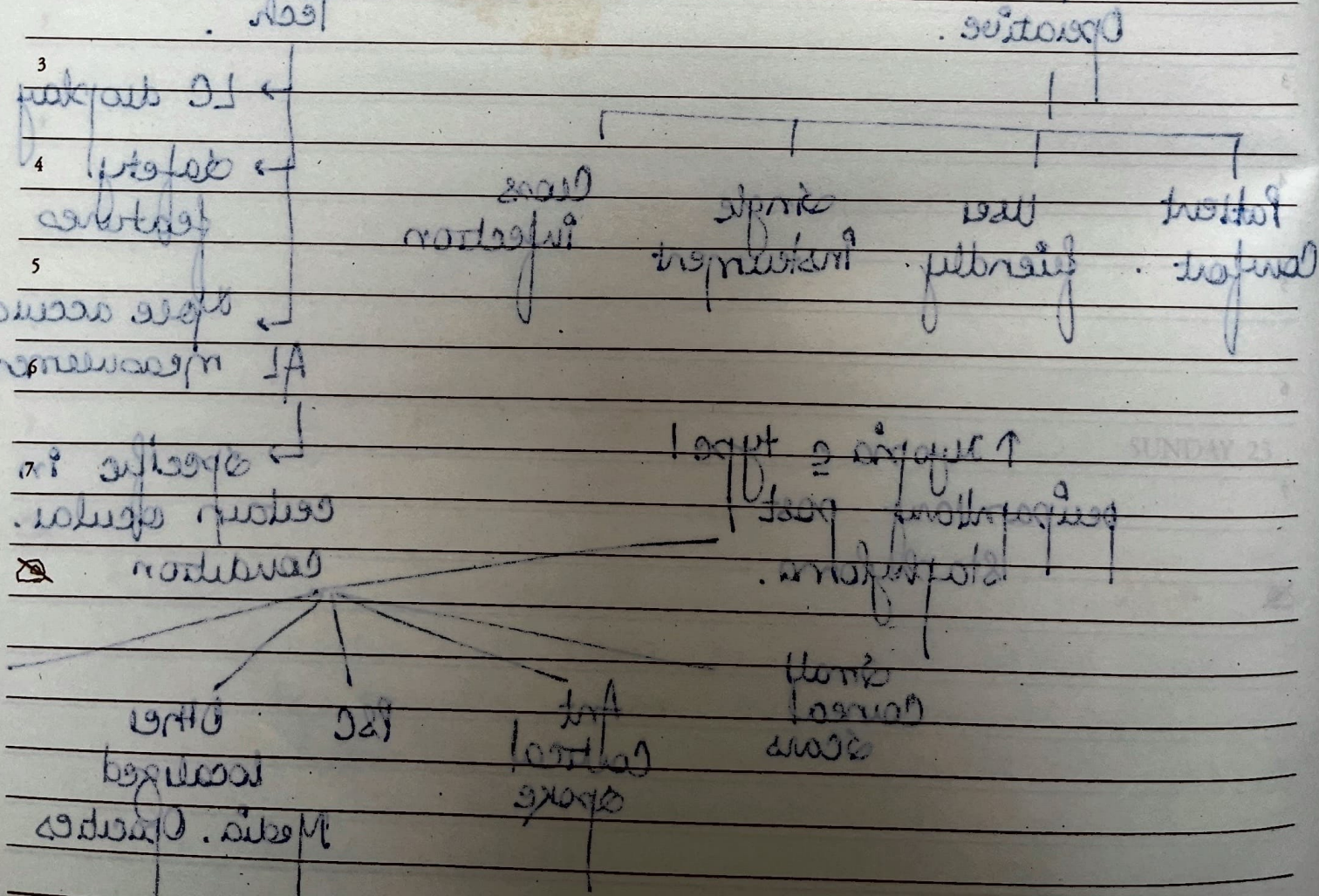
3

4

5

6

7



TD OCT

line - scan after combining Bl scan

400 A scans / sec

✓ — Dynamic focusing on axial plane

— Capture live images.

400 A Scan / s.

Resolution

8-10μ.

Moving reference Mirror

SD OCT

Spectral Interference pattern

↓

Dispersed by spectrometer

↓

collected by CCD

20,000 - 35,000 Scan / s.

5-7μ.

Stationery

∴ no need for Mech depth scanning

⇒ Also Surface

⇓

EDI OCT - by pushing Zero delay at (Sample and reflection) needs to ref " "

SS OCT

1μ.

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

	Measure echo time delay & intensity of reflected light	Measure λ of reflected light.	Narrow instantaneous line width, rapidly swept source
	Broadband & Continuous Wave	→	→
λ	830 nm	830 nm.	1050 nm (tunable source)
Axial R	10μ	5-7μ	1-7μ
Transverse R.	20-25μ	20-25μ	12.5μ.
Scan speed	400 A Scan/s	50,000 A Scan/s.	100c A Scan/s.
Width of B Scan		12×9 mm	6-9 mm
Ocular Opacity			↓ affected

JANUARY 2013

M	T	W	T	F	S	S
•	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	•	•	•

FEBRUARY 2013

M	T	W	T	F	S	S
•	•	•	•	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	•	•	•

NOVEMBER 2012

M	T	W	T	F	S	S
•	•	•	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	•	•

DECEMBER 2012

M	T	W	T	F	S	S
31	•	•	•	•	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Print Out — - Glaucoma field
- OCT
- UBM
- Pentacam
- Sobecan
- ~~BVTA~~
- ~~GDX~~ VCC

8 am

9

10

11

12

1pm

2

3

4

5

6

7