Overview

- Common Types of Strabismus
- Indications for Strabismus Surgery
- Common Procedures
- Psychosocial Benefits

Common Types

- Esotropia
- Exotropia
There are many different presentations of strabismus. Most can be corrected surgically.

Indications for Strabismus Surgery

Classically Taught Benefits of Strabismus Surgery
- Develop binocular vision
- Restore binocular vision
- Eliminate diplopia
- Eliminate torticollis

Other Benefits
- Improve visual field
Insurance accepted indications for strabismus surgery

- Diplopia
- Asthenopia (eye strain)
- Any misalignment of the eyes that cannot be corrected non-surgically – this is where some prodding is occasionally required

Surgical Procedures

- Weaken (recession)
- Strengthen (resection or tuck)
- Alter vector forces (transposition)

Table 10.1 Actions of the extraocular muscles

<table>
<thead>
<tr>
<th>Muscle</th>
<th>Primary action</th>
<th>Secondary action</th>
<th>Tertiary action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medial rectus</td>
<td>Abduction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral rectus</td>
<td>Abduction</td>
<td>Addition</td>
<td>Abduction</td>
</tr>
<tr>
<td>Superior rectus</td>
<td>Depression</td>
<td>Adduction</td>
<td>Internion</td>
</tr>
<tr>
<td>Inferior rectus</td>
<td>Depression</td>
<td>Adduction</td>
<td>Exosion</td>
</tr>
<tr>
<td>Superior oblique</td>
<td>Depression</td>
<td>Internion</td>
<td>Abduction</td>
</tr>
<tr>
<td>Inferior oblique</td>
<td>Depression</td>
<td>Exosion</td>
<td></td>
</tr>
</tbody>
</table>

Recession (weakening)
Resection (tightening)

Psychosocial Benefits of Strabismus Surgery
Patients benefit from strabismus surgery even if there is no hope of providing improved binocular vision or visual field.

Psychosocial aspects of strabismus study.


CONCLUSIONS: Psychosocial difficulties are a problem for teenagers and adults. Correction of strabismus in the older teenager or adult may offer them improvement in psychosocial functioning.

Strabismus surgery is NEVER “cosmetic”

Surgery to provide normal anatomy or physiology is RECONSTRUCTIVE. Cosmetic surgery makes an appearance more “beautiful”

While there are many “normal” appearances for human facial features, body types, etc., there is only one normal alignment status for human eyes ….

Orthotropia (straight)
Strabismus occurs secondary to an abnormality in binocular vision.

Strabismus surgery corrects an abnormal alignment secondary to abnormal physiology (binocularity).

How do people view people with strabismus?

Personality Traits Tested

- Attentiveness
- Communication Skills
- Competency
- Dependability
- Emotional Stability
- Honesty
- Humor
- Intelligence
- Leadership Ability
- Organizational Skills
- Sincerity

Results

Overall, the strabismic faces were judged significantly more negatively, across 11 descriptive characteristics, than the non-strabismic face.
Nobody is too old, has too poor vision or has had too many strabismus surgeries to not be allowed to have straight eyes.
Refractive IOL in Cataract Surgery

Jose Ivan Quiceno
MD
Scripps Clinic Medical Group

US Population age 65 and over

Do not underestimate the importance of good intermediate vision

Custom Cataract Surgery

- Aspheric IOL
- Toric IOL
- Multifocal IOL
- Accommodative IOL

Aspheric IOL

Spherical aberration occurs when light rays are over-refracted at the periphery of a lens system, resulting in a region of defocused light which can decrease image quality.

The Problem – Spherical Optics
The Solution – Aspheric Optics

- Aspheric optics align the light rays to compensate for positive corneal spherical aberration, resulting in enhanced image quality.

Ocular spherical aberration

- Anterior corneal positive SA is +0.275
- Young (19y/o) crystalline lens has a negative SA -0.275
- Older eyes crystalline lens increases + SA
- Aging (72y/o) SA of the crystalline lens is +0.15

Design Objective

- Design considerations for the IOL:
  - Induce negative Spherical Aberrations with the lens to compensate for positive corneal Spherical Aberrations

Correction of Spherical Aberrations

- SN60WF: -0.200 negative spherical aberration
- ZA9003: -0.275 negative spherical aberration
- LI61AO: Zero spherical aberration

Toric IOL

- Quality of vision is deteriorated considerably by astigmatism.
  - No astigmatism
  - 1.0 D astigmatism
  - 2.0 D astigmatism
Cylinder Distribution

Treatment Options for Astigmatism

- **Glasses or Contacts**
  - Patient dependent
  - Cosmetic / Lifestyle issues

- **Incisions**
  - Lack precision
  - Unpredictable outcomes
  - Increased risk
  - Regression
  - Limited treatment range

Treatment Options for Astigmatism

**Ideal Treatment**

- Precise and Accurate
- Predictable Outcomes
- Permanent
- Safe and Convenient

Toric IOL Design Characteristics

- **Design**
  - Posterior toricity
  - Toric axis marks
  - AcrySof® Natural Single-Piece platform

- **Dimensions**
  - Overall length: 13.0 mm
  - Optic diameter: 6.0 mm

- **Delivery**
  - Monarch II or III Injector
  - Cartridge

Cylinder Powers SN60T3-T5

<table>
<thead>
<tr>
<th>Toric IOL Model</th>
<th>Cylinder Power IOL plane</th>
<th>Cylinder Power Corneal Plane</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN60T3</td>
<td>1.50</td>
<td>1.03</td>
</tr>
<tr>
<td>SN60T4</td>
<td>2.25</td>
<td>1.55</td>
</tr>
<tr>
<td>SN60T5</td>
<td>3.00</td>
<td>2.06</td>
</tr>
</tbody>
</table>

Axis Marks

- Toric Marks
- Gross Alignment: 15° - 20°
IOL Alignment

3 Step Procedure:
I. Gross alignment
II. Removal of OVD
III. Final alignment

Intraocular lenses for Presbyopia

Lens Comparisons

Diffractive apodized IOL

- SN6AD3
  - Add Power: +4.0 D
  - Spectacle Plane: +3.2 D
  - Range: +10.0 D to +34.0 D
  - A-Constant: 118.9

- SN6AD1
  - Add Power: +3.0 D
  - Spectacle Plane: +2.5 D
  - Range: +10.0 D to +34.0 D
  - A-Constant: 118.9
**Apodization**

- Gradual reduction or blending of the diffractive step heights.
- Optimally manages light energy delivered to the retina as it distributes the appropriate amount of light to near and distant focal points, regardless of the lighting situation.
- Designed to improve image quality

**Anatomy of the Apodized Diffractive Technology**

- Central 3.6 mm apodized diffractive structure
- Step heights decrease peripherally from 1.3 – 0.2 microns
- A +4.0 D at lens plane equaling +3.2 at spectacle plane
- Outer refractive zone

**SN6AD1 Design Characteristics**

- Utilizes existing IQ ReSTOR® IOL +4.0 D platform with identical asphericity, energy distribution profile, and shape factor
- Modified add power from +4.0 D to +3.0 D
  - 9 diffractive steps vs. 12 diffractive steps
  - Slightly wider step spacing to modify the add power

**Accommodative Lens**

- "Accommodative" lens technology proved to be safe & effective by the Food & Drug Administration
- Uses the natural focusing ability of the eye.
- Provides a single focal point throughout a full range of vision from far to near & all images in between.

**Four Generations of Accommodative IOL**

- 1st Generation
  - FDA approved in 2003
  - The AT45
- 2nd Generation
  - Released Aug. 2005
  - The AT45-SE
- 3rd Generation
  - Released Nov. 2006
  - The AT50-SE
- 4th Generation
  - Released July 2008
  - HD 500-SE
Treatment of Presbyopia after Cataract Surgery

- Monovision (aspheric IOL)
- Blended vision (aspheric IOL)
- Monovision with Toric IOL
- Diffractive Apodized Multifocal
- Refractive multifocal
- Pseudo accommodative IOL

Summary

- Refractive intraocular lens is a good option for treatment of presbyopia after cataract surgery.
- Patient selection is key.
- Avoid patients with pre-existing eye disease.
Division of Ophthalmology

- Cataract
- Retina
- Cornea
- Oculoplastics
- Pediatric Ophthalmology

- Torrey Pines
- Rancho Bernardo
- Carmel Valley
- Encinitas
- Mission Valley
- Rancho San Diego

Laser Vision Correction at Scripps Clinic
Excimer Laser Parameters

- **Gas:** Argon / Fluoride
- **Wavelength:** 193 n
- **Duration:** 18 nsec
- **Repetition Rate:** 10/sec
- **Ablation Rate:** 0.25 µ/pulse
**IntraLase**

- Gas: Neodymium
- Wavelength: 1053 nm
- Speed: 60 kHz
- Duration: 600-800 femtoseconds (10^{-15} sec)

**Corneal Flap Procedure**
Results

- 5046 cases
- 43 SCMG doctors
- 85% 20/20 or better at 1 week
- 99% 20/40 or better at 1 week
- Enhancement rate = 8%
- Complications: dry eye, haloes
- No infections
- No loss of best corrected vision

Next Frontier

- Presbyopia
- Multifocal corrections
- Keratoconus

Thank You
Loading Deck

- Mounts & locks the applanation cone to the laser
LESSONS FROM Cataract Surgery IN FIJI

K. Victor Zablit M.D.
Scripps Clinic
January 2009

WHY FIJI

- Need
- Contacts
- Interest

Barriers Which Keep Patients from Getting Cataract Surgery in Developing Countries

- Cost of surgery
- Distance to hospital
- Cultural and social constraints
- Awareness of surgery or trust in outcome
- Visual needs differ

SPONSOR

- Scripps Health-Fiji Alliance Program
- Loloma Foundation

Fiji

Need

- Population of over 1 million people
- One public hospital in the capital provides cataract surgery
- Cost of private institution is prohibitive

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FIJI Eye Team
January 2009

- P. Lance Hendricks M.D. (Anesthesia)
- Ellen Mendez (Ophthalmology RN)
- Tim Mendez (surgical Ophthalmic tech)
- Mone’ Young (Ophthalmic assistant)
- K. Victor Zablit M.D. (Ophthalmologist)

Preparations

- List of supplies
- Manual IA chosen vs. Phaco machine
- Contacting donors
- Equipment: International Relief Teams

Plan

- Leave on a Saturday night from LAX, get to Fiji (Nadi Airport) Monday morning.
- Take the boat (5 hours) to Yaqeta island.
- Start seeing patients Monday pm.
- Tuesday morning: start surgeries.
- Do 40-45 cases (8-9 a day)
- Fly back Monday.

List

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
</table>
| ... | ... | ...

ALCON

Invoice

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Quantity</th>
<th>Price</th>
</tr>
</thead>
</table>
| ... | ... | ...

The above items represent the customs value of a charitable shipment.

These items are to be used in the mission field with no retail value.

FIJI

- Viti Levu
- Yasawa Islands
- Vanua Levu
- Taveuni
- Kadavu
- Lomaiviti Group
- Lau Group
- Mamanuca Islands
Simcoe Manual I/A
- Same one used for all cases
- K 50 with each case
- One BSS bottle 500cc per day
- Same IV tubing per day

ECCE

Packing
- 22 boxes
- Supplies for Fifty cases
- 50 IOL (5 A/C)
- 24 BSS 500cc bottles
- Equipment

ECCE with IOL
- movie

Change of Plans
- "Worst storm in 50 years", flooded the western area.
- The main hospital on the eastern side offered to host us.
Location

- Colonial War Hospital: 450 bed hospital and the main referral hospital for the country and the South Pacific.
- Suva: the capital.

CWH

Clinic

- 60 patients seen: most waiting for surgery by local ophthalmologist.
- Acuity: Light Perception
  Hand Motion
Most patients 50-60 years old
White Cataracts

Pre-Op Evaluation
- History
- Blood pressure measurement
- Auscultation of heart and lungs
- Scheduling
- A scan
- Instructions re: surgery

Before Surgery
- Dilated:
  - Neo 2.5
  - Cyclo 1%
  - Quinolone
  - NSAID
- Block:
  - 3.5cc mix Xylocaine 2% epi and Marcaine 0.75
- Prep:
  - Betadine
Anesthesia
- IV Cath
- Monitors for BP, ECG
- Oximeter
- Few: Propofol 40-60mg

Local Anesthesia
- Retrobulbar Block using 3.5 cc of 50/50 marcaine 0.75% and Lidocaine 2%
- The first day patients had some IV sedation.
- No sedation the following days.

Operations
- Aseptic technique
- Betadine scrub
- Gowns vs. sleeves
- 4-0 silk, 10mm incision, 6mm (<45y), 8-0 vicryl safety suture
- Viscoelastic, 10-0 nylon closure
- Ancef
- Patch with Zymar/Tobradex ointment

Patients
Immediate Post-Op

- Patch 24 hours
- Acetaminophen 500mg four tablets for pain prn
- Diamox 250mg tid for 3 days
- Post-Op instructions in English, Fijian, and Indian
- Appointment next day

First Day Post-Op

- Acuity
- IOP
- SLE exam
- Kit:
  - Quinolone/Prednisolone Acetate qid
  - Shield at night
  - Protective sunglasses
- Reviewed instructions with family
- Follow up one week with eye clinic

Boxes to bring back

Results

- 35 cases done.
- 1 Patient required vitrectomy
- Most in the 20/200 range, first day.
- Best 20/40, Worst CF
- 1 patient LP (retinal detachment)
- 1 Hyphema
- No Endophthalmitis
Lessons

- Profoundly satisfying
- Start working on supplies and donations > 4 months prior
- Educating the locals? Residency program at South Pacific University
- Review AB use
- ? 2 teams using the equipment: 2 shifts, or consecutive trips
- Give more consideration to the weather