

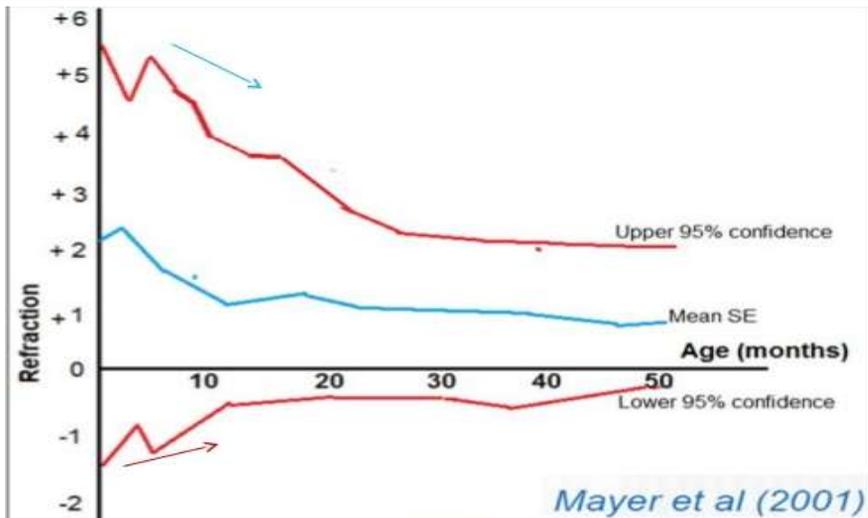
# GLASSES AS A NON SURGICAL MANAGEMENT OF STRABISMUS

**By: Dr. Heba Shafik**  
**Lecturer of Ophthalmology**  
**Tanta University.**



## GENERAL CONCEPTS IN PRESCRIBING GLASSES FOR CHILDREN

## I-REFRACTIVE GROWTH AND EMMETROPISATION



**Emmetropisation is both an active and a passive process i.e. error stimulate the eye to correct it**

**requires normal visual experience**

*Atkinson et al (2007)*

## 2- RISK OF AMBLYOPIA

**Emmetropisation fails when refractive errors are outside normal range for age and the risk of amblyopia and strabismus is increased**

**Glasses reduce the risk**

Atkinson et al (2007)

## 3-POWER OF ACCOMMODATION

**The mean accommodative amplitude is 14 diopters for 8 years old child.**

Southall, 1937

## GLASSES IN STRABISMIC CHILD

- **Plus or minus lens glasses.**
- **Prism glasses.**
- **Bifocals.**
- **Glasses with occlusion for amblyopia.**

## WHAT IS THE PRESCRIPTION AIM ?

**Our purpose is best visual acuity in distance versus binocular alignment**

- ◎ **Certainly ,we want to eliminate any amblyogenic factors by using the optical correction and consider the binocular status**



### ❖ **PRESCRIBING VISUAL CORRECTION FOR CHILDREN OFTEN HAS TWO GOALS**

- 1- Providing a focused retinal image
- 2- Achieving the optimal balance between accommodation and convergence

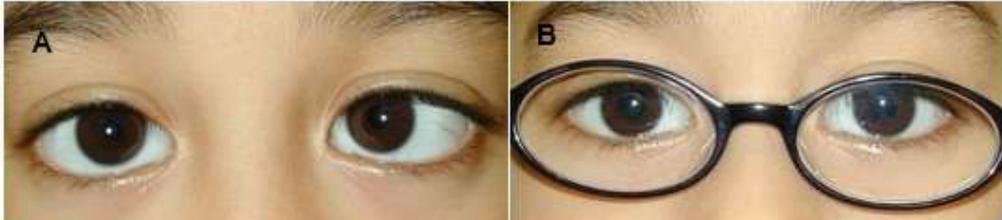
### ❖ **DEALING WITH THE CHILD**

- Measuring the Refraction of the child.
- Gain the child confidence first by talking to the parents first .
- Offering some sweets or a toy.
- Do refraction by the retinoscope while the child is sitting with his parents to vanish his frightening.
- If the child is totally uncooperative give him cycloplegic at home 3 days before examination.





## Fully Accomodative Esotropia



### NOW ! YOU HAVE TO DEAL WITH THE PARENTS.

- Why glasses?
- Why not surgery and get rid of Esotropia?
- Why not Refractive surgery?
- Will he or she wear it all time?
- IF not when will he or she stop wearing it?



---

## Partially Accomodative Esotropia



- 
- ❖ Trend is to prescribe full amount of refractive error in cycloplegia.
  - ❖ Young children tend to accept the correct glasses.
  - ❖ Search for hurt behind ears or pinch the nose or uncomfortable frame.
  - ❖ Cycloplegia of both eyes for 3-4 days in children unable to relax accommodation.

- 
- ❖ **Explain indication of the presence of normal vision (Refractive accommodative ET).**
  - ❖ **Consider full correction from infancy through pre school age.**
  - ❖ **Consider prescription of BCVA in old children.**
  - ❖ **Hypermetropic correction greater than +2 in esotropic patients.**

---

## **TO SUMMERIZE**

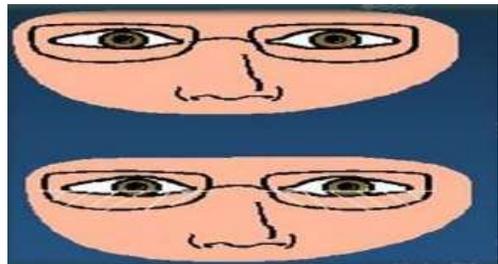
- When hyperopia and esotropia coexist, initial management includes full correction of the cycloplegic refractive error.
- Later, reductions in the amount of correction may be appropriate, based on the amount of esotropia and level of stereopsis at near and at distance with the full cycloplegic correction in place

- Generally this equals the full cyclopentolate or atropine refraction upto the age 2 years because the patients enviroment is close at hand and subjective tests are not possible
- In older children 0.50 – 1.00 D should be subtracted
- In some cases of acc /ET an extra + 0.50 D could make some difference to the strabismus

## ACCOMODATIVE ESOTROPIA WITH DISTURBED AC/A RATIO

### Bifocal Glasses

- Valuable in high AC/A ratio accommodative ET
- Restricted for children that were orthotropic or small angle ET in far by FCR but residual ET at near that convert to orthotropia or esotropia by additional plus lens.
- Contraindication is amblyopia and not complete elimination of ET in near.



- 
- Start with +1D and increase power in step of 0.5 up to +3D.
  - Minimal power that convert ET to orthotropia prescribed (prevent excessive relaxation of accommodation).
  - Success depend on proper bifocal segment.
  - Prefer straight top segment which bisect pupil or touch lower border in straight head position.



---

**When will we consider elimination of bifocal ?**

- Fusional amplitude increases so reduce power stepwise until discontinuation.
- If still dependant on bifocal segment to maintain fusion till teenage, consider surgery.

**What is the optimal time for follow up interval?**

- FCR must be done semiannually and correction readjusted.
- Goal is maximal hyperopic correction but reduces bifocal power by same amount if additional plus is necessary.

---

**Is it possible to avoid bifocals?**

- ⊙ It may be possible to avoid bifocal by simply slightly overplussing the patient with a single vision correction ( +0.50 +0.75D )

## GLASSES IN INTERMITTENT EXOTROPIA



### *Intermittent XT*



#### Aim of IXT treatment

Reducing episodes of manifest exotropia

Facilitating sensory fusion and achieving constant binocular alignment and normal stereoacuity.

## *Intermittent XT*



Nonsurgical management is indicated

In patients with excellent control as measured by normal distance stereoacuity

In young children who are at risk of developing monofixational esotropia from persistent surgical overcorrection

## In children



Nonsurgical techniques such as minus lenses and prisms can prevent or reverse early sensory anomalies

By maintaining the potential for equal vision in each eye and preserving binocular fusion status.

- Unequal clarity in vision represents an obstacle to fusion and can facilitate suppression, contributing to progressive loss of control in X(T).
- ***Significant RE, especially astigmatism and anisometropia, need to be corrected.***

❑ What if the patient had hypermetropia or high myopia?

## OVER MINUS LENS THERAPY

- All patients in minus lenses should be seen within 3 to 4 weeks after starting the therapy.
- Minus lenses should be discontinued if esotropia develops.
- There are studies that suggest that this treatment may induce myopia
- As the child grows older, asthenopic symptoms with over-minus lenses become prominent as the amount of near work increases



---

## GLASSES IN APHAKIA AND PSUEDOPHAKIA



## Bilateral Aphakia

- Bilateral cataracts in neonates are often treated with bilateral cataract extraction, with posterior capsulotomy and anterior vitrectomy.
- Although contact lenses have significant advantages over glasses in this situation, risks of infection, training parents, and the cost factor, limit its use and aphakic glasses are the only other alternative.
- Retinoscopy should be performed after dilating the pupil, although no cycloplegia is needed as the eye is aphakic.
- After taking away the working distance an addition of + 2.00 to + 3.00 D sph is added to the correction. This ensures that the child is corrected for near activities in the absence of accommodation. Not more than +13D.
- This addition can be reduced as the child grows older and bifocals should be considered by 1.5 to 2 years of age.

Based on the age and near activities of the child



---

## Unilateral Aphakia

- If only a unilateral cataract exists, then placing an intraocular lens or using a contact lens becomes extremely vital, as unilateral aphakic glasses cannot be prescribed due to extreme aniseikonia.

---

## PROBLEMS

- Amblyopia
- Reopacification of ocular media
- Anisometropia
- Aniseikonia



- Propensity for inflammation
- Different anatomy
- Growing eyeball
- Changing refraction
- Will patient wear glasses?

## DISADVANTAGES

### 1) IMAGE MAGNIFICATION

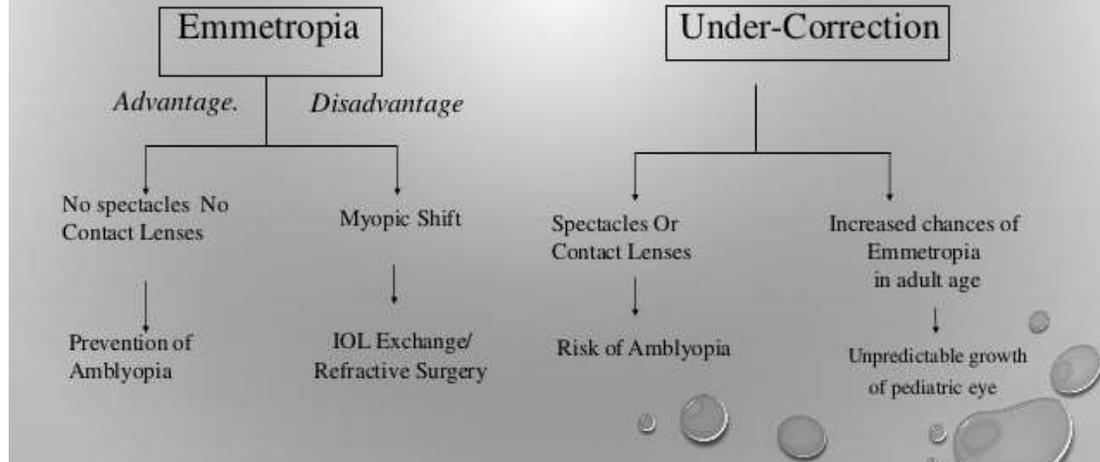
- 1D of convex power leads to about 3 % magnification of image; thus 10 dioptr=30%
- Difference of image size between the two eyes of about 7 % is tolerable
- beside that give rise to *diplopia* i.e., two images of one object are seen one small (from normal eye) and other larger (from aphakic eye).
- Not useful in unilateral aphakics
- Objects appear larger they appear falsely closer than reality, and this leads to physical in-coordination.



## Pseudophakia

- Children who have undergone cataract surgery with intraocular implants should be prescribed the entire spherical and cylindrical power calculated on a dilated retinoscopy.
- These children are usually older than a year, and thus, executive bifocals of + 2.50 to 3.00 D sph should be prescribed at the level of the pupil.
- Any glass prescribed after cataract surgery should ideally have an ultraviolet (UV) protective coating, as the natural protection of the crystalline lens is absent, although most of the intraocular lens (IOLs) now have UV protection properties.

## IOL SELECTION



Children less than 2 years old

- Do biometry and under correct by 20%, or
- Use axial length measurements only

Axial length IOL dioptric power

17 mm, 25 D

18 mm, 24 D

19 mm, 23 D

20 mm, 21 D

21 mm, 19 D

Children between 2 and 8 years old

- Do biometry and under correct by 10%

IOL-Intraocular lens, D-Dioptre

## IOL POWER SELECTION

AGE (Years)	Target Refraction
7	0 to +0.50
6	+1.00
5	+2.00
4	+3.00
3	+4.00
2	+5.00

Weigh:

- Refraction of other eye
- Risk of amblyopia
- Management of induced anisometropia

ME Wilson et al 2012, Faramarzi et al 2009.

## OCCLUSION



---

## OCCLUSION AND OPTICAL DEGRADATION

### Full time occlusion of the sound eye:

- *Defined as occlusion for all or all but one waking hour.*
- *It is the most powerful means of treating of amblyopia by enforced use of the defective eye.*
- *The patch can either be left in place at night or removed at bedtime.*
- *Spectacle-mounted occluder or special opaque contact lenses can be used as an alternative to full-time patching if skin irritation or poor adhesion proves to be a significant problem*

43

- 
- *Full time patching should generally be used only when constant strabismus eliminates any possibility of useful binocular vision because → full time patching runs a risk of perturbing binocularity.*

44

### ■ *Part-time occlusion:*

- *Defined as occlusion for 1-6 hours per day.*
- *The children undergoing part time occlusion should be kept as visually active as possible when the patch is in place (encourage near work for an hour).*
- *Compliance with occlusion therapy for amblyopia declines with increasing age.*

45

## TIPS IN OCCLUSION THERAPY

- Don't give up on amblyopia treatment till 17 years old
- Covering the sound eye is the gold standard for treatment of amblyopia , max part time occlusion is 6 hours/day , follow up every 6 weeks, continue till 4 month, wean from patch gradually, follow up one year after stoppage of treatment , continue follow up till age of 8-10years.
- Penalization in weekend is similar in results to penalization one drop /day and give same results as patching 2-6 hours/day in non compliant patient.

- In strabismic or mixed amblyopia ,patch first then treat with prism or surgery for strabismus and in mixed type(eg. Sensory EXO or ESO), then continue cover treatment and continue follow up till 8-10 years.
- There is high tolerance to correction of refractive errors in children by glasses without diplopia due to anisokonia.or better if tolerated extended wear CLs.
- In unilateral aphakia cover the sound eye and use CL is the best and 2ry implantation at 4 years age is the gold standard.

