Paediatric refraction – Basic Concepts

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The correction of ametropia especially those in preverbal, possess several challenging problems unlike in adults where we have a measurable end point – the best corrected visual acuity. In children there are lot of confusing variables like the following.

1. Inability to obtain a reliable visual acuity
2. Subjective refraction may not always be possible.
3. Control of accommodation is variable.

Retinoscopy rather than autorefraction should form the basis. When the child is too young for subjective input, prescription of spectacles is given based on retinoscopy reading alone.

Cycloplegic refraction should be carried out in every patient with or without strabismus. In hypermetropic esotropic children under 3 years of age atropine sulphate 1 % eye ointment 3 times daily x 3 days should be used. In nonstrabismic children over 3 years cyclopentolate can be used, but if accommodation remains active then atropine should be used.

Once refractive error has been determined a decision must be made about whether to give correction or not.

In the absence of strabismus, decision as to whether to prescribe the correction must be based on magnitude of error, patient’s ability to accommodate, visual needs of individuals, risk of refractive and anisometropic amblyopia.

When strabismus coexists with refraction or an abnormal AC/A ratio, full cycloplegic refraction should be given, adding bifocals if an esotropia is still for near. If alignment cannot be obtained in the spectacles, residual should be corrected by surgery. Prescribing glass for a child is often a dilemma, because no guidelines exist and practitioners rely in their experience and preconceived information, which are not often based on science.

**Myopia**

In myopia, infants are given correction if the error is 5D or more, since their visual demands are less. In toddlers the error increase, correction may be given if error is more than 3D. In school going age, correction is suggested if uncorrected visual acuity is 6/12 or worse. (This occurs at – 1.0 D). Minimum negative power to give maximum visual acuity should be the aim. Intentional over correction of myopia in intermittent exodeviation is practiced by some. In older children, to avoid possible effects of minification with high negative powers, contact lenses may be advised.

**Hyperopia**

Small to moderate HM appear to be normal in preverbal and are accepted as long as esotropia does not occur. Higher amounts of U/L or B/L hyperopia can cause amblyopia due to blurring of the perceived image at both near and far. In symmetrical hyperopia, one year old tolerate large amounts without correction because of their large accommodative reserves. In 2-5 years correct if more than + 2.5D. School going needs more strenuous near work and even smaller error needs correction. Usually given if more than + 1D. Prescribe fullest correction consistent with good vision, which the child accepts. If no esotropia and no asthenopic symptoms it is not necessary to correct low hyperopia.

**Astigmatism**

Correct any astigmatic error associated with spherical error. Astigmatism per se is to be corrected if visual acuity is decreased. (Usually if it is more than 1.5D) Full cylindrical correction
in the proper axis is tolerated by children. Due to low visual demands and to allow for normal reduction in astigmatism with age, in infants a close follow up is enough more so if the astigmatism is of oblique type.

**Anisometropia**

Anisometropia is fairly common at birth but decreases rapidly over one year. Correction is suggested for even amounts as low as 1D because anisometropic amblyopia can be insidious. Consider contact lenses when magnitude exceeds 3D. Close follow up is needed. Aniso hyperopia and cylinder anisometropia are more prone for amblyopia. If amblyopia is already present, occlusion therapy is mandatory.

Once we have prescribed glasses the dilemma of the parents start. How will I ever get my child to wear glass? Best answer is, most children who really needs glasses will wear it happily, because they do make a difference in their vision. But make sure they are comfortable.

Following are some features to consider when buying glass for kids. They should be shatter proof and impact resistant, with scratch resistant and antireflective coating in lenses. Spring loaded frames that are less likely to be bent are useful. Silicone nosepads or comfort cable temples or straps prevent the glass from slipping down the nose. CR – 39, high index plastic and polycarbonate are some of the materials suggested.

Therefore to make an intelligent decision in pediatric spectacle prescription
- Obtain a good history and perform a thorough examination
- Beware of developmental and refractive changes.
- Decide whether indication of glass outweigh the reason which make it cumbersome.