

## Letter to the Editor

### Correction of Refractive Errors in Children: Pearls

Dear Editor ,

The pediatric age group is vulnerable to permanent visual impairment due to any disruption in receiving symmetrical, focused retinal images.<sup>[1]</sup> There are also long term consequences of decreased vision reflecting in difficulties at school with consequent reduced employability and impaired quality of life.<sup>[2]</sup> A concise description of the importance of a timely management of refractive errors in children and practice tips for prescribing glasses in each type of refractive error is briefly discussed. Retinoscopy under cycloplegia is the standard method of refraction in children. <sup>[3]</sup>

It is important to consider the following factors while evaluating a child. <sup>[4]</sup>

1. Age of the child and the normal range of refractive error for that age.
2. Possibility of emmetropisation of child's refractive error.
3. Impact of refractive error on normal visual development.
4. Benefit of prescribing spectacles as opposed to possible impediment to emmetropisation.

It should also be kept in consideration that the level of refractive error required to produce amblyopia is also influenced by genetic factors as evidenced by family history. <sup>[5]</sup> The above features make it difficult to determine definitive guidelines regarding the threshold level at which refractive correction should be given at a particular age in order to prevent amblyopia and/or strabismus. However, some general guidelines have been formulated which need to be adjusted by taking into account individual patient factors.

**Myopia:** Myopic refractive errors, if symmetrical may be corrected by taking the child's visual needs in account since there is only a minimal risk of associated amblyopia. As per the guidelines from the American Academy of Ophthalmology Preferred Practice pattern, upto 3.00 D of myopia may not require

correction in age group of 2-3 years as most of the objects that the very young child is interested in does not require fine resolution.<sup>[6]</sup> In children upto 6 years, upto 1.5 D of myopia may not need to corrected given their largely desk based work but full correction should be prescribed for older children.<sup>[7]</sup> Contrary to popular belief, undercorrection of myopic refractive error should be avoided as it may lead to blurred vision and may increase progression of myopia.<sup>[8]</sup> In cases of myopia associated with a large exophoria or intermittent exotropia, a full time prescription of the full myopia correction is required; some cases may even require an intentional overcorrection to stimulate accommodative convergence to control an intermittent exodeviation, particularly in patients with a high AC/A ratio.<sup>[9]</sup> Some cases of high exophoria or long standing Intermittent exotropia could present as pseudomyopia as an attempt to maintain fusion by use of accommodative convergence. In such cases the aim of treatment is to relax accommodation by use of cycloplegic agents and thereafter treat the underlying strabismus.<sup>[10]</sup>

**Hypermetropia:** Uncorrected hypermetropia can produce accommodative esotropia and amblyopia (strabismic or refractive) but the threshold for management is not clearly defined.<sup>[7]</sup> Moderate hypermetropia, (not associated with strabismus, if left uncorrected will probably not degrade visual acuity in young children.<sup>[6]</sup> However, owing to the greater risk of associated strabismus and amblyopia, hypermetropic refractive error more than 3.5 to 4 D should be corrected especially if there is a poorly controlled phoria or a family history of strabismus and /or amblyopia. Full correction in the nonstrabismic child should be avoided as it blurs visual acuity at distance and hinders compliance .However, when strabismus is present, full cycloplegic hyperopic correction has to be given.<sup>[7]</sup> Children with bilateral high hypermetropia with isometropic amblyopia usually do not have a manifest esotropia since they make no attempts to accommodate.

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In such cases though the child may not be able to tolerate the full correction in the first instance, partial optical correction is strongly discouraged; since the child could now make use of accommodation in order to overcome the remaining uncorrected hypermetropia. These cases warrant a full optical correction.<sup>[11]</sup>

**Astigmatism:** It is known that upto 1.5 D of meridional symmetric astigmatic error is non-amblyogenic and therefore spectacles need not be prescribed in preverbal children.<sup>[5]</sup> However it is well accepted that oblique astigmatism is more amblyogenic even with less magnitude. In school going children, a cycloplegic refraction followed by comparison between BCVA with uncorrected VA will help in deciding whether or not to prescribe spectacles. Some patients may be able to use accommodation to obtain a fairly focused retinal image in moderate astigmatism. In other children, the full cylinder that can be tolerated should be prescribed. Spherical equivalent can be prescribed in compound myopic or hyperopic astigmatism.<sup>[7]</sup>

**Anisometropia:** Anisometropia can be a very powerful amblyogenic factor. In most cases, mild and moderate levels of anisometropia do not cause amblyopia. However, children with family history of amblyopia and patients with hyperopic anisometropia are more vulnerable.<sup>[7]</sup> The threshold for treating anisometropia is recommended to be > 1.5 D.<sup>[12]</sup> In hyperopic anisometropia with amblyopia, a symmetric reduction of hypermetropia of up to 1.5D of spherical hypermetropia should be done. However, if strabismus is also present, hypermetropia has to be fully corrected.<sup>[13]</sup>

In cases of myopic anisometropia, a difference of 3-4 D usually does not result in amblyopia. The less myopic eye fixes for far (unless more than 3 Dioptres) and the more myopic eye is used for near fixation, thus allowing use of both the eyes.<sup>[11]</sup> At higher levels, glasses may not be tolerated due to aniseikonia and contact lenses are preferable, but many children are intolerant to them. Refractive laser surgery could be a viable option in such cases.<sup>[14]</sup>

Usually, in anisometropic amblyopia, the dominant fellow eye has good visual acuity, and therefore there is no incentive to wear glasses. In such cases spectacle compliance is often difficult and needs to be forced.<sup>[7]</sup>

### Conclusion:

To summarize, the risk of permanent visual disability in undetected or improperly managed refractive

errors can be almost entirely eliminated by the simple implementation of proper refraction and optical correction, while adhering to general guidelines and making adjustments on a case to case basis.

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