

## Amblyopia Treatment Efficacy in Anisometropia

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**Citation:** Shamlan Al FT (2021) Amblyopia Treatment Efficacy in Anisometropia. Glob J Res Rev Vol.8 No.1: 55

### Abstract

**Purpose:** To compare the treatment efficacy of optical correction and occlusion therapy and/or penalization for different anisometropic refractive errors (hyperopic, myopic, and mixed).

**Methods:** Medical records of 51 patients with anisometropic amblyopia managed by both optical correction and occlusion therapy and/or penalization were evaluated retrospectively. Patients were categorized into hyperopic, myopic or mixed anisometropia groups. Cycloplegic refraction, spherical anisometropia, baseline visual acuity, baseline interocular difference, final visual acuity and final interocular difference were analyzed to assess association between type of anisometropia with both resolution of anisometropic amblyopia and the time required to achieve it.

**Results:** Baseline visual acuity of the amblyopic was  $0.94 \pm 0.47$  in the hyperopic group;  $1.12 \pm 0.56$ , in the myopic group; and  $1.08 \pm 0.39$  in the mixed group. Final visual acuity in the amblyopic eye was  $0.34 \pm 0.30$  in the hyperopic group,  $0.78 \pm 0.59$  in the myopic group, and  $0.78 \pm 0.56$  in the mixed group. The difference in final visual acuity in the amblyopic eye between the groups was significant ( $P=0.014$ ). The amblyopia was improved in 50% of patients in the hyperopic group, 23.8% in the myopic group, and 14.3% in the mixed group ( $P=0.081$ ). The type of anisometropia was significantly associated with the improvement of visual acuity in the amblyopic eyes ( $P=0.044$ ). The mean time for amblyopia improvement was  $16.50 \pm 10.52$  months in the hyperopic groups,  $15.60 \pm 12.44$  months in the myopic group, and  $21.00 \pm 21.21$  months in the mixed group ( $P=0.947$ ).

**Conclusion:** Lower amounts of hyperopic anisometropia are as amblyogenic as higher amounts of myopic or mixed anisometropia. Mean improvement in visual acuity of an amblyopic eye with both optical correction, occlusion therapy and/or penalization is higher in patients with hyperopic anisometropia in comparison with myopic or mixed anisometropia. No significant difference was found in the time required to achieve improvement between the study groups.

**Keywords:** Amblyopia; Anisometropia; Hyperopia; Myopia; Occlusion therapy; Penalization

**Received date:** December 15, 2020; **Accepted date:** December 29, 2020;

**Published date:** January 05, 2021

### Description

It is always been the concern of pediatric ophthalmologists to bring the patient to a state where a single Binocular Vision (BSV) is achieved. A single binocular vision is usually defined as a state of simultaneous vision with two seeing eyes when an individual fixes his visual attention on an object or regard. Hence, amblyopia, a decrease of visual acuity for which no causes can be detected by the physical examination of the eye caused by vision deprivation or abnormal binocular interaction, is considered a major challenge for pediatric ophthalmologists to correct in order to reach the goal of having the patient obtaining BSV. The correction usually is done

depending on the underlying cause that led to amblyopia. One of the major causes is anisometropia that is defined as a refractive difference between the two eyes that leads to one eye receiving a blurred vision compared to the other thus may cause amblyopia in the affected eye by suppressing the blurred image. This in return might lead to decreased visual acuity in the affected eye despite full refractive correction. The subject of anisometropic amblyopia has been tackled in the literature previously. Anisometropia can be hyperopic anisometropia one eye is more hyperopic than the other, myopic anisometropia where one is more myopic than the other, or astigmatic anisometropia where one is having more astigmatic component than the other [1-5].

Usually, the treatment of anisometropic amblyopia will be either refractive correction, patching the eye with the full visual acuity, penalization of the good eye using atropine or combination between those modalities.

The comparison of efficacy of amblyopia treatment with both optical correction and occlusion therapy and/or penalization between different types of anisometropia (hyperopic, myopic, astigmatic and mixed) has not, we believe, been evaluated or conducted in our region or elsewhere.

The purpose of our study was to compare the treatment efficacy of optical correction and patching and/or penalization on the different types of anisometropia to discover which type of anisometropic refractive error is more responsive to treatment so that we can deliver optimal care and management for our patients' condition knowing what to expect and when shall the pediatric ophthalmologist plan cease the treatment or prolong it, and in which type is the prognosis of treatment is better. We found that although hyperopic anisometropia was more amblyogenic among the groups, it had the best prognosis in visual acuity improvement after initiating the treatment.

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