**A comparison Between Macular & RNF Thickness in Recovered and Persistent Amblyopia**

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### Introduction

Questions such as why only some patients have reversible amblyopia and what are the causes that prevent the visual improvement in other patients despite timely and adequate treatment, have yet to be answered. Retinal involvement in amblyopia could not be conclusively proved based on neurophysiologic studies [1-2].

Thus, whether or not amblyopia is associated with any structural change in the retina remains to be investigated. With the introduction of optical coherence tomography (OCT) an increased thickness of the central macula and retinal nerve fiber layer (RNFL) was noted and reported in the amblyopic eyes. To date, the literature has shown conflicting results. Some studies found an increased thickness of peripapillary RNFL in eyes with anisometropic amblyopia. Others reported no difference in the thickness of the macula and peripapillary RNFL in amblyopic children (Table 1) [3-15].

### Aim

The objectives of this work is to find if there are any subtle retinal abnormalities or anatomical changes that hinder the visual improvement in some amblyopes. The aim is to investigate:

1. The presence of increased macular or retinal nerve fiber layer thickness (RNFLT) in amblyopic eyes.
2. If the increased macular or RNFLT is related to the lack of response in amblyopic eyes.
3. To explore whether the increased central macular thickness (CMT) in amblyopic eyes is purely related to the hyperopia, and eventually whether it would affect the patient prognosis.

### Method

This is an institutional, cross-sectional observational study conducted between May 2012 and April 2014. Sixty-four patients were recruited. The patients were divided into two groups: 27 patients with persistent amblyopia, and 33 patients with recovered amblyopia. Each group was stratified according to the refractive error. For each patient, the CMT and the peripapillary RNFLT were measured using a high-definition spectral-domain optical coherence tomography (SD-OCT) (Cirrus HD-OCT; Carl Zeiss, Dublin, California).

SPSS (Statistical Package for the Social Sciences) software (version 20) was used to perform the statistical analysis.

### Results

A total of 60 patients (26 males and 32 females) were included in the study. The median age was 11.00 years (Table 2).

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Macular and peripapillary retinal structure measurements in amblyopic children (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMT (camera)</td>
<td>14.74 (9.44)</td>
</tr>
<tr>
<td>CMT (OCT damage)</td>
<td>14.74 (9.44)</td>
</tr>
<tr>
<td>RNFLT (camera)</td>
<td>15.75 (9.44)</td>
</tr>
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<td>RNFLT (OCT damage)</td>
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### Discussion

Our findings indicate that amblyopia does not impact the macular and the peripapillary RNFLT thickness and the possible involvement of the retina in amblyopia remains controversial issue. The possible sources of disagreement among different studies that limit comparison of results are as follows:

1. The difference between OCT machine used TD-OCT vs. SD-OCT, as images on TD-OCT have poor point to point correlation while SD-OCT have improved resolution, more accurate segmentation, data points with less interpolation.
2. Poorly centred scans can generate difference in results.
3. Differences in patient’s refractive error and axial length.
4. Measurement of error from different examiners.
5. Differences in patients’ demographic criteria (age, numbers, and gender).
6. Differences in study designs and selection criteria.
7. Variations in patient’s optic disc size as smaller discs have more crowded RNFL.

However, further studies are warranted to prove the existence of retinal changes in amblyopic eyes and to determine whether retinal involvement has any effect on the response to amblyopia therapy.

### Conclusions

The macular and peripapillary RNFL thicknesses have been investigated by SD-OCT. The results show that amblyopia does not profoundly affect the macular thickness and the peripapillary RNFLT in strabismic and anisometropic amblyopia. No change in the macular and peripapillary RNFLT thicknesses could be documented to explain the loss of response in persistent amblyopic eyes. No increase in central macular thickness could be attributed to hyperopia by itself, in amblyopic eyes.

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### References


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