Average Retinal Nerve Fiber Layer Thickness In Children

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Introduction

- Abnormalities within the retinal nerve fiber layer can help diagnose and monitor the progression of a variety of diseases.
- At this time, there is insufficient data on the average nerve fiber layer thickness in children.
- Most of the studies regarding optic nerve disease in children are retrospective studies.
- Having an understanding of average thickness in children will not only help detect diseases such as glaucoma earlier, but will also aid in differentiating between optic nerve edema and pseudo-papilledema.

Methods

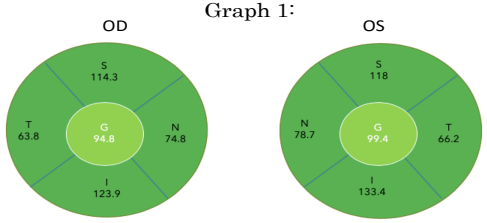
- Children ages 6-18 years old were screened at their comprehensive eye exam.
- A dilated exam was performed at the comprehensive eye examination.
- Children without any optic nerve pathologies were eligible for the study.
- Consent and assent forms were given to both children and parents.
- Optical Coherence Tomography (OCT) scans were administered to eligible participants.
- No other drops were administered other than the routine dilation drops.
- A list was compiled with unidentified information including only the age and gender of the participant.
- Our goal of 100 participants was not achieved, however, the data collected can be used to compare with future studies and provide information to the optometric field.

Results

- Mean global thickness in right eyes were 94.8 microns and left eyes were 99.4 microns. The RNFL was thickest inferiorly at 123.9 microns for right eyes and 133.4 for left eyes. The next thickest quadrant was superior with right eyes averaging 114.3 microns and left eyes 118 microns. Slightly thinner, the nasal quadrant of right eyes averaged 74.8 microns and left eyes 78.7 microns. The temporally quadrant was the thinnest with right eyes averaging 63.8 microns and and left eyes 66.2 microns (Graph 1).
- When comparing thickness between eyes, there are minimal differences between right and left eyes. Both right and left eyes had the thickest RNFL inferiorly, superiorly, nasally and lastly temporally (Graph 2).
- The average nerve size C/D ratio of right eyes were .43/.43 (horizontal/vertical) and left eyes were .35/.35. The smallest nerves were .07/.06 and the largest nerves were measured at .69/.71 (Table 1).

RNFL Thickness in Children

Graph 1:



Graph 2:

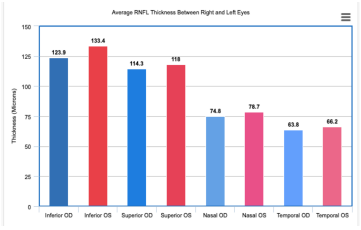


Table 1: Optic Nerve Sizes in Children (C/D ratio)

	C/D Ratio for Right Eyes	C/D Ratio for Left Eyes
1	.19/.20	.34/.36
2	.57/.58	.11/.12
3	.69/.71	.64/.65
4	.38/.33	.36/.29
5	.37/.37	.21/.28
6	.53/.50	.62/.55
7	.51/.53	.19/.19
8	.53/.53	.49/.50
9	.07/.06	.06/.06
10	.50/.50	.55/.50
Average	.43/.43	.35/.35

Conclusions

- Studying RNFL thickness norms in children will help differentiate between pseudo-papilledema and true papilledema, as well as other optic nerve conditions.
- Although our recruitment number was small, our study provides preliminary reference values for RNFL thickness in normal, healthy children.
- When compared to previous published studies, similar trends were found in RNFL thickness throughout optic nerve quadrants in healthy children. However, there was one study that found the nasal quadrant to be the thinnest quadrant which differed from our study and others published[9].
- Future studies should focus on a larger study population and a wider race demographic. With more data, this information would be extremely valuable in the optometric field. It can help clinicians diagnose and follow optic nerve changes more accurately and more confidently.

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