Retinal Mechanisms Involved in Myopia Progression in a Chick Model

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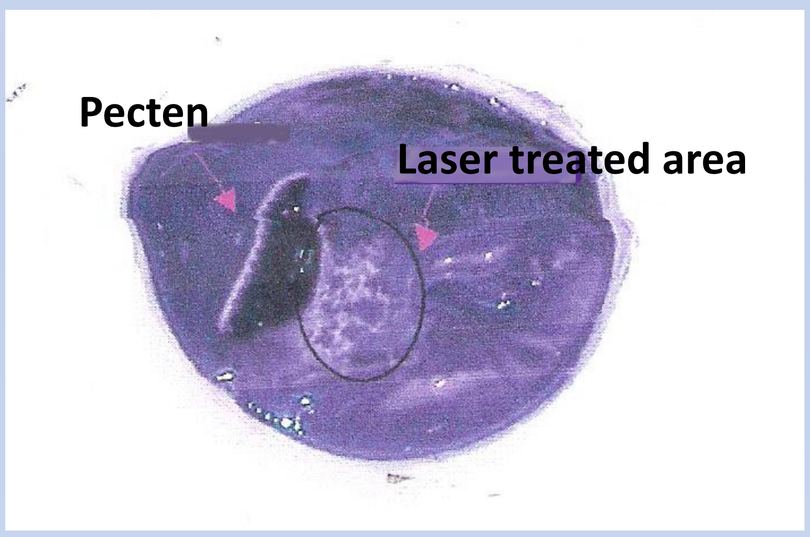
Experimental Question:

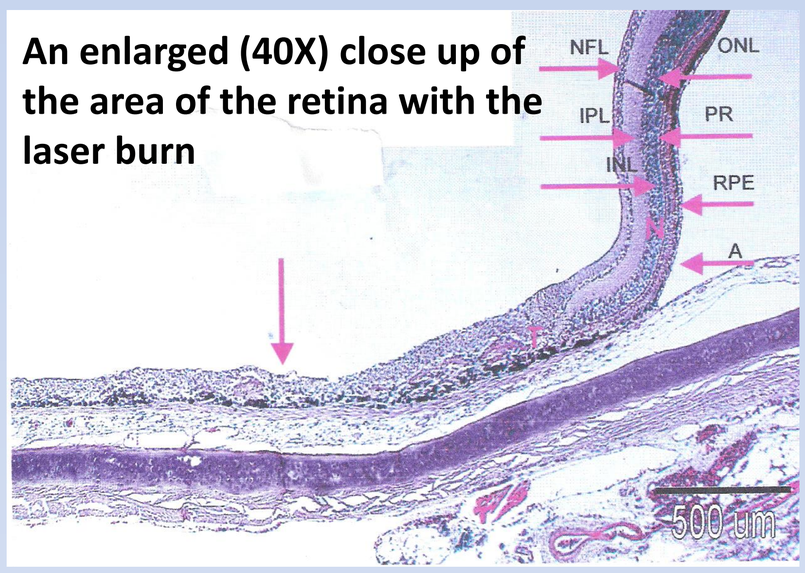
Does partial absence of mid-peripheral nasal retinal tissue affect the growth and function of the chick eye during development?

Methods:

- 21 domestic fowl chicks
- Treatment: Argon laser burn of 10% of the nasal aster retinal area.
- Post Treatment:
  - 1 month: 24 hours per day , 1200-3800 Lx lighting
  - Post 1 month: 12 hours of lighting per day.

Post-mortem view of excised section of treated retina

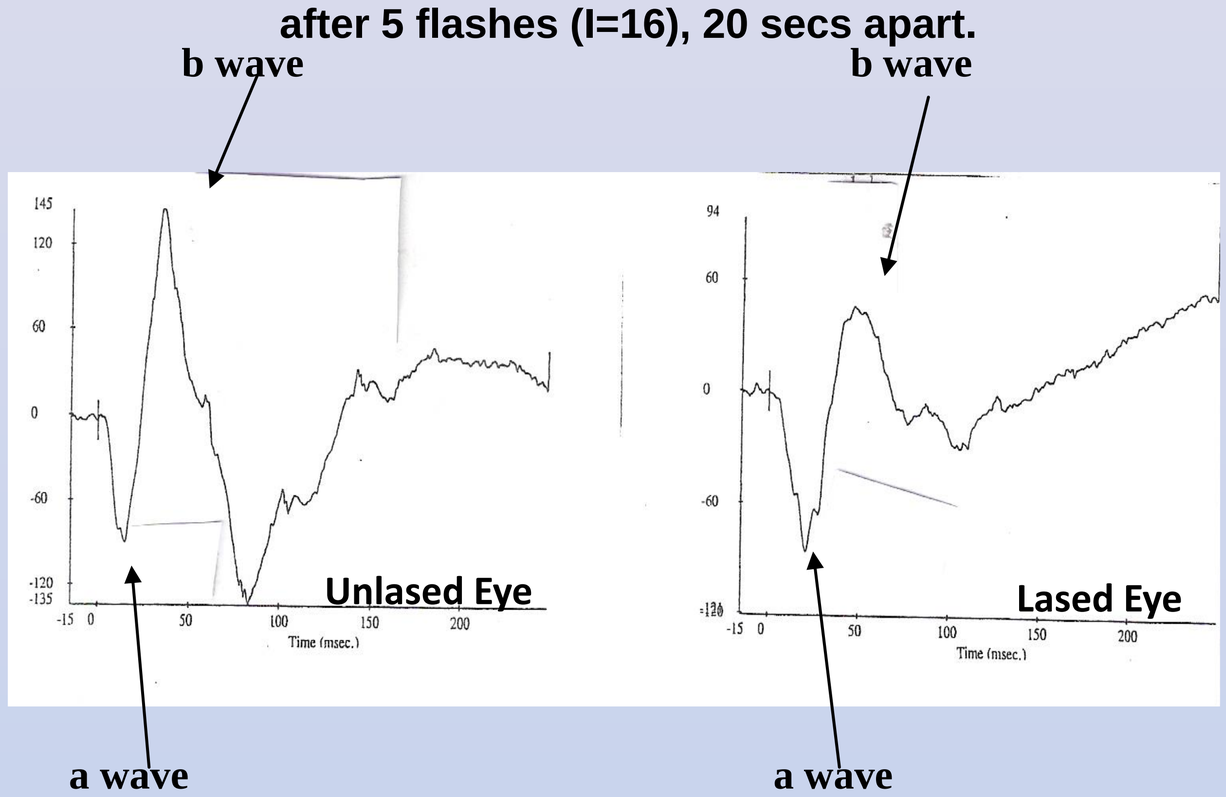




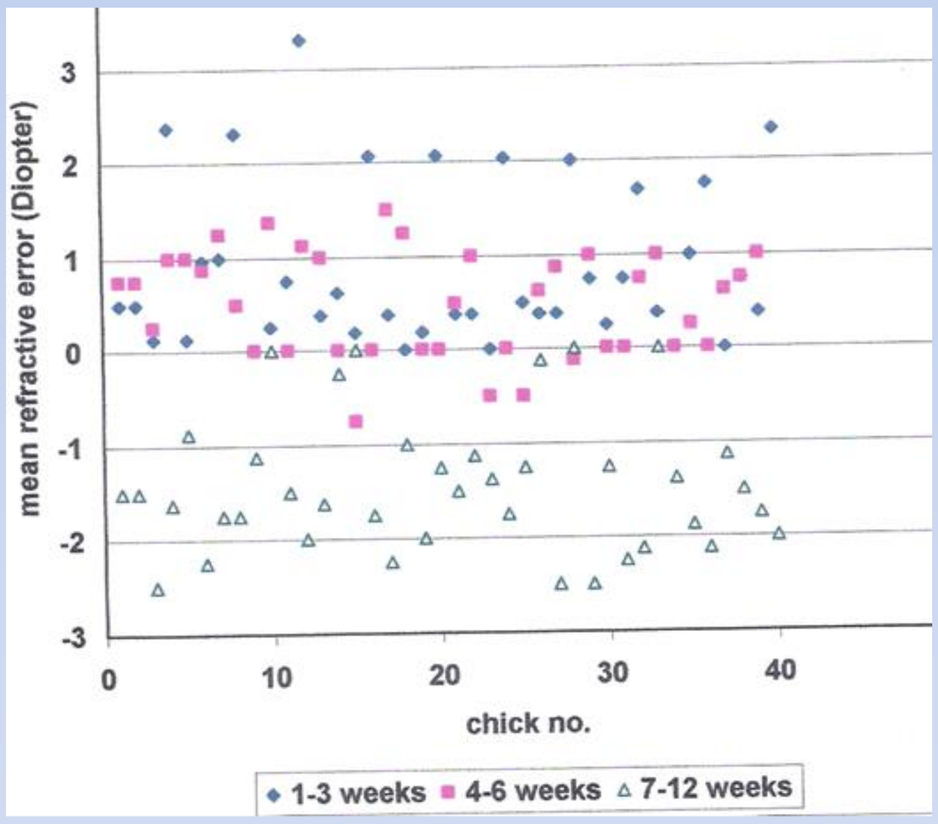
- Outcome Variables:
  - Retinoscopy- examined once every 18 days from hatching to 12 weeks.
  - Ultrasonography- axial length
  - Standard flash electro-retinogram (ERG)-retinal function : a-wave and b-wave peak and latency
- Pre and post treatment variables compared using Chi Square analysis and Student's t-test for independent samples, as appropriate.

Results:

Average recordings received after 5 flashes (I=16), 20 secs apart.



- There was a significant decrease in the amplitude of both the a- and b- wave ERG recordings ($p<0.05$), and in the latency of the a-wave of the treated and fellow-control eyes.
- The latency of the b-wave was not significantly different between the groups, but approaching a significant difference ($p=0.08$).



Refractive findings examined once every 18 days from hatching until age 12 weeks. Each point represents the average between the findings of the right and left eyes in the two primary meridians (180 and 90)

Conclusion:

- Although there were significant impairments in the retinal function in the treated chick eyes, the refractive error and axial length of the chicks was not significantly different between the control and treatment group.
- Burning only a small part of the peripheral retina does not significantly impair eye growth or refractive development notwithstanding the ensuing decrease in photoreceptor function.

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