Foveators: Strabismus correction with Risley prisms

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Motivation

Strabismus: misalignment of eyes

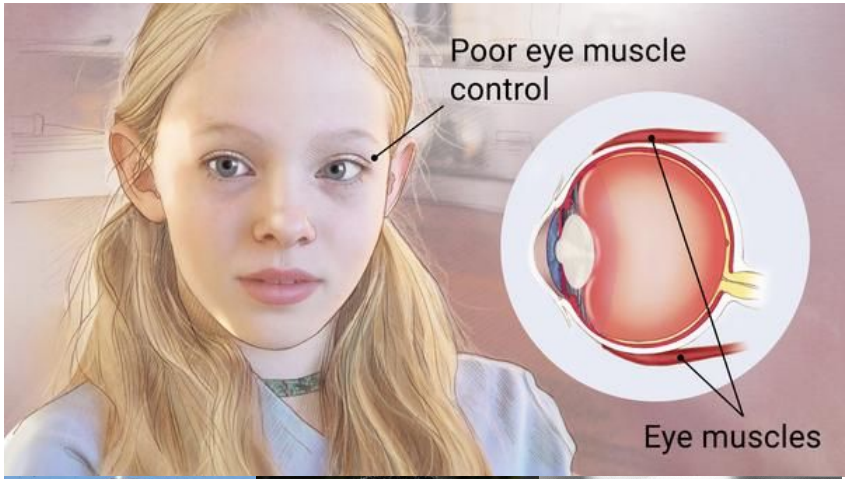
- Affects 5% of all people
- 1.3M surgeries per year in U.S.
- 1 in 50 children has surgery

Treatment options:

- Surgery
- Prisms
- Vision Therapy

Prisms are static, therapy is hard.

Why not have the best of both?

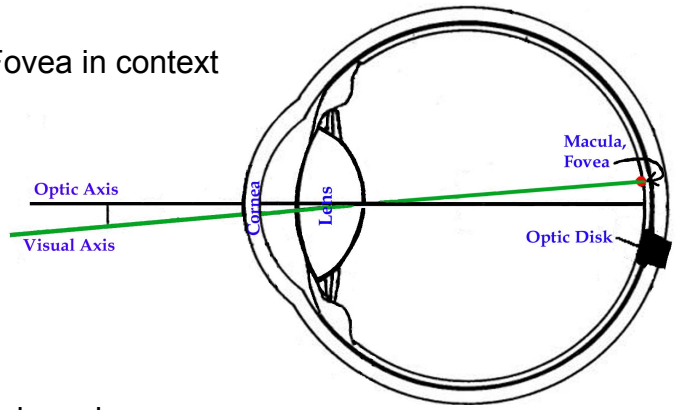


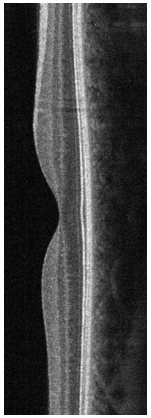
Methods

Solution: refocus light onto fovea of stray eye

- Risley prisms: back-to-back wedge prisms

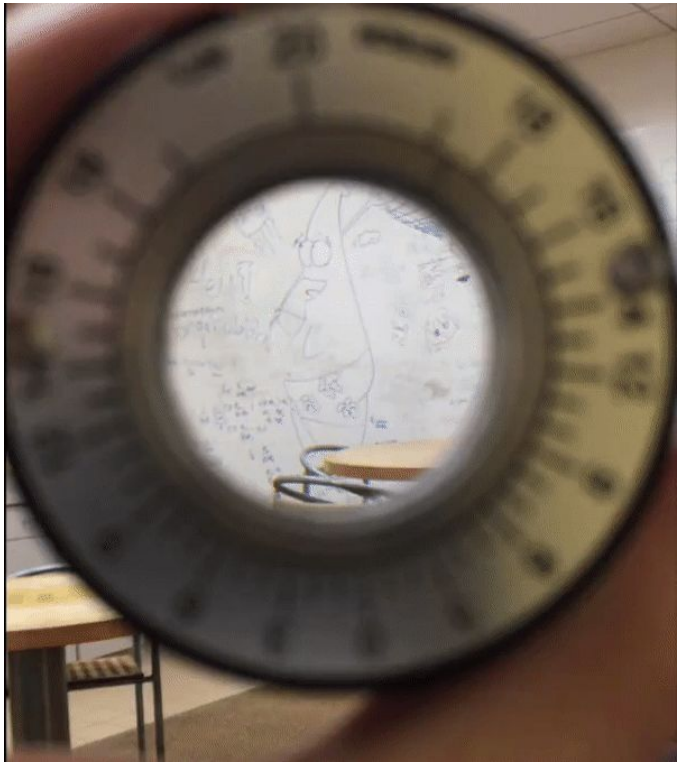
Fovea in context





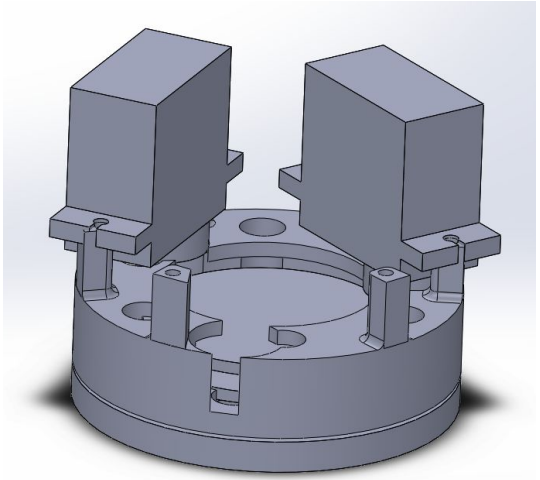
Foveal pit

Risley prisms

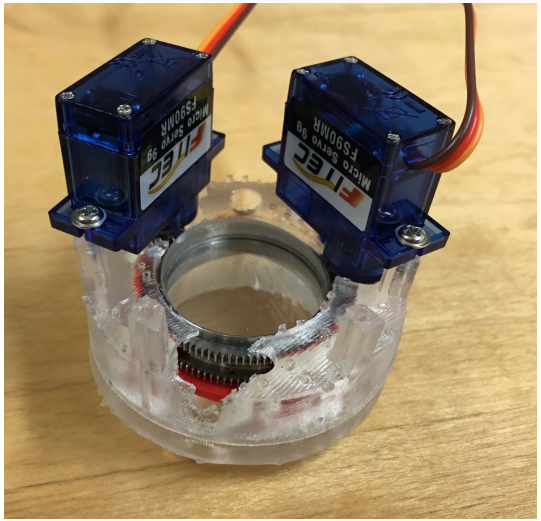


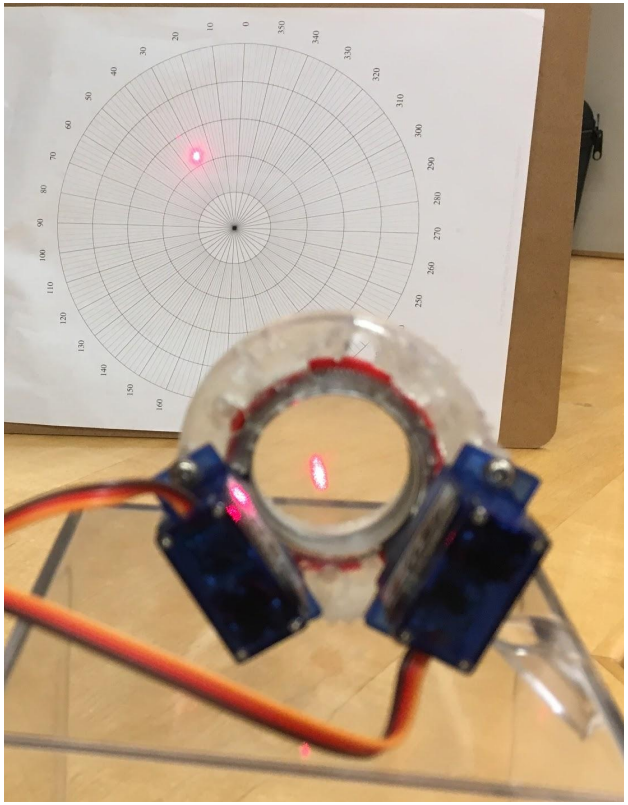
Results

“Before”
(CAD model)



“After”
(3D-printed)

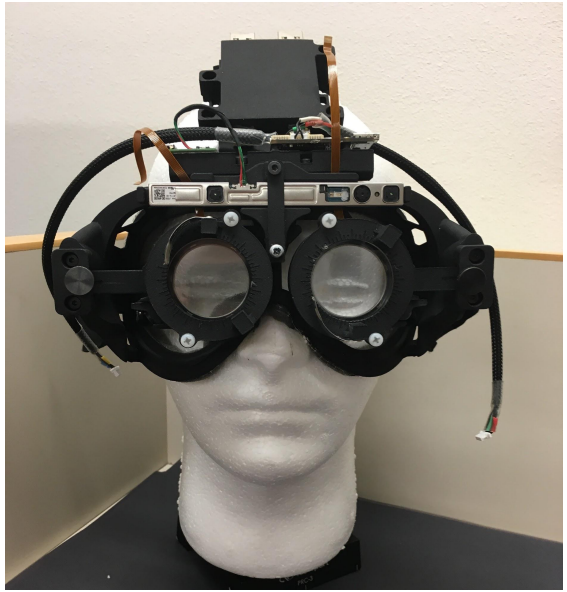




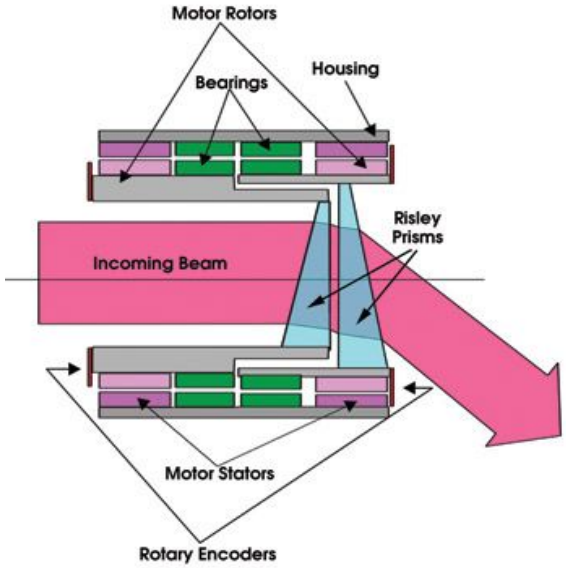
Mechanized beam-steering

Future Work

Eye tracking



Wearable frame



Recessed stepper motors (preserve peripheral vision)

Acknowledgements

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https://lab64.stanford.edu/

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