



# **Rejuvenation of Visual Age After Laser Anterior Ciliary Excision to Restore Dynamic Range of Vision**

**AnnMarie Hipsley, DPT, PHD**

**Co-Authors: Mitchell Jackson, MD**

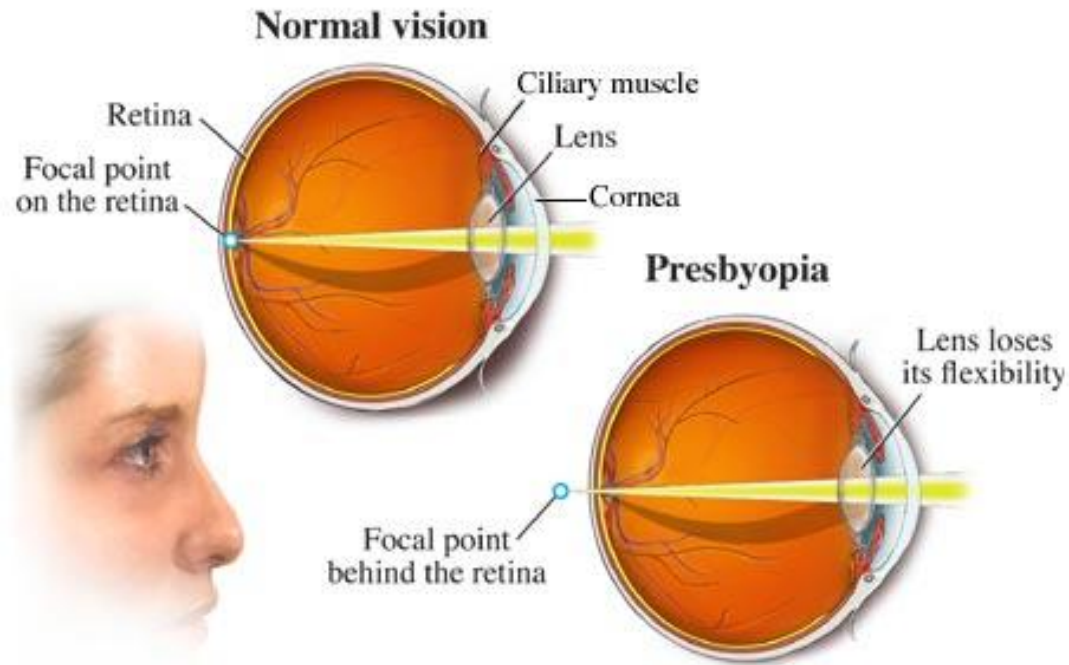
**Tracy Swartz, OD**

**Financial Disclosure:**

Author 1 & 2 & 3 are consultants for  
Ace Vision Group, Inc. for this poster

# PRESBYOPIA is NOT a “REFRACTIVE” ERROR. It is an AGING DISEASE.

*The word presbyopia is based on Greek word that means "aging eye"*



*Loss of accommodation is the result of presbyopia. Can we rejuvenate the eye by restoring accommodation??*



# Is Reversing Age of our Organs Possible?



Heart Organ



Eye Organ



- While chronological age is simply your current age in years, biological age refers to the age, and subsequent health, of your organs.
- Muscle strengthening and mobility training has long been proven to reverse age and to improve longevity of organ health.

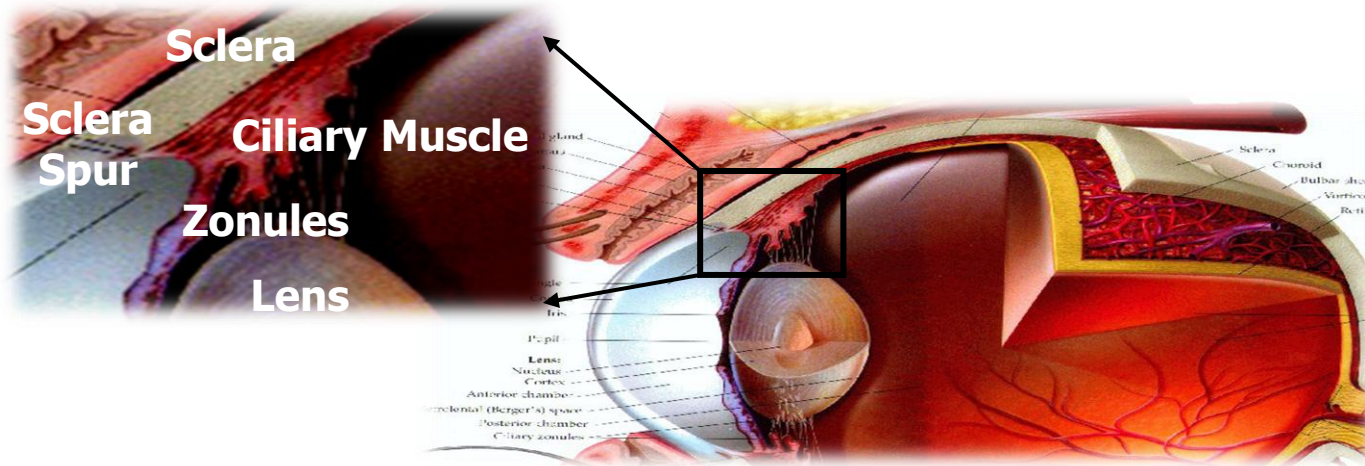




# VISIODYNAMICS

## ACCOMMODATION

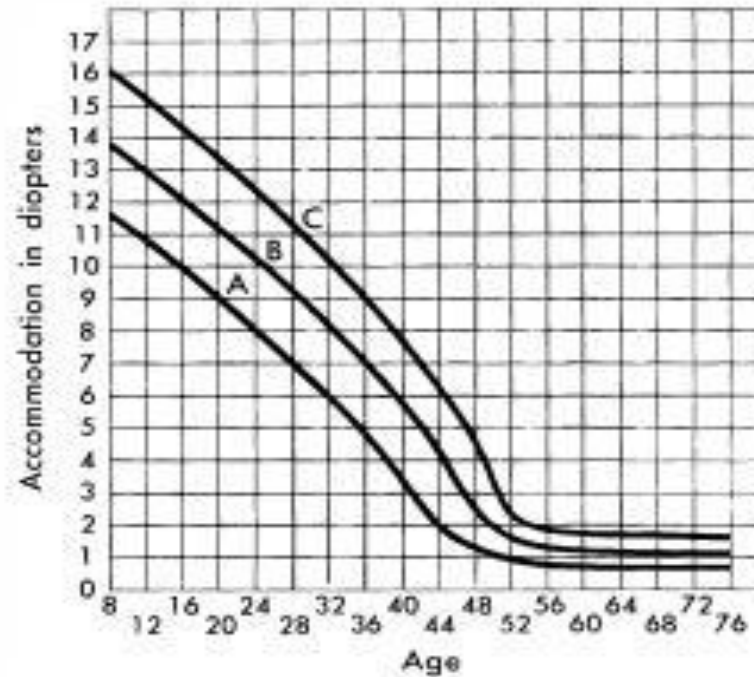
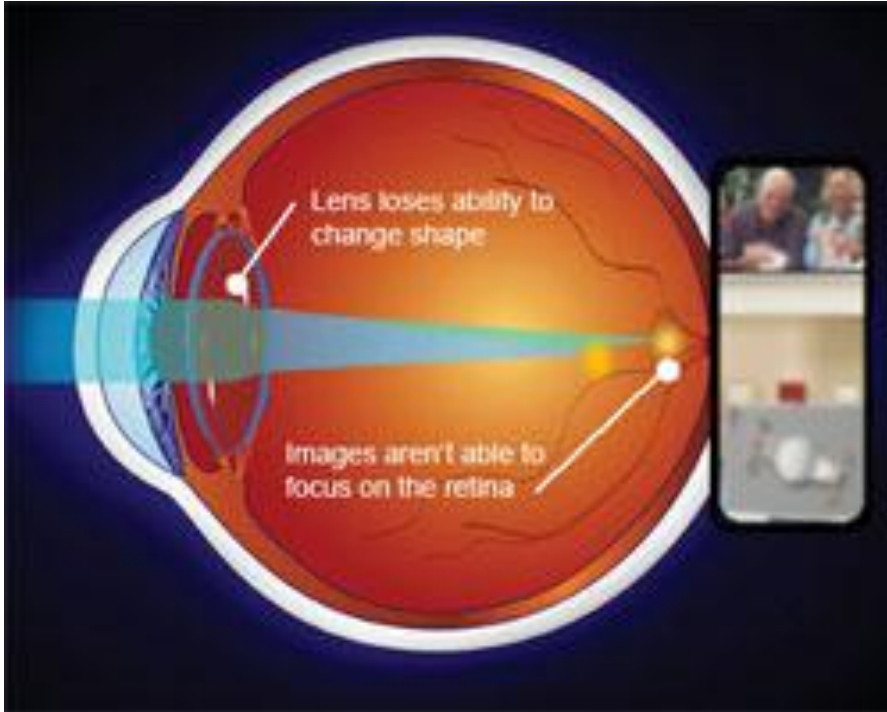
## BIOMECHANICS



- **Loss of accommodation biomechanics impacts:**
  - **BOTH** visual accommodation **AND** ocular biotransport mechanisms
  - Mobility and function of the ciliary muscle complex is largely **REDUCED**
- **Restoring this function could potentially:**
  - **IMPROVE** mobility & muscle function
  - **REVERSE** visual aging process **AND** prolong the longevity of the eye organ



# Loss of Accommodation Has Been Correlated With Age

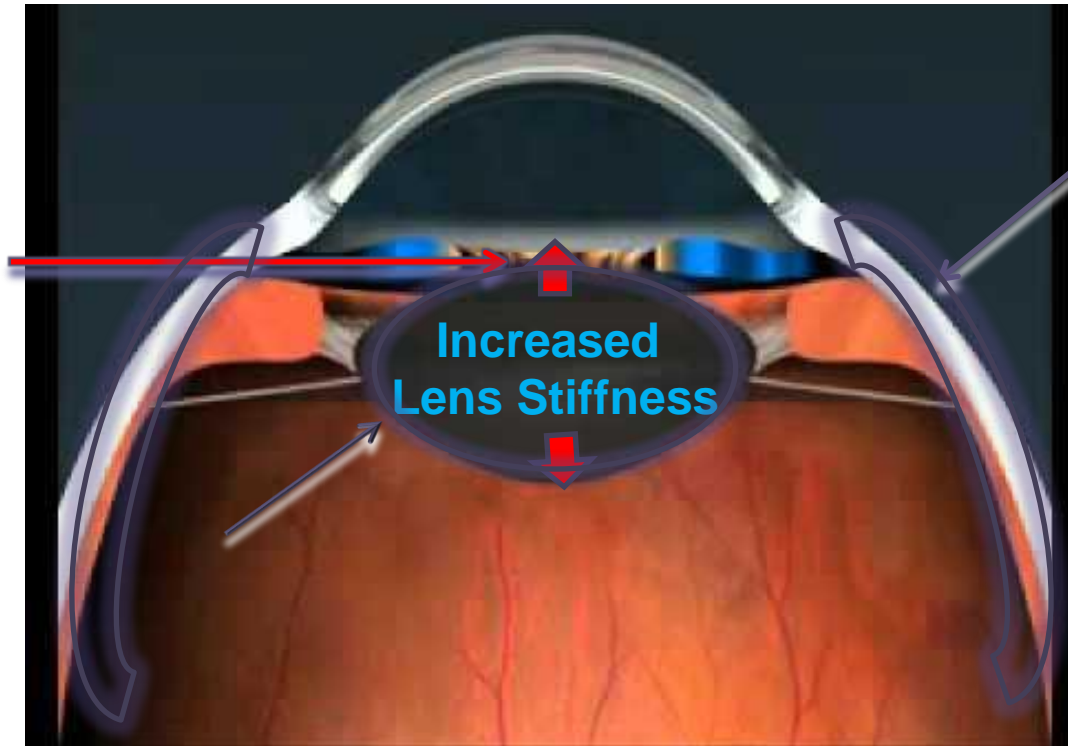


Duane, MD. NORMAL VALUES OF THE ACCOMMODATION AT ALL AGES. *JAMA*. 912;LIX(12):1010-1013.



# New Evidence: Ocular Rigidity Has Been Correlated With Loss of Accommodation

**Decreased**  
Ciliary  
Muscle Force  
To Adjust the  
Lens



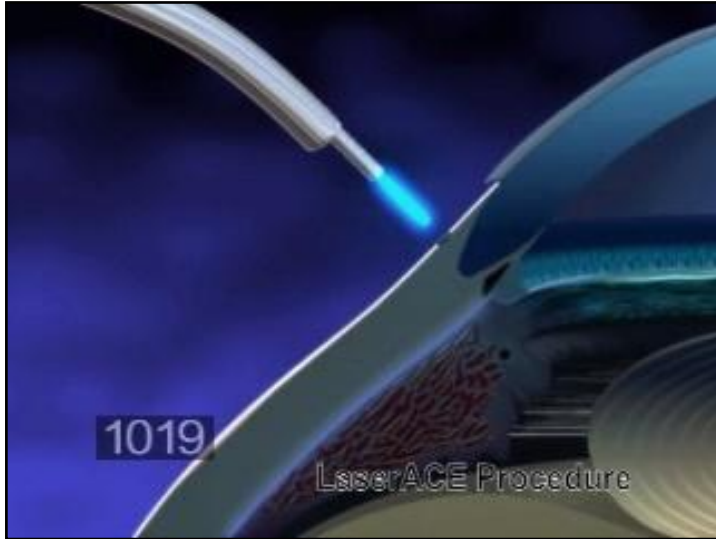
**Increased**  
Scleral  
Rigidity

Detorakis ET, Pallikaris IG. Ocular rigidity: biomechanical role, in vivo measurements and clinical significance. Clin Experiment Ophthalmol. 2013 Jan-Feb;41(1):73-81.





# Laser Anterior Ciliary Excision



Er:YAG 600um Micro-excisions  
over critical Ciliary anatomy



9 spot Matrix in 4 Oblique  
Quadrants

- Change biomechanical properties of sclera by increasing plasticity
- Maximization of accommodative biomechanics by decreasing scleral resistive forces, and increasing resultant ciliary muscle forces
- Restoration of accommodative function for visual tasks



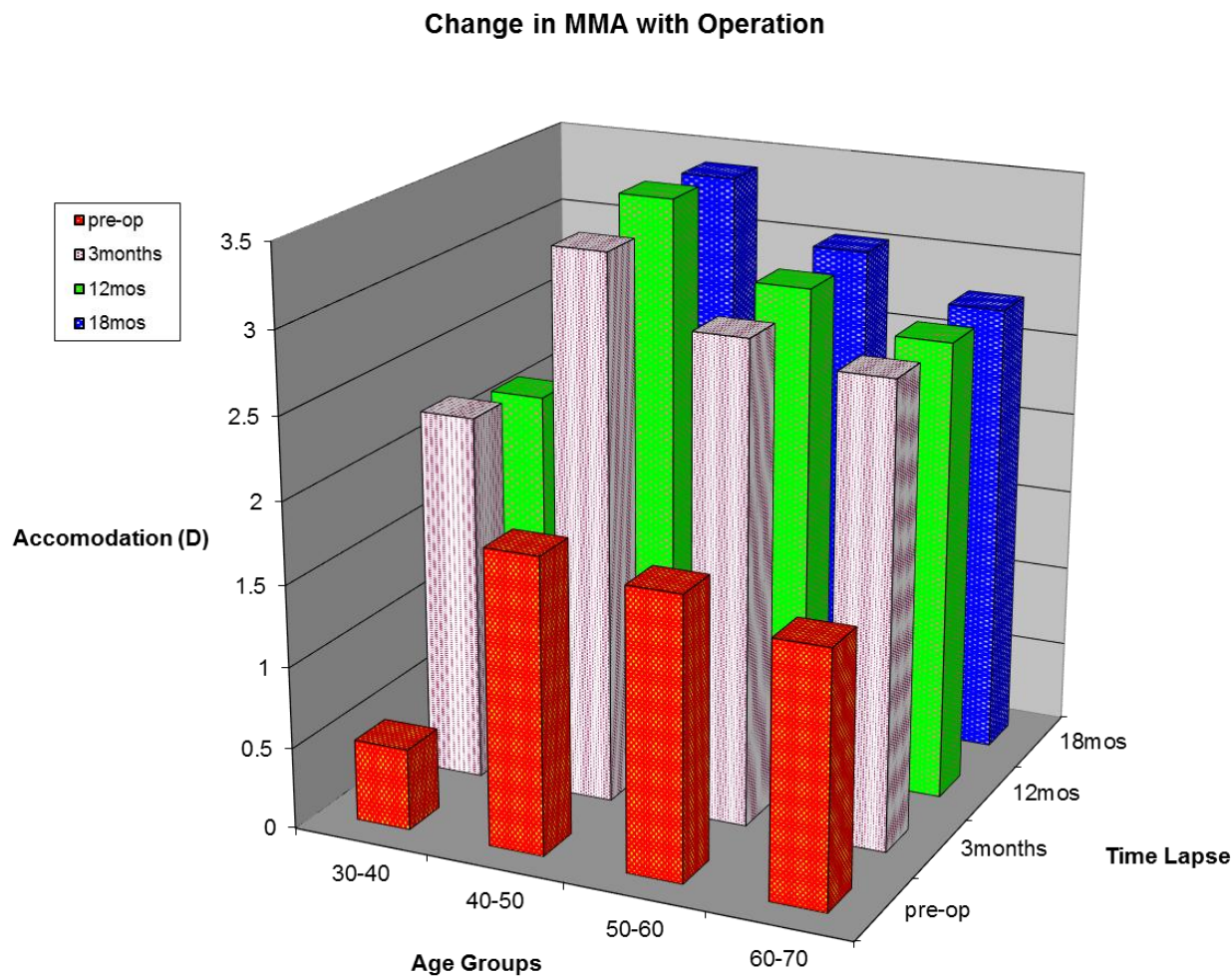
# Methods

- Binocular Minimum Accommodative Amplitudes (MMA) were measured with the iTracy wavefront aberrometer
- Changes in Binocular MMA after the procedure were plotted.
- A Pearson correlation was used to compare pre-op and post-op MMA's with normative data curves.
- Both pre-op(Old Visual Age) and post-op(New Visual Age) were plotted against actual calendar age to determine the mean visual rejuvenation.

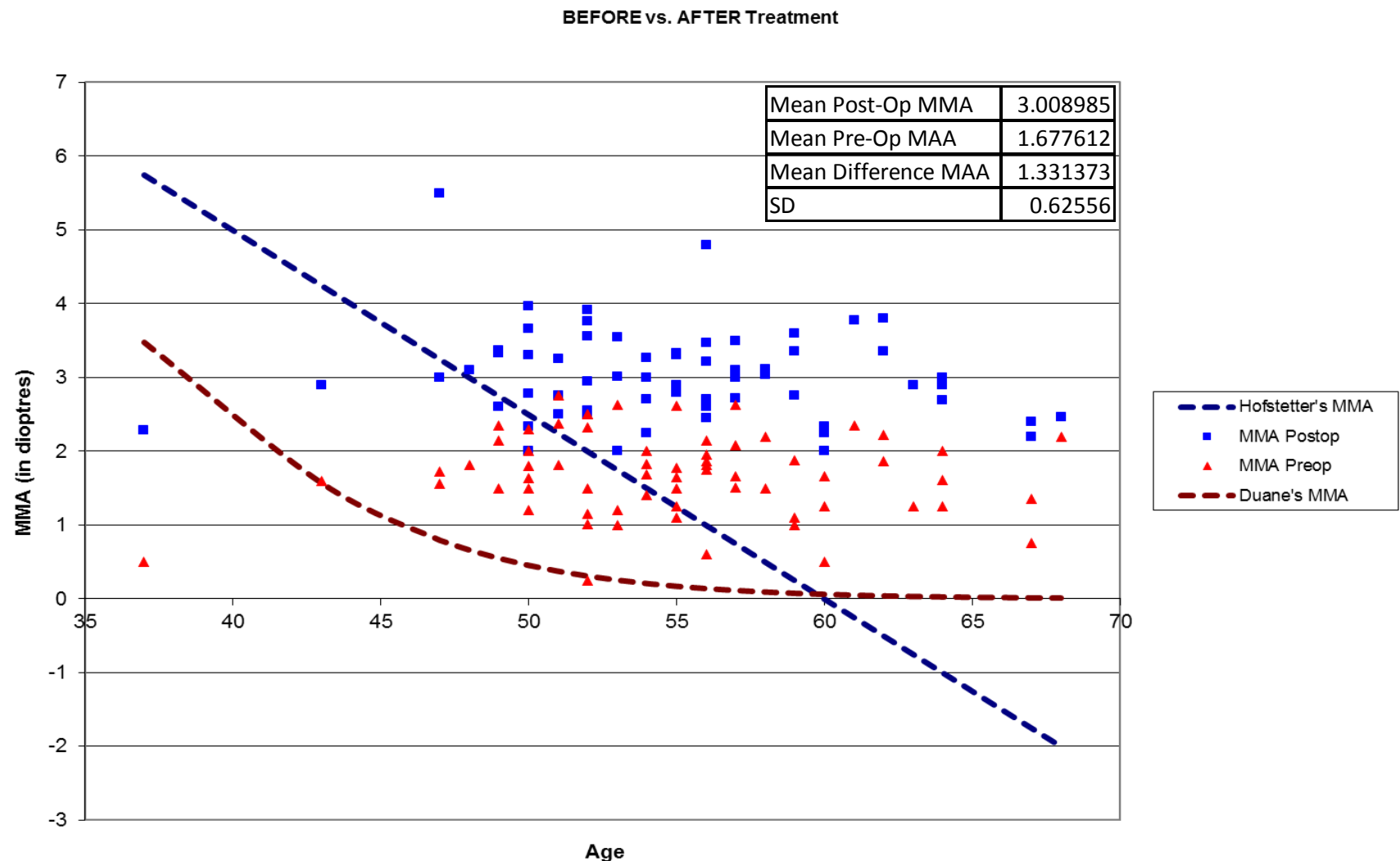




# Change in Binocular Mean Amplitude of Accommodation Following Laser Anterior Ciliary Excision



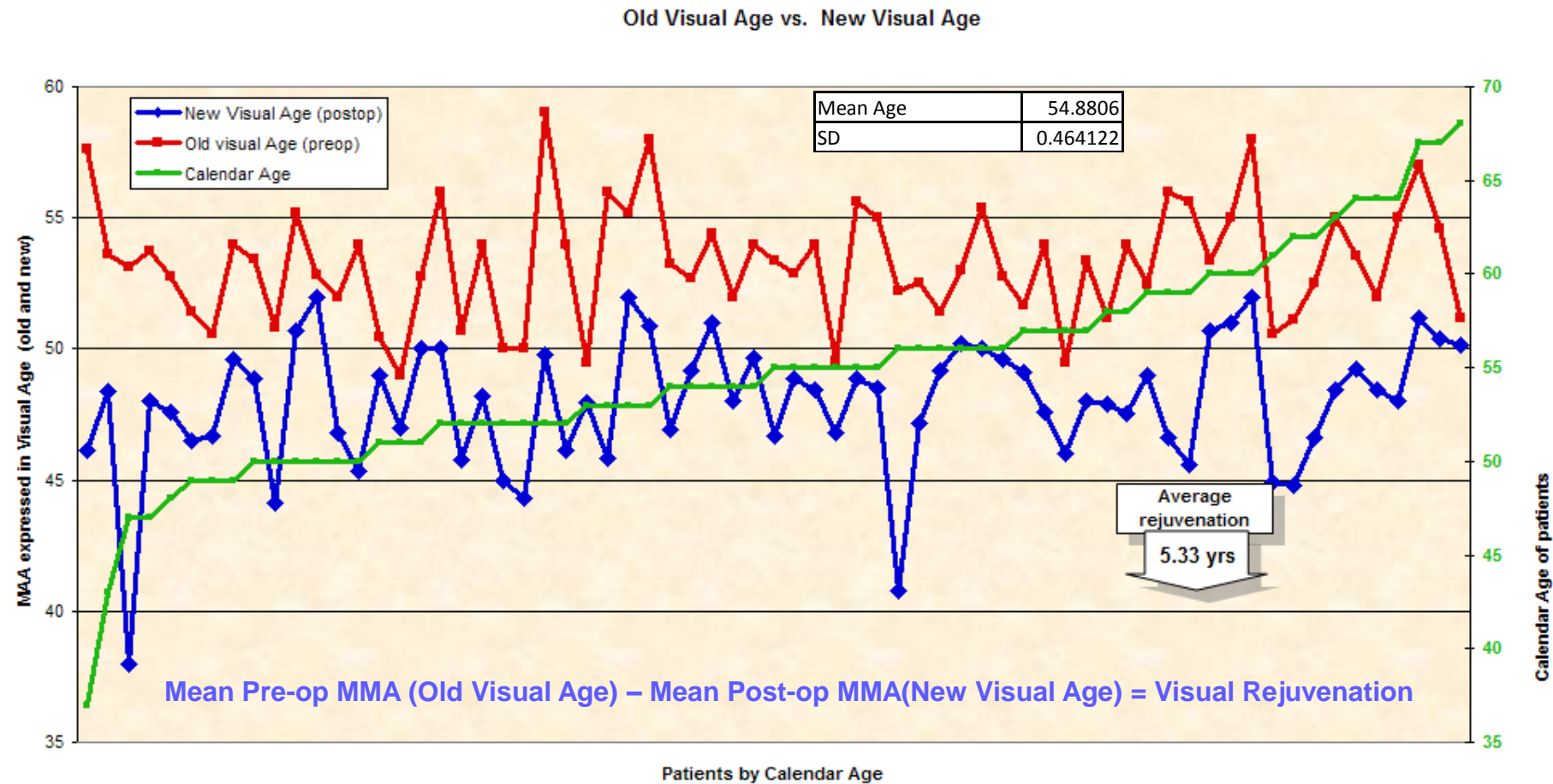
# Correlation of Pre-Op and Post-Op Binocular Mean Amplitude of Accommodation



1.Hofstetter HW. A comparison of Duane's and Donder's tables of the amplitude of accommodation. Am J Optom Arch Am Acad Optom. 1944;21(9)345-362  
2.. Duane A. The accommodation and Donder's curve and the need of revising our ideas regarding them. JAMA. 1909;52(25)1992-1996



# Rejuvenation of Visual Age After Laser Anterior Ciliary Excision



\*Inclusion criteria required reading Add of +1.50 D or more





# Conclusions:

- There was a statistically significant change Minimum Accommodative Amplitude (MMA) postoperatively after Laser Anterior Ciliary Excision.
- When plotted with accommodative data from previous studies, our data from patients treated with Laser Anterior Ciliary Excision represented a significant reversal of the trend of presbyopia correlated with age.
- There was a mean value of 5.33 years of rejuvenation of visual age based on expected minimum accommodative amplitude for calendar age.
- Future studies will focus on measuring multidimensional parameters of ocular aging relative to accommodation.

