Supplemental Materials and Methods:

Statistical Explanatory Text

Multiple Comparisons

Given the number of t-tests, one needs to consider the possibility of a Type I error rate (the possibility of a false assumption of a significant difference between the groups, with no biological basis). The probability of such an error is low (typically p < 0.05 or a 5% chance). Given the nature of the experiments, we consider the adjustment for multiple comparisons unnecessary and impractical and doing so may result in an inflated Type II error rate (the possibility of failing to identify a significant difference between the groups, when there really is such a difference). It is generally accepted that the results in these situations do not simply occur by "chance" and we are not testing a "universal null hypothesis," it is reasonable to consider each test on its own.

Explanatory Material of the Stepwise Regression: Relatedness of the Variables

It is logical that a number of the measurements will be related to one another, because of the geometry of the accommodative system (i.e., the accommodative amplitude is dependent upon the thickness of the lens, or in another example the lens is dependent upon the movements of the extralenticular structures in order to thicken). The significant associations between the variables reported in the above results demonstrate that our physiological findings are consistent with the geometry and the anatomy of the various structures. These are "positive controls" and demonstrate the validity of our techniques.
**Supplemental Results Reporting the Mean and s.e.m of the Distances Measured**

**The Lens**

*Lens Thickness*

The resting lens thickness was 3.31 ± 0.09 mm in the young and middle-aged human eyes (grouped together) and 4.06 ± 0.27 mm in the older eyes (p=0.081). During maximum (PILO-induced) accommodation the lens thickness was 3.64 ± 0.10 mm in the young and middle-aged human eyes and 4.06 ± 0.26 mm in the older eyes.

*Centripetal Lens Equator Position/Centripetal Movement*

In the resting state, the centripetal distance (axially) between the lens equator position and the scleral spur (as defined in Fig. 1) was 1.78 ± 0.07 mm in young and middle-aged human eyes (grouped together), and 1.56 ± 0.04 mm in the older eyes (p=0.014). During maximum (PILO-induced) accommodation, the distance was 1.92 ± 0.07 mm in the young and middle-aged human eyes and 1.62 ± 0.05 mm in the older eyes (p=0.007).

The centripetal lens equator position regression analysis showed one outlier at age 31; the centripetal lens equator position was 0.4 mm farther inward (centripetally) from the scleral spur than all other subjects of this age group (Fig. 4D). This subject engaged in competitive volleyball daily for 2-3 hours, and the resting muscle apex width was thicker in this subject than any of the
other 11 subjects (Fig. 5D, Supplemental Fig. 5). Without this outlier included, the distance between the lens equator and the scleral spur (centripetally) declined significantly with age in the resting (p=0.008) and accommodated eyes (p=0.009), and the distance between the lens equator and the scleral spur was significantly related to accommodative amplitude in the resting and accommodated states (Supplemental Fig. 6); the farther away the lens equator was from the scleral spur (centripetally) in each state, the higher was the accommodative amplitude.

The Ciliary Muscle

The resting ciliary muscle apex width was 0.70 ± 0.04 mm in the young and middle-aged human eyes (grouped together), and 0.81 ± 0.02 mm in the older eyes (p=0.028). During maximum (PILO-induced) accommodation, the ciliary muscle apex width was 0.95 ± 0.05 mm in the young and middle-aged human eyes and 0.89 ± 0.03 mm in the older eyes (p=0.36).

The Circumlental Space (CLS) and the Anterior Zonule

The resting CLS width was 0.66 ± 0.03 mm in the young and middle-aged human eyes (grouped together) and 0.35 ± 0.05 mm in the older eyes (p=0.003). During maximum (PILO-induced) accommodation, the CLS width was 0.65 ± 0.02 mm in the young and middle-aged human eyes and 0.20 ± 0.03 mm in the older eyes (p=0.001).
The Vitreous Zonule

In the resting state, the distance between the vitreous zonule insertion zone and the scleral spur was $4.58 \pm 0.10$ mm in the young and middle-aged human eyes (grouped together) and $4.17 \pm 0.18$ mm in the older eyes. During maximum (PILO-induced) accommodation, the distance was $3.84 \pm 0.12$ mm in the young and middle-aged human eyes and $4.02 \pm 0.16$ mm in the older eyes.