The Dysfunctional Lens

- The lens begins to age from the day we are born.
- We lose accommodation as the lens grows in size and hardens.
- Clarity and accommodation is lost due to oxidation, disulfide bonds and loss of protein solubility.

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Dysfunctional Lens Syndrome (DLS) & Presbyopia: Definition, Mechanism & Staging

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## Diopters of Accommodation by Age

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<th>Amplitude</th>
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DLS Stages

- Stage 0: Great accommodation and visual quality
- Stage 1: Good visual quality with loss of accommodation
- Stage 2: Loss of accommodation and good visual quality
- Stage 3: Loss of visual acuity (Snellen chart) in addition to accommodation and visual quality
Stage 0 DLS

- Under age 40
- Great accommodation and visual quality
- Great OSI, MTF, PSF, and predicted VA

Stage 0 DLS

- No increased nuclear density

Stage 0 DLS

- No back scatter

Stage 0 – Great Vision

- No back scatter
Stage 1: DLS

- Typically aged 40-50
- Loss of accommodation
- Good visual quality
- Mid-normal OSI
- Mid-normal MTF
- Normal Predicted VA
- Recommend laser corneal refractive surgery

Stage 1 DLS: HD Analyzer Results

- Mid-normal OSI, MTF, and PSF.
- Good predicted VA

Stage 1 DLS: Densitometry

- Mildly increased nuclear density

Stage 1 DLS: Densitometry

- Mildly increased nuclear density
Stage 1 DLS: Slit Lamp Exam

- Very mild “back scatter”

Stage 2

- Typically over 50 y/o
- Loss of accommodation
- Loss of visual quality
- Moderate OSI, PSF, and MTF
- Good predicted VA
- Recommend DLR

Stage 1 DLS

Stage 2 DLS: HD Analyzer Results

- Moderate OSI, PSF, and MTF
- Good predicted VA
Stage 2 DLS: Densitometry

- Moderately increased nuclear density

Stage 2 DLS: Densitometry

- Moderately increased nuclear density

Stage 2 DLS: Slit Lamp Exam

- Moderately increased “back scatter”
**Stage 3 DLS**

- Typically >60 but any age possible
- Loss of accommodation and visual quality
- Loss of visual acuity
  - (BCVA and or glare testing<20/40)
- Poor OSI, MTF and predicted VA
- Recommend refractive cataract

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**Stage 3 DLS: HD Analyzer Results**

- Poor PSF
- Poor MTF
- Poor predicted VA
- Moderate to poor OSI

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**Stage 3 DLS: Densitometry**

- Greatly increased nuclear density
Stage 3 DLS: Densitometry

- Greatly increased nuclear density

Stage 3 DLS: Slit Lamp Exam

- Greatly increased “back scatter.”

Combined Stage 3 and Stage 2

- Not all lenses age symmetrically

Stage 3 OD and Stage 2 OS
Fundus photos showing asymmetrical viewing

Before and After Lens Surgery