Myopic Refractive Shifts Commonly Occur With DMEK Alone: How Much And Why

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Disclosures

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Refractive Shifts after EK Conventional Wisdom

- DSAEK
  - Hyperopic Shift of ~ 0.75 to 1.25 D
  - Negative Lens (thick on the edges, thin in the middle)
- DMEK
  - Less of a hyperopic shift
  - Posterior curvature is flat preoperatively and curved anteriorly postoperatively

Reality

- Huge range of refractive & topographic shifts
- Index of refraction between posterior K and aqueous is minimal
  - 10 D needed to induce 1 D of refractive effect
- How do we explain MYOPIC shifts?

Devers Study:
Analysis of DMEK Refractive Shifts

- 309 DMEK standardized technique surgeries from 2/5/13 to 6/2/15
- 200 had a triple procedure so excluded from analysis of shifts
- 102 eyes did not have a triple or IOL exchange or LASIK/PRK
- 61 eyes with preop and 6 month post op complete data
  - Age: 63.9 ± 7.2 years
  - 67% Female, 33% Male
- Pre-op Spherical Equivalent Mean:
  - -0.86 ± 1.8 (Range: -6.0 - +2.63)
- Post-op Spherical equivalent Mean:
  - -0.51 ± 1.78 (Range: -5.5 - +2.5)
- Mean SE change from preop to post op: hyperopic shift of +0.32

Devers Study:
Analysis of DMEK Refractive Shifts

Myopic Shifts

- 30 eyes (49%)
- Average Shift: -0.51 ± 0.4
- Median Shift: -0.38
- Range: -0.25 to -1.50 D

Hyperopic Shifts

- 31 eyes (51%)
- Average Shift: +1.11 ± 1.02
- Median Shift: +1.0 D
- Range: 0 to + 3.25 D

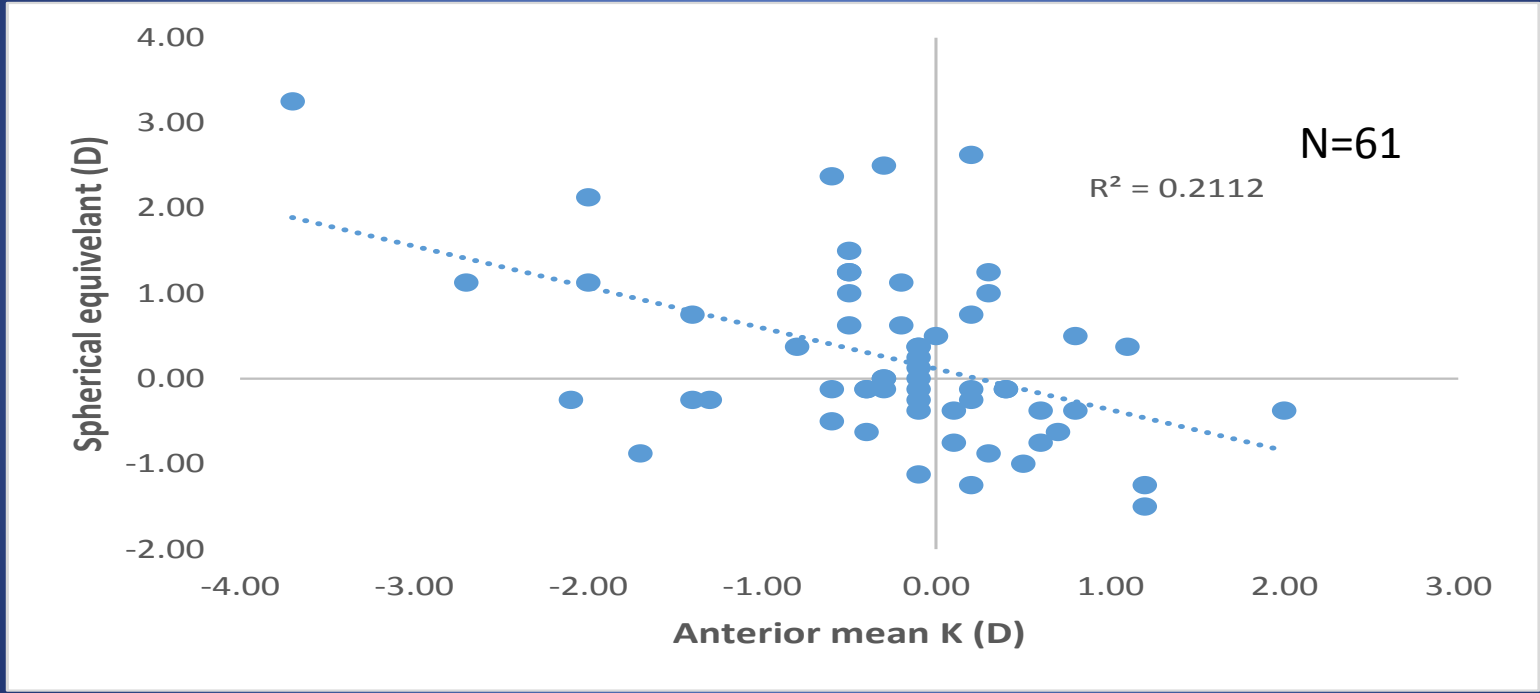
Literature Data: DMEK

- Melles (van Dijk et al: Contact Lens & Anterior Eye 36 (2013) 13– 21):
- N= 167 pseudophakic eyes
- Mean refractive change: +0.25 +/- 1.12 at 6 months
- Range: -2.50 of myopic shift and +3.75 of hyperopic shift
- % of eyes with myopic shift: not given

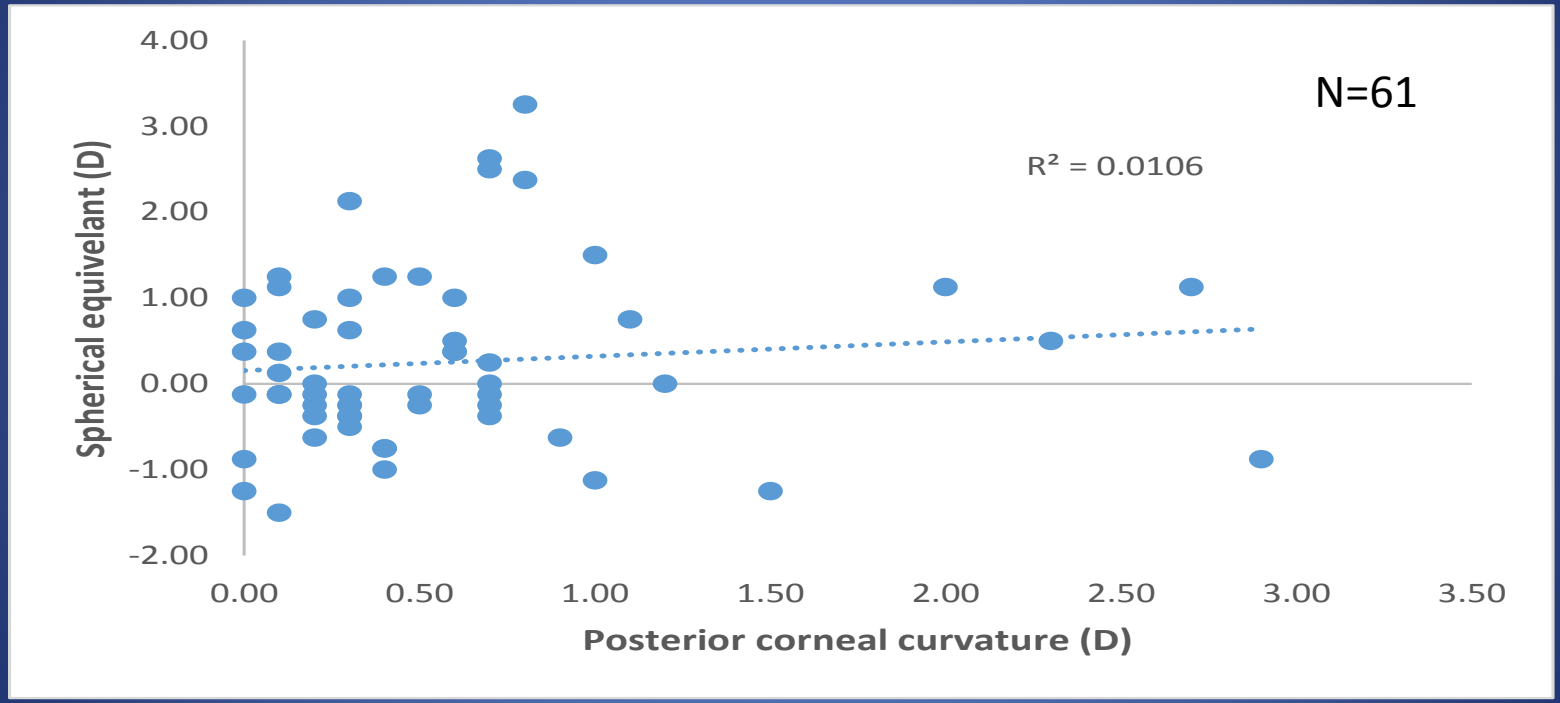
So What Causes The Variability in Shifts?

- Anterior Corneal Changes?
- Posterior Corneal Changes?
- Pachymetry?

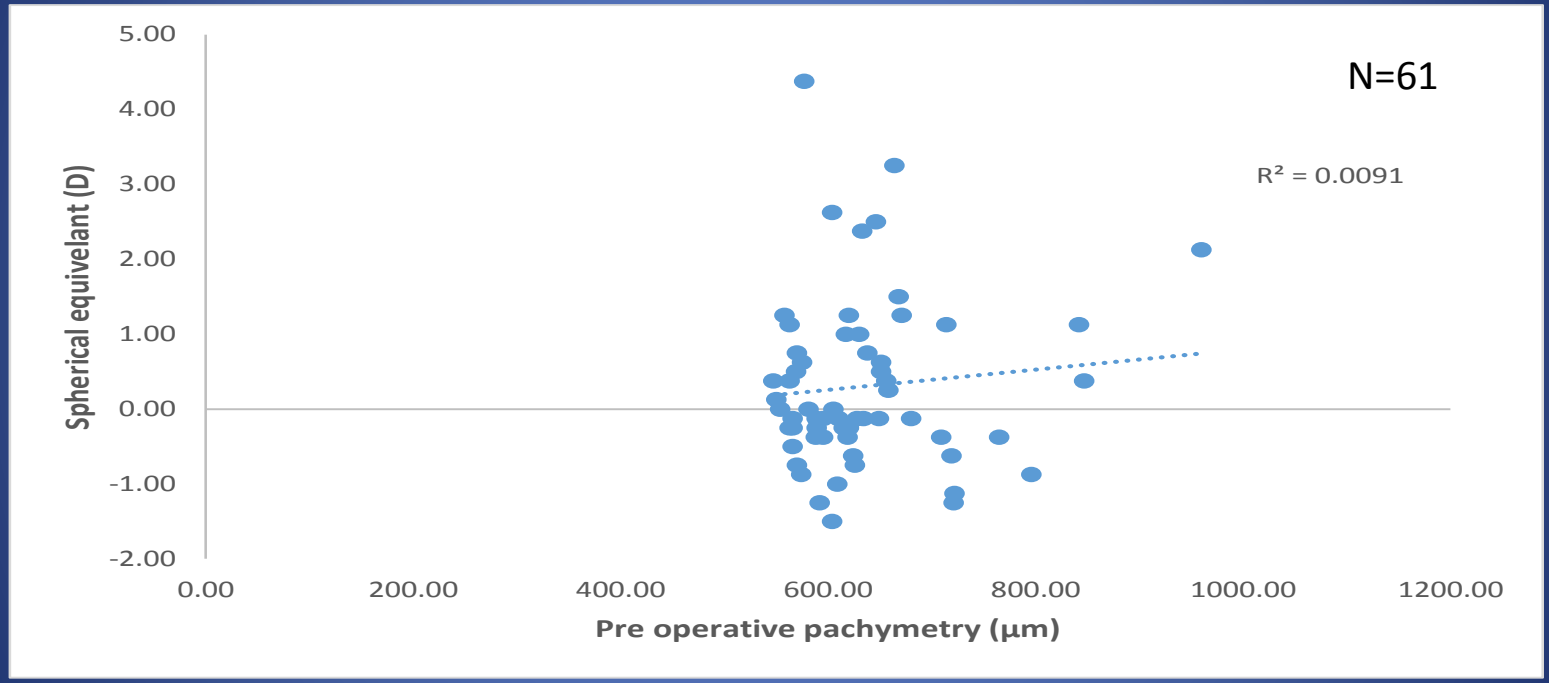
Correlation of change in SE to changes in Anterior Mean K



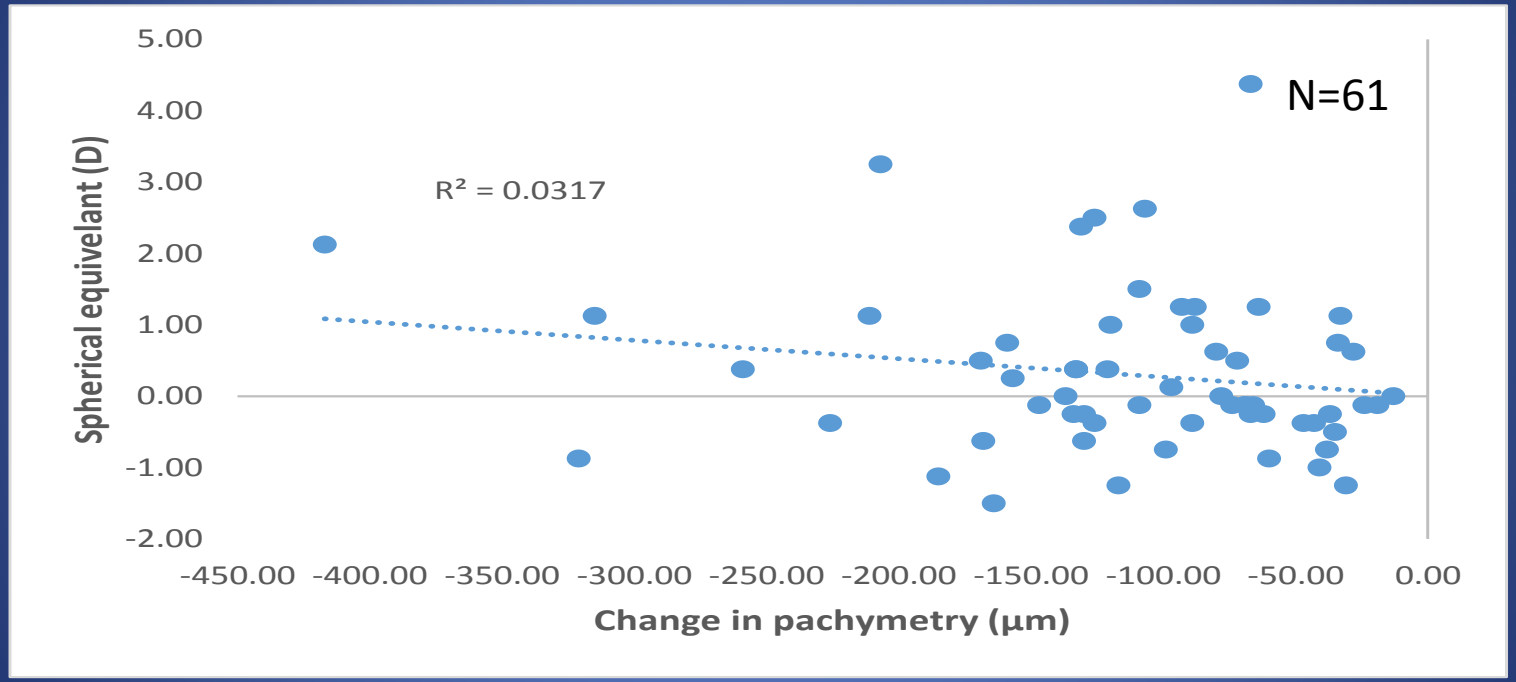
Correlation of change in SE to changes in Posterior Mean K



Correlation of change in SE to Pachymetry Pre-op

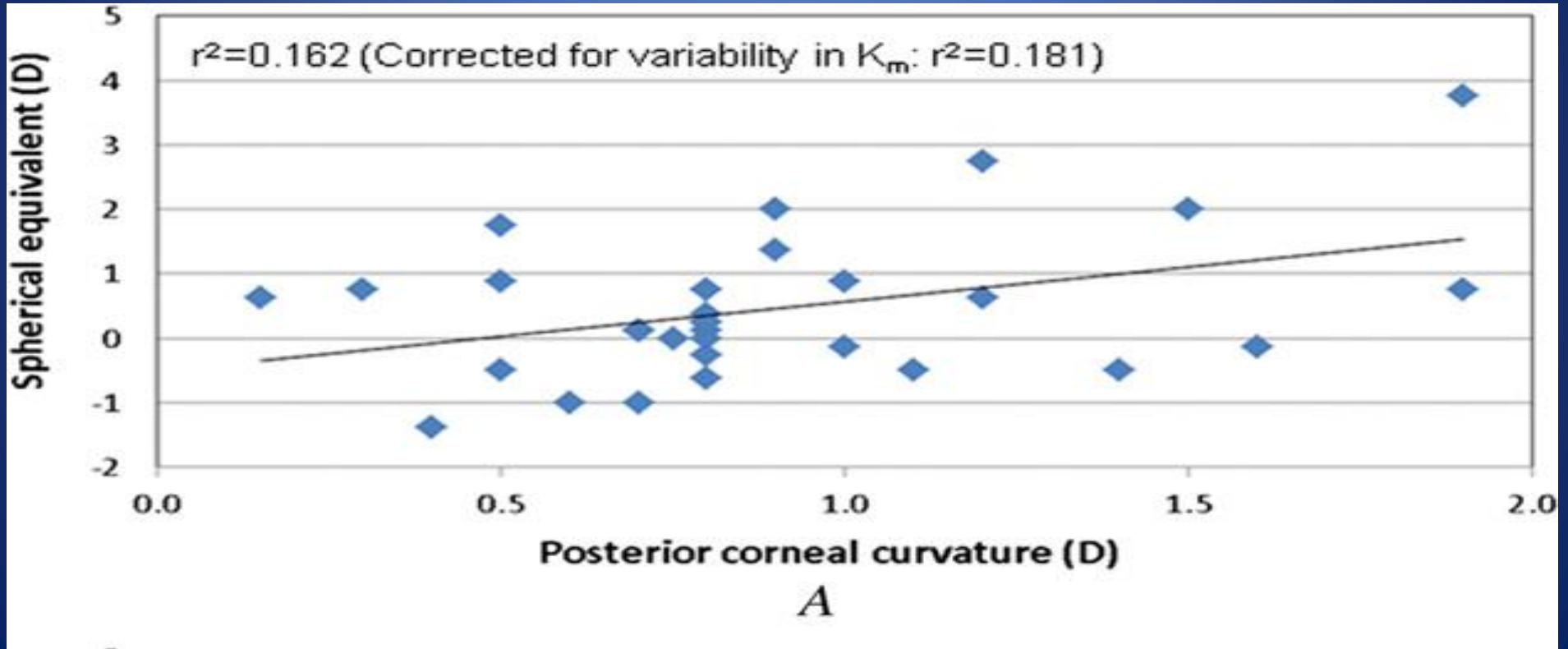


Correlation of change in SE to change in Pachymetry



WEAK correlations between posterior corneal curvature changes and Spherical Equivalent Shifts

Melles: (Hamm et al: J Cataract Refract Surg 2011; 37:1455–1464): 50 eyes, 43 pseudo



Conclusion

- Myopic refractive shifts occur half the time after DMEK alone.
  - Posterior curvature and pachymetry changes do not explain this myopic shift
  - Likely are most dependent on changes in anterior curvature
  - The use of multifocal IOLs and the promise of emmetropia to patients after DMEK (or DSAEK) is likely not warranted

Thank you!

Questions?