

Diurnal Study of Normal Corneas

Margaret Iwanski

L.Niedzwiecki

OD

	Feb.2nd	Feb.5th	Feb.8th
3mm	44.94 @ 106 44.50 @ 197 44.46 @ 229 44.06 @ 41	44.76 @ 105 44.48 @ 196 44.23 @ 266 44.21 @ 21	42.99 @ 090 42.95 @ 181 42.36 @ 284 42.52 @ 27
5mm	45.03 @ 123 44.34 @ 214 44.29 @ 183 43.58 @ 22	0.00 @ 0 0.00 @ 0 0.00 @ 0 0.00 @ 0	43.10 @ 110 42.71 @ 201 42.31 @ 289 42.15 @ 19
	Feb.10th	Feb.12th	Feb.15th
3mm	44.66 @ 95 44.50 @ 196 44.29 @ 271 44.19 @ 19	44.60 @ 95 44.46 @ 186 44.25 @ 282 44.13 @ 22	45.20 @ 92 44.92 @ 201 44.88 @ 172 44.76 @ 21
5mm	44.64 @ 110 44.29 @ 201 44.09 @ 282 43.69 @ 16	45.08 @ 82 44.23 @ 173 43.97 @ 280 42.47 @ 10	45.38 @ 99 44.74 @ 209 44.62 @ 285 44.15 @ 15
	Feb.17th	Feb.19th	Feb.22nd
3mm	44.74 @ 92 44.23 @ 346 44.17 @ 181 43.98 @ 275	44.67 @ 93 44.52 @ 210 44.48 @ 154 44.25 @ 10	44.64 @ 111 44.34 @ 202 44.23 @ 291 44.06 @ 27
5mm	44.70 @ 96 44.06 @ 187 43.81 @ 264 43.83 @ 10	0.00 @ 0 0.00 @ 0 0.00 @ 0 0.00 @ 0	44.85 @ 117 44.11 @ 208 43.96 @ 293 43.58 @ 23

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OD (continued)

Feb.23rd

3mm 44.82 @ 101  
44.44 @ 222  
44.40 @ 181  
44.25 @ 279

5mm 0.00 @ 0  
0.00 @ 0  
0.00 @ 0  
0.00 @ 0

	median	mode	mean
3mm	44.60 44.46 44.25 44.13	44.66 44.50 44.23 44.06	44.60 +/- .32 44.33 +/- .30 44.20 +/- .18 44.03 +/- .32
5mm	45.08 44.23 43.97 42.47	44.64 44.06 43.97 43.58	44.68 +/- .47 44.07 +/- .39 43.87 +/- .46 43.43 +/- .56

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OS

	Feb. 2nd	Feb. 5th	Feb. 8th
3mm	44.34 @ 195 44.27 @ 296 44.13 @ 241 43.86 @ 120	44.40 @ 183 44.31 @ 68 44.07 @ 263 44.06 @ 112	44.60 @ 47 44.40 @ 186 44.11 @ 241 44.07 @ 142
5mm	44.56 @ 89 44.25 @ 329 44.00 @ 239 43.60 @ 148	44.52 @ 68 44.19 @ 329 43.94 @ 245 43.64 @ 147	44.50 @ 40 44.23 @ 308 43.88 @ 233 43.69 @ 140
	Feb. 10th	Feb. 12th	Feb. 15th
3mm	44.42 @ 45 44.25 @ 193 44.02 @ 240 43.96 @ 139	44.52 @ 50 44.52 @ 197 44.34 @ 255 44.17 @ 107	0.00 @ 0 0.00 @ 0 0.00 @ 0 0.00 @ 0
5mm	44.36 @ 60 44.16 @ 330 43.75 @ 239 43.64 @ 139	44.62 @ 53 44.34 @ 317 44.06 @ 227 43.64 @ 129	44.54 @ 48 44.37 @ 318 44.11 @ 239 43.69 @ 135
	Feb. 17th	Feb. 19th	Feb. 22nd
3mm	44.56 @ 190 44.34 @ 51 44.17 @ 326 44.15 @ 100	44.52 @ 192 44.46 @ 303 44.34 @ 240 44.10 @ 113	44.29 @ 185 44.36 @ 37 44.21 @ 242 43.92 @ 132
5mm	44.30 @ 44 44.21 @ 210 44.06 @ 263 43.79 @ 123	44.52 @ 54 44.40 @ 321 44.09 @ 232 43.73 @ 141	44.54 @ 48 44.25 @ 318 43.81 @ 235 43.60 @ 140

OS (continued)

Feb.23rd.

3mm 44.64 @ 59  
 44.34 @ 187  
 44.09 @ 132  
 44.07 @ 247

5mm 0.00 @ 0  
 0.00 @ 0  
 0.00 @ 0  
 0.00 @ 0

	median	mode	mean
3mm	44.52	44.52	44.48 +/- .10
	44.52	44.34	44.35 +/- .064
	44.34	44.34	44.16 +/- .088
	44.17	44.07	44.04 +/- .084
5mm	44.62	44.52	44.50 +/- .062
	44.34	44.25	44.27 +/- .07
	44.06	44.06	43.97 +/- .11
	43.64	43.64	43.67 +/- .05

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OD

	Feb.2nd	Feb.5th	Feb.8th
3mm	42.93 @ 245 42.88 @ 83 42.32 @ 163 41.71 @ 336	43.04 @ 248 42.92 @ 87 42.43 @ 164 41.76 @ 337	42.88 @ 242 42.70 @ 78 42.24 @ 151 41.71 @ 341
5mm	42.86 @ 236 42.72 @ 89 42.34 @ 161 41.49 @ 337	42.84 @ 238 43.04 @ 86 42.47 @ 171 41.52 @ 346	42.77 @ 231 42.52 @ 103 42.36 @ 73 41.41 @ 342
	Feb.11th	Feb.12th	Feb.15th
3mm	43.04 @ 251 42.88 @ 77 42.41 @ 167 41.87 @ 344	42.92 @ 241 42.79 @ 86 42.36 @ 162 41.75 @ 345	42.64 @ 252 42.97 @ 87 42.22 @ 175 41.66 @ 340
5mm	42.86 @ 237 42.52 @ 66 41.30 @ 103 41.56 @ 338	42.70 @ 228 42.36 @ 106 42.34 @ 171 41.46 @ 344	42.48 @ 234 42.88 @ 90 42.27 @ 174 41.44 @ 340
	Feb.17th	Feb.19th	Feb.22nd
3mm	42.82 @ 247 42.84 @ 90 42.29 @ 161 41.56 @ 345	42.86 @ 257 42.82 @ 80 42.23 @ 171 41.71 @ 342	42.84 @ 247 42.92 @ 79 42.36 @ 167 41.82 @ 337
5mm	42.66 @ 231 42.61 @ 100 42.34 @ 163 41.36 @ 347	42.63 @ 237 42.54 @ 100 42.29 @ 160 41.49 @ 341	43.25 @ 238 43.12 @ 74 42.33 @ 111 42.08 @ 342

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OD (continued)

Feb. 24th

3mm 43.03 @ 250  
42.88 @ 86  
42.41 @ 164  
41.70 @ 342

5mm 42.77 @ 230  
42.79 @ 98  
42.45 @ 155  
41.44 @ 342

	median	mode	mean
3mm	42.92	42.92	42.90 +/- .092
	42.79	42.82	42.86 +/- .058
	42.36	42.36	42.33 +/- .067
	41.75	41.71	41.73 +/- .061
5mm	42.70	42.86	42.78 +/- .14
	42.61	42.61	42.71 +/- .20
	42.34	42.34	42.34 +/- .043
	41.46	41.49	41.50 +/- .11

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OS

	Feb. 2nd	Feb. 5th	Feb. 8th
3mm	42.99 @ 269 42.85 @ 79 42.50 @ 0 41.92 @ 176	43.03 @ 276 42.95 @ 78 42.54 @ 353 41.97 @ 180	42.99 @ 269 42.93 @ 95 42.22 @ 18 41.76 @ 174
5mm	0.00 @ 0 0.00 @ 0 0.00 @ 0 0.00 @ 0	42.82 @ 292 43.69 @ 84 42.04 @ 35 41.64 @ 173	0.00 @ 0 0.00 @ 0 0.00 @ 0 0.00 @ 0
	Feb. 11th	Feb. 12th	Feb. 15th
3mm	42.99 @ 271 42.57 @ 66 42.29 @ 356 41.87 @ 161	43.08 @ 269 42.99 @ 81 42.50 @ 359 42.06 @ 173	42.88 @ 267 42.66 @ 77 42.13 @ 357 41.63 @ 170
5mm	42.82 @ 282 42.57 @ 53 42.29 @ 9 41.47 @ 166	42.93 @ 290 42.81 @ 60 42.50 @ 358 41.71 @ 166	42.73 @ 273 42.50 @ 57 42.29 @ 2 41.32 @ 170
	Feb. 17th	Feb. 19th	Feb. 22nd
3mm	43.03 @ 271 42.93 @ 79 42.45 @ 359 42.01 @ 170	42.93 @ 263 42.66 @ 73 42.38 @ 0 41.82 @ 163	42.95 @ 268 42.66 @ 69 42.33 @ 8 41.51 @ 168
5mm	42.88 @ 281 42.90 @ 55 42.61 @ 355 41.68 @ 164	42.84 @ 282 42.55 @ 42 42.47 @ 3 41.51 @ 162	42.76 @ 290 42.55 @ 47 42.33 @ 5 41.51 @ 165

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OS(continued)

Feb.24th

3mm 42.99 @ 273  
42.66 @ 62  
42.43 @ 3  
41.71 @ 172

5mm 42.82 @ 291  
42.65 @ 45  
42.52 @ 76  
41.46 @ 166

	median	mode	mean
3mm	43.08 42.99 42.50 42.06	42.99 42.66 42.50 41.82	42.99 +/- .038 42.79 +/- .144 42.38 +/- .107 41.83 +/- .14
5mm	42.93 42.81 42.50 41.71	42.82 42.55 42.29 41.51	42.83 +/- .045 42.77 +/- .265 42.38 +/- .14 41.54 +/- .105

Trends:

1. The measurement on February 8th. of the female subject's OD was consistently flatter by at least 1.50D in every quadrant both in the 3mm and 5mm zones.
2. The measurement on February 15th. of the females right eye in both the 3mm and 5mm zones were steeper by at least 0.50D.
3. Comparing the 3mm inferior and nasal graphs of the female's right eye shows them to be identically plotted within a 0.25 D steps.
4. Comparing the overall views of the female's left eye vs. the right eye the left was consistently flatter than the right.
5. The inferior and nasal 3mm zones of the male subject's right eye was plotted in the same linear fashion within a 0.50D steps.
6. The measurement on February 22nd. of the male's right eye showed it to be steeper by at least 0.75 D in the superior, inferior and temporal quadrants.
7. The superior and temporal 5mm zones of the male's left eye are plotted in the identical linear fashion.
8. The temporal quadrant of both eyes in the male subject was found to be significantly flatter both in the 3mm and 5mm zones.

## Comment

The major purpose of this study was to determine if the cornea remains relatively unchanged during a prolonged period of time. Although our sample was not large, our data statistically indicates that for most of the parameters measured, there was not a clinically significant change in the cornea's shape. Using the Corneal Analysis System (EyeSys) made the data more reliable, repeatable and without significant human error.

The female's cornea was shown to be predominantly spherical, while the male's cornea did show an asymmetrical bow tie. This bow tie pattern has some clinical meaning that the subject has a greater amount of astigmatism than the round pattern that was seen in the female. The other two topographic patterns are oval and symmetrical bow tie. The oval and round patterns are clinically considered the same. The symmetrical bow tie also means that there is astigmatism at the cornea but not to the extent of the asymmetrical bow tie. (4)  
Further investigation with a larger sample and for a longer period of time may indicate that there are some significant changes of the cornea, but that is beyond the scope of this paper.

## References

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