SUPPLEMENTAL MATERIAL

Astigmatism and maternal myopia as important factors affecting success rate of DIMS lens treatment

Patricia Domsa[1,2*], Éva M. Bankó[3*], Judit Körtvélyes[1], Christof Meigen[4], Rita Széchey[1,5], Krisztina Lantos[2], Zoltán Zs. Nagy[5]†, Adrienne Csutak[2]†

[1]Non Plus Ultra Vision Centre, Budapest, Hungary, [2]Department of Ophthalmology, University of Pécs Medical School, Pécs, Hungary, [3]Brain Imaging Centre, HUN-REN Research Centre for Natural Sciences, Budapest, Hungary, [4]LIFE Child, LIFE Leipzig Research Center for Civilization Diseases, Leipzig University, Leipzig, Germany, [5]Department of Ophthalmology, Semmelweis University, Budapest, Hungary,

In addition to computing and analysing the spherical equivalent, we also transformed S/C_A refractive data into Long's matrix formalism based on the equations below[1]:

$$P = \begin{bmatrix} f11 & f12 \\ f21 & f22 \end{bmatrix}$$

$$f11 = S + C\,sin^2\,A$$

$$f22 = S + C\,cos^2\,A$$

$$f12 = f21 = -C\sin A\cos A$$

where P is the total refractive power, S is spherical power, C is cylindrical power with axis A. After computing descriptive and ANCOVA statistics the components were back transformed to determine the spherocylindrical parameters following Keating's method [2]:

$$C = \pm\sqrt{t^2 - 4d}$$

$$S = \frac{t - C}{2}$$

$$A = tan^{-1}\left(\frac{S - f11}{f12}\right)$$

where t is the trace, and d is the determinant of the matrix P:

$$t = f11 + f22$$

$$d = f11f22 - f12f21$$

1. Long WF. A matrix formalism for decentration problems. *Am J Optom Physiol Opt*. 1976;53:27–33. https://doi.org/10.1097/00006324-197601000-00005

2. Keating MP. On the Use of Matrices for the Mean Value of Refractive Errors. *Ophthalmic Physiol Opt*. 1983;3:201–3. https://doi.org/10.1111/j.1475-1313.1983.tb00599.x

Effect	Degr. of freedom	F	p
Intercept	1	12,53640	0,000831
Age	1	5,44532	0,023374
Mother D	1	0,69864	0,406925
Father D	1	0,07577	0,784165
Baseline f11 eye ave	1	0,19729	0,658689
Baseline f12 eye ave	1	3,57979	0,063853
Baseline f22 eye ave	1	0,13105	0,718762
Astigmatism	1	4,45179	0,039514
Error	54		
Component	2	5,24723	0,006686
Comp.*Age	2	3,49656	0,033775
Comp.*Mother D	2	4,20396	0,017451
Comp.*Father D	2	0,83757	0,435554
Comp.*BL. f11 eye ave	2	15,56982	0,000001
Comp.*BL. f12 eye ave	2	2,86704	0,061206
Comp.*BL. f22 eye ave	2	16,19851	0,000001
Comp.*Astigmatism	2	2,35092	0,100140
Error	108		

Table S1. Statistical values for Long's matrix refractive components f11, f12, and f22 analysis. Significant results are indicated in red.

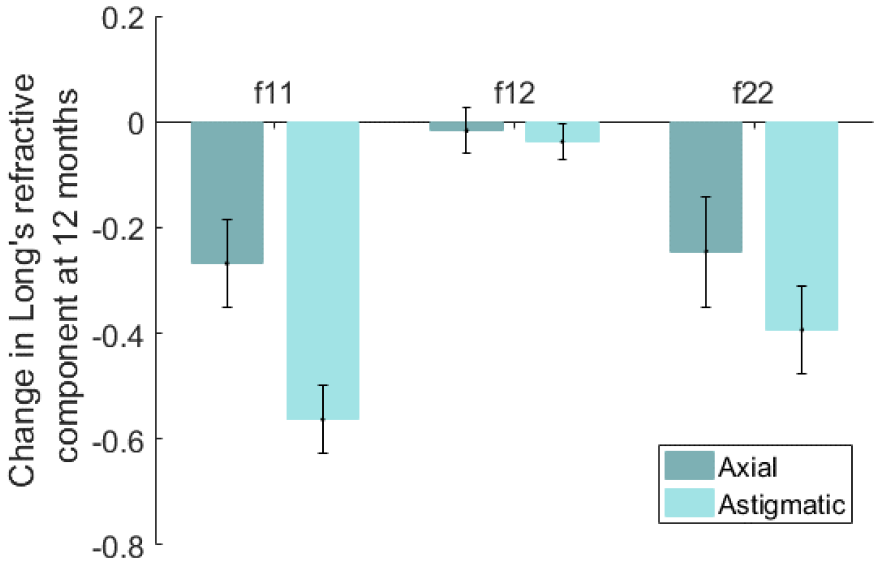

Figure S1. Change in refractive power (Long's components) over 12 months as a result of DIMS therapy. N=62, errorbars represent SE.