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APPENDIX

Subgroup data analyses

Odd group

There were 7 subjects in this group who received the OMT (Treatment A) during Phase 1 and P training (Treatment B) during Phase 2. Out of the 7, 2 (BR03 and AK11) completed Phase 1, but later withdrew from the study during Phase 2 training due to their lack of availability. Another subject (DB07) completed both phases of training, but during post-training measures period (week 15) suffered a second head injury; hence, evaluative procedures (repeat baseline measures) could only be performed partially in this subject. However, data from all 7 subjects were analyzed for baseline (pre-OMT) versus OMT (post-OMT) alone for comparison. For comparisons involving baseline, OMT (post-OMT), and P (post-P) training, data from 4 subjects that completed both phases of training including post-training measures, along with available data from DB07, were analyzed.

Even group

There were 5 subjects in this group who received P training (Treatment B) during Phase 1 and OMT during Phase 2. All completed both phases of training and post-training measures. Data from all 5 subjects were analyzed for comparing baseline OMT (post-OMT) alone, as well as in the comparisons involving baseline, P (post-P), and OMT (post-OMT).

Sub-group analysis

a. Laboratory-based objective measures

Odd group (N=5) – Order of treatment: A----B

Dynamic parameters measured at baseline, then following the OMT (post-OMT), and later following the P training (post-P) were compared using one-way, repeated-measures ANOVA; post-hoc analyses were performed using Tukey's multiple comparison tests. There was a significant increase in peak velocity for both increasing ($F[2,14]=33.02$, $p=0.0001$) and decreasing ($F[2,14]=28.44$, $p=0.0002$) steps of accommodation. Similarly, significant decreases were observed for both increasing ($F[2,14]=12.95$, $p=0.003$) and decreasing ($F[2,14]=13.59$, $p=0.002$) time constants. For both peak velocity and time constant, the post-hoc analyses revealed significant differences between baseline and post-OMT, and also between baseline and post-P, thus showing a real effect of the OMT ($p<0.05$). However, no significant difference was observed between post-OMT and post-P, thus showing no effect of the subsequent P training ($p>0.05$). None of the other laboratory-based objective parameters were significantly different ($p>0.05$) between baseline, post-OMT, and post-P for both increasing and decreasing steps of accommodation, as expected, since the values were already normal at baseline. Mean values of the laboratory-based parameters are given in Table A.

Even group (N=5) – Order of treatment: B----A

Dynamic parameters measured at baseline, then following the P training (post-P), and later following the OMT (post-OMT) were compared using one-way, repeated-measures ANOVA; post-hoc analyses were performed using Tukey's multiple comparison tests. Peak

velocity for both increasing ($F[2,14]=7.69$, $p=0.01$) and decreasing ($F[2,14]=4.73$, $p=0.04$) steps of accommodation increased significantly. Similarly, time constant for both increasing ($F[2,14]=6.39$, $p=0.02$) and decreasing ($F[2,14]=5.92$, $p=0.02$) steps of accommodation decreased significantly. For both peak velocity and time constant, the post-hoc analyses revealed significant differences between baseline and post-OMT, and also between post-P and post-OMT, thus showing a real effect of the OMT ($p<0.05$). However, no significant difference was observed between baseline and post-P, thus showing no effect of the P training ($p>0.05$). None of the other dynamic parameters were significantly different ($p>0.05$) between baseline, post-P, and post-OMT for both increasing and decreasing steps of accommodation, as expected, since the values were already normal at baseline. Mean values of the laboratory-based parameters are given in Table B.

b. Clinically-based subjective measures

Odd group (N=4) – Order of treatment: A----B

All clinic parameters measured at baseline, then following OMT (post-OMT), and later following P training (post-P) were compared using one-way, repeated-measures ANOVA; post-hoc analyses were performed using Tukey's multiple comparison tests. Only accommodative facility of the OD revealed a significant increase ($F[2,11]=21.12$; $p=0.001$) following training. Post-hoc analysis showed a significant difference between baseline and post-OMT, and also between baseline and post-P, thus showing a real effect of true oculomotor training for this parameter ($p<0.05$). However, there was no significant difference between post-OMT and post-P, thus showing no effect of P training for this parameter ($p>0.05$). None of the parameters were significantly different ($p>0.05$) between baseline, post-OMT, and post-P. This may be due to

mixed results from the individual subjects, as well as the relatively small sample size of the subgroup as compared with the combined group sample size. Mean values of the clinical parameters are given in Table C.

Even group (N=5) – Order of treatment: B----A

Clinic parameters measured at baseline, then following P training (post-P), and later following OMT (post-OMT) were compared using one-way repeated measures ANOVA; post-hoc analyses were performed using Tukey's multiple comparison tests. There was a significant increase in both monocular (OD: $F[2,14]=7.93$; $p=0.01$ and OS: $F[2,14]=15.28$; $p=0.001$) and binocular ($F[2,14]=9.71$; $p=0.007$) accommodative amplitude following training. There was also a significant increase in both monocular (OD: $F[2,14]=34.69$; $p=0.0001$ and OS: $F[2,14]=22.92$; $p=0.0005$) and binocular ($F[2,14]=17.91$; $p=0.001$) accommodative facility after training. For both parameters, post-hoc analyses revealed significant differences between baseline and post-OMT, and also between post-P and post-OMT, thus showing a real effect of the true oculomotor training ($p<0.05$). However, a significant difference was not observed between baseline and post-P, thus showing no effect of P training ($p>0.05$). None of the other clinical parameters were significantly different ($p>0.05$) between baseline, post-P, and post-OMT. Again, this may be due to mixed results from the individual subjects, as well as the relatively small sample size of the subgroup as compared with the combined group sample size. Mean values of the clinical parameters are given in Table D.

Table A: Mean (± 1 SEM) laboratory-based parameters of accommodation before (baseline), after oculomotor training (post-OMT), and following P training (Post-P) in ODD group. Inc- increasing step; Dec- decreasing step.

Parameter	Baseline	Post-OMT	Post-P
Inc- Peak velocity (D/sec)	3.0 (0.5)	4.2 (0.6)	4.3 (0.5)
Dec- Peak velocity (D/sec)	2.3 (0.5)	3.6 (0.6)	3.8 (07)
Inc- Time constant (millisec)	611 (55)	442 (47)	428 (47)
Dec- Time constant (millisec)	860 (173)	589 (152)	498 (89)
Inc- Steady-state response level (D)	3.08 (0.09)	3.11 (0.15)	3.16 (0.14)
Dec- Steady-state response level (D)	1.67 (0.18)	1.69 (0.05)	1.58 (0.13)
Inc- Steady-state variability (D)	0.19 (0.05)	0.10 (0.01)	0.13 (0.02)
Dec- Steady-state variability (D)	0.13 (0.03)	0.11 (0.02)	0.10 (0.01)
Inc- Response amplitude (D)	1.75 (0.2)	1.74 (0.1)	1.77 (0.08)
Dec- Response amplitude (D)	1.63 (0.2)	1.67 (0.16)	1.68 (0.07)

Table B: Mean (± 1 SEM) laboratory-based parameters of accommodation before (baseline), after oculomotor training (post-OMT), and following P training (Post-P) in EVEN group. Inc- increasing step; Dec- decreasing step.

Parameter	Baseline	Post-P	Post-OMT
Inc- Peak velocity (D/sec)	5.6 (1.0)	5.7 (1)	7.7 (0.6)
Dec- Peak velocity (D/sec)	5.4 (0.7)	5.9 (0.3)	7.7 (0.3)
Inc- Time constant (millisec)	414 (75)	412 (69)	267 (17)
Dec- Time constant (millisec)	388 (31)	358 (24)	287 (31)
Inc- Steady-state response level (D)	3.64 (0.06)	3.68 (0.13)	3.71 (0.13)
Dec- Steady-state response level (D)	1.85 (0.11)	1.86 (0.12)	1.86 (0.17)
Inc- Steady-state variability (D)	0.13 (0.02)	0.19 (0.03)	0.11 (0.01)
Dec- Steady-state variability (D)	0.10 (0.01)	0.13 (0.008)	0.11 (0.01)
Inc- Response amplitude (D)	2.03 (0.13)	2.09 (0.15)	2.01 (0.08)
Dec- Response amplitude (D)	2.0 (0.1)	2.02 (0.04)	1.91 (0.08)

Table C: Mean (\pm 1SEM) clinically-based subjective parameters of accommodation, vergence, and reading eye movements before (baseline), after true oculomotor training (post-OMT), and following P training (Post-P) in ODD group. OD- right eye; OS- left eye; OU- both eyes; (D)- diopter; (cpm)- cycles per minute; PRA- positive relative accommodation; NRA- negative relative accommodation.

Clinical parameter	Baseline	Post-OMT	Post-P
Accommodative Amplitude (OD) (D)	6.4 (1.3)	8.2 (1.2)	7.8 (0.9)
Accommodative Amplitude (OS) (D)	6.3 (1.4)	8 (1.1)	9.2 (1.5)
Accommodative Amplitude (OU) (D)	7.8 (1.0)	9.0 (0.8)	9.6 (1.2)
Accommodative facility (OD) (cpm)	2.7 (1.3)	6.2 (1.1)	6.0 (0.6)
Accommodative facility (OS) (cpm)	2.7 (1.4)	6.7 (1.1)	6.2 (1.3)
Accommodative facility (OU) (cpm)	4.3 (2.6)	7.6 (1.4)	5.7 (1.2)
PRA (D)	2.2 (0.6)	2.9 (0.5)	2.9 (0.7)
NRA (D)	2.0 (0.4)	2.0 (0.2)	2.30 (0.2)
Accommodative gain	0.73 (0.08)	0.78 (0.07)	0.76 (0.05)

Table D: Mean (\pm 1SEM) clinically-based subjective parameters of accommodation, vergence, and reading eye movements before (baseline), after true oculomotor training (post-OMT), and following P training (Post-P) in EVEN group. OD- right eye; OS- left eye; OU- both eyes; (D)- diopter; (cpm)- cycles per minute; PRA- positive relative accommodation; NRA- negative relative accommodation.

Clinical parameter	Baseline	Post-P	Post-OMT
Accommodative Amplitude (OD) (D)	7.5 (0.3)	7.4 (0.2)	8.9 (0.3)
Accommodative Amplitude (OS) (D)	6.8 (0.4)	7.7 (0.3)	9.0 (0.5)
Accommodative Amplitude (OU) (D)	7.8 (0.5)	7.7 (0.5)	9.9 (0.5)
Accommodative facility (OD) (cpm)	7.5 (2.7)	8.6 (3.0)	15.8 (2.7)
Accommodative facility (OS) (cpm)	7.1 (2.7)	8.4 (2.9)	16.2 (3.6)
Accommodative facility (OU) (cpm)	7.9 (2.6)	8.6 (2.5)	15.7 (2.7)
PRA (D)	3.4 (0.7)	2.6 (0.6)	3.4 (0.5)
NRA (D)	2.2 (0.3)	2.3 (0.3)	2.5 (0.2)
Accommodative gain	0.96 (0.08)	0.98 (0.08)	0.94 (0.07)