Assessing Effectiveness of a Clinical Algorithm for Myopia Progression (CAMP) Treatment Strategy in Real-World Practice Settings

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INTRODUCTION

Myopia emerges as a leading global public health concern, leading to irreversible, yet preventable, vision loss. It is projected to increase the prevalence to nearly five billion people by 2050. Benefits of proactive myopia management has been shown to outweigh the associated risks. This retrospective study assessed clinical treatment algorithm and strategy for myopia progression used in a real-world practice setting.

METHODS

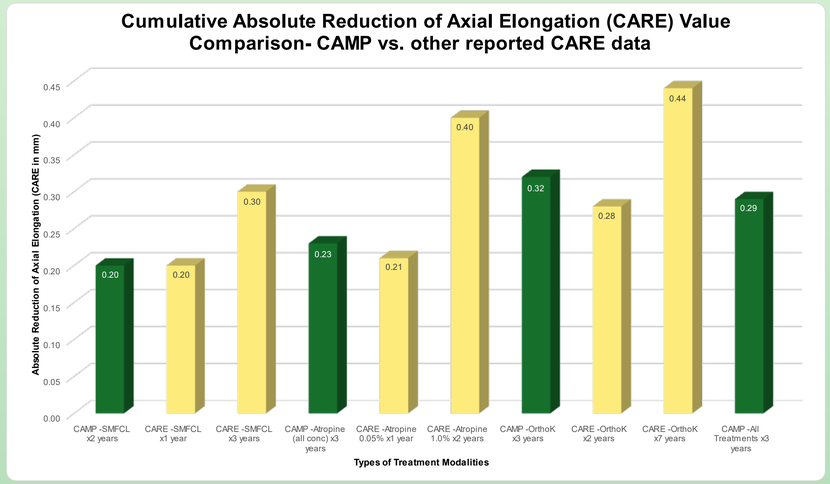
De-identified EHR data were analyzed for all patients presenting to Treehouse Eyes (Bethesda, MD and Tysons Corner, VA) from Aug 2016-Sept 2019. 1487 records were reviewed for all children and visits during that timeframe, and records were retrieved for 342 children completing at least 1 annual visit. Data were grouped into treatment modalities prescribed the at initial visit: orthokeratology (OK), OK+atropine (OK+A), soft multifocal contact lenses (SMF), SMF+atropine (SMF+A), Atropine of any concentration (ATR). Changed modality or treatment added after 1M were excluded. Measuring parameters included cycloplegic spherical equivalent refractive error (CSER), and axial length (AL). Data presented are Mean (SE) with $p < 0.05$ set for statistical significance.

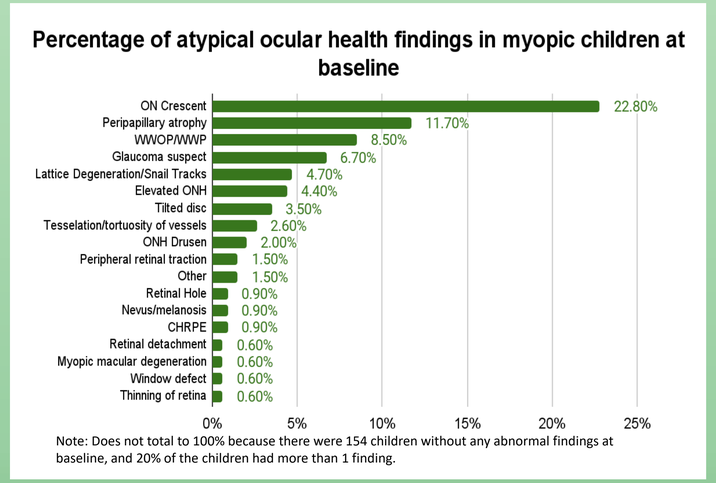
RESULTS

At the initial visit, the cohort was 53% female, 10.84 (0.13) years old, CSER -4.01 (0.15), AL 24.97 (0.07), 45% Asian ethnicity, 91% with at least 1 myopic parent. Change in CSER, (including orthokeratology use) were:Y1 +1.03 (0.12), Y2 -0.15 (0.12), Y3 -0.09 (0.22). Change in AL were: Y1 0.16 (0.01), Y2 0.17 (0.02), Y3 0.09 (0.02). 66% of children were treated with OK, 3% OK+A, 11% SMF, 5% SMF+A, 15% ATR. 78% of children started with 0.01% and 76% of those started with 0.02/0.025% ATR had concentration or dosage frequency increased. At baseline, 55% of the children had an atypical ocular finding indicating that the cohort was of significant risk for myopia. A comparison to age and ethnicity matched myopic virtual control group demonstrated effectiveness with CSER and AL changes significantly less ($p < 0.001$) than predicted for untreated children. Cumulative Absolute Reduction of axial Elongation (CARE) value of 0.29 mm over 3 years was predicted based on comparison to the age and ethnicity matched myopic virtual control group, which compares favorably to other published CARE values. Overall, 63% showed a minimal change in CSER of -0.25D or less/yr and 60% showed a change in AL of 0.10mm or less/yr after 3 years.

Overall CAMP Treatment Effectiveness through 3 Years

	Baseline	Change Year 1	Change Year 2	Change Year 3
n=	342	342	142	25
CSER (D)	-4.01 (0.15)	+1.03 (0.12) -0.29 (0.11) without OK included	-0.15 (0.12) -0.46 (0.12) without OK included	-0.09 (0.22) -0.45 (0.18) without OK included
CSER Progression (% ≤0.25D/yr)	1.7% (N=59 based on referral)	78%	51%	63%
AL (mm)	24.97 (0.07)	0.16 (0.01)	0.17 (0.01)	0.09 (0.02)
Minimal Axial Elongation (% (≤0.10mm/yr)	Not reported	45%	44%	60%





CONCLUSIONS

The clinical treatment algorithm (CAMP) demonstrated excellent control of CSER and AL as compared to age and ethnicity matched virtual myopic control group data. Orthokeratology and soft multifocal contact lenses showed the lowest amount of change over time. Atropine treatment generally required modification for most children (78%). The treatment protocol was successful for modifying the treatment for myopic progression through 3 years in a high-risk group of children and provides a model that can be applied in other practice settings.

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