Physical activity in childhood and the association with myopia in adolescence – The CHAMPS Eye Study

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### Purpose
- To investigate the effect of physical activity (PA) on the development of myopia in a Danish cohort of schoolchildren

### Design and methods
- **A prospective cohort study with 198 school children.**
  - **Baseline - August to October 2010:**
    - PA assessed with GT3X-accelerometer (ActiGraph) worn at least 10 hours/day, minimum 4 days and 1 weekend day
    - PA measure: mean counts/min
    - Cut-off-points for the PA intensity levels:
      - Sedentary (SED) ≤ 100 counts/min
      - Light (L) > 100 counts/min
      - Moderate (M) ≥ 2296 counts/min
      - Vigorous (V) ≥ 4012 counts/min
  - **Follow-up - March to May 2015:**
    - Examination at Department of Ophthalmology, Odense, Denmark, including:
      - Autorefraction in cycloplegia and Keratometry (Tonoref II, Nidek)
      - Biometri (axial length (AL)) (Lenstar 900, Haag Streit)

### Results
- **Results are calculated at follow-up**
  - Mean age was 15.5 years (range 14.2-17.5)
  - 50% were male
  - **Mean axial length:** 23.4±0.94 mm
  - Mean spherical refractive error (RE): +0.69±1.54 diopter (D)
  - 11% were myopic (RE ≤ 0.5 D)
  - Mean spherical equivalent (SE): 0.5±1.50 D
  - 15% were myopic (SE ≤ 0.5 D)
  - 10% increment in M-PA-time was predictive of a decrease in AL of 1.2 mm (p<0.01) and an increase in SE of 1.50 mm (p<0.01)
  - Each 10% increment in SED-PA prompt a 0.3 mm longer AL (p<0.01) and a -0.4D increment of the SE (P<0.05)

### Conclusion
- **Increased level of physical activity was associated with refractive error and a shorter axial length for sedentary and moderate physical activity, consistent with theory.**

### Background
- Myopia is the most frequent eye disease globally
- Caused by axial growth of the eye during childhood
- Lifestyle changes, reduced physical activity and time spent outdoors are thought to be the driving force behind the rapid increase of myopia worldwide
- This is a sub-study of the Childhood Health, Activity, and Motor Performance School Study (CHAMPS)

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**Figure 1-4:** Prediction from linear regression analyses. Axial length (y-axis) by physical activity (x-axis). 1-4 shows increasing levels of physical activity from sedentary to vigorous. *Statistical significant.