

Modifying classroom environments to reduce childhood obesity: Implications for practice and policy

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Presenter Disclosures

☞ The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose

Childhood Obesity

☞ Growing public health concern

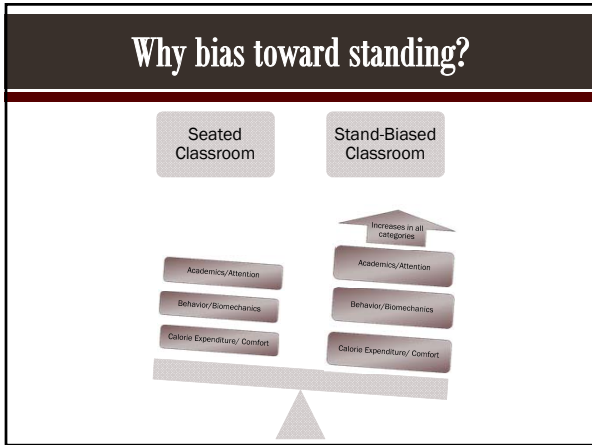
☞ Percentage of overweight/obese children is at or above 30 percent in 30 states in U.S.

☞ Obese children and adolescents have increased chance of becoming obese adults.

☞ Obese children who grow into obese adults have higher risks and potential shorter lifespan.

Intervention Efforts

- ↳ School-based efforts focus on energy balance
 - Increased physical activity
 - Improved nutrition
- ↳ School-based physical activity:
 - Integrated into PE classes
 - Demands instructional time
 - Requires fidelity from teachers who implement it
- ↳ Biasing the classroom toward standing:
 - Requires no instructional time
 - Requires no teacher effort
 - Utilizes school-time to increase physical activity that has not yet been targeted





How about in the class?



Pilot Study

- ↻ 5 classrooms of 1st Graders at diverse elementary school in Central Texas
 - 2 treatment classes
 - 2 control classes
 - 1 "swing" class (to allow for within group comparisons)
- ↻ ALL desks in treatment classrooms were converted
- ↻ 71 children and parents consented (of 100) to data collection

Outcomes of Interest

- ↻ How much would students elect to stand on their own?
- ↻ How would standing affect caloric expenditure?
- ↻ How would caloric expenditure differ between normal weight children and overweight/obese children?
- ↻ What other effects would modifying the classroom have on the teachers and students?

Data Collection

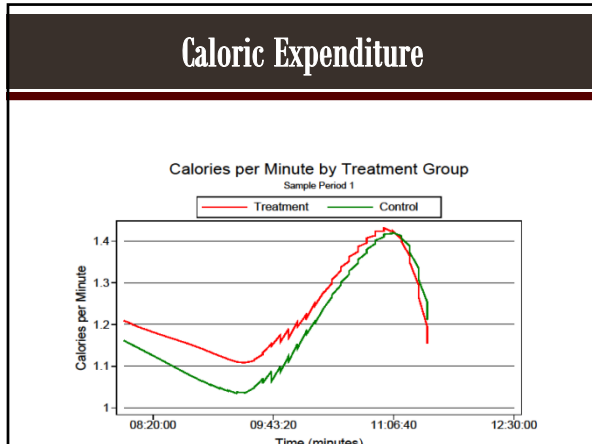
- ↻ Height and weight taken at beginning and end of school year (BMI calculated)
- ↻ Body fat taken at beginning and end of school year (impedance tool)
- ↻ Caloric expenditure measured 5 consecutive days early and late fall, early and late spring
- ↻ Classroom observation was done to assess standing versus sitting behavior and posture analysis
- ↻ Comfort surveys were given to the students (☺ ☹)
- ↻ Teacher and parent interviews conducted at the end of the study

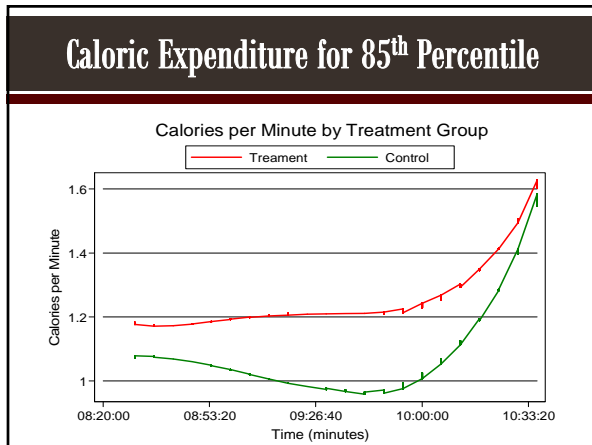
Results

- ↻ How much would students elect to stand on their own?
 - After the 12th week of school, 70 percent of students in the modified classrooms did not use their stool at all.
 - The remaining 30 percent of students in the modified classrooms were standing about 75 percent of the time.

Results

- ↻ The results indicate that the treatment group burned an average of 0.18 kcal per minute more than the control group ($p = 0.022$).
- ↻ The difference in calories burned is a for the treatment students over the control students: **17% increase**
- ↻ For children in both groups that are over the 85th percentile in weight for their age group and gender, we see a **32% increase** in calorie expenditure (1.56 kcal/min vs. 1.18 kcal/min) for this overweight and obese group.
- ↻ The paired comparison yielded an **18% increase** in seated vs. standing calorie expenditure.





Real World Interpretation

- A 0.18 kcal/minute increase means that the average student standing will burn about 11 more calories per hour than sitting.
 - For the student typically seated 4-6 hours a day, that equates to 44-66 calories per day or about 300 calories per week. These students are only consuming about 700-800 calories per day, so this can increase expenditure by close to 10 percent for an AVERAGE child.
- A 0.38 kcal/minute increase means that the overweight/ obese student standing will burn about 23 more calories per hour than sitting.
 - For the overweight student typically seated 4-6 hours a day, that equates to 92-138 calories per day or about 575 calories per week.

Results

» What other effects would modifying the classroom have on the teachers and students?

- o Teacher interviews indicated that standing improved:
 - Attention
 - Focus
 - Alertness
 - Behavior for children with issues
 - Performance
- o Parent interviews indicated that standing improved behavior at school

Practical & Policy Implications

» Recent testimony at the Texas House Public Health Committee regarding potential implications for schools in the future:

Average EE Improvement Overweight/Obese Students

Day	Standing Classroom - Avg Daily Expenditure	Seated Classroom - Avg Daily Expenditure
1	550	450
2	600	500
3	650	550
4	700	600
5	750	650
6	800	700
7	850	750
8	900	800
9	950	850
10	1000	900
11	1050	950
12	1100	1000

Practical & Policy Implications

» Standing desk and stool cost \$150 per unit and last about 10 years

» For investment of about \$15 per student, schools can increase caloric expenditure and prevent excess weight gain

» Standing desks may also contribute to improved attention and classroom behavior/performance

» As new schools are built (or old ones renovated), districts should consider this as a better alternative to traditional classroom furniture.

Future Research

Future research is planned to focus on calorie burn in different age children, as well as academic and behavioral impacts of using the stand/sit desks.

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