

Obese Children are not like Healthy Weight Children

- Biomechanical disadvantaged during walking and running
- Metabolically compromised due to impaired insulin sensitivity and low fat oxidation
- Physically compromised during weight-bearing aerobic exercise



Sothorn, M. Profile of the Overweight Child, in Safe and Effective Exercise for Overweight Youth, 2014; Halfon, 2013; Cliff, 2012; D'Hond., 2012; Schwimmer, 2003; Salvy, 2012; Sothorn, et al, 1999, 2001

Obese Youth have a Biomechanical Disadvantage

- Excess fat negatively affects the fundamental motor skill performance
- Healthy weight children have superior gross motor coordination when compared to obese children
- A group of 43 eight-year-olds with an average weight of 40 kg took twice as long as average-weight kids to get out of a lounge chair. Some even needed assistance.

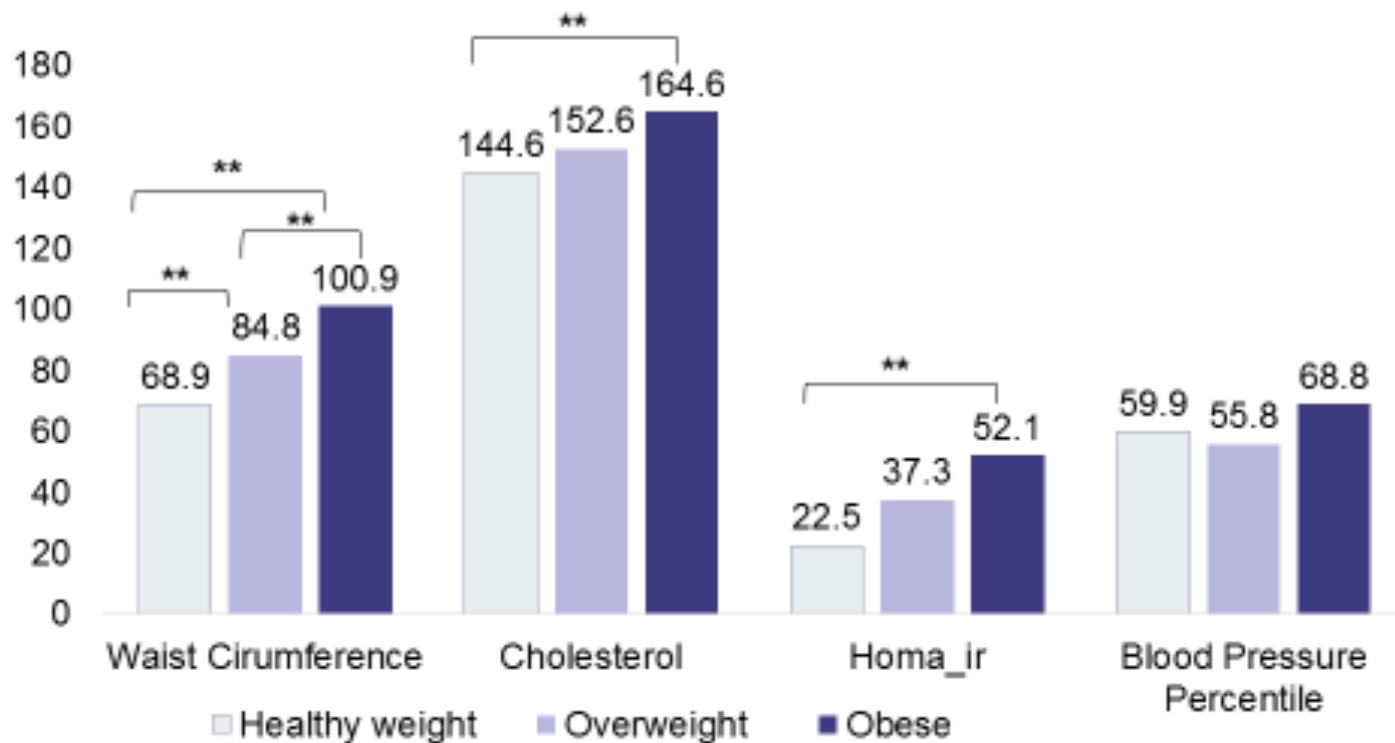


- "They have flatter feet, collapsed arches... We think they are just more uncomfortable all the time." (Professor Steele)

Steele, et al, 2006, Int'l J of Ped Obesity; Cliff, et al, 2012; D'Hondt, et al 2012; Okely, 2004; Graff, 2004

Obese Children are Metabolically Compromised

Cardio-Metabolic Risk Factors by Weight Status

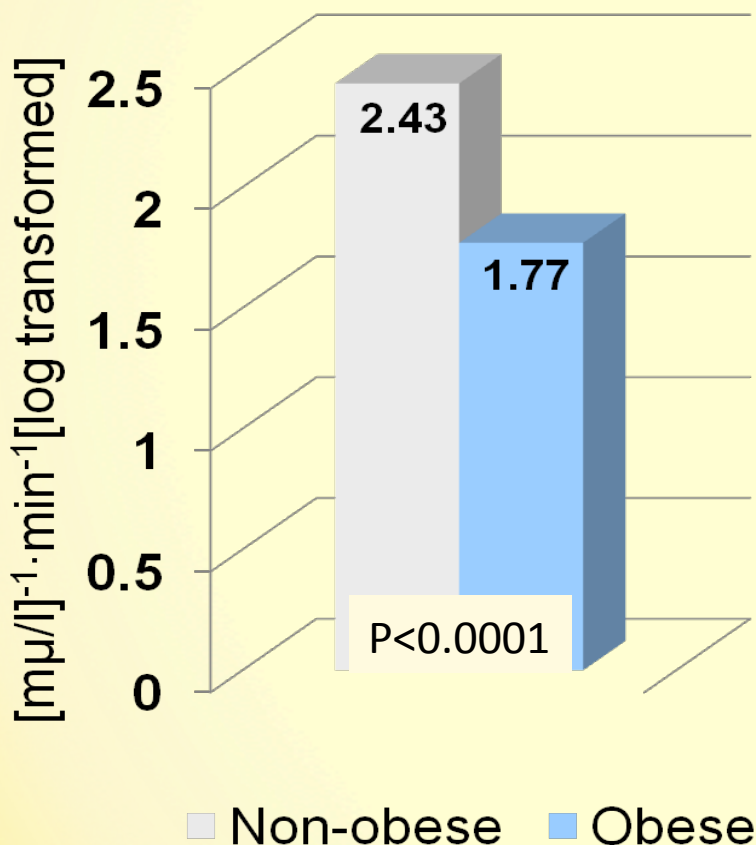


Independent sample t-test and chi-squared tests determined significant differences.

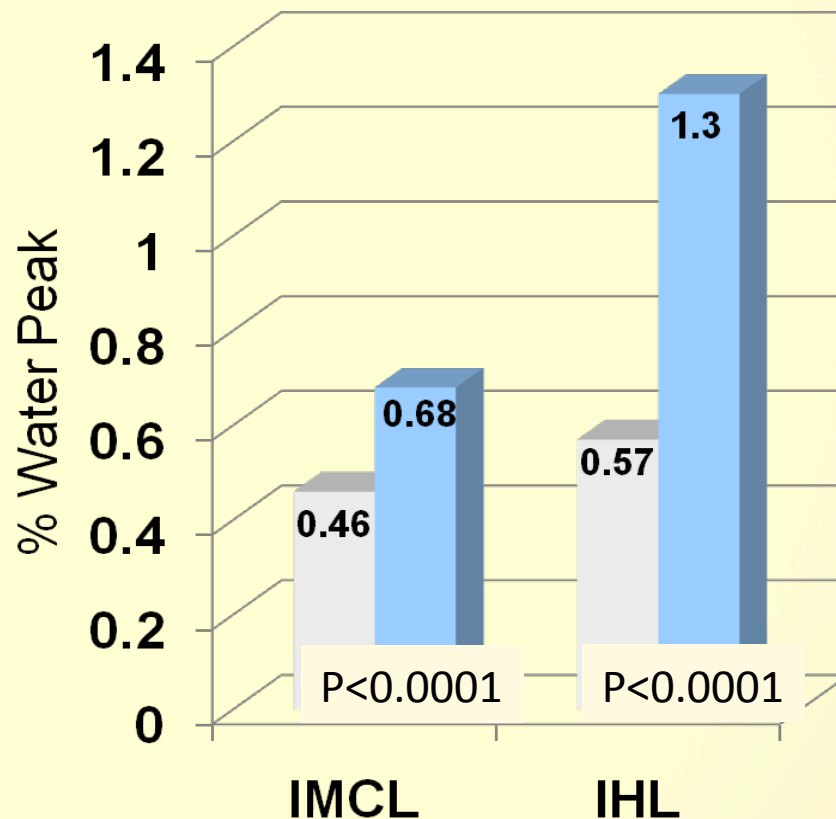
** indicates a significant difference ($p < 0.05$) between groups

Obese Children are Metabolically Compromised

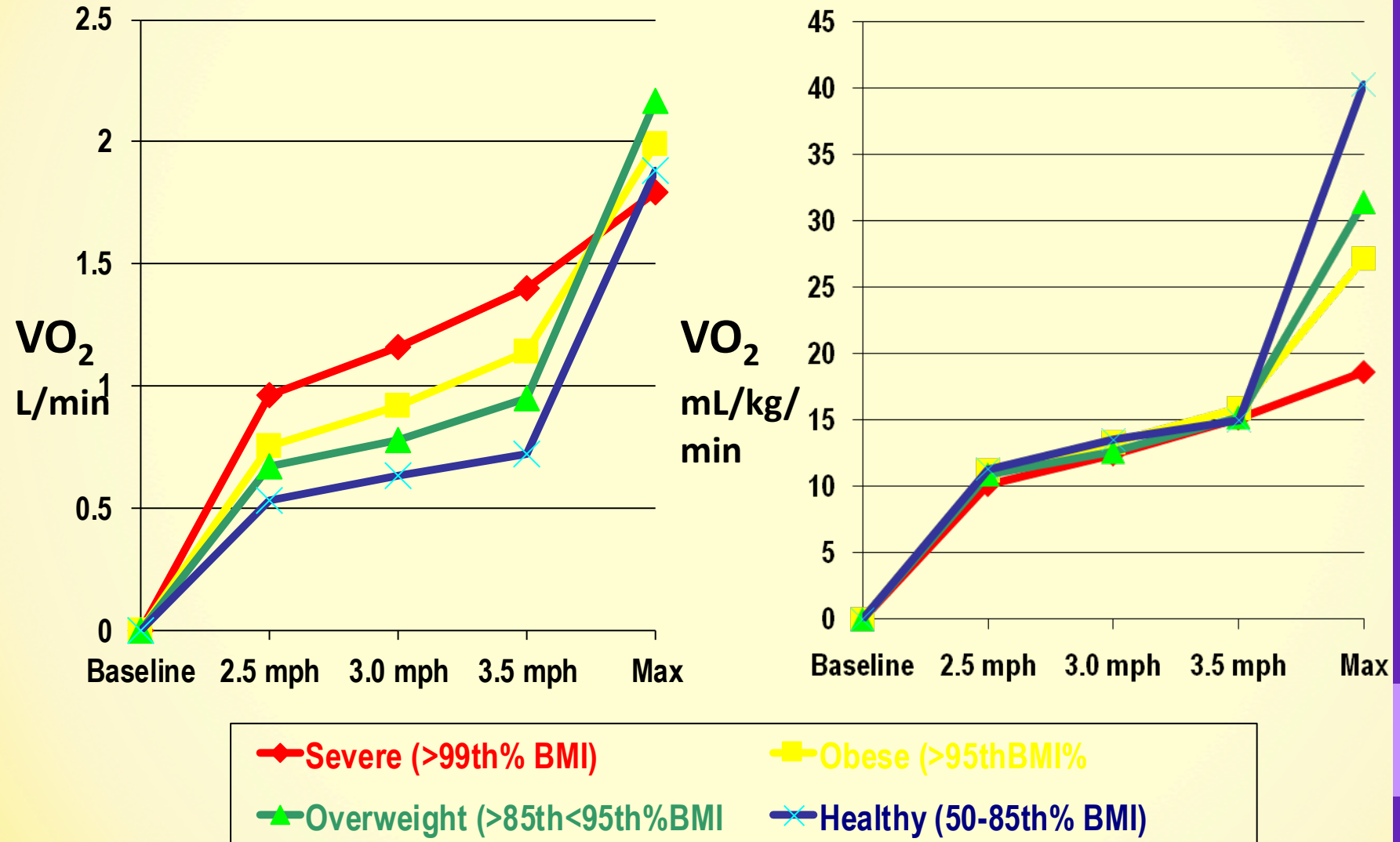
Insulin Sensitivity



Ectopic Fat



Obese Children are Physically Compromised during Weight Bearing Exercise



◆ Severe (>99th% BMI)

■ Obese (>95th BMI%)

▲ Overweight (>85th<95th% BMI)

× Healthy (50-85th% BMI)

Co-morbidities of Obesity Further Limit Exercise Ability in Children

- Recommend activities below ventilatory threshold so that physical activity can be sustained.
- Physical fitness and sedentary time mediate asthma risk through central obesity.
- Mechanical compression on the thoracic cage and pro-inflammatory mediators.
- Extreme obesity limits mobility and causes discomfort, preventing safe and effective exercise
- Dietary modification and subsequent weight loss prior to exercise may improve outcomes

Sothorn, M. Safe and Effective Exercise for Overweight Youth, CRC Press, 2014;
Chen, et al, 2014 Norman, 2005; Brandou, et al, 2005; Nassis, et al, 2005; Drinkard, et al, 2007; Daniels, et al, 2009

An Interdisciplinary Approach is Needed

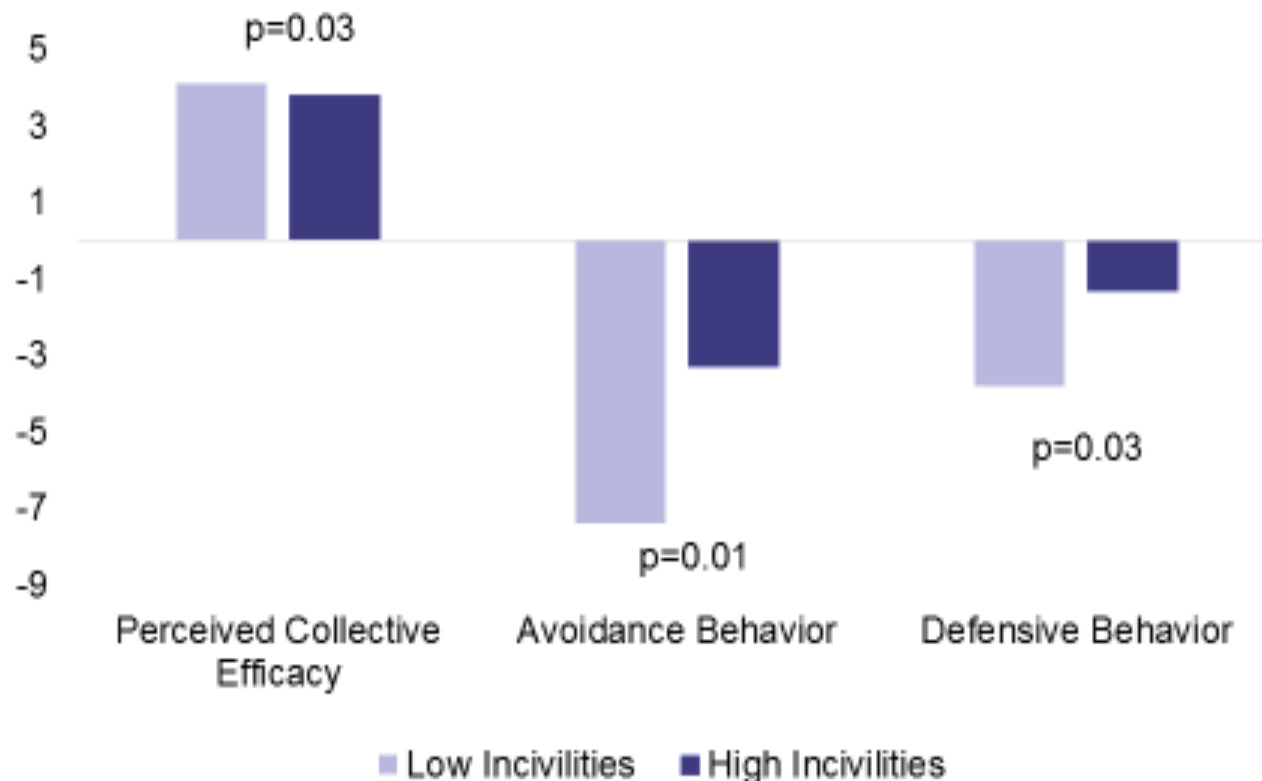
More than half of parents with overweight or obese children perceive their children as normal weight.

About 15% of parents with normal weight kids considered their child underweight.

(Lundahl, et al, Pediatrics, 2014)

nutrition & physical activity can all be treated.

Parent's perceived collective efficacy and constrained outdoor play practices (avoidance and defensive behavior) by low vs. high incivilities.



Objectives:

- **Identify potential targets for developing high-quality multi-level, interdisciplinary obesity prevention and management programs.**

The Obesity Trinity

- **Tobacco use during pregnancy,**
- **Formula vs. Breastfeeding**
- **Frequent Pregnancies.....**
 - Resulted in fetal-programmed obese baby-boomers, maternal obesity, obese infant-toddlers, obese children/adolescents, maternal obesity and so on.....

Solutions:

- **Implement intense nutrition, physical activity and behavioral counseling/education during first visit to the Ob/Gyn and continuing until the child enters puberty**
- **Establish high-quality weight management programs for obese adolescent girls to ensure healthy pregnancies**

Effectiveness of home based early intervention on children's BMI at age 2: randomized controlled trial

- The Healthy Beginnings randomized controlled trial (N = 497)
- A childhood obesity prevention program for first time mothers, delivered by trained community nurses.
- At 2 years of age BMI was significantly lower in the children in the intervention group (16.53) than in the control group (16.82), with a difference of 0.29 (95%confidence interval -0.55 to -0.02; P=0.04).

