Obese Children are not like Healthy Weight Children

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

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)

Obese Children are Metabolically Compromised

Cardio-Metabolic Risk Factors by Weight Status

Kepper, et al, in press

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**

- Non-obese: [value]
- Obese: [value]  
  \[P < 0.0001\]

**Ectopic Fat**

- **IMCL**
  - Non-obese: [value]  
  - Obese: [value]  
  \[P < 0.0001\]

- **IHL**
  - Non-obese: [value]  
  - Obese: [value]  
  \[P < 0.0001\]

Bennett, et al, Obesity, 2012; Larsen-Meyer, et al, Diabetologia, 2011; Research supported by NICHD # HD49046 and #HD41071; NIDDK/NORC; NIMHD; After adjustment for body fat: IHL only (p<0.01)
Obese Children are Physically Compromised during Weight Bearing Exercise


Four group repeated measures ANOVA; p <0.03
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.

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

Kepper, et al, in press
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

(Sothern, M. Childhood Obesity, 2011)
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).