Exercise & Pregnancy

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Objectives

• Review the history and current guidelines of exercise in pregnancy
• Describe the benefits of exercise during pregnancy
• Discuss the relationship between exercise in pregnancy and chronic disease progression

Background
Background

- Physical inactivity is the 4th leading risk factor for early mortality worldwide.
- In pregnancy:
  - independent risk factor for maternal obesity and related pregnancy complications
  - minimal risks
  - Beneficial for most women

History

- 1985: ACOG’s 1st guidelines for exercise in pregnancy
  - maternal HR limit of 140 b/min, time limit of 15 minutes
- Early concern that exercise during pregnancy caused harm to the mother or fetus
  - Vast majority of studies showed no adverse effects

History

- 1994: ACOG revised guidelines
  - Focus on benefits of exercise in pregnancy
  - Removed restriction based on HR & duration
  - Recommended mild-moderate exercise at least 3 d/week
- 2002: ACOG’s second revision
  - 20-30 minutes of moderate intensity exercise on most or all days of the week
- 2015: ACOG’s third revision
  - No change to exercise recommendation
  - More focus on how we promote exercise
Benefits of exercise in pregnancy

• Reduced
  – Excessive weight gain
  – gestational diabetes
  – pre-eclampsia
  – low back pain, constipation, bloating, swelling
• Improved
  – energy, mood, sleep
  – Fetal tolerance of labor
  – Weight-bearing exercise throughout pregnancy can reduce the length of labor & delivery complications

Current Guidelines

• ACOG 2015
  – 20-30 minutes of moderate intensity exercise most of all days of the week
  – May need to modify exercise routines
  – A thorough clinical evaluation before recommending an exercise program
  – aerobic & strength conditioning
  – before, during, and after pregnancy.

• 2008 DHHS Physical Activity Guidelines for Americans
  – Healthy women who are not already active: at least 150 minutes of moderate intensity aerobic activity per week during pregnancy
  – Healthy women who were active prior to pregnancy: continue physical activity during pregnancy
Current Guidelines

• Canadian Society for Exercise Physiology
  – Adults age 18-64 should accumulate at least 150 minutes of moderate to vigorous intensity aerobic activity per week, in bouts of 10 minutes or more
  – Strengthening activities using muscle groups at least 2 days per week
  – These guidelines may be appropriate in pregnancy

Current Guidelines

• Royal College of Obstetricians and Gynecologists, 2006
  – All pregnant women should participate in aerobic and strength-conditioning
  – Previously sedentary women:
    • begin with 15 min. three times per week, increasing gradually to 30 min. four times per week, then daily
  – Physically active women:
    • maintain their fitness level without trying to reach peak fitness level or train for athletic competition

Anatomic & Physiologic Changes

• Increased weight gain
• Change in center of gravity
• Progressive lordosis with increased force across the joints and spine
  – >60% incidence of low back pain
  – Improved with strengthening of abdominal and back muscles
Anatomic & Physiologic Changes

• Increased:
  – blood volume, heart rate, stroke volume and cardiac output
• Decreased:
  – systemic vascular resistance
  – Certain yoga postures may result in decreased venous return and hypotension in 10-20% of pregnant women

Anatomic & Physiologic Changes

• Increased:
  – tidal volume & minute ventilation
• Decreased:
  – pulmonary reserve
  – Lag in O2 availability, impaired anaerobic exercise

Anatomic & Physiologic Changes

• Temperature regulation is especially dependent on hydration and environmental conditions
  – Caution for heat stress
• MSK injuries
  – Most common sports related injuries in pregnancy
  – Mostly related to lower extremity edema and joint laxity
Exercise Intensity & Duration

- Moderate intensity
  - 3-4 METs (brisk walking)
  - Talk-test
  - Can be increased to 6-7 METs if well-conditioned
  - Due to variable HR responses in exercising pregnant women, a rating of perceived exertion is a more effective way to monitor exercise intensity than HR
- No safe upper limit has been established

Exercise Intensity & Duration

- Women who were previously sedentary should follow a more gradual progression
- <45 minutes
  - thermo-regulatory control
  - caloric costs
  - hypoglycemia risk

What type of exercise?

- Activate large muscle groups in rhythmic and continuous fashion
  - walking, aerobic dance, swimming, cycling, rowing, skiing, jogging
- Include
  - strength training
  - weight bearing
  - core
  - flexibility
What type of exercise?

- Consider water exercise
  - Reduce edema
  - Reduces force across weight-bearing joints
  - Body heat is readily dissipated into water
  - No concern with balance/falling
- Up to 6000 feet elevation

The following activities should be avoided:

- Contact sports (eg, ice hockey, boxing, soccer, and basketball)
- Activities with a high risk of falling (eg, downhill snow skiing, water skiing, surfing, off-road cycling, gymnastics, and horseback riding)
- Scuba diving
- Sky diving
- “Hot yoga” or “hot Pilates”
Nutrition

- Caloric costs of pregnancy and exercise should be estimated and balanced by appropriate caloric intake
  - Pregnancy: additional 200-300 cal/day
- Always maintain proper hydration to avoid overheating and dehydration

Box 2. Relative Contraindications to Aerobic Exercise During Pregnancy

- Anemia
- Unevaluated maternal cardiac arrhythmia
- Chronic bronchitis
- Poorly controlled type 1 diabetes
- Extreme morbid obesity
- Extreme underweight (BMI less than 12)
- History of extremely sedentary lifestyle
- Intrauterine growth restriction in current pregnancy
- Poorly controlled hypertension
- Orthopedic limitations
- Poorly controlled seizure disorder
- Poorly controlled hyperthyroidism
- Heavy smoker

Box 1. Absolute Contraindications to Aerobic Exercise During Pregnancy

- Hemodynamically significant heart disease
- Restrictive lung disease
- Incompetent cervix or cerclage
- Multiple gestation at risk of premature labor
- Persistant second- or third-trimester bleeding
- Placenta previa after 26 weeks of gestation
- Premature labor during the current pregnancy
- Ruptured membranes
- Preeclampsia or pregnancy-induced hypertension
- Severe anemia
Box 4. Warning Signs to Discontinue Exercise While Pregnant

- Vaginal bleeding
- Regular painful contractions
- Amniotic fluid leakage
- Dyspnea before exertion
- Dizziness
- Headache
- Chest pain
- Muscle weakness affecting balance
- Calf pain or swelling

Special Considerations: Bed Rest

- "is not effective for the prevention of preterm birth and should not be routinely recommended"
- Consider allowing ambulation in most circumstances

Special Considerations: Obese women

- Start with low intensity short periods of exercise and increase as able
- Studies have shown success in these women with modest reductions in weight gain and no adverse outcomes among those assigned to exercise
Special Considerations: Competitive Athletes

- Effects of pregnancy on competitive ability
  - Weight gain
  - Change in center of gravity
  - Ability to stop/start, change direction will decrease
  - Relaxed ligaments and pelvic instability
  - Physiological anemia of pregnancy/higher resting oxygen consumption

- Effects of training on pregnancy
  - Thermoregulatory complications
  - Hydration status
  - Physical activity can increase contractions
    - No evidence that this causes preterm labor
  - Decreased weight gain and birth weight

- Pay close attention with more close monitoring to
  - Avoiding hypothermia
  - Maintaining proper hydration
  - Sustaining adequate caloric intake to prevent weight loss
- Studies regarding weight lifting have focused on occupational lifting
  - Cohort of 62,000 Danish women showed that lifting loads greater than 20kg more than 10x/day was associated with an increased risk of preterm birth
Special Considerations: Postpartum

- Womens’ level of participation in exercise programs diminishes after childbirth
- Physiologic and morphologic changes of pregnancy return to pre-pregnancy state by ~6 weeks postpartum
- Pre-pregnancy exercise can be resumed gradually
- Competitive athletes with no complications can resume training soon after delivery
- If delivery was complicated or via LTCS, resumption of activity should wait until after 6 week PP visit
- Exercise promotes weight loss/decreases frequency of PP depression
- Does not effect milk production or weight gain in newborn
- Breastfeed before exercise

Future Directions

- 1985:
  - Is exercise in pregnancy safe:
- 1994:
  - What are the benefits of exercise during pregnancy?
- Today:
  - What are the long-term benefits of exercise during pregnancy?
  - What is the best way to promote exercise during pregnancy?

Chronic Disease Prevention

- Gestational Diabetes
- Hypertensive Disorders
- Obesity
- Childhood Obesity
Gestational Diabetes

- Recent meta-analysis by Tobias et al. involving 7 studies
  - Overall, pre-pregnancy and pregnancy exercise significantly reduced odds of GDM
- Two observational studies have noted significant reduction in GDM risk with “any vs. none” exercise in pre-pregnancy or early pregnancy
- One observational study showed significant reduction in risk of GDM with any vigorous exercise before pregnancy

Hypertensive Disorders

- Case-control studies & Pre-Eclampsia:
  - Pre-pregnancy exercise reduced odds by 30-80%
  - Pregnancy exercise reduced odds by 45-65%
- Norwegian Mother & Child Cohort Study:
  - Exercise ≥ 25 times per month before 16 wks gestation vs. no exercise significantly reduced odds of pre-eclampsia (OR=0.79, 95% CI = 0.65-0.96)
- Danish National Birth Cohort:
  - No significant correlation between minutes per week of exercise @ 17 wks gestation and diagnosis of pre-eclampsia

Gestational Weight Gain

- Of 13 studies evaluating effectiveness of exercise programs on preventing excessive
  - 6 were not successful, 7 were successful
  - Education or behavioral interventions were not successful
  - Individualized exercise prescriptions were successful, even just walking up to 40 min 3-4 days/wk
- Appropriate exercise dose is still not known to prevent excessive GWG
Childhood Obesity

• Study evaluated offspring of women who continued to exercise vs. offspring of those who chose to stop exercising
  – Children of exercising women were lighter and leaner at birth, and this continued at age 5
• Recent study asked women to recall their 3rd trimester MET-minutes/week, and this was inversely correlated with toddler weight and weight for height at 16-22 months
• More study is needed, but exercise in pregnancy could help combat childhood obesity

Future Directions

• Prospective studies & objective measures of exercise
• Minimum dose of activity needed for health benefits
• Pre-pregnancy vs. pregnancy exercise
• Combat increasing chronic disease
• Most effective exercise programming and behavioral counseling methods
• Effects of occupational physical activity and competitive athletic activity

Conclusions

• In the absence of medical or obstetric complications, pregnant women should exercise at a moderate level for at least 30 minutes on most, if not all days of week
• Multiple benefits to both mother and fetus, including long term positive effects on chronic disease prevention
References

- Artal R. Recommendations for exercise during pregnancy and the postpartum period. In: UpToDate, Rose BD (Ed), UpToDate, Waltham, MA, 2013.