

# **PREGNANCY & FITNESS**



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# DISCLAIMER

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Sadie Betro strongly recommends that you consult with your physician before beginning any exercise program. You should be in good physical condition and be able to participate in the exercise. Sadie Betro is not a licensed medical care provider and represents that she has no expertise in diagnosing, examining, or treating medical conditions of any kind, or in determining the effect of any specific exercise on a medical condition.

This guide is not an all-inclusive guide to pregnancy and may leave out important information related to pregnancy. The intersection of pregnancy and fitness information is vast in amount and depth. Not all information required for a healthy pregnancy can be included in this guide, but an intentional effort was made to cover topics related specifically to movement during pregnancy.

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**WHEN IN DOUBT, CONTACT YOUR  
PHYSICIAN**





# CONTRAINDICATIONS & WARNING SIGNS TO CONSIDER IN RELATION TO EXERCISING WHILE PREGNANT

From the American College of Obstetricians and Gynecologists (ACOG) 2015

## ABSOLUTE CONTRAINDICATIONS TO AEROBIC EXERCISE DURING PREGNANCY

- Hemodynamically significant heart disease
- Restrictive lung disease
- Incompetent cervix or cerclage
- Multiple gestation as risk for premature labor
- Persistent 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

**DO NOT EXERCISE.**

## 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 <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

**PROCEED WITH CAUTION.**

## 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

**IF YOU HAVE ANY DOUBTS, CONCERNS, OR QUESTIONS  
REGARDING EXERCISING DURING PREGNANCY, PLEASE CONSULT  
YOUR PHYSICIAN.**



# BRIEF OVERVIEW OF PHYSIOLOGICAL CHANGES RELATED TO EXERCISE

## AND HOW EXERCISE BENEFITS YOU DURING + AFTER PREGNANCY

### **CARDIOVASCULAR TRAINING**

During your pregnancy and beyond, maintaining an exercise program can help you to have fewer complications, a well-fed and supplied baby, and a better relationship with your body. Training also helps to condition you for the actual physical events of labor and delivery. Sticking to a program has numerous desirable benefits to your growing baby as well; I'll touch on those after we talk about how your program can serve to boost you during your pregnancy. At the end of this chapter, I'll include a bit more detail on the mechanisms of the adaptations your body is experiencing, if you're desiring to understand in more depth.

Cardiovascular training, in which we are intentionally focusing on heart health, helps to improve your body's efficiency at distributing oxygen to your tissues. Blood is the medium in which oxygen is transported to your tissues, and waste is taken away. As the demand for oxygen (and thus blood, as oxygen is carried in the blood) increases, your heart needs to work harder to deliver this demand. Creating a reasonable demand on your heart encourages the adaptations that allow your heart to become stronger, increasing the amount of blood pumped, while contracting less often.

As you increase the demand for oxygen around your body with training, the left ventricle of your heart will increase in size, allowing for more blood fill and then eject with the next contraction. Essentially, your heart won't have to beat as often to produce the same output of oxygenated blood; you're more efficient! Because the cardiovascular system is also responsible for carrying away metabolic waste, that process becomes more efficient as well (Cram & Hyatt, 2016).

### **WHAT TO EXPECT: FEELING CARDIOVASCULAR CHANGES**

Early in pregnancy, it is common to experience lightheadedness, dizziness, rapid pulse, and fatigue. This is because you now have hormones signaling your blood vessels to relax, which essentially creates more space for more fluid in the future. However, as this process is starting, you don't have the extra blood and plasma volume to fill the new space. When your body "catches up" to fill this extra space, you'll likely feel less of these symptoms. When you have these symptoms, please don't put yourself through exercise.



# BRIEF OVERVIEW OF PHYSIOLOGICAL CHANGES RELATED TO EXERCISE

## AND HOW EXERCISE BENEFITS YOU DURING + AFTER PREGNANCY

### STRENGTH & MOBILITY

Strength training, for obvious reasons, will help you to strengthen your body for carrying around your baby both during pregnancy and after. Strength and mobility training have the same benefits to pregnant women as any other population. The skills of heightened body awareness, preservation of lean body mass, and knowing strength in diverse positions are all vitally relevant to a pregnant woman.

Consistent, intentional, challenging movements provide the opportunity to improve awareness and strength. Creating a demand on your muscles signals your body that your muscle is useful, and needs to be preserved. Pregnancy or not, having a solid amount of lean body mass is advantageous metabolically, so preserving it and challenging it is an important part of prenatal programming.

Strength, mobility, and cardiovascular training during pregnancy often results in fewer common pregnancy symptoms such as:

- Nausea
- Fatigue
- Leg cramps
- Excessive weight gain
- Pelvic and low back pain, especially in the third trimester
  - Women who consistently focus on core strengthening report a significant reduction in intensity and discomfort of low back pain throughout pregnancy
- Constipation
- Varicose veins
- General body discomfort

### WHAT TO EXPECT: FEELING "SHORTNESS OF BREATH"

As you inhale, the diaphragm usually extends downward to pull air into your lungs. As the uterus expands, the downward distance you can inhale is limited, so your body will adapt by breathing wider instead. Pregnancy also increases your sensitivity to waste accumulation, which is the "waste" you exhale. Your body is going to feel the desire to remove this waste at a lower threshold than pre-pregnancy. Some women perceive these changes as being "harder to breath", but in reality your body is doing exactly what it needs to do to maintain, or even increase breathing capacity compared to pre-pregnant state.



# BRIEF OVERVIEW OF PHYSIOLOGICAL CHANGES RELATED TO EXERCISE

## AND HOW EXERCISE BENEFITS YOU DURING + AFTER PREGNANCY

### **METABOLISM & THERMAL MANAGEMENT**

In addition to cardiovascular and respiratory changes, your body also makes a few adaptations to your metabolism and thermal management. Growing a fetus utilizes carbohydrates/glucose as the main fuel source, so your body will switch to using fats for its own fuel. This shift in energy allocation can produce rapid fluctuations in your blood sugar levels. To avoid a hypoglycemic response, which includes lightheadedness, dizziness, weakness, and nausea, keep your meals spaced evenly throughout the day, with a balance of complex carbohydrates, fats, and protein (Cram & Hyatt, 2016).

Growing a baby requires an increase in energy production of 15-20%; in other words, a pregnant metabolism can increase 15-20%! Heat is a byproduct of metabolism, and thus increases as metabolism increases. Heat stress, or hyperthermia, can occur when you overheat. Hyperthermia is associated with birth defects specifically within the first two months of pregnancy, but prolonged heat exposure and dehydration can potentially lead to neural tube defects and premature labor.

This is important to remember when considering hydration, especially while pregnant. Water plays a vital role in body temperature regulation and the prevention of overheating, so it's crucial to be mindful of water intake during pregnancy.

Avoiding hot tubs and saunas is recommended. It should be noted that heated blankets and waterbeds appear to introduce no risk for hyperthermia.

### **WHAT TO EXPECT: LOTS & LOTS OF H<sub>2</sub>O**

You're going to be drinking a LOT of water. The Institute of Medicine recommends pregnant women to drink at least 10 cups (80oz) per day. Water, juices, coffee, and tea can all contribute to your fluid intake goal. Keeping your hydration level high also gives you a better chance at preventing constipation, hemorrhoids, excessive swelling, and urinary tract or bladder infections (Mayo Clinic, 2019).



# BRIEF OVERVIEW OF PHYSIOLOGICAL CHANGES RELATED TO EXERCISE

## AND HOW EXERCISE BENEFITS YOU DURING + AFTER PREGNANCY

Consistent exercise has also been shown to reduce incidence of gestational diabetes and preeclampsia, as well as enhance psychological well-being (Cram & Hyatt, 2018). Exercise can create an antidepressant effect via production of neurotransmitters, and also through improved body composition and functional capacity- even a single bout of exercise can help to improve mood. Exercise has also been shown to stimulate energy levels and decrease anxiety. Exercise provides an opportunity to challenge and appreciate what your body can do, and that can have wonderful effects on your body image and self-esteem.

### WHAT TO EXPECT: "EASIER" L & D

Besides setting yourself up for a strong, healthy pregnancy, maintaining a consistent exercise program with a focus on strength, mobility, and cardiovascular health will set you up an overall smoother labor and delivery process. Consistent exercise is associated with decreased risk of premature labor, shorter duration of active labor, and decreased risk of operative delivery.

- A physical exercise program during pregnancy is associated with a significant reduction in duration of first-stage labor when compared to controls (Perales et al. (2015)
- Women who exercise throughout pregnancy had a higher incidence of uncomplicated, spontaneous delivery, and their length of labor was shorter than the control group by nearly 33% (Clapp and Dickstein, 1984).
- Women who exercised throughout pregnancy rated pregnancy as lower exertion than women who didn't exercise. (Rice and Fort, 1991)
- Structured exercise during pregnancy reduces the risk of a c-section delivery; additionally women who exercised had slightly lower pregnancy weight gain than the control group (Domenjoz, Kayser, and Boulvain, 2014)
- Women who stopped exercise mid-pregnancy saw similar results to women who did not exercise prior to or during pregnancy.
- Women who stopped exercise mid-pregnancy gained more weight and fat than the non-exercise control group, likely consuming the additional calories to support exercise without completing it. (Clapp et al.)

### BETTER TOLERANCE OF STRESSES OF PREGNANCY AND THE PHYSICAL CARDIOVASCULAR AND MUSCULOSKELETAL STRESSES OF LABOR, DELIVERY, AND MOTHERHOOD.





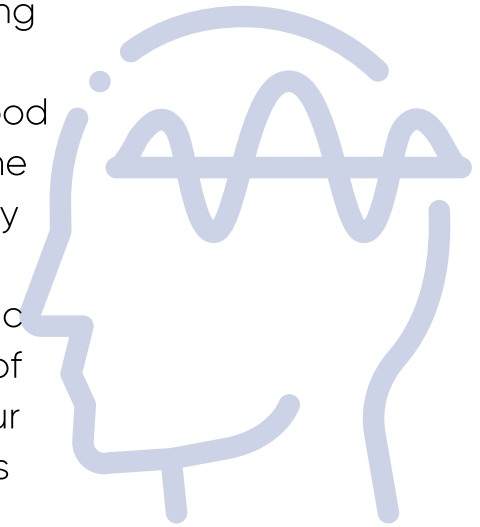
# **BENEFITS OF REGULAR EXERCISE**

## **ON YOUR GROWING BABY**

When you maintain a consistent exercise program, your baby reaps many benefits because of your adaptations. Here are a few worth touching on!

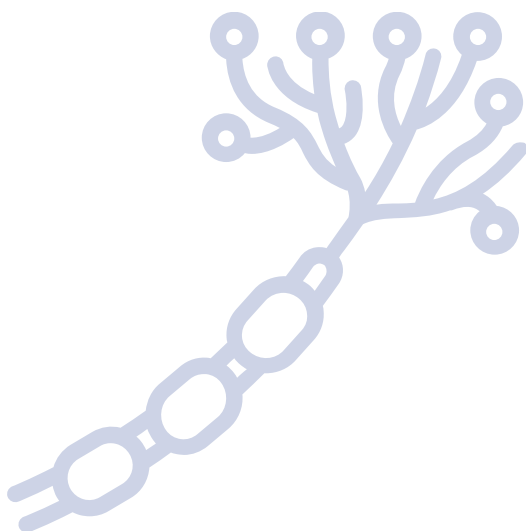
### **AUTONOMIC NERVOUS SYSTEM**

It appears that fetuses of women who took part in an exercise program had lower resting heart rates, as well as higher Heart Rate Variability (HRV) (Shaw et al., 2018). Having a lower resting fetal heart rate indicates that the baby has a more efficient heart, and thus needs to work less to deliver the required blood and oxygen. HRV is a measure of how quickly and strongly the heart recovers from a high work demand, and is controlled by the autonomic nervous system. From this, we can make the connection of high HRV as an indicator of a strong autonomic nervous system (ANS). The ANS is responsible for the control of involuntary processes in the organs of your body. Setting your baby up with a strong ANS while growing has positive effects for the rest of their life. Babies with a strong ANS are better able to tolerate periods of lower oxygen, and have a better reserve of oxygen during times of stress, in vivo and out!



### **NEURODEVELOPMENT**

Your decision to stick to an exercise program during pregnancy will also increase the neurodevelopment in your growing baby. The nervous system is essentially the communication network between cells, made up of neurons (nervous system cells) that innervate the tissues of your body. For any action- voluntary or involuntary- a signal must be sent via neurons. Greater neurodevelopment, or development of this communication network, is associated with increased attentiveness when your baby is born, and may lead to better cognition through life. Exercise presents the opportunity to create a more advanced baby brain during a critical period of development!







# BRIEF OVERVIEW OF PHYSIOLOGICAL CHANGES RELATED TO EXERCISE

## AND HOW EXERCISE BENEFITS YOUR GROWING BABY

### **FUNCTIONAL CAPACITY OF THE PLACENTA**

Exercise stimulates growth and vascularity of the placenta, which generates a greater functional capacity of this organ. The placenta delivers nutrient- and oxygen-rich blood, 24/7 to your baby. The health of the placenta can directly influence the rate and strength of growth and development in your baby. Women who exercise regularly see faster placental growth; from 10-15%! This additional growth provides more surface area and blood vessels for transportation of nutrients to the fetus, as well as the removal of waste.



### **LIGHTER BIRTH WEIGHT**

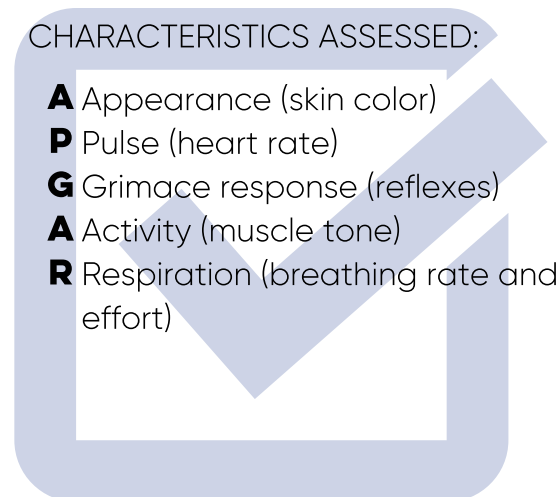
Babies of exercising mothers tend to have lighter birth weights, simply from less fat deposition to the baby. A baby of an exercising mother weighs, on average, 14oz less than a non-exercising mother's baby. It should be noted that with this lighter birth weight tendency, there is no increased risk of clinically low birth weight. Heavier babies are also at a higher risk for required cesarean delivery.

### **HIGHER APGAR SCORES**

Additionally, the babies of mothers who exercised during pregnancy had slightly higher Apgar scores, which is the assessment of the physical condition of the baby at birth (Hall and Kaufman, 1986). This set of characteristics let us know how the baby tolerated the birthing process, and how well they are doing outside of the womb.

#### CHARACTERISTICS ASSESSED:

- A** Appearance (skin color)
- P** Pulse (heart rate)
- G** Grimace response (reflexes)
- A** Activity (muscle tone)
- R** Respiration (breathing rate and effort)





# EXERCISE PROGRAMMING RECOMMENDATIONS: GOALS, INTENSITY, & DURATION

Programming is going to vary person to person depending on their exercise tolerance and history, so take these guidelines as general recommendations. These recommendations are suitable assuming an uncomplicated pregnancy.

## **GOALS & EXPECTATIONS OF EXERCISE PROGRAMS DURING PREGNANCY:**

Prioritizing your health, maintain/improve movement quality, preserve lean tissue mass, and create a fitness level at which you can have a healthy pregnancy, strong labor and delivery, and well functioning post-pregnancy body that allows you to keep up with the demands of motherhood.

## **EXERCISE INTENSITY & HOW TO MONITOR IT:**

Intensity should be in the range of moderate to somewhat hard.

While it's recommended to keep heart rate below 90% Heart Rate Max, heart rate has been shown to be a poor indicator of intensity during pregnancy, partially due to the cardiovascular changes we mentioned before. Instead, please rate your intensity on a scale of 1-10, 10 being an absolute maximal effort, and keep your intensity around 4-5. An easy test to measure intensity is the "talk test". The talk test is simply talking during your exertion. Ideally, you want to be able to carry on a conversation during exercise without feeling like you're gasping for breath (Cram & Hyatt, 2016).

Please avoid exercise during acute illness, when fatigued, or when excessively stressed. Also avoid exercise when feeling any signals of abnormality, such as dizziness, extreme fatigue, discomfort or pain, or lightheadedness. Never push beyond your personal limits.

## **EXERCISE DURATION:**

This variable is based on what you can handle to achieve moderate to somewhat hard intensity, without feeling too much discomfort.

The optimal duration for an exercise bout would be 30 minutes or more. Increasing duration is completely acceptable so long as the pregnancy continues to develop normally and you feel well and up to it.



# EXERCISE PROGRAMMING RECOMMENDATIONS: FREQUENCY & TYPE

## EXERCISE FREQUENCY:

Intentional daily activity is recommended. To ensure you're moving daily, variables such as intensity, type of exercise, and length of workout can be adjusted to better support a daily activity routine. Light exercise helps, moderate/more frequent exercise helps more (Schoenfeld, 2016)! That being said, not every day has to be structured in a rigid way. You can stick to strength training 3x/week, while letting your body guide your other days. Perhaps a long walk, or a stretching session on your non-programmed days. Something is almost always better than nothing, especially when talking about movement.

3 days/week is the minimum amount needed to achieve benefits and improvement in fitness. 30 min/day of movement is ideal, so aim for everyday. But if you do have to miss structured exercise for whatever reason, don't be hard on yourself or stress. Just get back to it the next day or ASAP!

## EXERCISE TYPE:

The best exercise regimen is the one that you enjoy and can stick to, so the type of exercise is going to be dependent on you.

The following section contains some further considerations to keep in mind when choosing and executing your exercises.

### WEIGHT-BEARING

Weight-bearing activities such as walking, dancing, running, strength-training, etc., help maintain bone mass and prepare for the strength demands that come with motherhood.

VS.

### NON WEIGHT-BEARING

Non-weight bearing activities such as swimming, stationary biking, etc., are good for those who are experiencing discomfort with weight-bearing exercises.

As the pregnancy progresses, you might feel more comfortable with different types of exercises, and that is completely fine. Stay moving, and adjust as needed!



# EXERCISE PROGRAMMING: WHAT TO DO, AND WHAT TO AVOID

## DO:

- Warm up for 5-10 min prior to workout, and cool down 5-10 min post-workout. Light walking/cycling, dynamic stretching, and movement prep work for this purpose.
- Allow for adequate rest time; ~2 minutes between sets
- Stay moving during your rest time to avoid blood pooling in one specific body part. Light dynamic (moving) stretches or walking will assist in blood returning to the heart
- Breathe continually. Inhale on the eccentric (lengthening) phase of movements, exhale on the concentric (shortening/tightening) phase of movements
- Place emphasis on endurance-based core work, with focus on pelvic floor strength; think plank, deadbugs, bird dog, etc.
- Hit a variety of body parts each workout. Don't limit yourself to one muscle group per workout, and that encourages blood pooling and less return to the heart.
- Ground yourself by holding on lightly to a surface if balance feels insecure
- Move with intention, everyday.

## DO NOT:

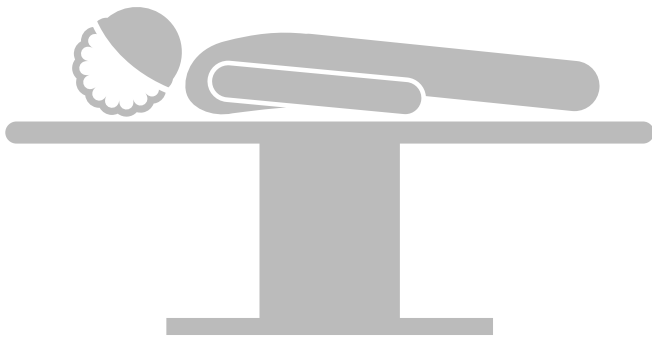
- High intensity-plyometrics such as jumping
- Train to failure; keep weight at 70% intensity or less. Should be able to complete 10+ reps with some still left in the tank.
- Try out new moves that you don't feel in control of
- Force yourself to do movements you find painful or irritating
- Partake in high risk exercises, including but not limited to:
  - Contact sports/activities that could create an opportunity for trauma to the abdominal region (kickboxing, soccer, basketball, volleyball, etc.)
  - High-risk-of-fall activities (gymnastics, horseback riding, jumping, downhill skiing, waterskiing, etc)
  - Scuba and skydiving



# EXERCISE PROGRAMMING: WHAT TO AVOID (CONT'D) & PELVIC FLOOR

## DO NOT (CONTINUED):

Avoid exercises that position you in a supine or prone position. I will not program these positions in, but know that this is for the purpose of allowing venous return from the uterus (Cram & Hyatt, 2016). So please do not do your workouts laying down on your back or belly.



Supine position (lying flat on back)

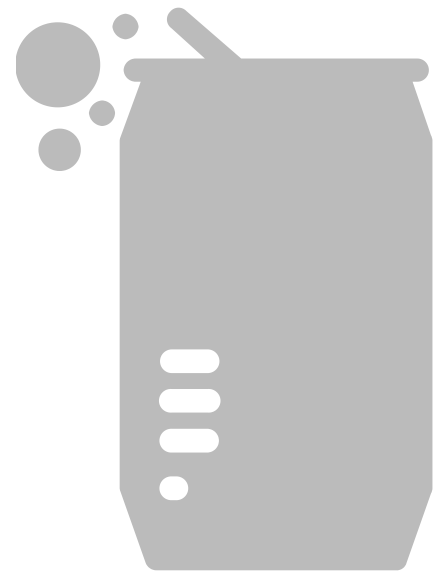


Prone position (lying flat on belly)

## PELVIC FLOOR & CORE CONSIDERATIONS

Pregnancy, labor and deliver, and life after these events all create a huge stress on your core. Please note that your "core" not only consists of your abdominal muscles and muscles along the spine, but also your diaphragm, glutes, and pelvic floor.

Try to imagine your core like a can of soda. The diaphragm is the top, your abdominals and spinal erectors are the sides of the can that help it stand tall, and your glutes and pelvic floor provide the base. If we're keeping the can up tall, the top and bottom parts are part of managing pressure within the can.



# PELVIC FLOOR & CORE CONSIDERATIONS (CONTINUED)

When you breathe and move, the pressure in the “can” has to be managed, and that takes a strong, intentional top and base. When this pressure is mismanaged or strength is lacking, we see the can crack open; and for your body that means we start to see sphincter control problems such as urinary incontinence and bowel dysfunction, as well as low back and pelvic pain. For this reason, we want to ensure you understand proper deep breathing, as well as build intentional pelvic floor strength.

Including pelvic floor-specific work in your program will help to equip you for occurrences that challenge your pelvic floor unexpectedly, such as in preparation to lift, laugh, sneeze or cough.



I often use Michelle Kenway's Youtube videos as a great starting point for my clients. She is a physical therapist, and she's excellent at explaining what's going on, what to control, and what to think about during pelvic floor exercise. I encourage you to check out her Youtube page by searching "Michelle Kenway pelvic floor".

Please note that if you continue to do the same routine throughout pregnancy, it might feel like you're not getting the same strength in your contraction. This is likely due to the extra weight now sitting on your pelvic floor. It's still better to keep practicing and building strength and awareness in this muscle group, even when it doesn't feel like you're doing much.





# DIASTASIS RECTI ABDOMINIS

## WHAT IT IS:

To avoid any unnecessary widening of DRA, please use caution with any activity that increases pressure on the abdominal wall. Some mindless activities to be cautious of include coughing, sneezing, and laughing. Additionally, rising from a lying position should be done with caution. To reduce any additional pressure, roll over onto your side before rising, and push up using your arms. Avoid holding your breath or “bearing down”, as both of these also increase pressure in your abdomen. If you notice your recti muscle separation increasing, please discontinue exercise and consult with your physician.

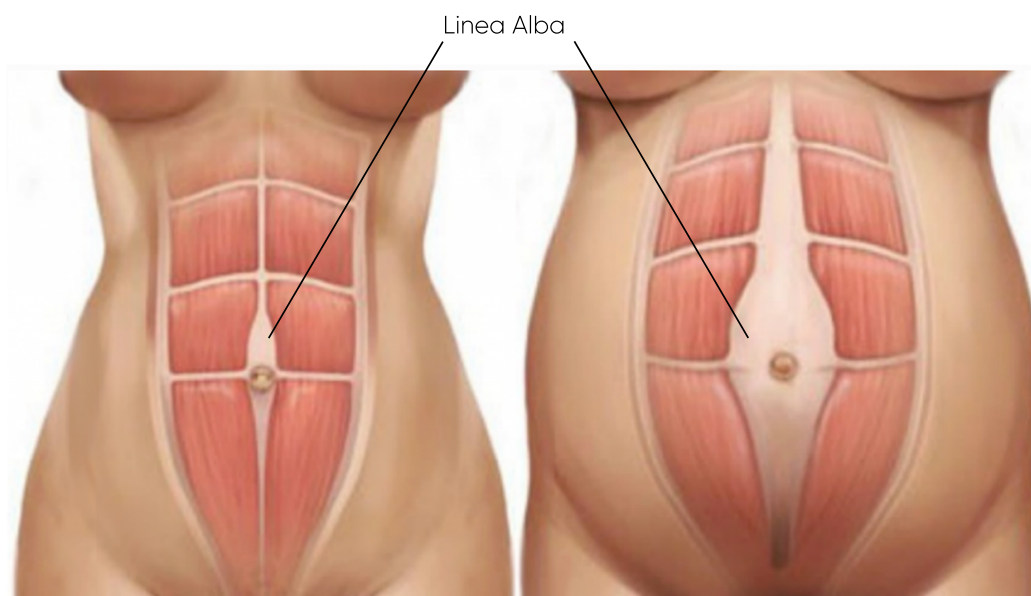


Image from Mundell, 2020

## HOW TO CHECK FOR IT:

1. Lay on your back with your knees bent, with arms resting at your sides.
2. Tuck your chin, and slowly raise your upper body off of the floor until you feel your abdomen contract.
3. Press the fingers of one hand down horizontally (spanning from one side to your other), slightly above or below your navel (belly button).
4. Feel the soft area between your two recti muscles, and note how many fingers you can fit within the gap.

**A FINGER GAP OF MORE THAN 2 FINGERS IS CONSIDERED A DRA. IF THIS IS THE CASE FOR YOU, PLEASE INFORM YOUR DOCTOR.**



# DIASTASIS RECTI ABDOMINIS (CONTINUED)

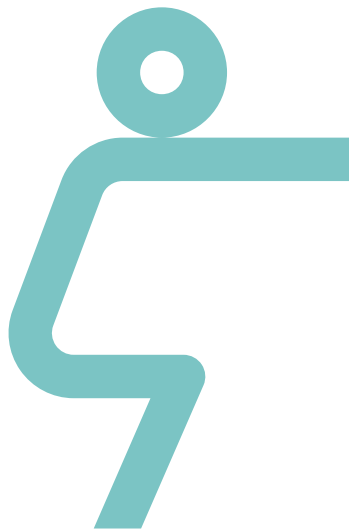
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DRA is not the end of the world, but it is something to be considerate of when moving. At this time, there is no permanent cure for DRA, but the DRA gap may potentially reduce in size with proper exercise programming and awareness.

Programming needs are addresses on an individual basis. Please be cautious when doing any movements that increase pressure on the core, intentionally and unintentionally.

DRA strengthening and management can start very shortly after childbirth, but please get approval from your physician before re-starting exercise.





# NUTRITIONAL CONSIDERATIONS IN RELATION PREGNANCY & EXERCISE

## WHAT TO EAT:

For convenient, current, and in-depth nutrition intake information, I highly recommend the Mayo Clinic online pregnancy source. You can find this by going to [Mayoclinic.com](https://www.mayoclinic.com) and search "Pregnancy Nutrition". I was considering translating the articles here, but honestly they're written very clearly and I don't want anything to get lost in translation.

After reviewing the Mayo Clinic nutrition resources, you may realize that diversity in your diet is going to help hit your intake goals for both macronutrients (proteins, carbohydrates, and fats), and your micronutrients (vitamins and minerals). For this reason, it's helpful to preplan your meals and snacks. To ensure you're getting the minimum daily intake of each nutrient, it might be a good idea to talk to your doctor about taking a prenatal vitamin. Please consult your doctor for specifics and further information. One mineral to be especially conscious of is iron; your daily requirement for iron doubles during pregnancy, as you're responsible for more oxygen delivery (iron binds oxygen to your red blood cells to transport it!).

The snapshot on the following page contains a list of essential nutrients, their function, and some dietary sources. taken from my prenatal programming textbook (Cram & Hyatt, 2016).

## WHAT TO EXPECT: CHANGES IN PALATE

Most women experience a variety of different food aversions and/or cravings during pregnancy, and that is okay. You'll have the opportunity to work on creatively sneaking in nutrients in desirable ways, but don't force yourself to eat something that turns your stomach. As for cravings- enjoy what you're craving but keep the rest of your day in mind. Pinterest is a really solid source for inspiration, especially for high protein recipes, desirable recipes; Cookies, waffles, muffins, etc all using protein powder!





# NUTRITIONAL CONSIDERATIONS IN RELATION PREGNANCY & EXERCISE

## Essential Nutrients During Pregnancy

A healthy diet that includes plenty of fruits and vegetables, lean protein, whole grains, and healthy fats is important during pregnancy and postpartum. A few nutrients deserve special attention during pregnancy.

Nutrient	Function	RDA	Food sources
Folic acid	Prevents birth defects	800 mcg	Leafy green vegetables, citrus fruits, green beans, lima beans, asparagus, whole grains, lentils, nuts, oranges
Iron	Produces hemoglobin, which aids in oxygen delivery to the mother and placenta and prevents anemia	27 mg	Poultry, fish, lean red meat, oysters, blackstrap molasses, spinach, beans, raisins, dried apricots (absorption increased by eating foods high in vitamin C)
Calcium	Responsible for building strong bones and teeth and regulates nerve and muscle function	1000 mg	Salmon, sardines, dark leafy green vegetables, calcium-fortified orange juice, dairy products
Magnesium	Works with calcium to build bone, assists in energy metabolism and nerve transmission, aids in muscle contraction and relaxation	450 mg	Wheat germ, bran, whole grains, nuts
Vitamin C	Needed for fetal bone and tooth development, plays role in fetal and maternal metabolic processes	70 mg	Citrus fruits, strawberries, peppers, tomatoes, beans, grain sprouts
Vitamin A	Needed for fetal bone growth, reproductive health, fat metabolism, resistance to infection, and eye and mucus membrane development	5000 IU	Yellow and orange fruit and vegetables, leafy greens
Vitamin D	Required for maternal calcium and phosphorous absorption to promote bone strength and development	600 IU	Daily sunlight, vitamin D–fortified foods like milk and salmon
Protein	Crucial for baby's growth, especially during second and third trimesters	71 grams	Lean meat, poultry, fish, eggs, dried beans and peas, tofu, dairy products, peanut butter
B vitamins	Aid in maternal and fetal metabolism of protein and CHO	2.2 mg	Soy beans, brown rice, veal, lamb, salmon, bananas

From Mayo Clinic Staff, 2014, Pregnancy diet: Focus on these essential nutrients. [Online]. Available: <http://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/pregnancy-nutrition/art-20045082?pg=1> [October 14, 2015], and other sources.

From C. Cram and G. Hyatt, 2016, *Prenatal and Postpartum Exercise Design*, 4th ed. (Champaign, IL: Human Kinetics).



# NUTRITIONAL CONSIDERATIONS IN RELATION PREGNANCY & EXERCISE

## PROPER/ ADEQUATE WEIGHT GAIN:

The proper amount of weight gain during pregnancy varies from person to person, but is largely dependent on their initial starting Body Mass Index (BMI). Early in your pregnancy, your doctor will let you know your BMI. If you're curious to calculate it now, it's simply your weight in kilograms, divided by your height in meters squared.

$$\text{BMI} = \text{kg}/\text{m}^2$$

The drawback to BMI is that it only takes into account weight and height, and not at all body composition. For example, someone who is 5'7", 150lb but has 12% body fat will have the same BMI as someone who is 5'7", 150lb but 30% body fat. Both technically have the same BMI, but the second person is carrying significantly more fat mass than the first person.

That being said, these guidelines on appropriate weight gain don't address body composition, but are just a general guide. Please speak to your doctor if you are concerned about weight gain or loss during pregnancy. Typically if a doctor has concern, he/she will express it to you. Below is a chart provided by the Institute of Medicine and National Research Council (2019) on recommended weight gain.

<b>Pre-pregnancy weight</b>	<b>Recommended weight gain</b>
Underweight (BMI under 18.5)	28 to 40 lbs. (about 13 to 18 kg)
Normal weight (BMI 18.5 to 24.9)	25 to 35 lbs. (about 11 to 16 kg)
Overweight (BMI 25 to 29.9)	15 to 25 lbs. (about 7 to 11 kg)
Obesity (BMI 30 or more)	11 to 20 lbs. (about 5 to 9 kg)

Source: Institute of Medicine and National Research Council



# NUTRITIONAL CONSIDERATIONS IN RELATION PREGNANCY & EXERCISE

## PRE-WORKOUT NUTRITION:

- The baby's primary fuel source is carbohydrates, so it's a good idea to eat prior to exercise to avoid hypoglycemia; at least an hour before, if possible.
- Drink 8oz of water pre-workout, and another 8oz every 15 minutes intra workout to maintain fluid balance. Of course, more if desired.



## INTAKE SAFETY:

- Avoid raw or undercooked meat, eggs, poultry & seafood
- Wash all fruits and vegetables thoroughly
- Avoid foods high in mercury

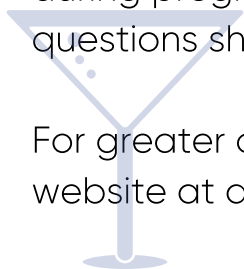
## OTHER GENERAL "DON'TS" DURING PREGNANCY RELATED TO FITNESS:

"Use of marijuana during pregnancy might increase the risk of having a baby that is smaller at birth. It might also slightly increase the risk of stillbirth. Using marijuana during pregnancy can also harm your health. The American College of Obstetricians and Gynecologists recommends against using marijuana during pregnancy." (Lamppa, 2018).

According to ACOG (2016), moderate caffeine intake (<200mg/day) does not appear to be a contributing factor for miscarriage or preterm birth. An average cup 8oz cup of coffee contains ~95mg.

At this time, there's not much supporting research for including alcohol in any amount during pregnancy. Best to err on the side of caution, and cut completely out. Further questions should be directed toward your doctor.

For greater depth with drug and alcohol recommendations, please visit the ACOG website at [acog.org](http://acog.org) or speak with your physician.







# REFERENCES:

- ACOG Committee, -. "Moderate Caffeine Consumption During Pregnancy." American College of Obstetricians & Gynecologists, 2016, [www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2010/08/moderate-caffeine-consumption-during-pregnancy](http://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2010/08/moderate-caffeine-consumption-during-pregnancy).
- Cram, C., & Hyatt, G. (2016). *Prenatal and Postpartum Exercise Design* (Fourth ed.). Champaign, IL: Human Kinetics.
- JE; Dalton KJ;Dawes GS;Patrick. "The Autonomic Nervous System and Fetal Heart Rate Variability." *American Journal of Obstetrics and Gynecology*, U.S. National Library of Medicine, 1983, [pubmed.ncbi.nlm.nih.gov/6859165/](http://pubmed.ncbi.nlm.nih.gov/6859165/).
- Mayo Clinic Authors, \_ . "Pregnancy Nutrition: Healthy-Eating Basics." Mayo Clinic, Mayo Foundation for Medical Education and Research, 28 Nov. 2019, [www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/pregnancy-nutrition/art-20046955#:~:text=The%20Institute%20of%20Medicine%20recommends,much%20can%20cause%20weight%20gain](http://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/in-depth/pregnancy-nutrition/art-20046955#:~:text=The%20Institute%20of%20Medicine%20recommends,much%20can%20cause%20weight%20gain).
- Mundell, J. (2020, May 02). 3 Steps To Healing Your Diastasis Recti. Retrieved June 04, 2020, from <https://www.girlsgonestrong.com/blog/articles/healing-diastasis-recti/>
- Lamma, Julie A. (2018, September 15). Marijuana during pregnancy: What's the harm? Retrieved May 26, 2020, from <https://www.mayoclinic.org/healthy-lifestyle/pregnancy-week-by-week/expert-answers/marijuana-during-pregnancy/faq-20436868>
- Schoenfeld, B. (2011). Resistance Training During Pregnancy: Safe and Effective Program Design. *Strength and Conditioning Journal*, 33(5), 67–75. doi: 10.1519/ssc.0b013e31822ec2d8
- Shaw, C J, et al. "Altered Autonomic Control of Heart Rate Variability in the Chronically Hypoxic Fetus." *The Journal of Physiology*, John Wiley and Sons Inc., Dec. 2018, [www.ncbi.nlm.nih.gov/pmc/articles/PMC6265555/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6265555/).