

# *Ergonomic Considerations During Pregnancy*

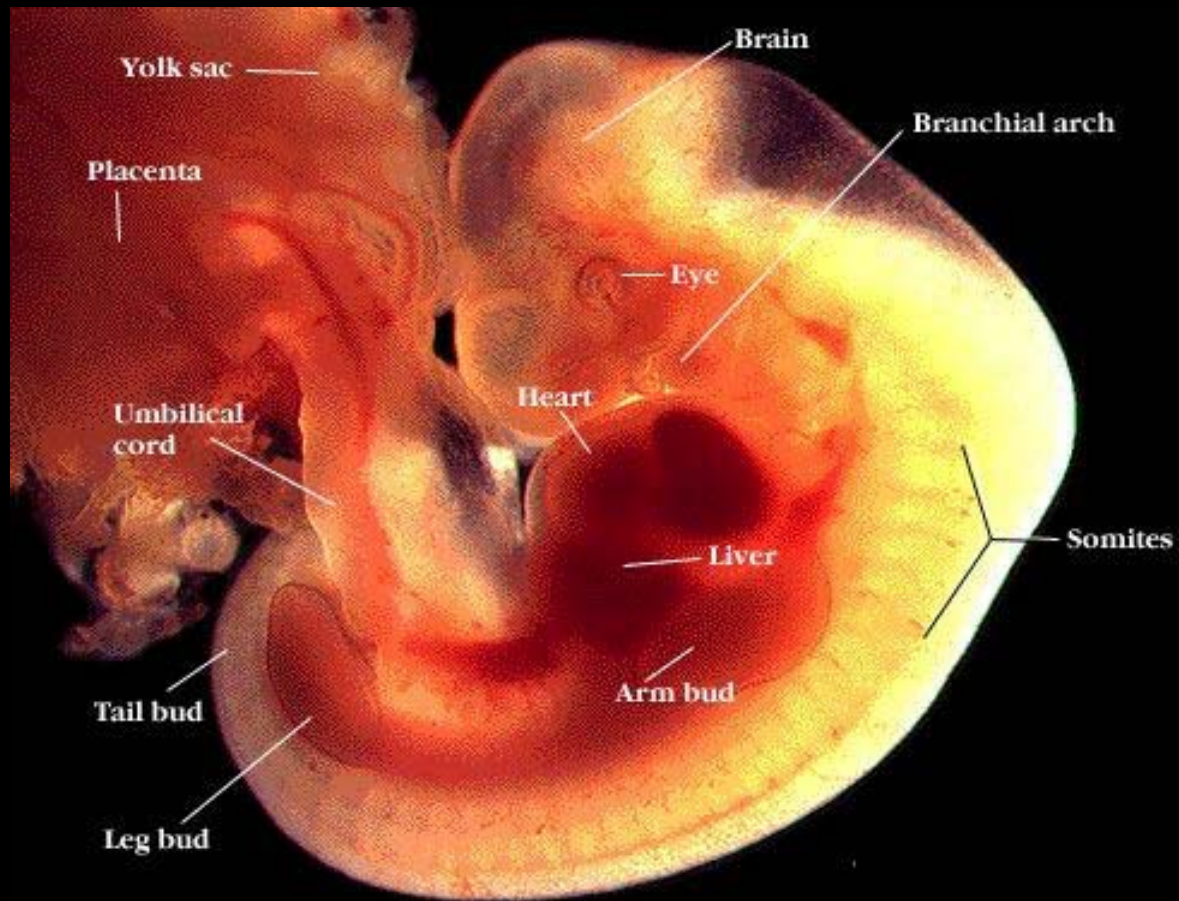
- Taylor Greenfield Ergonomist
- Ivan Bauer Occupational Health Nurse



# Overview

- Divided into three trimesters
  - 1st trimester - weeks 1 – 12
  - 2nd trimester - weeks 12 to 28
  - 3rd trimester - weeks 28 – 40
- OHCOW “Pregnancy & Ergonomics” fact sheet
- General ergonomic guidelines





# *First Trimester*

- All of fetus's essential organs and structures are formed
- Average fetus 2.5 to 3.0 inches long, weighs one ounce
- Heart beating since day 26
- Reproductive organs formed
- Liver making bile, kidneys secreting urine into the bladder



# *First Trimester*

- Circulatory and respiratory system working
- Fingers and toes present, nails beginning
- Symptoms
  - Fatigue - increased blood volume, heart rate, utilization of protein, cho and fat changes
  - Nausea and vomiting - hormone and slowed gastrointestinal mobility
  - Urinary frequency - uterus size, renal function enhanced
  - Breast tenderness
  - Headaches and dizziness



## WEEK 12

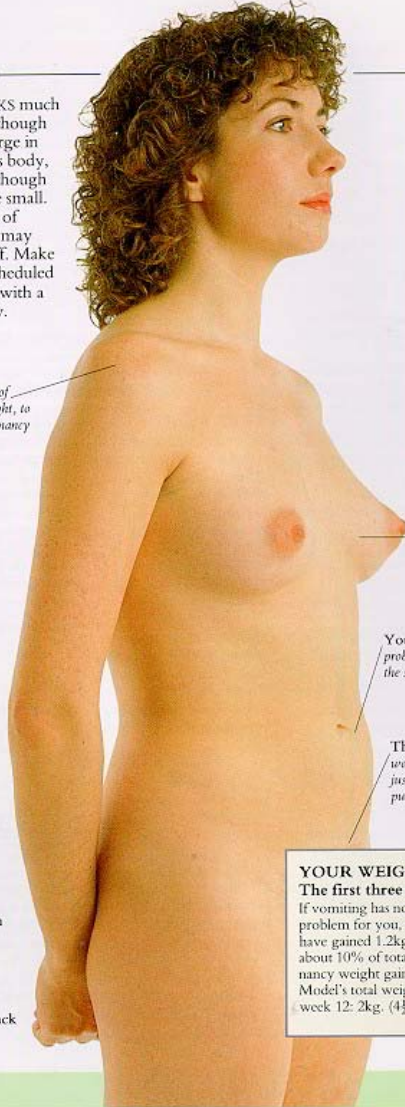
THE BABY LOOKS much more human, although his head is still large in proportion to his body, and his limbs, although fully formed, are small. The discomforts of early pregnancy may begin to wear off. Make sure you have scheduled an appointment with a physician by now.

Get into the habit of always standing straight, to help you in later pregnancy



Position of the womb

SEE ALSO:  
Prenatal checkups  
pages 34–36  
Prenatal exercises  
pages 45–47  
Healthy eating  
pages 50–53  
Frequent urination  
page 41  
Morning sickness  
page 41  
Pregnancy bra  
page 23  
Protecting your back  
page 44



### CHANGES IN YOU

- If you've been feeling nausea because of morning sickness, this should start to ease.
- You will probably find that you don't need to urinate as often as you did in the early weeks of pregnancy.
- You may still be emotional, and easily upset by little things, because of hormone changes.
- Constipation may be a problem, because bowel movements tend to slow down in pregnancy.
- The volume of blood circulating in your body is increasing, so your lungs, kidneys, and heart have to work harder.

Your breasts will feel heavier, and may be tender

Your shape is probably still much the same as usual

The top of the womb can be felt just above your pubic bone

The external ears are well developed

Tiny fingers and toes have formed



### YOUR WEIGHT GAIN

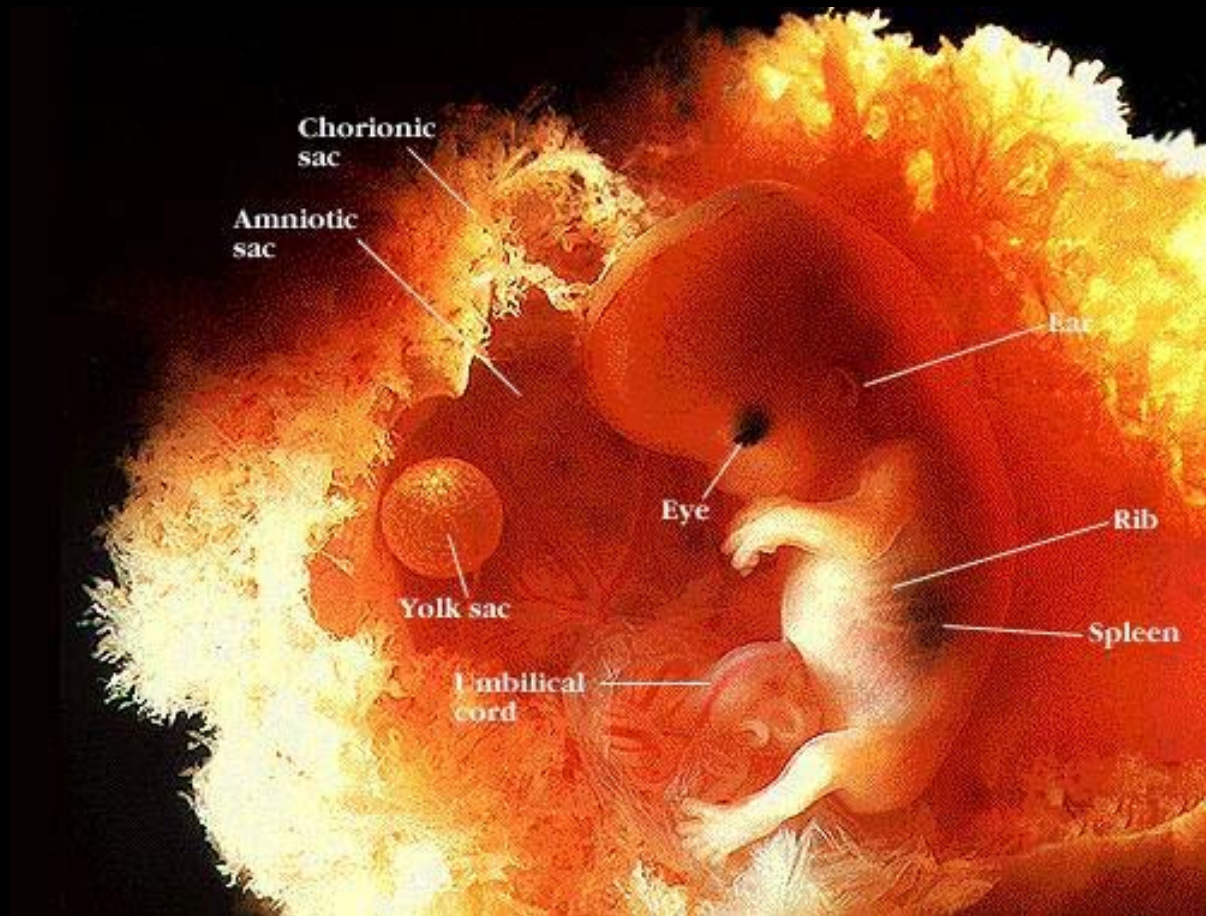
#### The first three months

If vomiting has not been a problem for you, you may have gained 1.2kg (2½lb.), about 10% of total pregnancy weight gain. Model's total weight gain at week 12: 2kg (4½lb.)



### YOUR BABY

Length  
6.5cm. (2½in.)  
Weight  
18g. (¾oz.)



# *Second Trimester*

- Rapid increase in size of uterus changes centre of gravity
- Greater tension placed on ligaments and muscles
- Joints between pelvic bones begin to soften and loosen
- Separation of the rectus abdominus muscles
- Stretching of ligaments and muscles around the expanding uterus

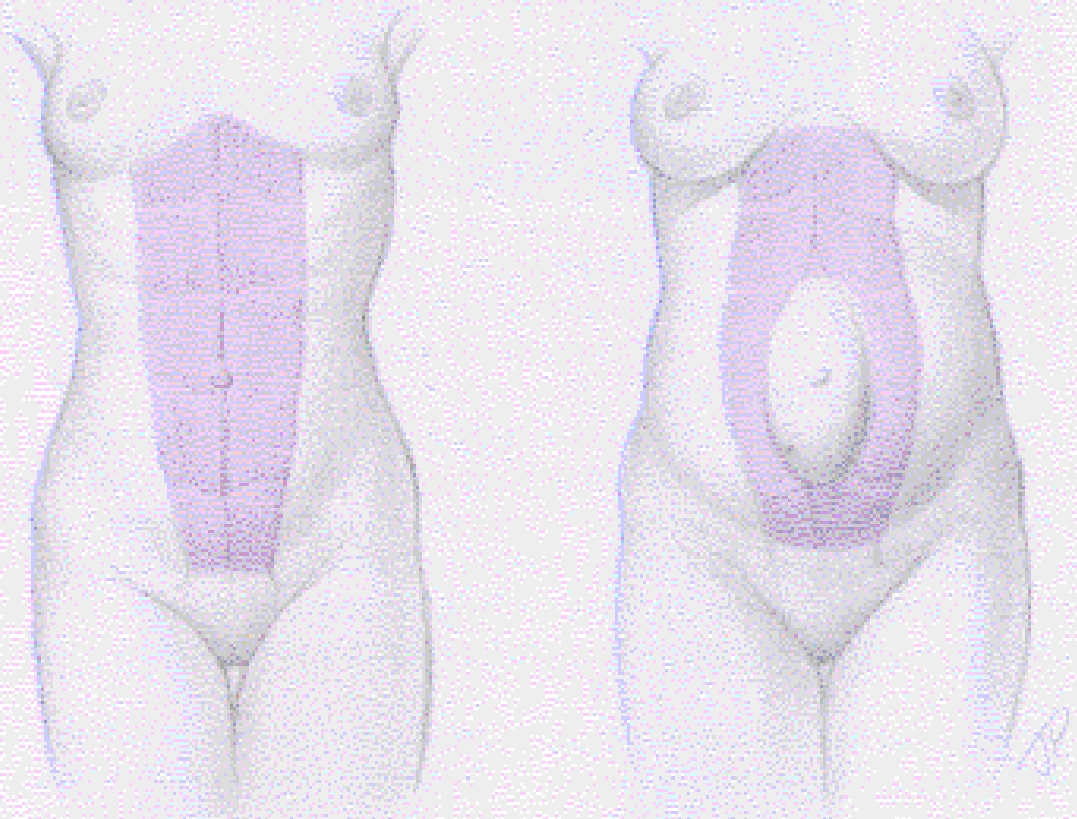


# *Second Trimester*

- By 28 weeks fetus 10 inches and 2 lbs
- Fat laid down, finger and toe prints present
- Covered with fine hair (lanugo)
- Fetus sleeps and wakes, eyes open and close
- Esophageal motility reduces, delayed stomach emptying and intestinal motility allowing improved absorption of nutrients ---- bloating, indigestion and heartburn



*Normally, two bands of muscles, called the rectus abdominis muscles, meet in the middle of the abdomen, as shown in the left illustration. Some pregnant women experience a separation or relaxation of the two bands of muscles, as shown on the right. You might notice this separation (diastasis) because it can cause a bulge where the two muscles separate. The separation of these muscles can contribute to back pain. The condition may first appear during the second trimester, may become more pronounced in the third trimester and sometimes persists after delivery.*



# *Second Trimester*

- Skin changes:
  - Skin Darkening (nipples, perineum, armpits, inner thighs, linea nigra, face (chlosma))
  - Red and Itchy Palms
  - Skin Tags
  - Moles
  - Fingernails soft and brittle

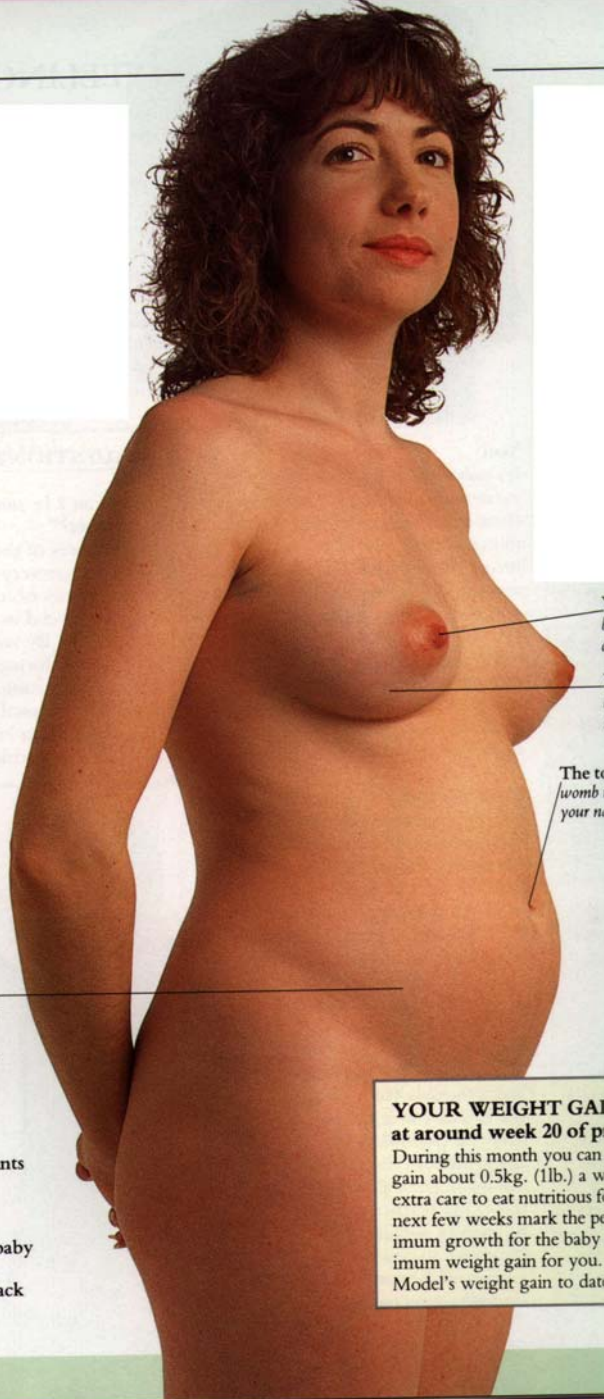




Position of the womb

You will first feel your baby moving as faint flutterings inside your abdomen, like bubbles rising

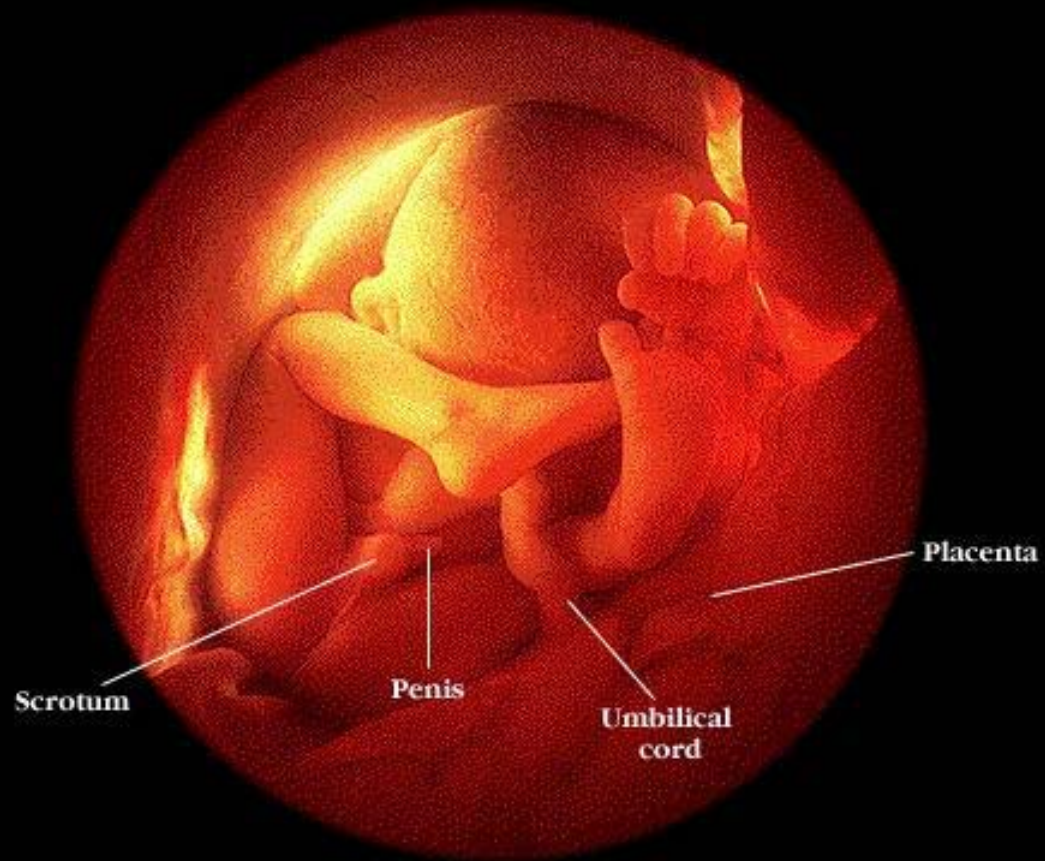
SEE ALSO:  
Common complaints  
pages 40–42  
Healthy eating  
pages 50–53  
Essentials for the baby  
page 27  
Protecting your back  
page 44



The top of the womb is at your navel

**YOUR WEIGHT GAIN**  
at around week 20 of pregnancy

During this month you can expect to gain about 0.5kg. (1lb.) a week. In the next few weeks mark the period of maximum growth for the baby and maximum weight gain for you. Model's weight gain to date



## *Third Trimester*

- Fetus continues to increase weight .5lb per week
- Increasing fetal movements
- Shortness of breath due to diaphragm elevation, progesterone
- Hip pain - connective tissue softens and loosens up, greater flexibility of pelvic joints



# *Third Trimester*

- Sciatica - pressure of the uterus
- Vaginal pain as cervix starts to dilate
- Sleeping difficulties: urinary frequency, abdominal size, leg cramps
- Varicose veins, vascular spiders
- Hemorrhoids
- Urinary incontinence

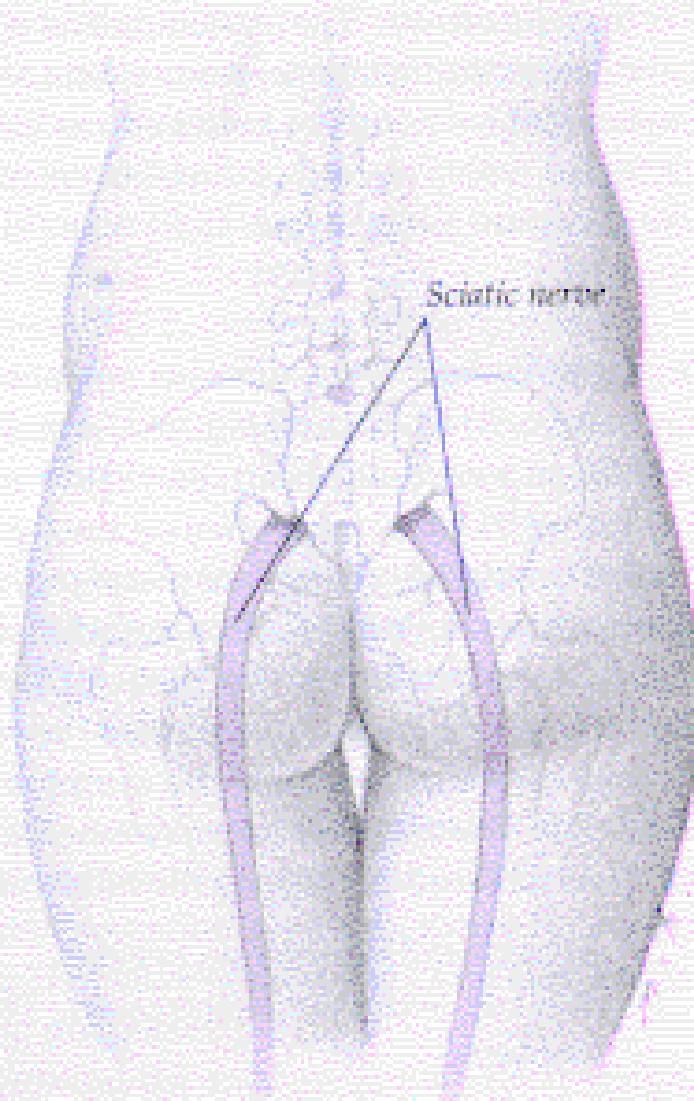


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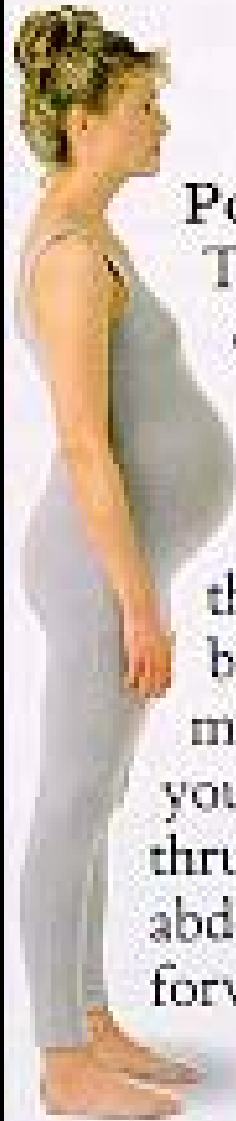


**YOUR WEIGHT GAIN  
at week 40 of pregnancy**

In the final two weeks you may actually lose a little weight. This is a sign that your baby is fully mature, and you can expect



*Pressure on your sciatic nerve may cause pain, tingling or numbness in your buttock, hip or thigh late in your pregnancy. Called sciatica, it's unpleasant but temporary and generally not serious.*



### Poor posture

This is common during pregnancy. As the baby grows, its weight throws you off-balance, so you may overarch your back and thrust your abdomen forward.

# *Electromagnetic Fields (EMFs)*



- Concern only if VLF or ELF monitors
- Most research *does not* correlate EMFs with complications
- Take regular breaks from exposure

# *Loud Noise/ Vibration*

- Over 90 dB-a: risk to baby's weight
- Hand-arm vibration → hand tool use
- Whole body vibration → from flooring
- Vibration further loosens ligaments

# *Heat/ Cold Stress*



- **Heat:** workers in laundries, kitchens, fieldwork, use of heavy PPE, etc.
- **Cold:** workers in cold storage, outdoor workers, wet/ windy environments, etc.

# *Shift Work/ Long Working Hours*

- Avoid:
  - Work weeks >40 h
  - Night shift
  - Overtime hours (I.e. >8 h/d)
- Minimize:
  - Rotating shiftwork
  - Repetitive/ entirely manual duties
- Lower birth weights/ miscarriages

# *Body Changes*

- Digestion slows (progesterone)
- Corneas thicker, fluid pressure decreases
- Nasal cavities swell and increased mucus
- Heart pumps 30 - 50% more blood, heart rate increases by 20%
- Nausea, heartburn and constipation
- Slightly blurred vision and effects contacts
- Nasal congestion and nosebleeds
- Faster heart rate, varicose veins and hemorrhoids



# *Body Changes*

- Spine curvature changes and ligaments supporting abdomen stretch
- Progesterone relaxes muscles of the ureters
- Backache
- Frequent urination, more prone to bladder infections



# *Body Changes*

- **Respiratory System:**
  - lung capacity increases (30 - 40%)
  - rib cage increases by 2 - 3 inches in circumference
  - carbon dioxide level decreases
  - respiratory rate increases
- Shortness of breath in the late first trimester and second trimester



# Weight Gain

• Baby	6.5 - 9.0 pounds
• Placenta	1.5
• Amniotic Fluid	2.0
• Breast Enlargement	1.0 - 3.0
• Uterus	2.0
• Fat Stores and Muscle	4.0 - 8.0
• Increased Blood Volume	3.0 - 4.0
• Increased Fluid Volume	2.0 - 3.0
• Total	22 - 32.5 pounds



# *Heights/ Reaches*



- Centre of Gravity changes (forward)
- Pregnant women are more prone to:
  - Fall from a ladder
  - Tip or slip when reaching
  - Place manual tasks at a distance
- Eliminate overhead work
- Minimize reaches below waist

# *Unadjustable Work Stations*



- Pregnant women prefer to work below waist height (~6-12 cm below)
- Higher than hip height → women will turn body & shoulders (static posture)
- Modified movement → awkward posture
- Footrests for both sitting and standing

# *Prolonged Sitting/Standing/Driving*



- Effects both mother and fetus
- Sitting no longer than 2 h
  - Especially if driving
- Standing no longer than 2 h
- Rotate and break often

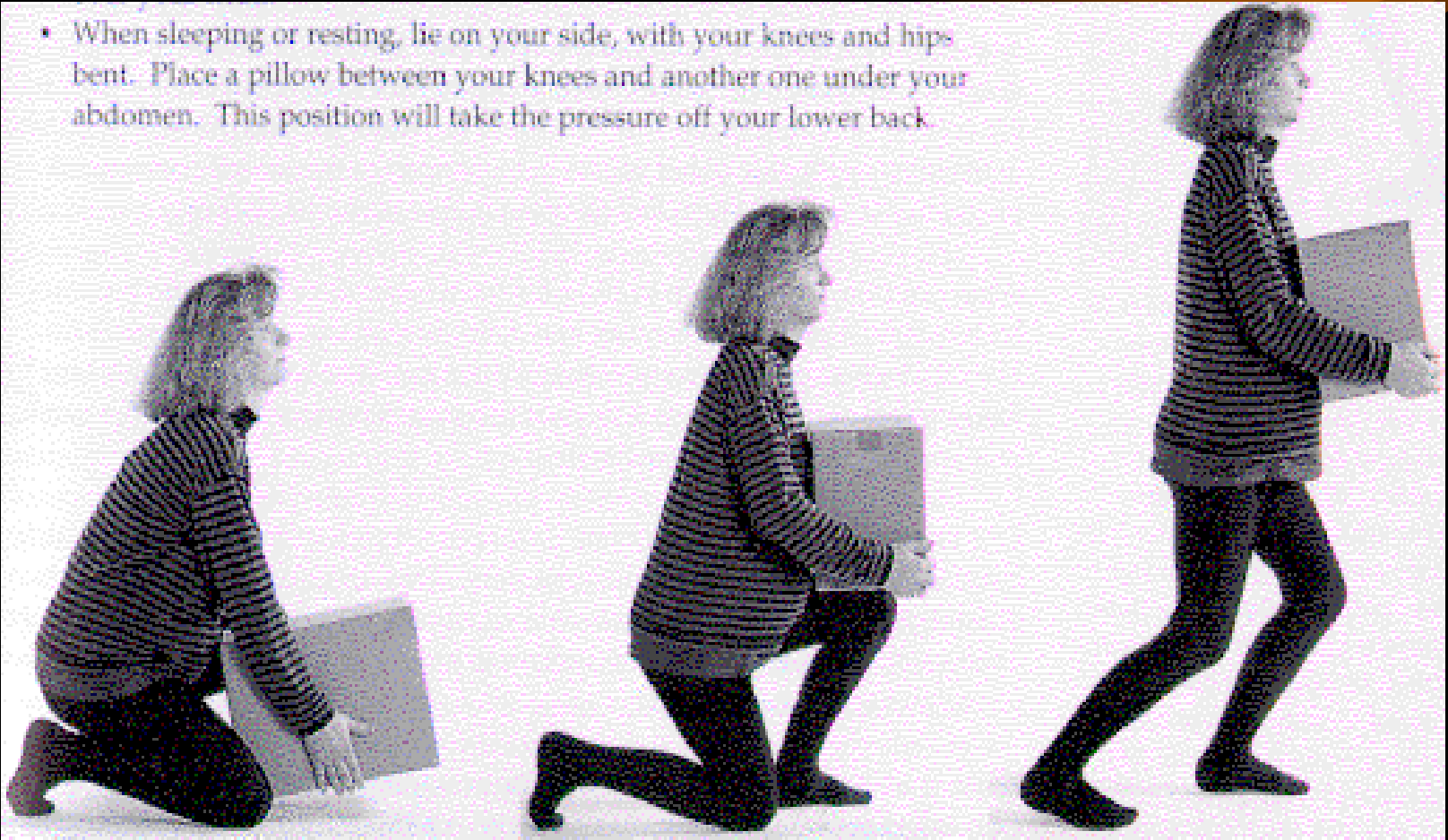


# *Physical Work/ Lifting*

- Increased risk of:
  - 50% experience LBP (Low back pain)
  - 28% experience CTS (Carpal tunnel syndrome)
- Body/ hormone changes
- Increased heart rate
- Back injuries from lifting:
  - Lift further from spine
  - Stretched abs → weakened
  - Back muscle fatigue → strain
  - Loosened ligaments → sprain
- Lift mechanics not consistent
- Higher IAP → gestational age

# *Lifting Technique for Pregnancy*

- When sleeping or resting, lie on your side, with your knees and hips bent. Place a pillow between your knees and another one under your abdomen. This position will take the pressure off your lower back.



*Maternal Health—  
Greatest Risk during Third trimester*

General Impairment of:

- Dexterity
- Agility/ Coordination
- Balance
- Ligament strength



# Maternal Health

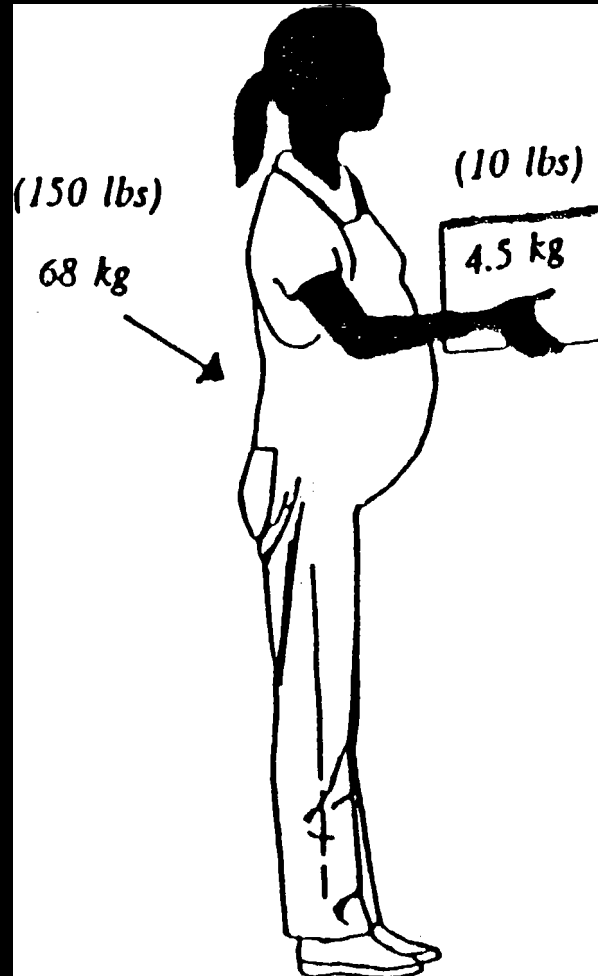
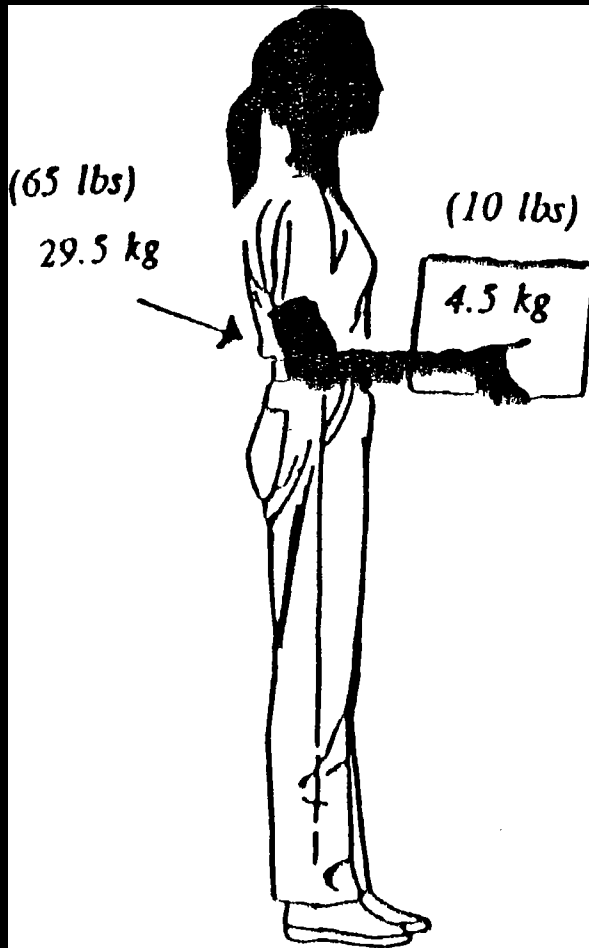


Figure 2: This figure shows the amount of stress that occurs on the lower back increases when the object is lifted further away from the body.

# *Important Questions*

- Is it safe to work while pregnant?
- How can you make work environment as physically comfortable as possible?
- What steps can be made to reduce stress and fatigue?
- Can you count on support from employer and coworkers?



# *Important Questions*

- What health insurance and maternity leave benefits is the worker entitled to?
- What options are available at work accommodate Ergonomic Hazards?



# *Pregnancy and Ergonomics Fact Sheet*

- Why did we produce this fact sheet?
- Concerns from the union of a Plastics Plant regarding Ergonomic Hazards



# *Pregnancy and Ergonomics Fact Sheet*

Focused on pregnancy outcomes not on  
Maternal Health

- Gestational Age
- Birth weight
- Preterm Birth
- Pregnancy Loss



# *General Ergonomic Guidelines For Pregnant Workers*

## Avoid or Limit

- Physical work (HR>140bpm)
- Heat/ Cold Stress
- Heavy Lifting (>25lbs)
- Heights/ Reaches (balance)
- Loud Noise (>85 dB-a)
- Vibration (HAVS or WBV)
- Shiftwork/Long Hours (>8h)
- Unadjustable Work Stations
- Prolonged Sitting (>2h)
- Driving (>2h continuous)
- Prolonged Standing (>2h)
- EMF Exposure



*Thank You*



Occupational Health Clinics for Ontario Workers  
(OHCOW, Inc.)

[www.ohcow.on.ca](http://www.ohcow.on.ca)