UGRC 145:
FOOD AND NUTRITION IN EVERYDAY LIFE

Session 9 – ENERGY BALANCE

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Session Overview

Learning Objectives:

At the end of this lecture you should be able to:

At the end of this lecture you should be able to:

- Explain Energy Balance
- List the factors that determine energy expenditure
- Enumerate the contributing factors to overweight and obesity

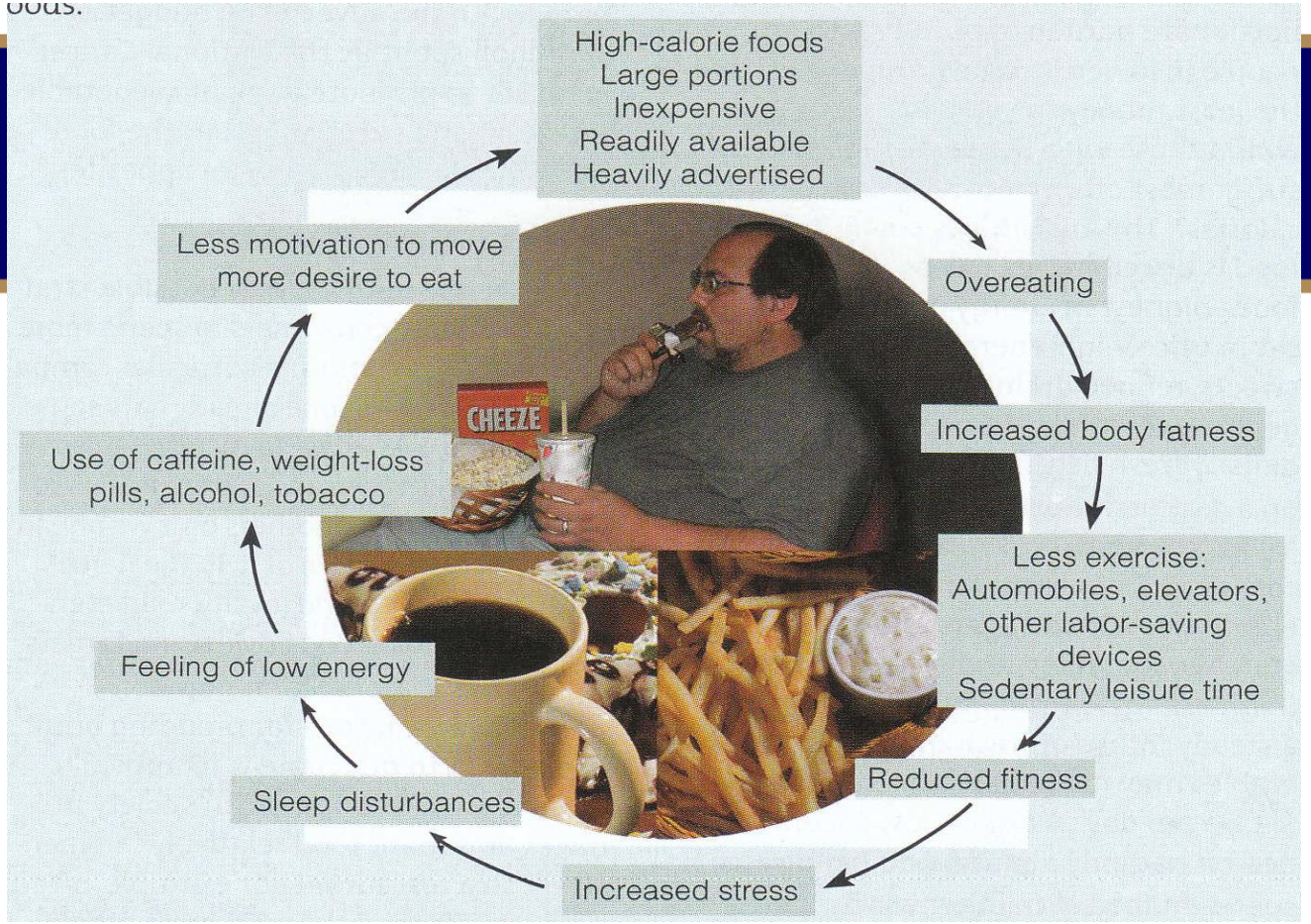
Session Overview *cont'd*

- Calculate the BMI for various people when given their height and weight information, and describe the health implications of any given BMI value.
- Describe the roles of Basal Metabolic Rate (BMR) in determining an individual's daily energy needs

Session Outline

The key topics to be covered in the session are as follows:

- Topic One: Energy Balance and Healthy Body Weight
- Topic Two: Eating Disorders
- Topic Three: Assignment/Discussion For Next Session



Topic One

Energy Balance and Healthy Body Weight

Energy Balance and Healthy Body Weight

- Both overweight and underweight present risks to health
- It is not the weight that needs to be controlled
- it's the fat in the body in proportion to the lean mass –**body composition**.

The Body's Energy Balance

- Energy balance is defined as:

Change in the body's energy stores.

- This is express mathematically as

energy in – energy out

Energy In and Energy Out

- The **foods and beverages** taken in are the only contributors to the **"energy in"** side of the equation

- The **"energy out"** side is more difficult to determine and has to do with **lifestyle, BMR and metabolism** (Breakdown and formation)
- About 500 grams body fat = 3,500 calories

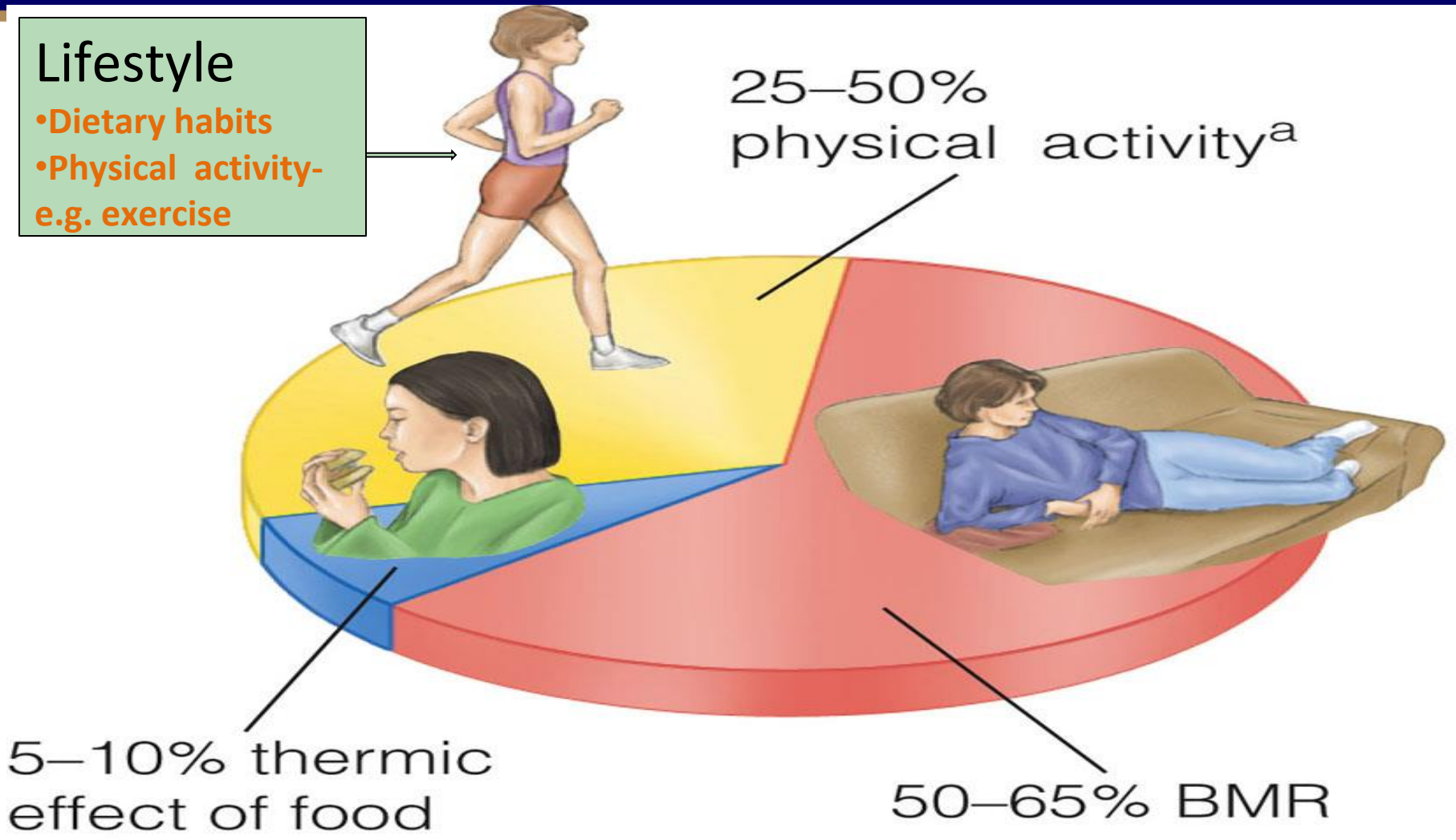
Energy In and Energy Out

- When more food is consumed than is needed, excess fat accumulates in the fat cells in the body's adipose tissue where it is stored.
- When energy supplies run low, stored fat is withdrawn

Energy out

Lifestyle

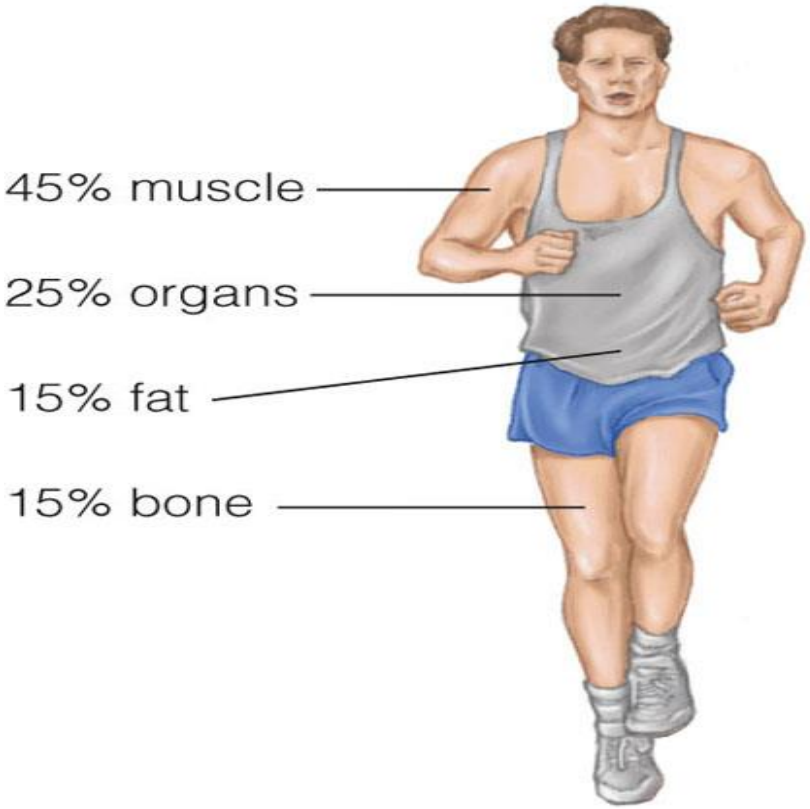
- **Dietary habits**
- **Physical activity- e.g. exercise**

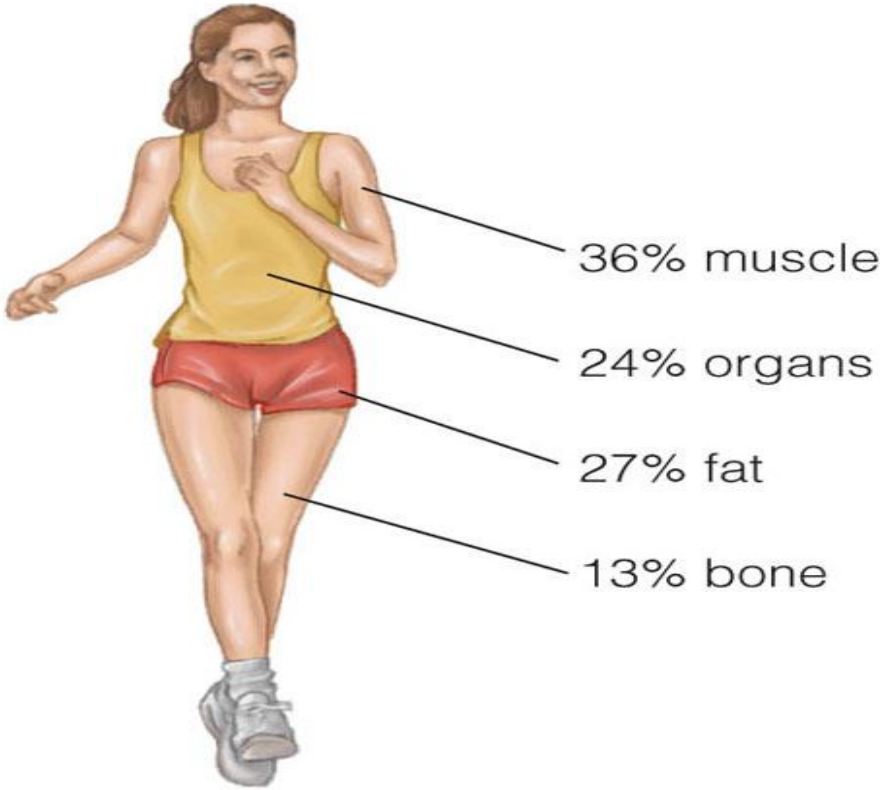


Factors that affect the BMR

FACTOR	EFFECT ON BMR
Age	The BMR is higher in youth; as lean body mass declines with age, the BMR slows. Physical activity may prevent some of this decline.
Height	Tall people have a larger surface area, so their BMRs are higher.
Growth	Children and pregnant women have higher BMRs.
Body composition	The more lean tissue, the higher the BMR. A typical man has greater lean body mass than a typical woman, making his BMR higher.
Fever	Fever raises the BMR.
Stress	Stress hormones raise the BMR.
Environmental temperature	Adjusting to either heat or cold raises the BMR.
Fasting/starvation	Fasting/starvation hormones lower the BMR.
Malnutrition	Malnutrition lowers the BMR.
Thyroxine	The thyroid hormone thyroxine is a key BMR regulator; the more thyroxine produced, the higher the BMR.

Body Composition and Fat Distribution between genders





Lifestyle behaviour and energy balance

- The three lifestyle components leading to healthy body weight are:
  - **Diet (all foods and drinks)**
  - **Physical activity (all bodily movements)**
  - **Behavior change**

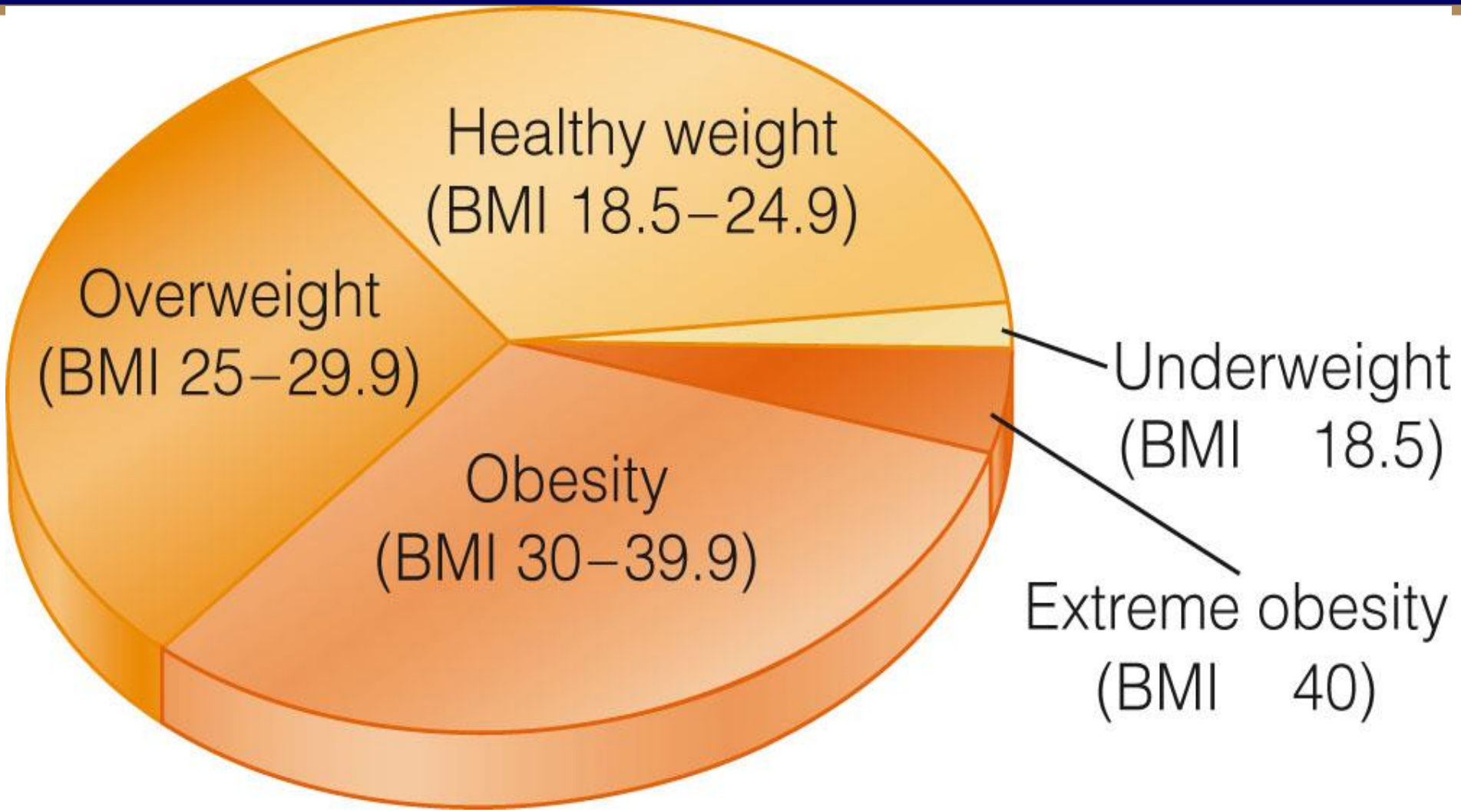
The BODY MASS INDEX (BMI)

- Obesity is usually classified using the BMI
- A measure of relative weight for height defined as:

  BMI= weight (kg)/height (m^2)

- The BMI is an imperfect index because it does not discriminate between lean and fat tissue

Classification of BMI



Chronic disease risk by BMI and waist size

BMI		Waist ≤ 40 in. (Men) or ≤ 35 in. (Women)	Waist ≥ 40 in. (Men) or ≥ 35 in. (Women)
18.5 or less	Underweight	Low risk	—
18.5–24.9	Normal	Low risk	—
25.0–29.9	Overweight	Increased risk	High risk
30.0–34.9	Obese, class I	High risk	Very high risk
35.0–39.9	Obese, class II	Very high risk	Very high risk
40 or greater	Extremely obese, class III	Extremely high risk	Extremely high risk

[a] *Risk for type 2 diabetes, hypertension, and cardiovascular disease.*

Source: National Heart, Lung, and Blood Institute, National Institutes of Health, The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, *NIH publication no. 00-4084.*

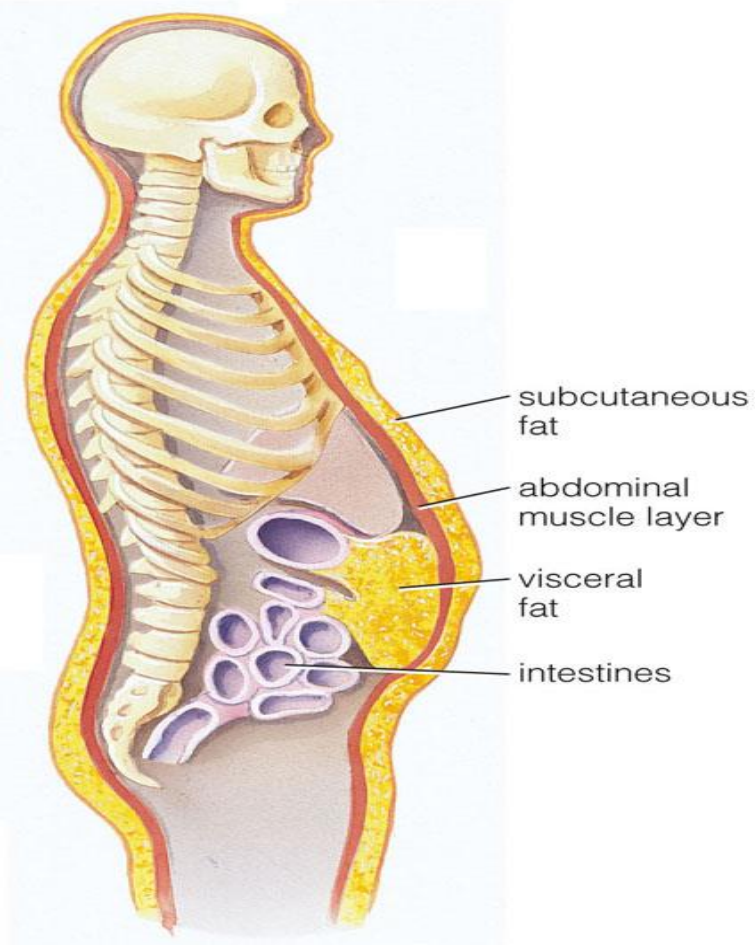
Risks associated with Overweight /obesity

- Hypertension
- Heart disease
- Stroke
- Diabetes
- Hernias
- Flat feet
- Sleep apnea
- Some cancers
- High accident rate
- Arthritis

Central Obesity

- Visceral fat is fat that
  - Is located deep within the central abdominal area of the body (see diagram on next slide)
  - Raises the risks of
    - **Hypertension**
    - **Heart disease**
    - **Stroke**
    - **diabetes**

Central Obesity



Body Fat distribution

- Factors affecting body fat distribution:
  - **Gender**
  - **Menopause**
  - **Smoking**
  - **Alcohol intake**
  - **Physical activity**

Social and Economic Costs of Obesity

- Over fatness presents
  - **social**
  - **economic handicaps**
  - **physical problems**
- Judging people by their body weight is a form of prejudice in society.

Chronic Disease risks according to BMI values and waist circumference

The degree of risk is heightened by the presence of specific diseases, other risk factors (such as elevated blood LDL cholesterol, as described in Table 9–2), or smoking.

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Elements of a Healthy Diet - ABCMV

- **Adequacy -** get enough of essential nutrients.
- **Balance -** contains a good proportion of nutrients. No overemphasis of a food group.
- **Calorie control -** choose foods to maintain ideal body weight.
- **Moderation -** eat any food in reasonable-size portions.
- **Variety -** eat different types of food to prevent deficiencies (**Dietary diversity**).

Why People Choose Foods

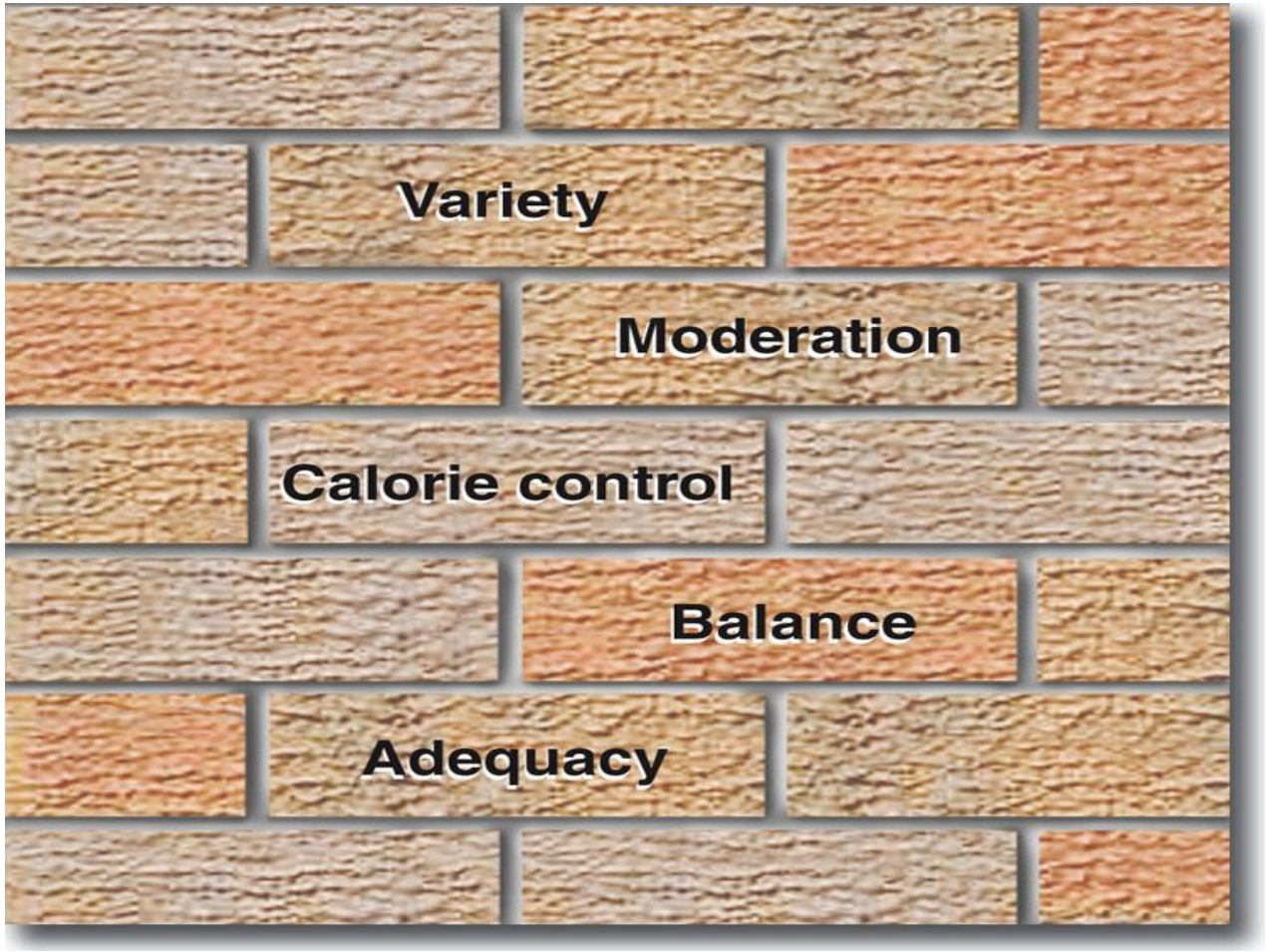
- Eating is an intentional act.
- People choose:
  - What to eat
  - Where to eat
  - Who to eat with
  - How to prepare it

Factors That Drive Food Choices

- Advertising
- Availability
- Economy
- Emotional comfort
- Habit
- Personal preference
- Season
- Positive associations
- Region of the country
- Social pressure
- Values or beliefs
- Weight
- Nutritional value
- Time

Nutritious Diet- YOU ARE WHAT YOU EAT

All of these factors help to build a nutritious diet.



Topic Two

EATING DISORDERS

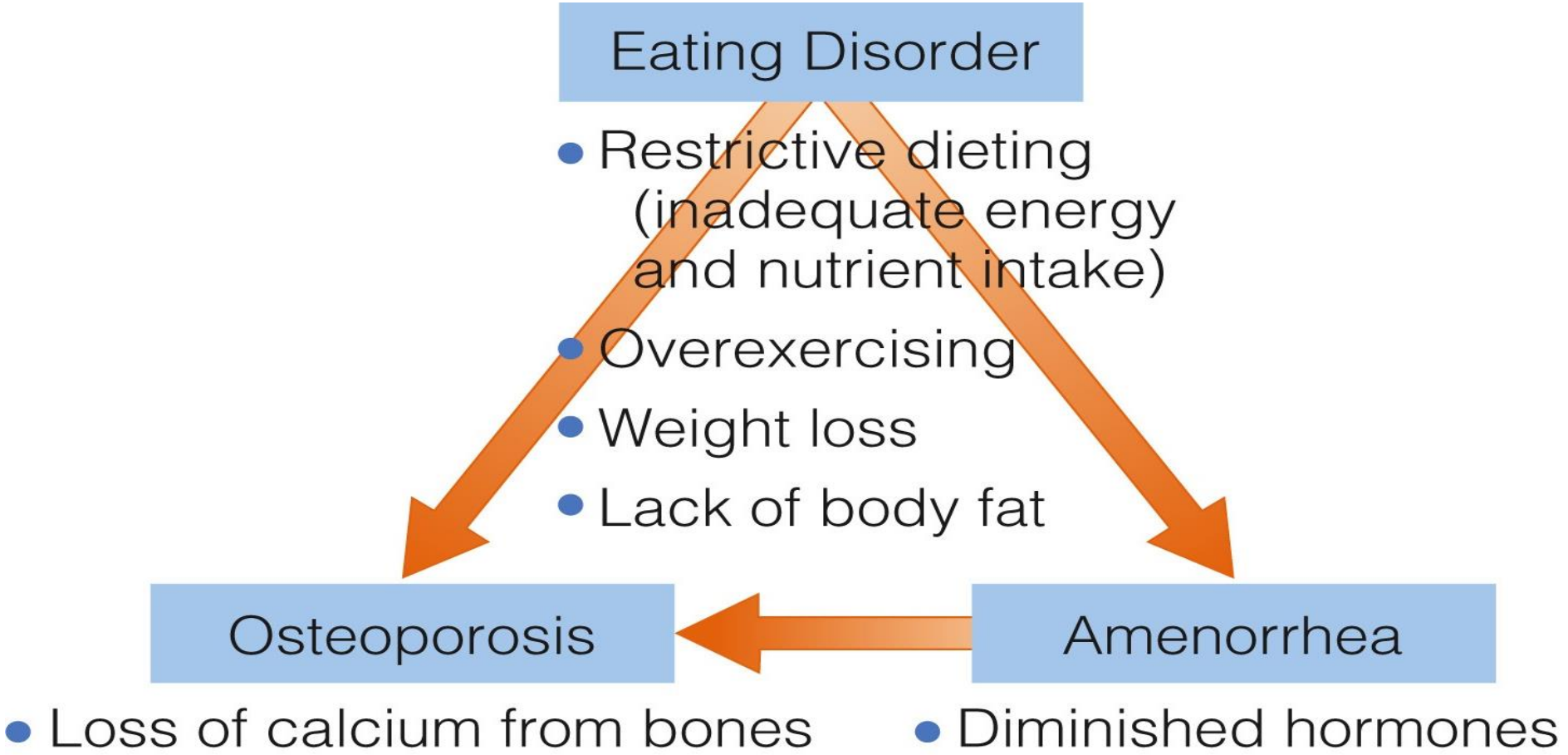
Eating Disorders

Occurs in the following

1. Athletes
   - Female athlete triad
     - Three medical problems
   - Male athletes
     - Weight-gain problems

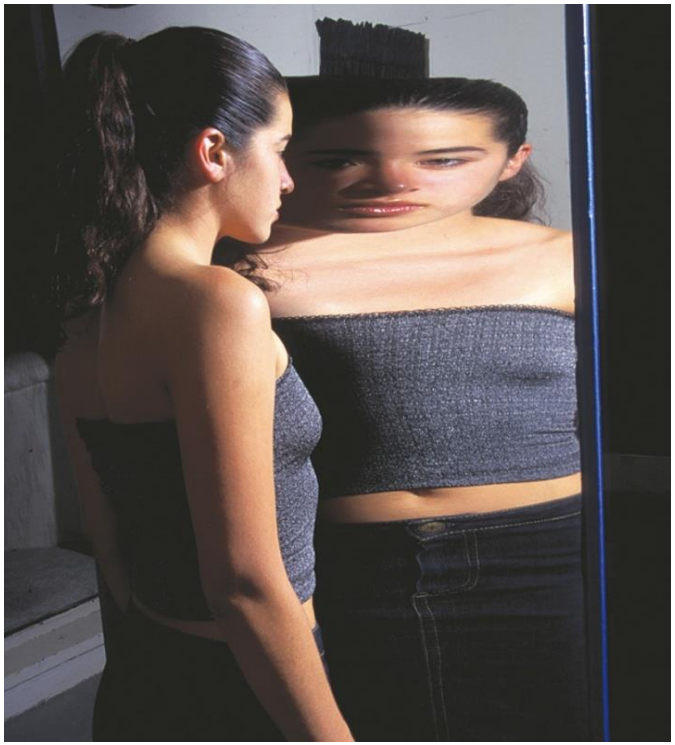
Eating Disorders

The Female Athlete Triad characteristics



Anorexia Nervosa

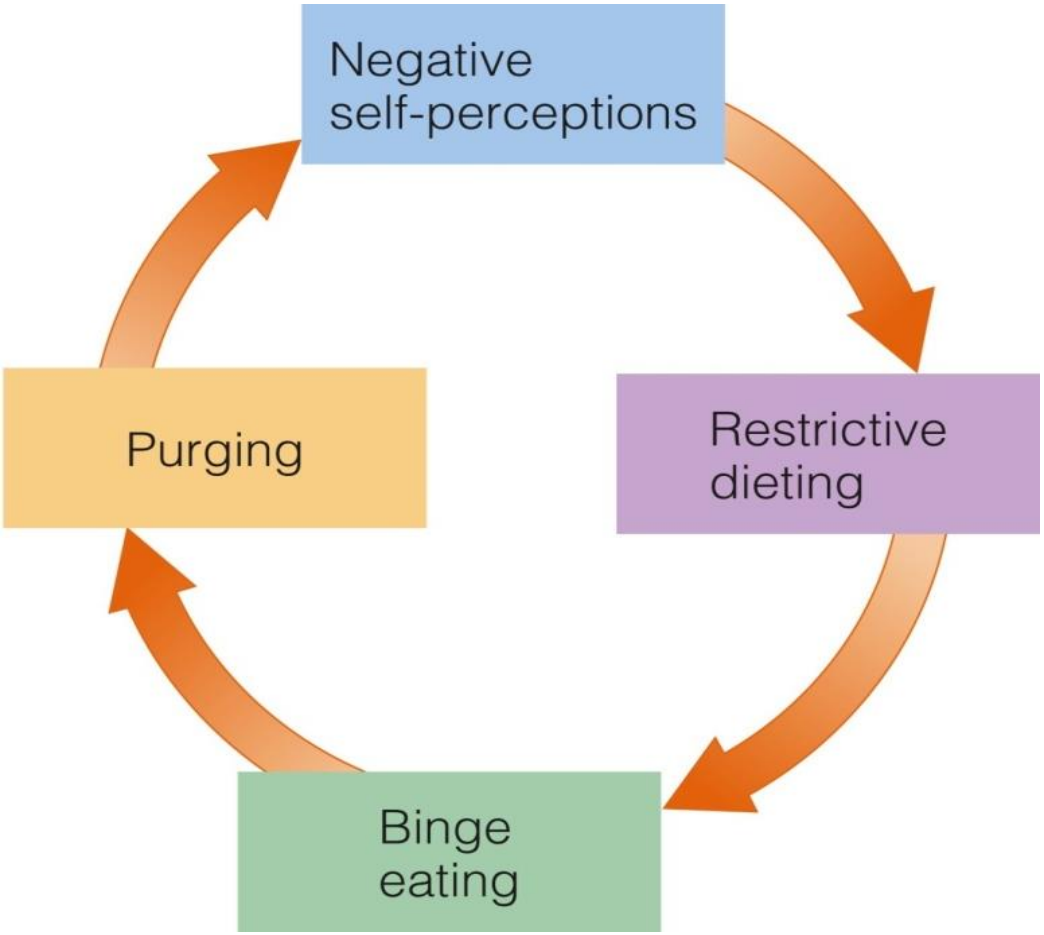
- Characteristics
  - Cannot recognize condition
- Role of the family
- Self-starvation
- Physical perils
  - Damage to whole body
  - Death
- Treatment



Bulimia Nervosa

- Characteristics
  - More prevalent than anorexia nervosa
- There is binge eating and purging
  - Stages of a binge
  - Methods for purging
- Physical and psychological perils
- Treatment is possible

The Cycle of Bingeing, Purging, and Negative Self-Perception



Binge Eating Disorder

- Different from bulimia nervosa
- Responds more readily to treatment

Topic Three

ASSIGNMENT/DISCUSSION FOR NEXT SESSION

Take Home

1. Why do some people get fat?
2. Why do some stay thin?
3. Is weight controlled by heredity?
4. Is it eating habits?

Next week

- We shall discuss breastfeeding and its importance to the mother and the child.

- Make sure you review handout 7A & 7B