

A large, faint watermark of a university crest is visible on the left side of the slide. The crest features a shield with a cross, topped by a crown and surrounded by ornate flourishes. Below the shield, a banner contains the Latin motto "ET VENUSTAS PER SCIENTIAM".

vict

Understanding medical conditions for exercise referral

Chronic obstructive pulmonary disease (COPD)
and asthma

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 'tct' are lowercase, with a decorative flourish above the 't'.

Signs, symptoms and common causes

Vtct

Activity

- What are the signs and symptoms of COPD and asthma?
- What causes COPD and asthma?
- How may COPD or asthma progress?



Vtct

Chronic obstructive pulmonary disease – COPD

Vtct

Chronic obstructive pulmonary disease – COPD

- The preferred term for conditions previously diagnosed as:
 - Chronic bronchitis
 - Emphysema
- Airflow obstruction is progressive and not reversible
- Cannot be cured
- Can be treated
- Early intervention is essential to slow the decline in function of lungs and help the person to maintain an active life for a longer period of time.

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Chronic obstructive pulmonary disease – COPD

Chronic bronchitis

- Irritation and inflammation in the bronchi
- Bronchi become narrowed
- Productive cough with sputum production

Emphysema

- Permanent damage and inflammation of the alveoli
- Less efficient gaseous exchange
- Low oxygen levels in blood
- Reduce elasticity of the lungs
- Expiration becomes difficult

Source: Lawrence. 2013

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Chronic obstructive pulmonary disease – COPD

Signs and symptoms:

- Shortness of breath (dyspnoea)
 - Worse over time
 - Present every day
 - Worse on exercise
 - Worse during respiratory infections
- Productive cough
- Wheezing
- Fatigue
- Peripheral muscle weakness

Source: NICE 2010 and GOLD 2005 in Lawrence. 2013

Vtct

Chronic obstructive pulmonary disease – COPD

- Estimated that around 3 million people in the UK have COPD
- Around 900,000 are diagnosed
- 2 million undiagnosed
- Accountable for 30,000 deaths each year

Source: NICE 2010 in Lawrence. 2013

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Contributory factors and causes

Cigarette smoking is the main risk factor

Other risk factors:

- Genetics
- Age – over 35
- Passive smoking
- Respiratory infections in childhood
- Environmental pollutants and occupations with exposure to pollutants, such as dust and chemicals
- Low socio-economic status

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Asthma

Vtct

Asthma

- Chronic inflammatory condition
- Affects the bronchi of the lungs
- Causes narrowing and constriction – usually reversible with treatment
- Hypersensitive airways that constrict in response to ‘triggers’

Around 5.4 million people in the UK are diagnosed with asthma.

Source: Asthma UK, 2005 in Lawrence, 2013.

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Asthma

Signs and symptoms:

- Wheezing
- Shortness of breath
- Coughing, especially at night
- Chest tightness, pressure or pain

Diagnosis may be from mild to severe depending on frequency and severity of symptoms

Vtct

Asthma

Potential contributory factors and causes:

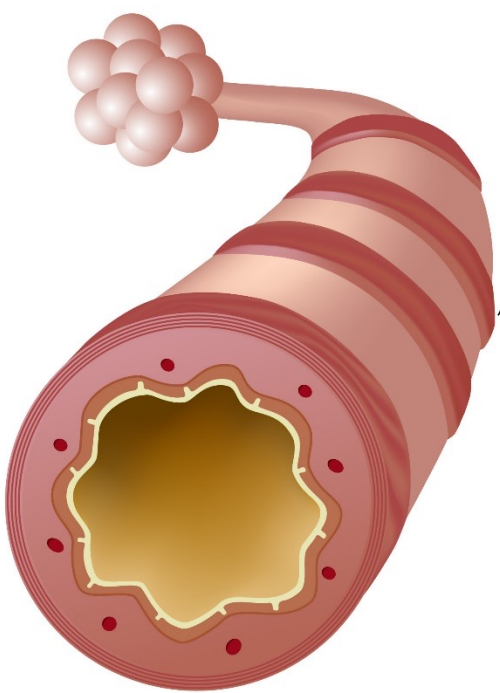
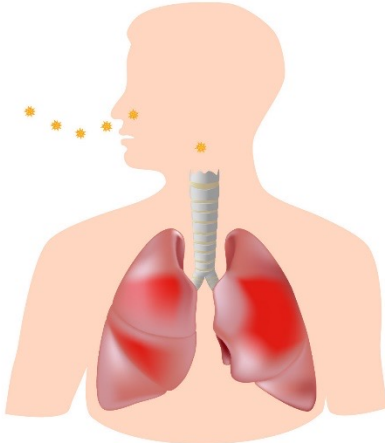
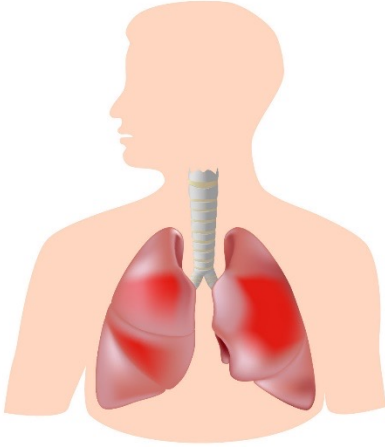
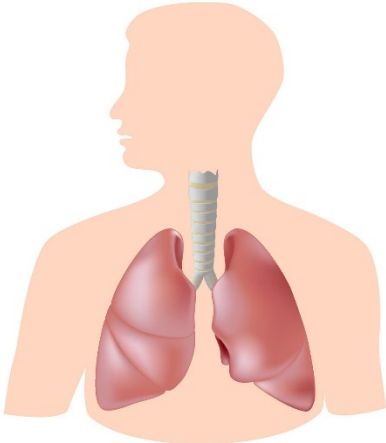
- Family history of or coexistence of atopic disease, e.g. asthma, eczema
- Premature birth or low birth weight
- Bronchiolitis in infancy
- Smoking, including passive smoking

Triggers:

- Exercise
- Emotion
- House mites or dust
- Animals
- Pollens and moulds
- Occupation
- Smoking
- Certain drugs, e.g. beta blockers

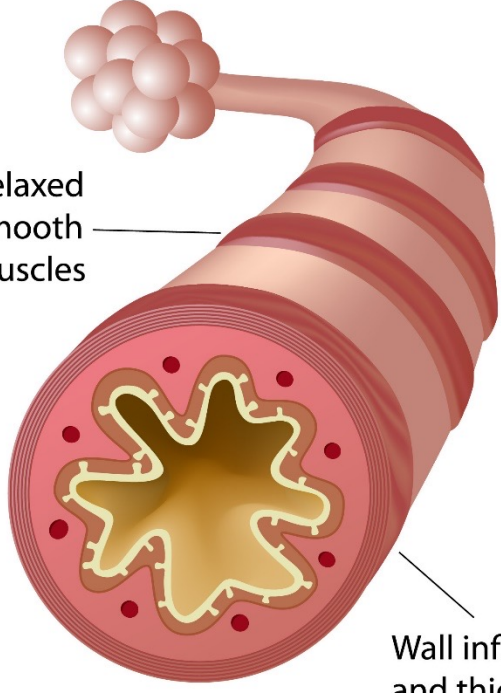
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Pathology of Asthma



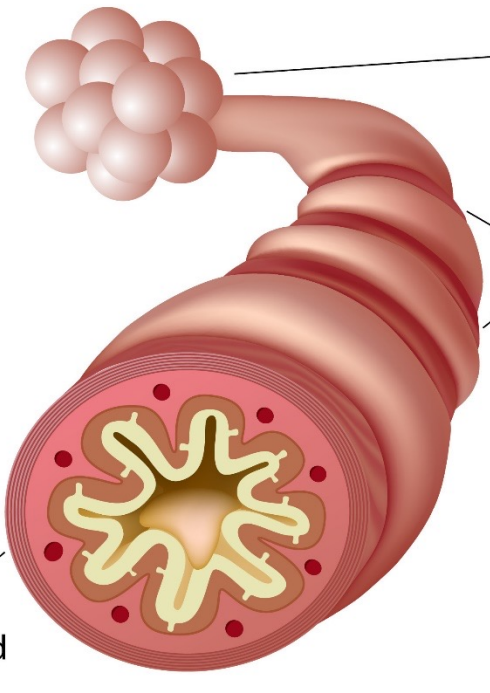
Relaxed smooth muscles

Normal airway



Wall inflamed and thicken

Asthmatic airway



Air trapped in alveoli

Tightened smooth muscles

Asthmatic airway during attack

Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

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Chronic obstructive pulmonary disease – COPD

Vtct

Medication

The aim of medication is to:

- Manage symptoms
- Reduce the severity and frequency of exacerbations
- Improve health status

Medications

- Short acting bronchodilators
 - Beta-agonists – salbutamol
 - Anti-muscarinic inhalers
- Long acting bronchodilators
- Steroid inhalers
- Combination inhalers
- Bronchodilator tablets to open airways
- Mucolytic medicines

Source: NHS choices. 2012. in Lawrence. 2013

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Medications and side effects

Beta-agonists

- Tremors, tachycardia, palpitations

Antimuscarinics

- Dry mouth, constipation, palpitations

Steroids

- Reduced bone density, muscular weakness, thinning of skin, weight gain

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Side effects and exercise

Side effects of medication that may have an implication on the exercise response:

- Tachycardia
- Palpitations
- Dry mouth
- Reduced bone density
- Muscle weakness

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Asthma

Vtct

Medication

- To prevent and control symptoms
- To reduce the severity and frequency of symptoms
- Generally four groups:
 - Bronchodilators – widen the airways (usually inhalers)
 - Steroids - reduce the inflammation in the airway linings
 - Caffeine-like drugs - relax tight muscles in the airways
 - Mast cell stabilisers – suppress inflammatory responses

Source: NHS choices. 2012. in Lawrence. 2013

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Medications

Inhalers are usually colour coded:

- To relieve symptoms – e.g. Salbutamol (**BLUE**) Short-acting Beta-agonist
- To prevent symptoms – e.g. Steroid inhalers (**BROWN / MAROON**)
- For further control – e.g. Salmeterol (**GREEN**) Long-acting Beta-agonist
- For severe symptoms – (**RED, PURPLE** or **WHITE**) Long-acting Beta-agonist and Corticosteroid combo

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Side effects and exercise

Side effects of medication that may have an implication on the exercise response:

- Tremors
- Tachycardia
- Palpitations
- Dry mouth
- Reduced bone density
- Muscular weakness
- Systemic hypertension
- Weight gain

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Lifestyle interventions

COPD

- Smoking cessation
- Exercise
- Pulmonary rehabilitation

Asthma:

- Smoking cessation
- Weight reduction (in obese people)

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Risks and benefits of exercise and activity

Vtct

Activity

What are the risks and benefits of exercise and activity?



Vtct

Chronic obstructive pulmonary disease – COPD

Vtct

Benefits

- Maintain independence
- Reduce disabling effects
- Assist management of depression/anxiety
- Cardiovascular and muscular conditioning
- Improve ventilatory efficiency
- Desensitisation to breathlessness (dyspnoea)
- Increase flexibility

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Asthma

Vtct

Asthma

- Assist management of triggers (be mindful of exercise induced asthma, where exercise is a trigger)
- Maintain fitness and health - cardiovascular and muscular conditioning and flexibility
- Help to maintain a weight management
- Help to reduce risk of other health conditions, linked to inactivity, e.g. CVD

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Exercise guidelines, restrictions and considerations

Vtct

Chronic obstructive pulmonary disease – COPD

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	<p>3-5 sessions a week</p> <p>RPE 3-4 on adapted modified Borg dyspnoea scale</p> <p>20-30mins per session</p> <p>Shorter intermittent sessions or interval approaches may be necessary initially</p> <p>Lower body muscle focus as upper body equipment (rowing) may promote dyspnoea</p>
Resistance	<p>2-3 days a week</p> <p>Low resistance (50-60% of 1RM and build to 80%)</p> <p>8-10 repetitions</p> <p>8-10 exercises for whole body</p> <p>Legs, functional movement muscles and accessory muscle of breathing (pectorals serratus anterior)</p>
Flexibility	<p>3 – 7 days a week</p>
Functional	<p>Increase activities of daily living to maintain function</p>

Considerations

- Appropriate screening to check comorbidities
- Use RPE and breathlessness scale to monitor intensity
- Progress gradually
- Avoid exercise in extreme temperatures and humidity
- Be sensitive to anxiety, fear and depression in response to breathlessness and disability
- Diaphragmatic breathing as part of relaxation
- Work with respiratory physiotherapists
- If excessive breathlessness experienced use techniques learned in pulmonary rehabilitation

Source: Lawrence. 2013

The logo for Vtct (Venture Tact) is displayed in a purple serif font. The 'V' is large and stylized, with a thin purple line curving over the top of the 't's.

Comorbidities

Clients with COPD may present with the following comorbidities:

- Cardiovascular disease and CVD risk factors are often comorbid
Depression and anxiety in response to breathlessness and disability
- Medications used to treat COPD may contribute to other conditions,
e.g. osteoporosis/corticosteroids

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Asthma

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	3-5 days a week 55-65-75% of Hrmax 11-13 RPE scale 30mins per session (continuous or intermittent) Monitor dyspnoea Emphasise progression of duration rather than intensity
Resistance	2-3 days per week Low resistance, high reps 1 set 8-10/12-15 repetitions 8-10 muscle groups
Flexibility	3-7 days a week Point of mild discomfort Static stretching

Considerations

- Check asthma well controlled
- Check exercise not trigger (exercise induced asthma)
- Dose of reliever before exercise may be needed
- Ensure reliever close at hand during exercise
- Longer warm up and cool down
- Exercise mid to late morning
- Be aware of environmental triggers, e.g. use scarf to cover mouth during cold weather
- Swimming (warm, humid air) can be ideal exercise, but be mindful of chemical triggers
- Know how to respond to an asthma attack

Source: Lawrence. 2013

The logo for Vtct (Victoria Tenants' Council) is displayed in a purple serif font. The 'V' is large and stylized, with a thin purple line curving over the top of the 't's.

Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion
- Effects of multiple medications must be considered
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

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Recommended reading

Larry Durstine et al, eds. (2009) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Lawrence, D (2013) ***The Complete Guide to Exercise referral*** . UK. Bloomsbury publishing.

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

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Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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Understanding medical conditions for exercise referral

Cardiovascular disease risk factors – hypertension
and Hypercholesterolemia

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

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Signs, symptoms and common causes

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Activity

- What are the signs and symptoms cardiovascular disease?
- What causes cardiovascular disease?
- How may cardiovascular disease progress?



Vtct

Cardiovascular disease

Vtct

A word cloud centered around the theme of heart attacks. The most prominent text is 'HEART ATTACK' in large, red, serif capital letters. Surrounding it are various related terms in different colors (blue, orange, black) and orientations. The words include: ambulance, rx, crushing, aspirin, death, doctor, blood pressure, genetics, artery, chest, radiating, call 911, diet, blood, treatment, cholesterol, hospital, arm, pain, killer, er, arteries, deadly, cardiac, medicine, heart disease, exercise, emergency, veins, blockage, jaw, pain, second, stent, high, angina, and angioplasty.

ambulance
rx
crushing
aspirin
death
doctor
blood pressure
genetics
artery
chest
radiating
call 911
diet
blood
treatment
cholesterol
hospital
arm
pain
killer
HEART ATTACK
er
arteries
deadly
cardiac
medicine
heart disease
exercise
emergency
veins
blockage
jaw
pain
second
stent
high
angina
angioplasty

Cardiovascular disease

Umbrella term used to refer to all conditions affecting the heart and circulatory system, including:

- **Coronary heart disease** – angina, myocardial infarction/heart attack or heart failure.
- **Hypertension** – high blood pressure
- **Stroke**
- **Peripheral vascular disease**

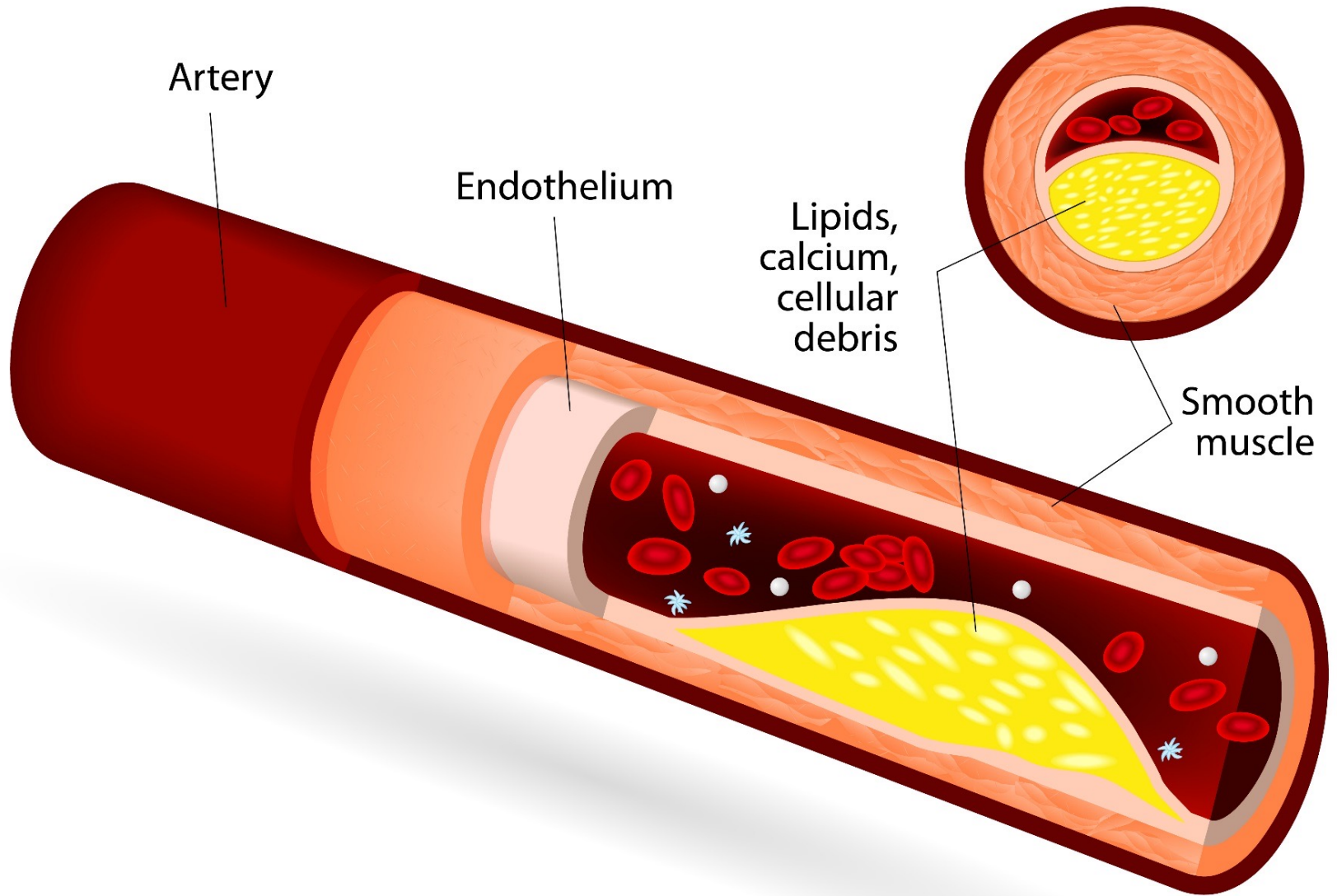
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Cardiovascular disease

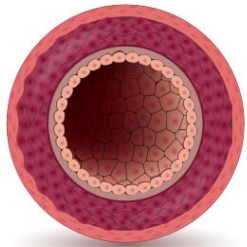
- Leading cause of death globally
- Underlying cause is **atherosclerosis**
- Fatty plaques build up on artery walls, causing narrowing and restriction of blood flow.

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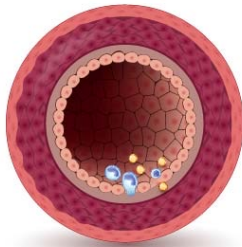
ATHEROSCLEROSIS



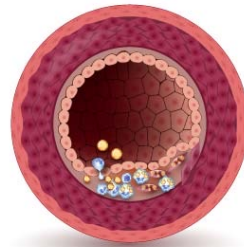
ATHEROSCLEROSIS



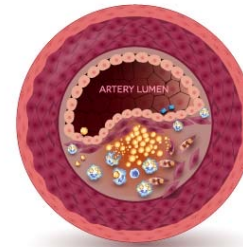
1.
NORMAL ARTERY



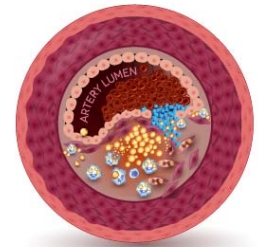
2.
**ENDOTHELIAL
DISFUNCTION**



3.
**FATTY STREAK
FORMATION**



4.
**STABLE (FIBROUS)
PLAQUE FORMATION**



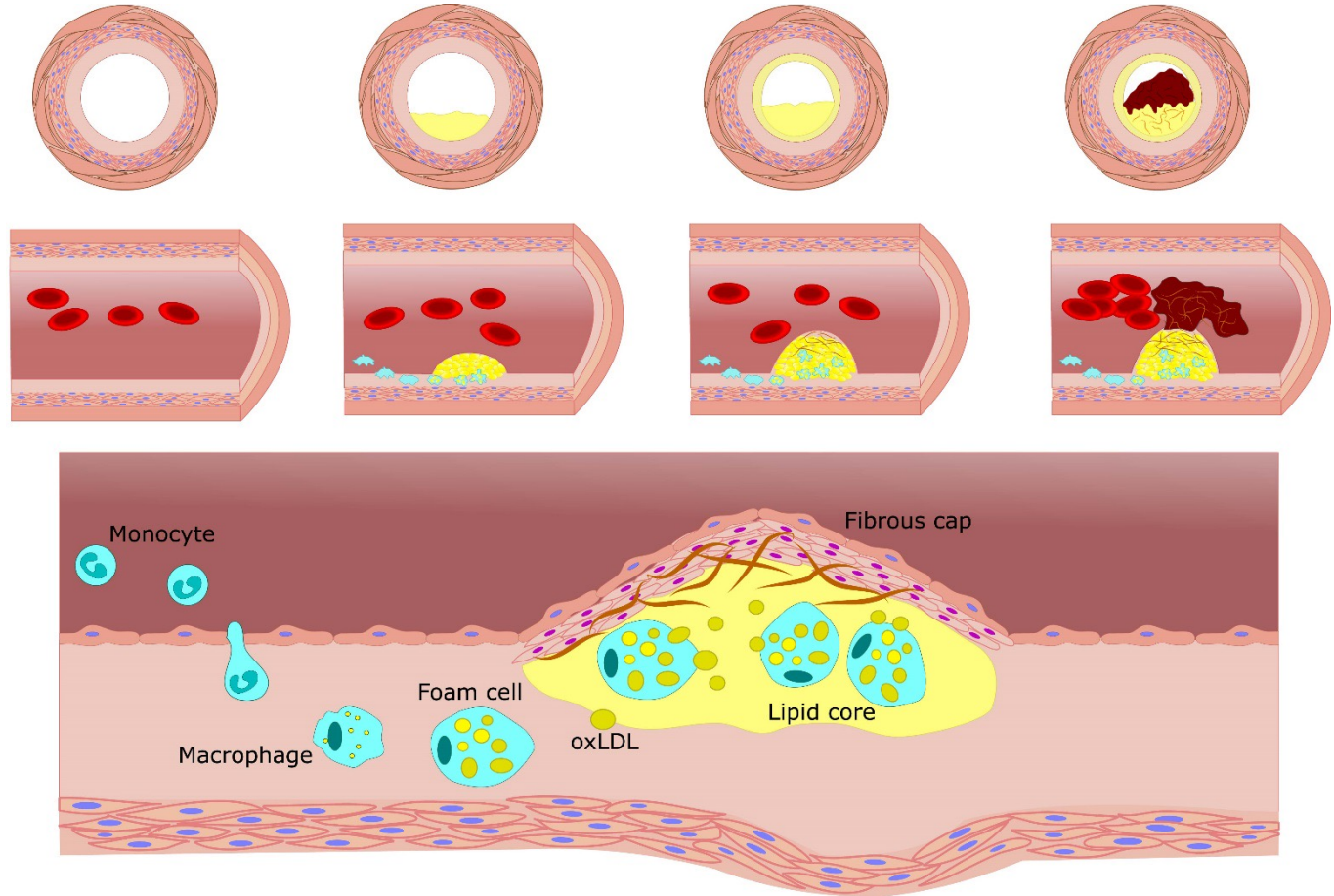
5.
**UNSTABLE
PLAQUE FORMATION**

Effect of disease processes on blood vessels

- Diseases:
 - Arteriosclerosis.
 - Atherosclerosis.
- Processes:
 - Inflammation.
 - Thickening of artery walls.
 - Loss of elasticity.
 - Endothelial damage.
 - Smooth muscle fibre proliferation.
 - Lesions formed by fatty plaque.

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Disease processes



Vtct

Disease processes

Arteriosclerosis – hardening of the arteries

- The arteries become thick and stiff.
- Sometimes restricting blood flow to the organs and tissues.

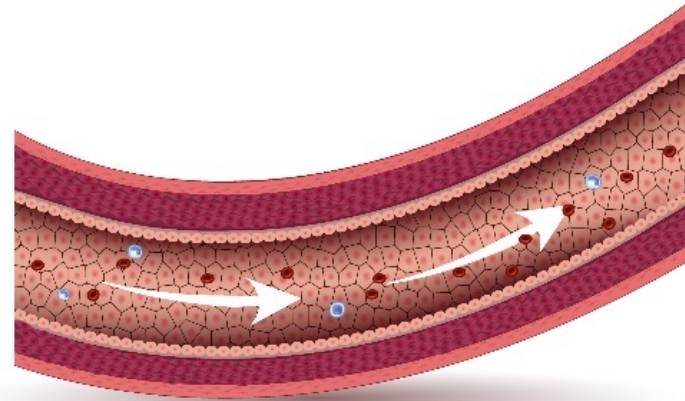
Atherosclerosis - a specific type of arteriosclerosis.

- Build up of fats, cholesterol and other substances in and on the artery walls (plaques).
- Can restrict blood flow.
- Plaques can burst and trigger a blood clot.
- Can affect arteries anywhere in the body.

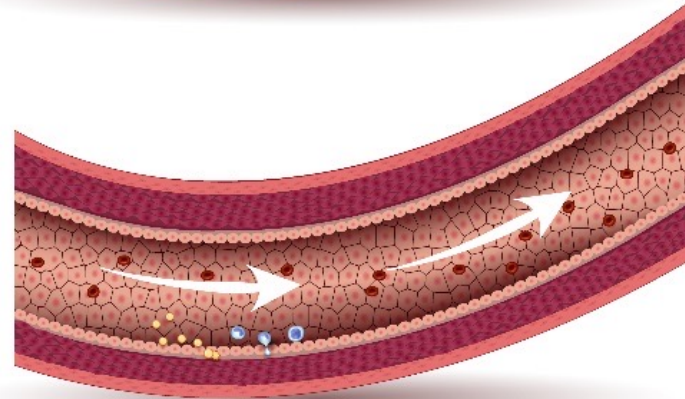
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ATHEROSCLEROSIS

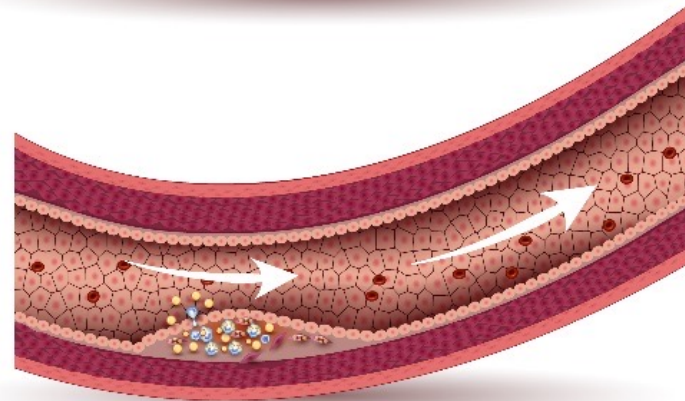
NORMAL ARTERY



ENDOTHELIAL DYSFUNCTION

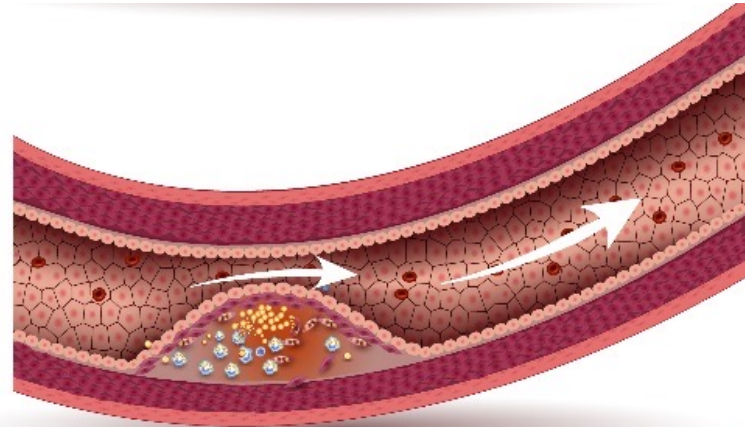


FATTY STREAK FORMATION

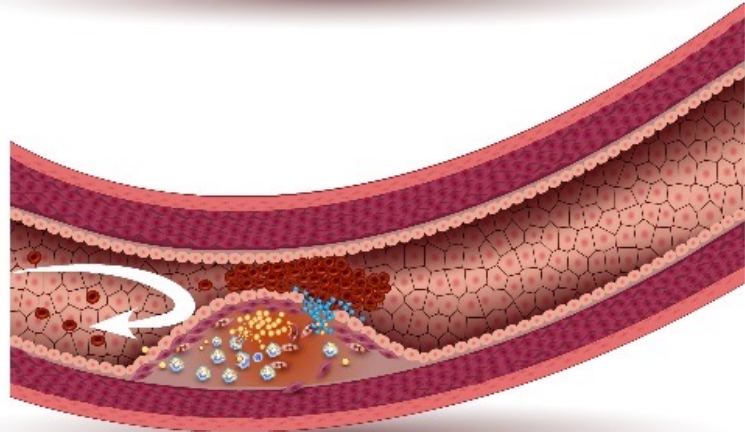


ATHEROSCLEROSIS

**STABLE (FIBROUS) PLAQUE
FORMATION**



**PLAQUE RUPTURE
THROMBOSIS**



Cardiovascular disease

Plaque formation:

- If **coronary arteries affected** - reduced blood flow to heart, which may result in angina or heart attack
- If **cerebrovascular arteries affected** – reduced blood flow to brain, which made lead to stroke
- If **peripheral arteries affected** – peripheral artery disease, intermittent claudication (pain in calf muscles)

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Complications of Atherosclerosis

Brain

stroke, TIA

Heart

angina, heart attack

Kidneys

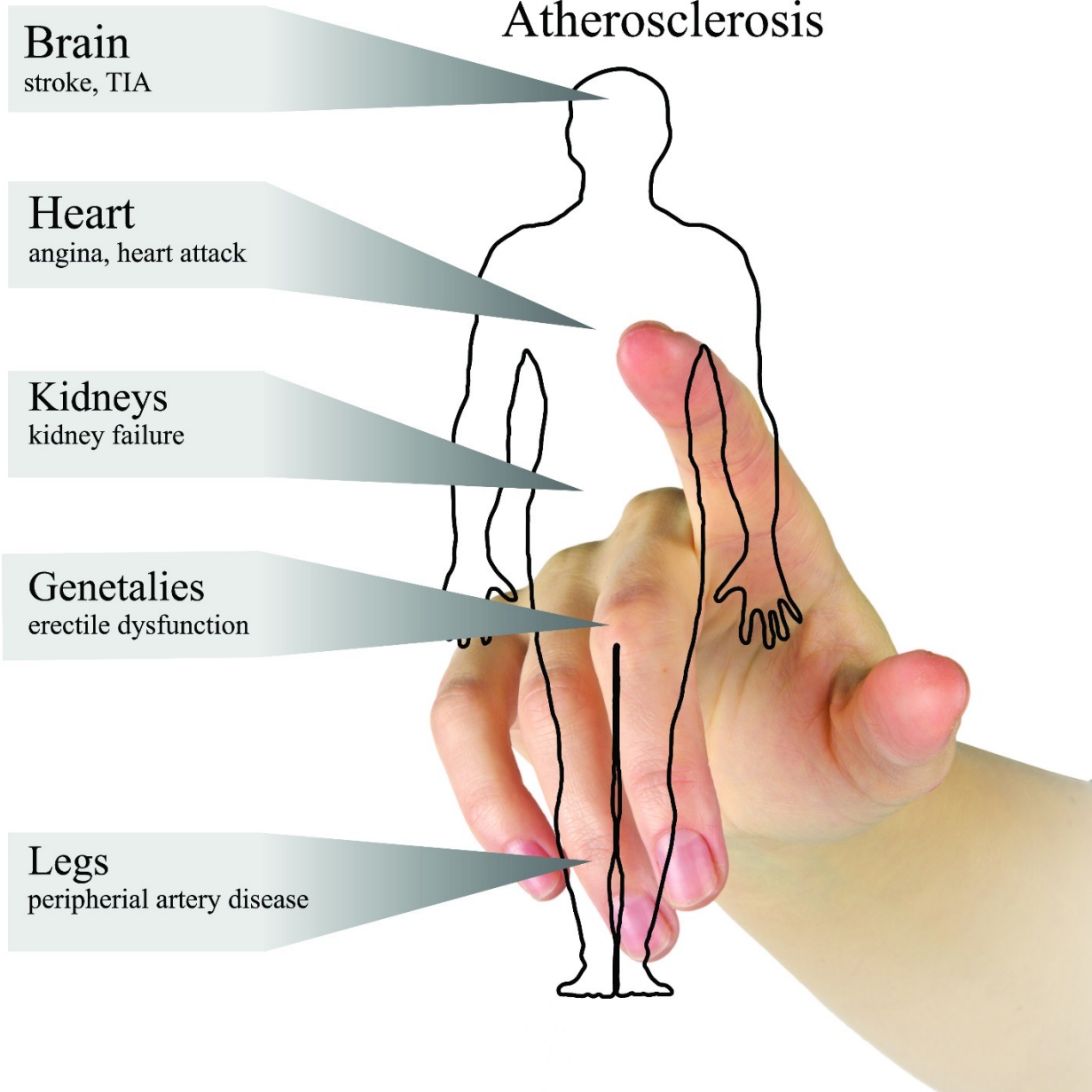
kidney failure

Genetaliaes

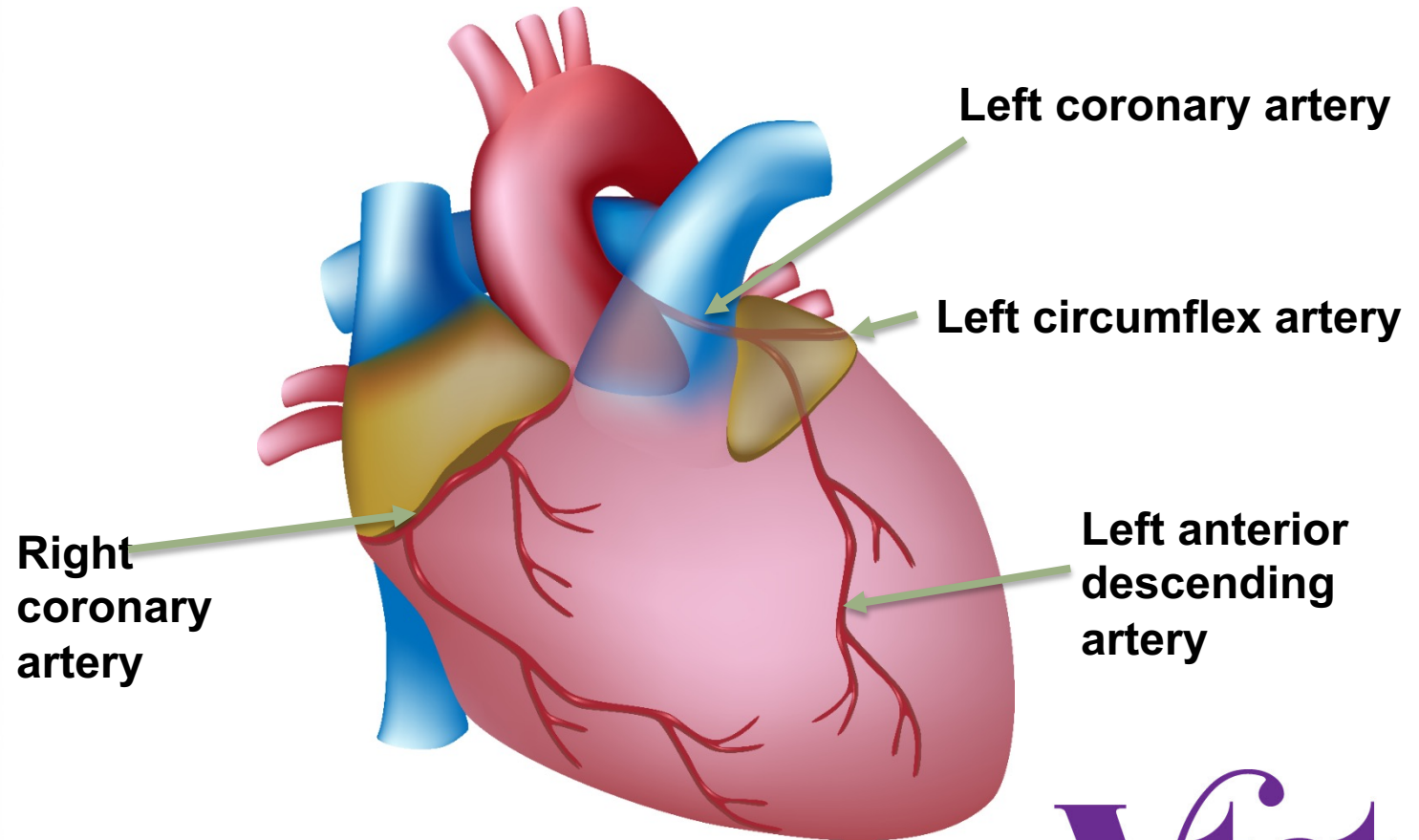
erectile dysfunction

Legs

peripheral artery disease

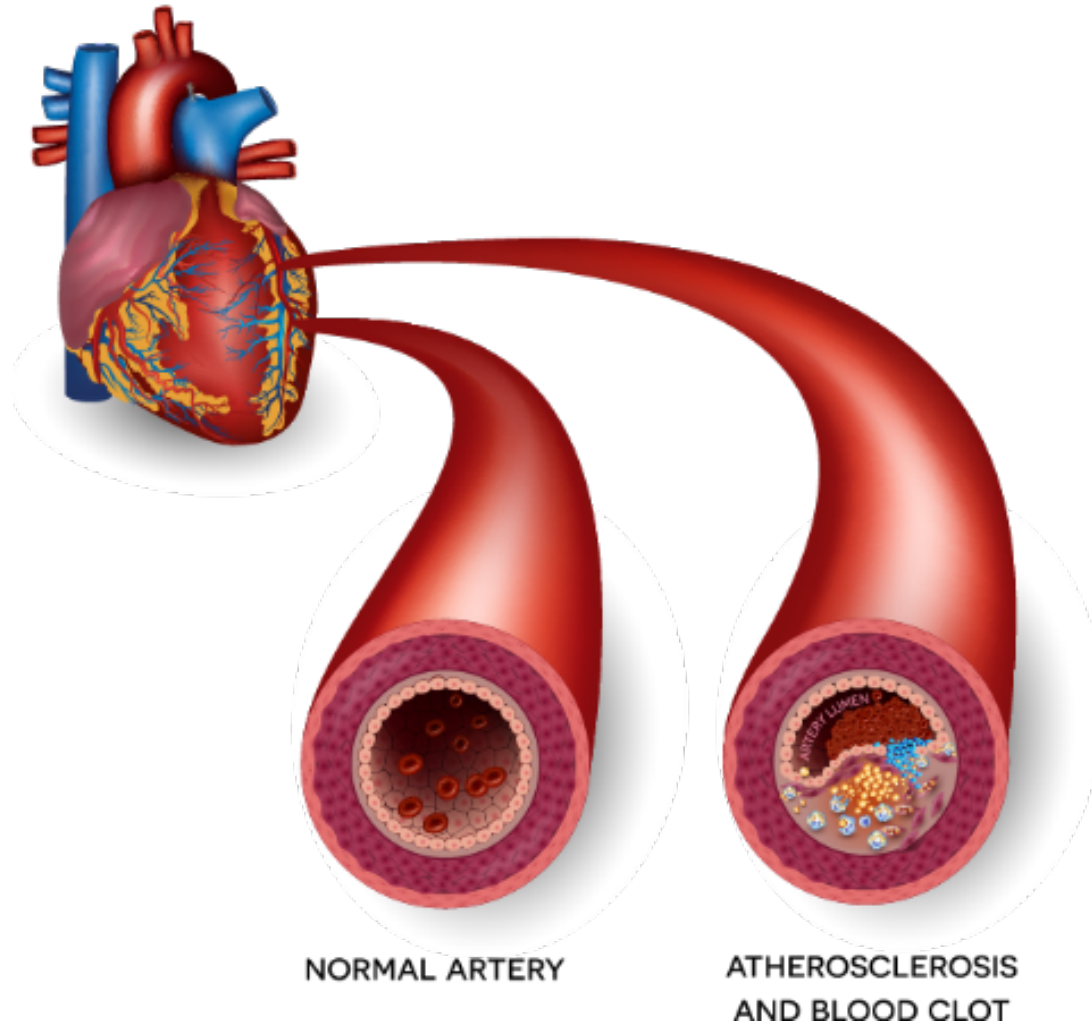


Coronary circulation



Vtct

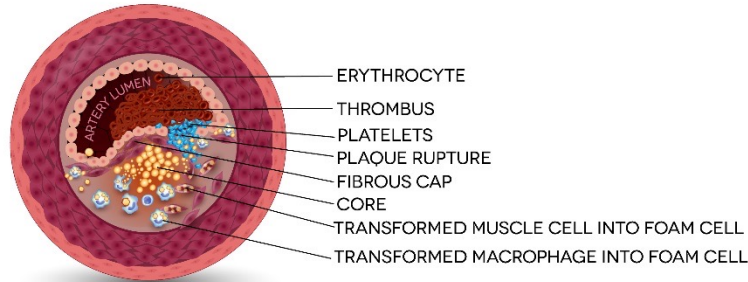
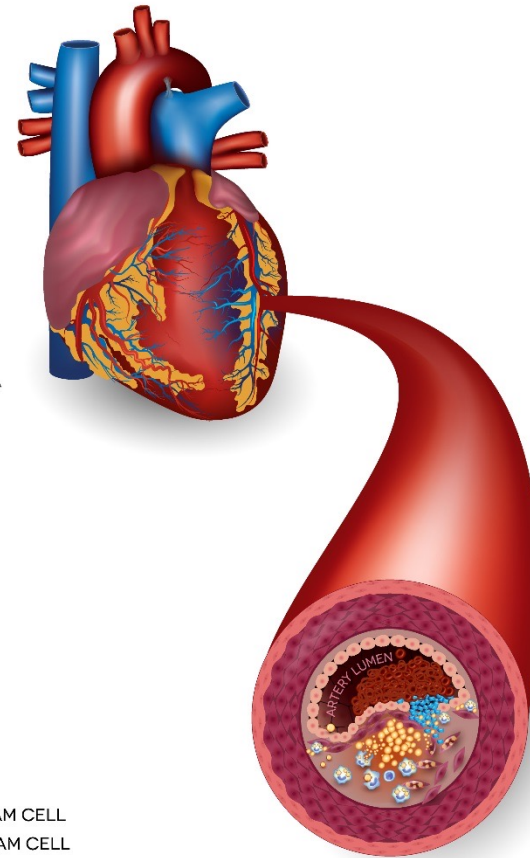
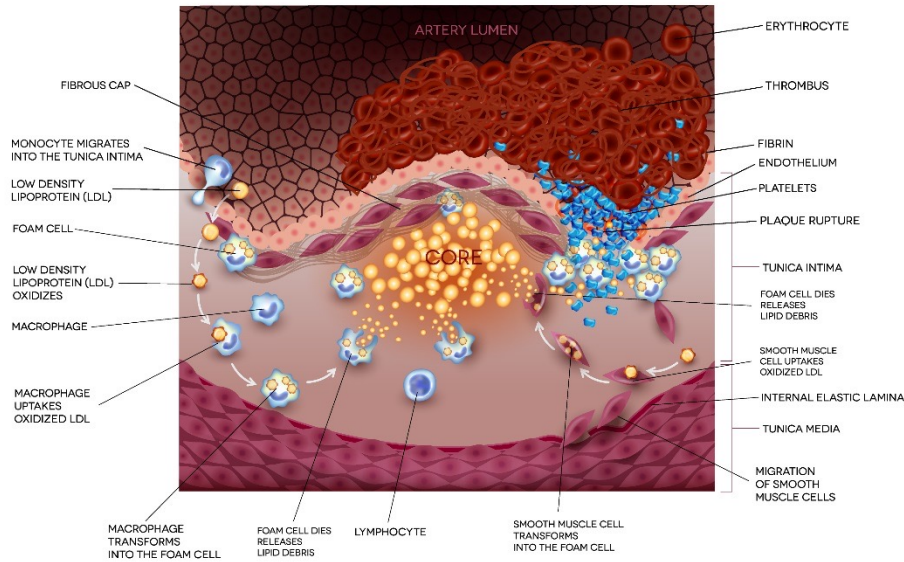
**NORMAL ARTERY
AND ARTERY WITH ATHEROSCLEROSIS,
BLOOD CLOT**



ATHEROSCLEROSIS

UNSTABLE PLAQUE FORMATION

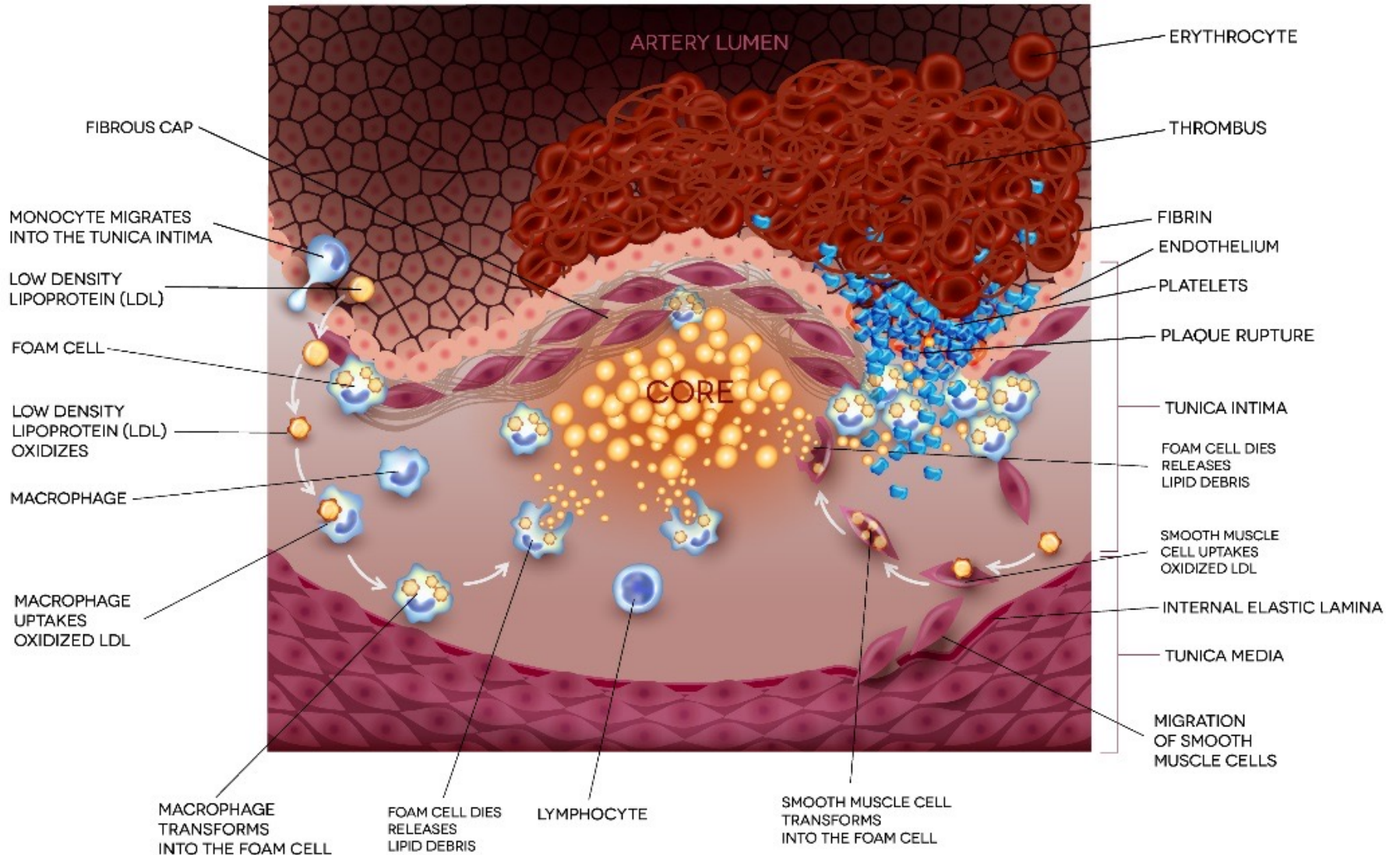
THROMBUS



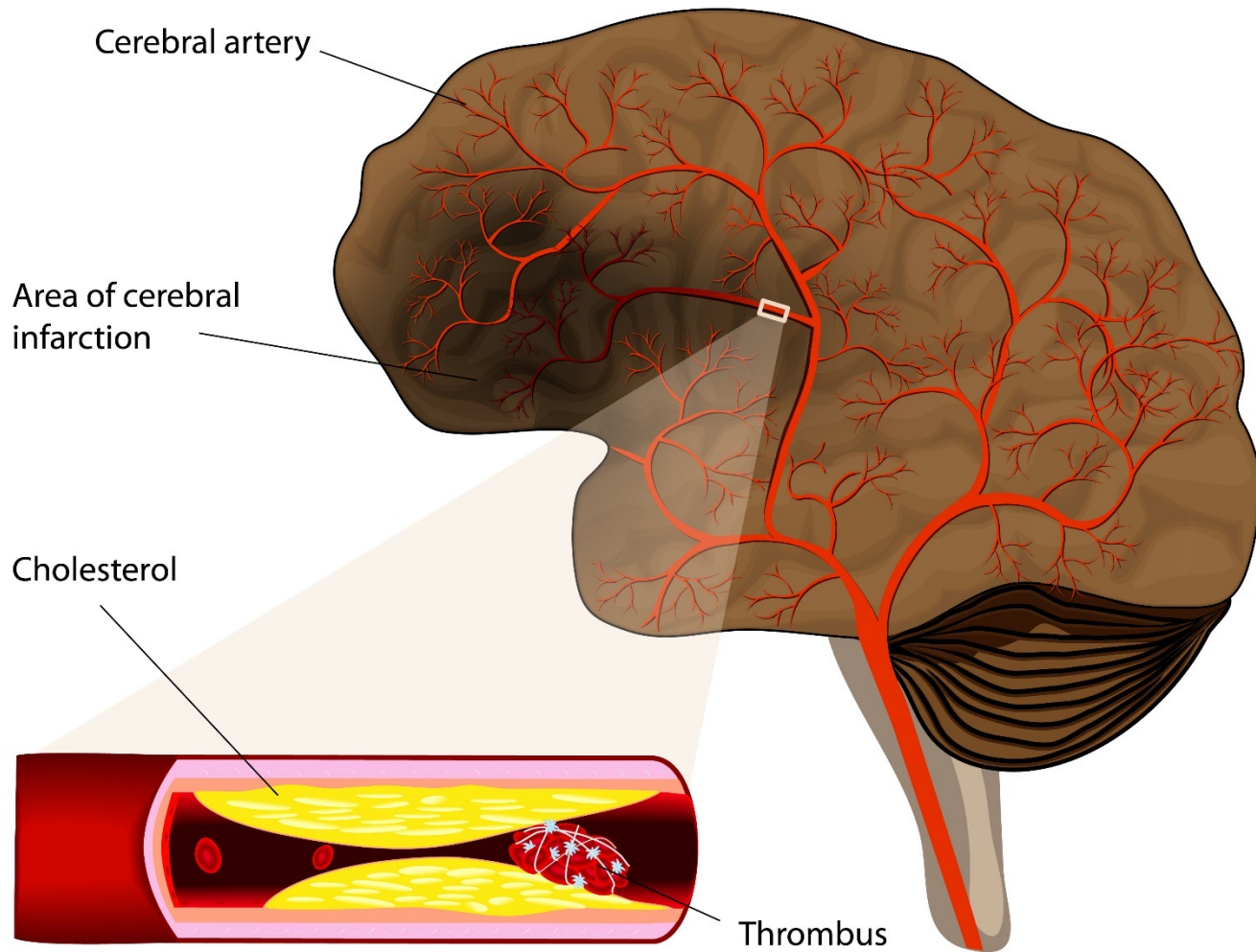
ATHEROSCLEROSIS

UNSTABLE PLAQUE FORMATION

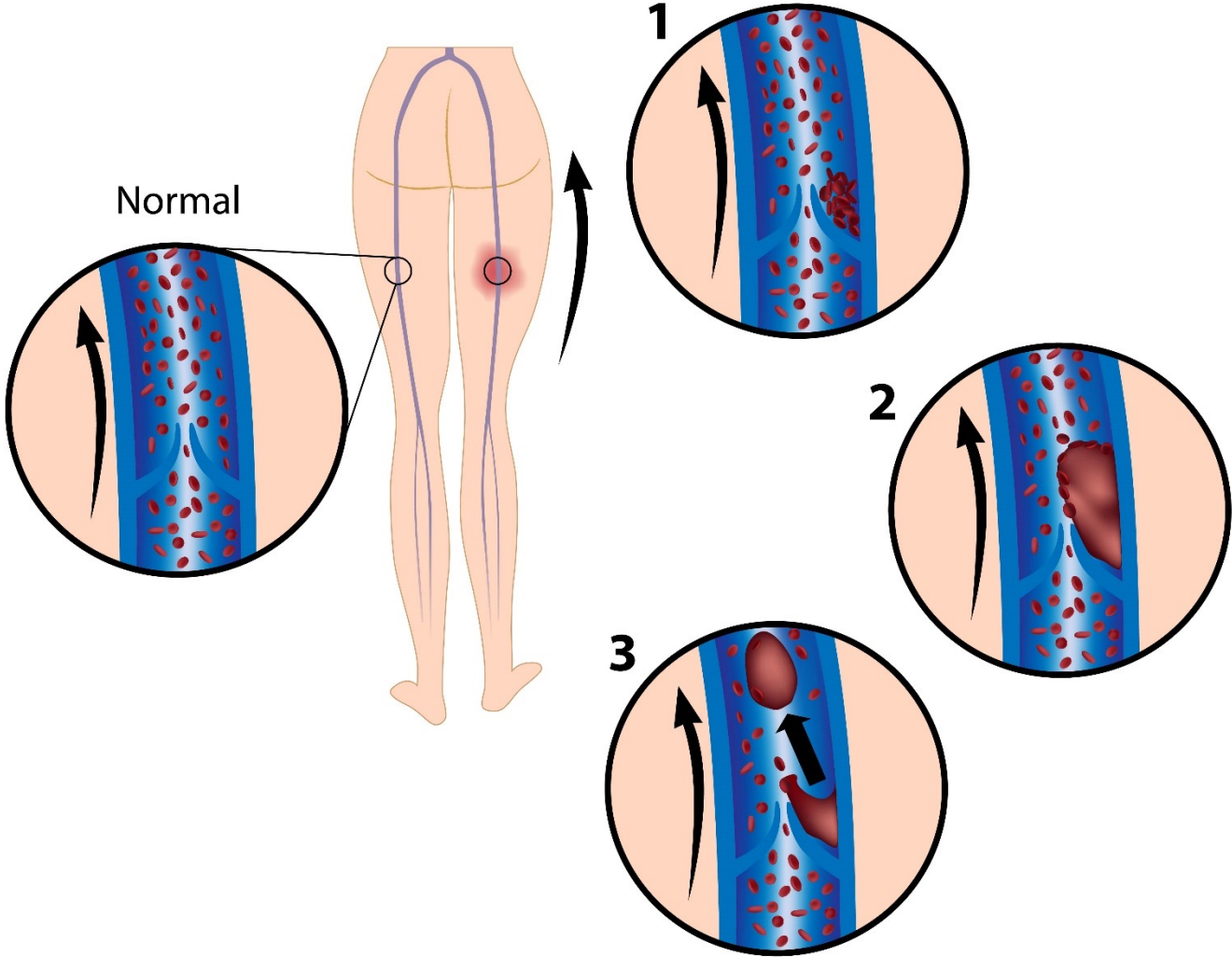
THROMBUS



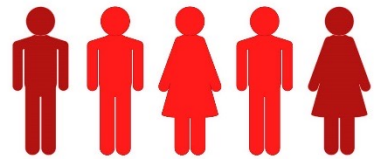
CEREBRAL INFARCTION



Deep Vein Thrombosis



Atherosclerosis



Disease is more prevalent in men than women

Complications



Stroke



Heart attack

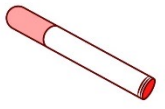


Gangrene

Risk



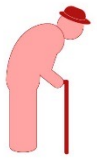
Diabetes



Smoking



Vitamin B6 deficiency



Age



Obesity



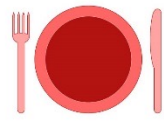
Male sex



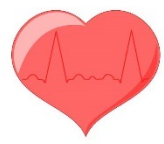
Genetic abnormalities



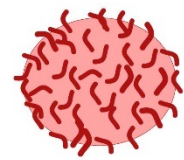
Sedentary lifestyle



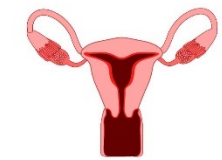
Unhealthy food



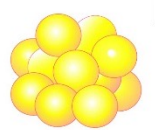
Hypertension



White blood cells



Postmenopausal estrogen deficiency

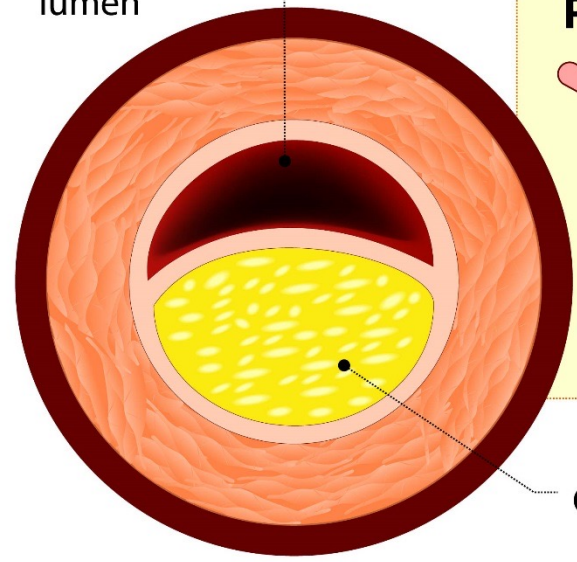


Fat

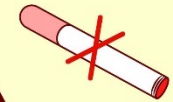


Chlamydia pneumoniae

Artery lumen



Prevention & Treatment



Weight loss



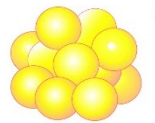
Diet



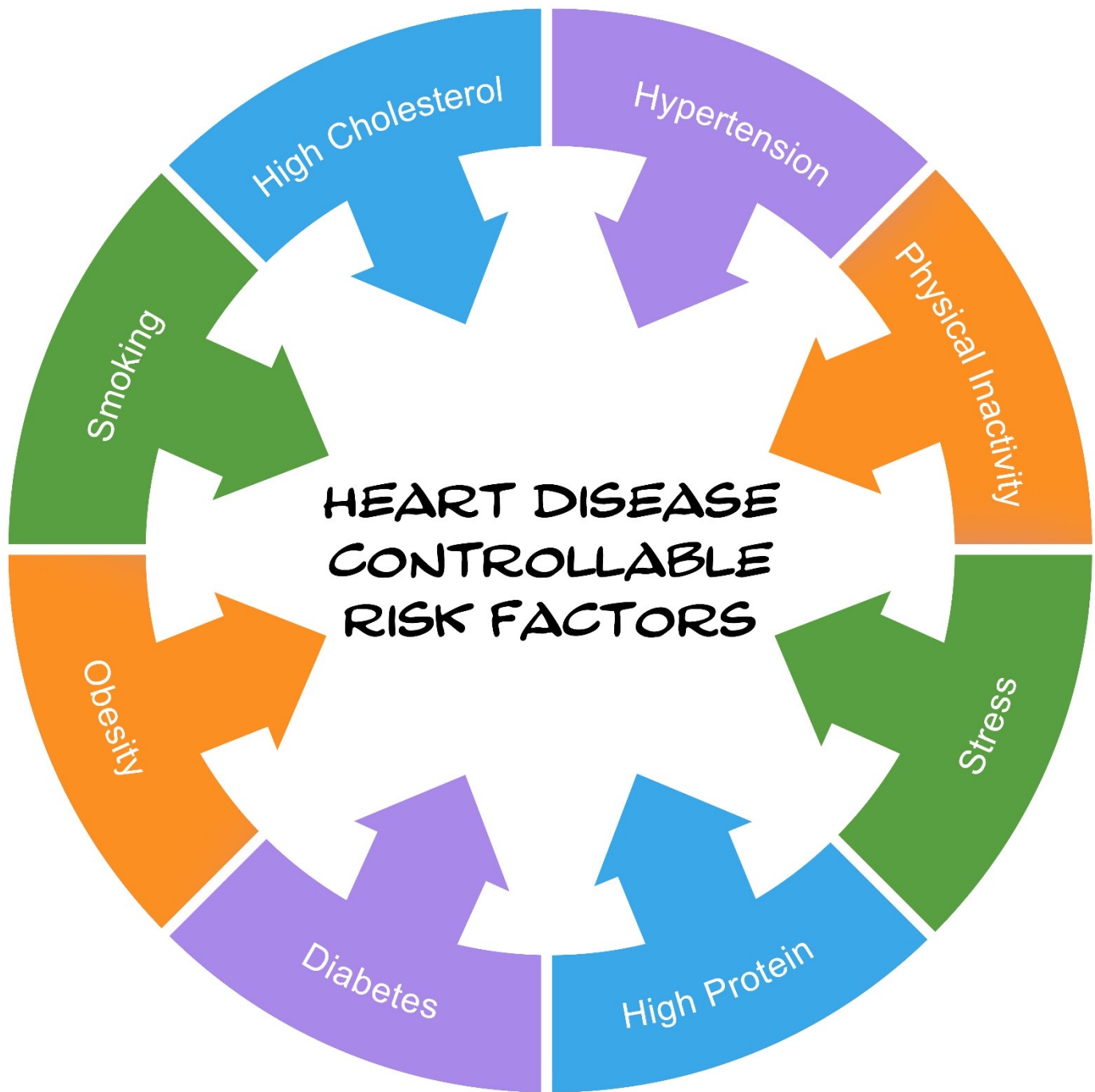
Exercise



Cholesterol



Fat



Hypertension

Vtct

Hypertension

- When blood pressure remains higher than normal guidelines for an extended period of time
- The heart has to work harder to pump blood around the body
- There is greater resistance in the vascular system
- In the long term, this may cause the heart muscle to become thicker and stiffer (myocardial hypertrophy)

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is smaller and has a similar flourish. The 'c' and 't' are also in the same font style.

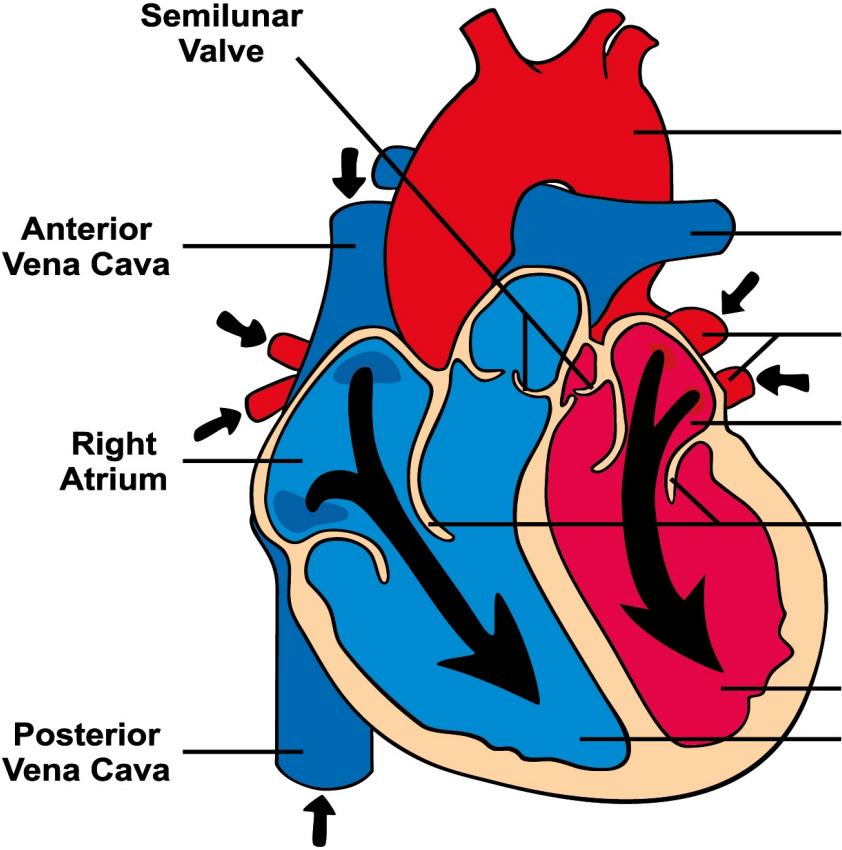
Blood pressure

Classification category	Systolic (mmHg)	Diastolic (mmHg)
Normal	<120	<80
Prehypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	160-179	100-109

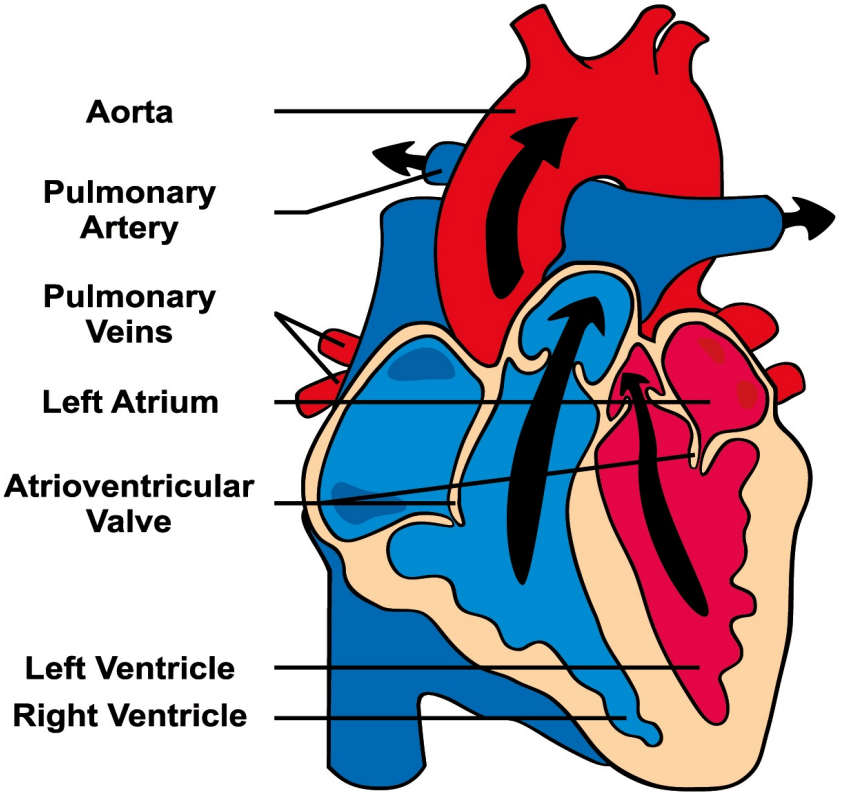
ACSM (2014,p46)

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and the 't's are smaller and connected to the 'c'.

Diastole & Systole of Human Heart



**Diastole
(Filling)**



**Systole
(Pumping)**

Hypertension

Signs and symptoms:

- Often referred to as 'the silent killer'
- May be asymptomatic/no symptoms
- If symptoms present, they may include: chest pain, breathlessness, headaches
- A heart attack or transient ischaemic heart attack or stroke can be the first noticed sign

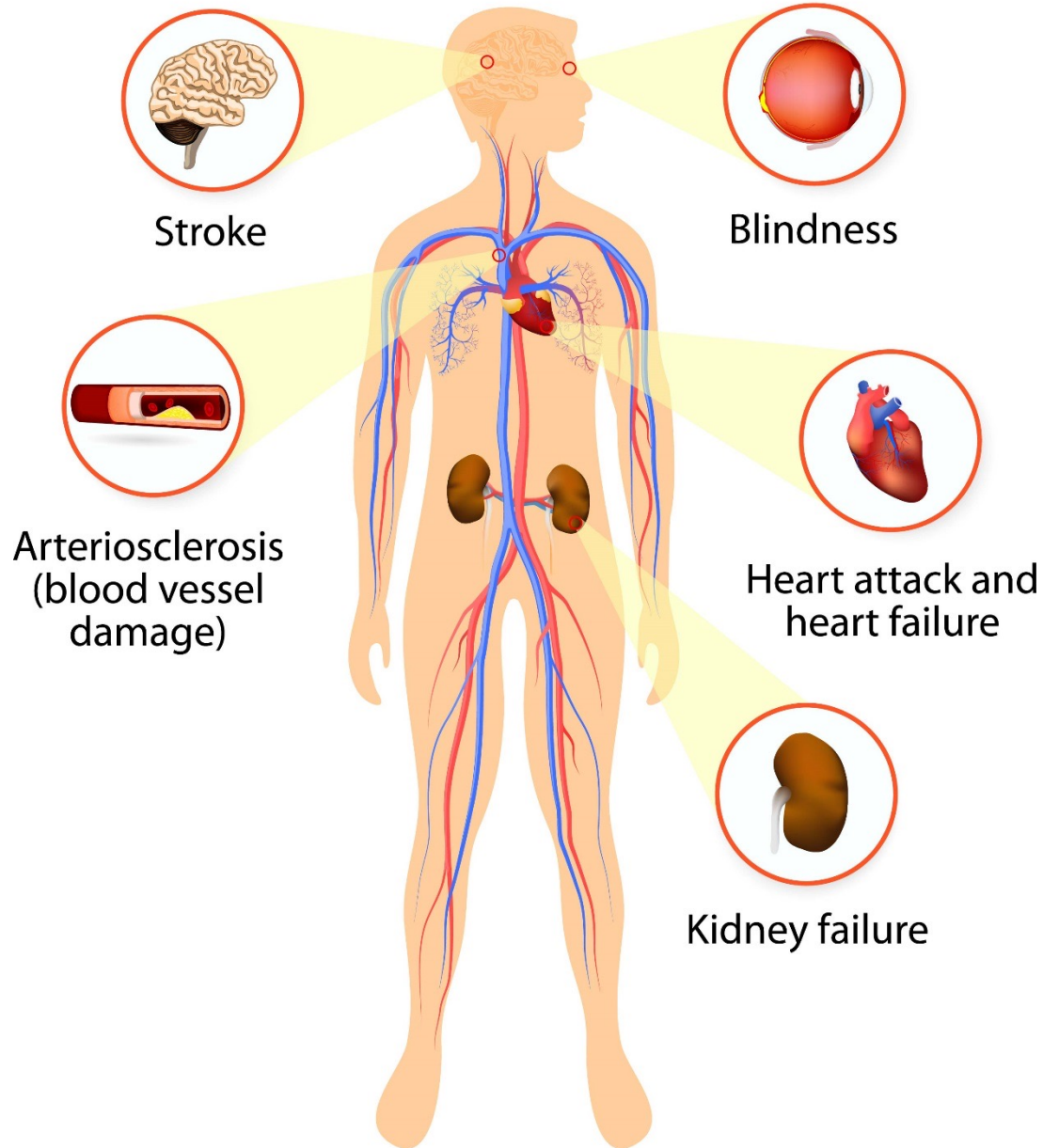
The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is smaller and has a similar flourish. The 'c' and 't' are also in the same style.

Hypertension and health risks

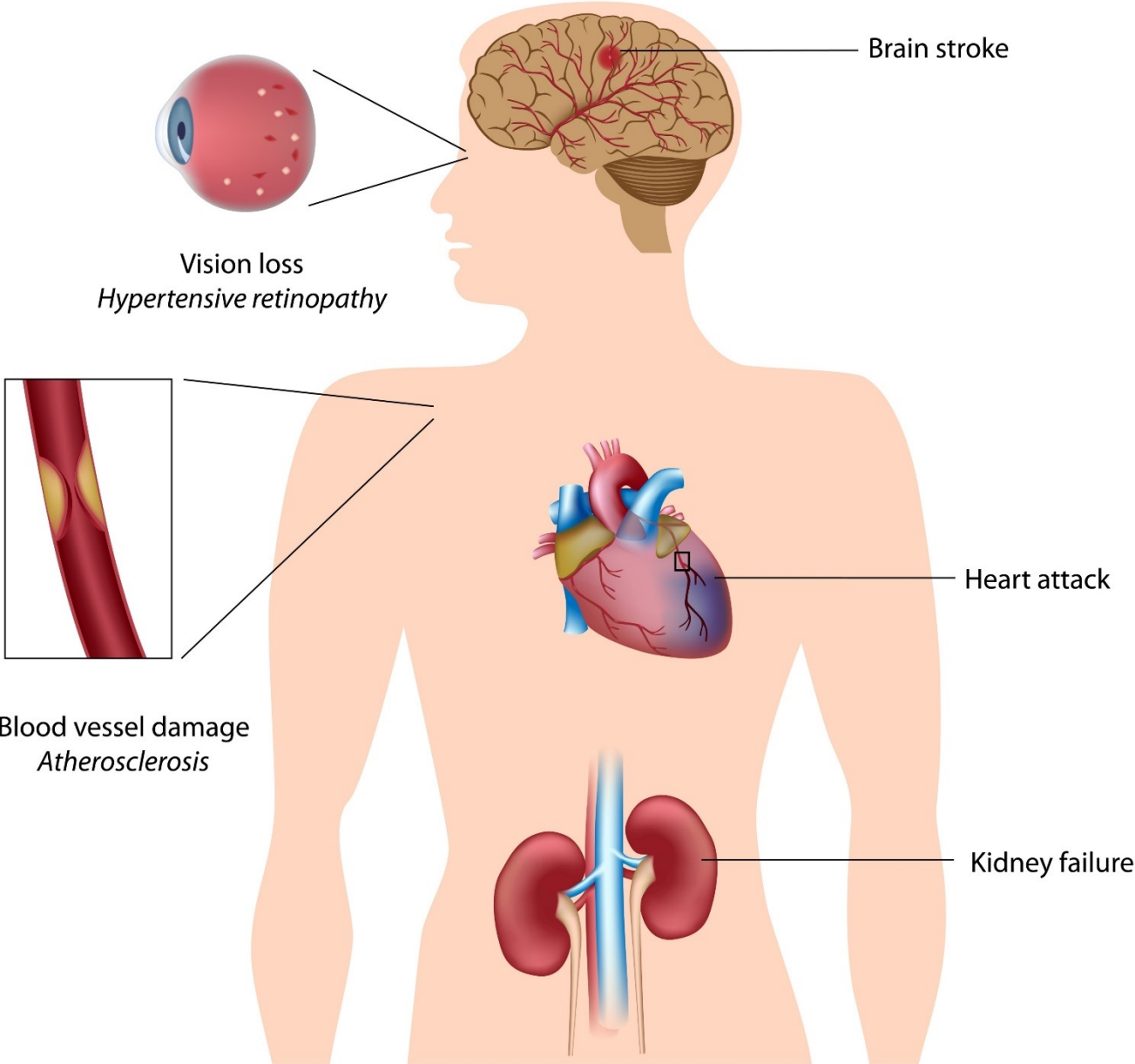
- Cardiovascular disease (CVD)
- Stroke
- Coronary heart disease (CHD)
 - Angina
 - Myocardial infarction (heart attack)
- Coronary artery disease
- Kidney disease
- Loss of vision



Hypertension



Main complications of hypertension



Hypertension

Contributory factors and causes:

- Increasing age
- Ethnicity - higher prevalence in black Caribbean men and women
- Family history
- Diet - high salt intake, high alcohol intake
- Physical inactivity
- Smoking
- Psychosocial stress

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Hypercholesterolemia

The logo for the Venous Thrombotic Centre of the United Kingdom (VTCT). It features the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that extends upwards and to the right. The 't' is lowercase and has a similar flourish. The 'c' and 't' are lowercase and are positioned to the right of the 'v' and 't' respectively.

cholesterol

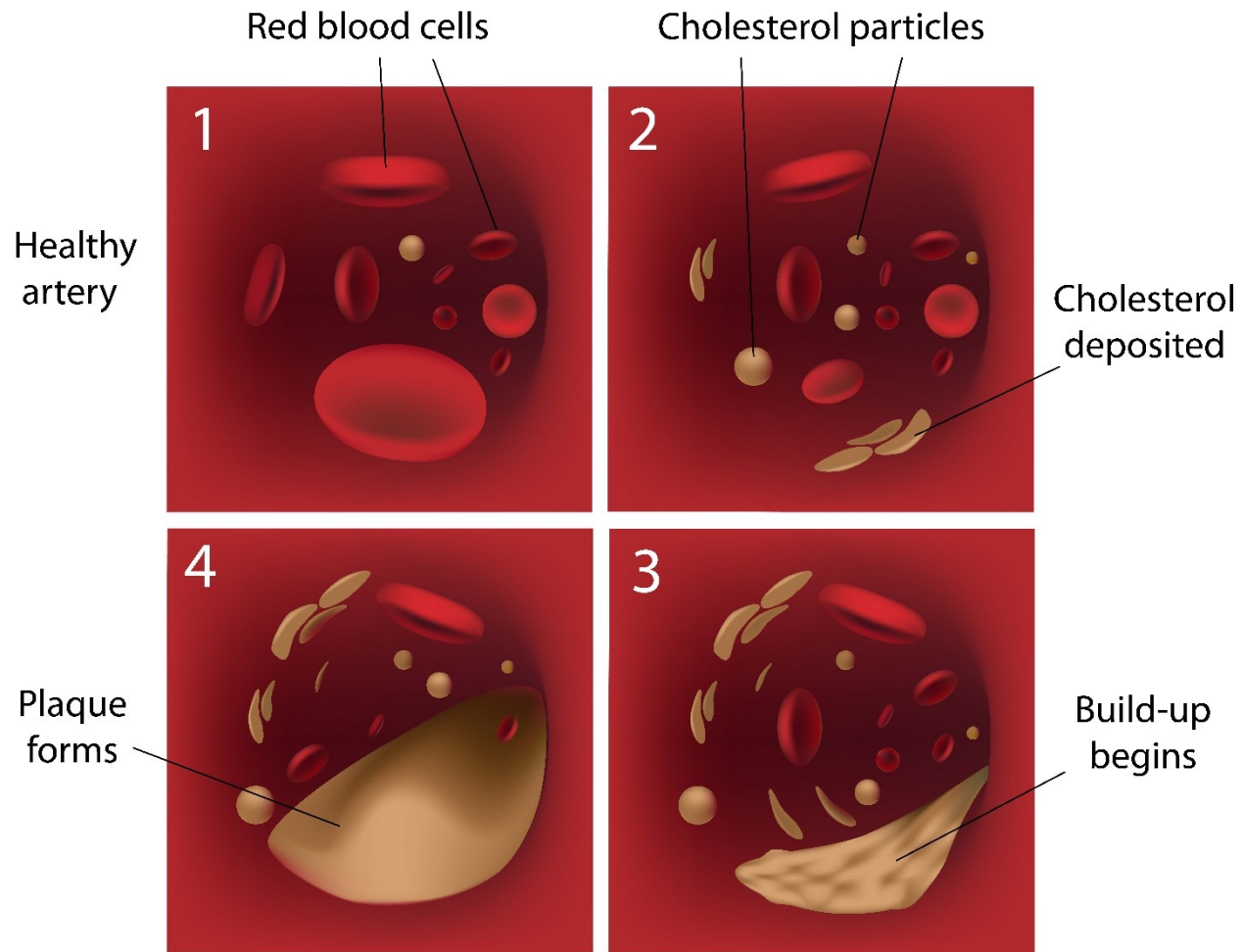


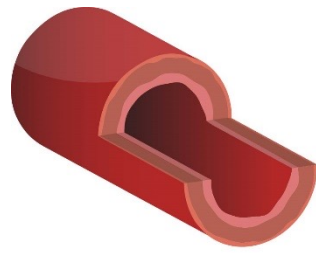
Hypercholesterolemia

- High blood cholesterol levels
- Cholesterol is transported in the blood attached to lipoproteins
 - HDL (healthier)
 - LDL (lousy – sticky plaque)
- Levels of TOTAL cholesterol categories:
 - Ideal: less than 5mmol/l
 - Mildly high: between 5 to 6.4mmol/l
 - Moderately high: between 6.5 to 7.8mmol/l
 - Very high : above 7.8mmol/l

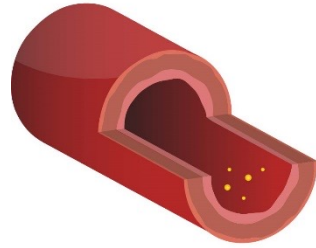


STAGES OF ATHEROSCLEROSIS

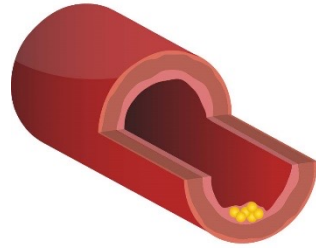




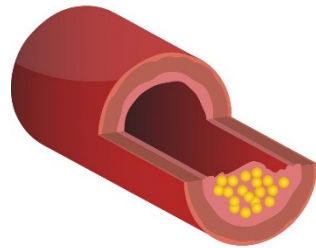
Normal cross section of artery



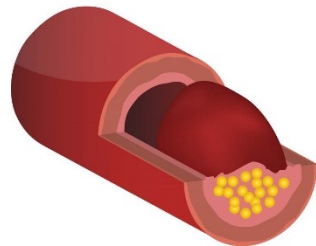
Cholesterol Particles



A plaque forms in the artery

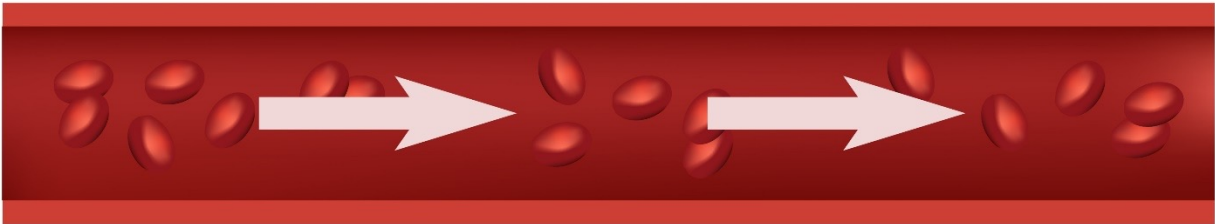


Artery becomes narrowed



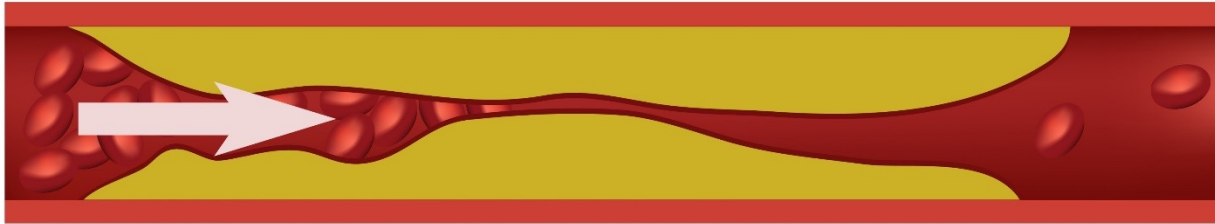
Narrowed artery becomes blocked by a blood clot

Normal Artery



Normal blood flow

Atherosclerosis Artery



Plaque narrows Artery
Obstacle to Blood Flow

Arteriosclerotic vascular disease

Hypercholesterolemia

Signs and symptoms:

- May be asymptomatic
- No initial symptoms
- Longer term risk of cardiovascular disease

Vtct

Hypercholesterolemia

Contributory factors and causes:

- Diet
- Inactivity
- Diabetes mellitus
- Some medications, e.g. diuretics, beta blockers, and oestrogens
- Some medical conditions, e.g. renal failure, hypothyroidism

Risk factors that determine LDL-cholesterol levels:

- Heredity
- Diet
- Weight
- Age and sex
- Alcohol
- Stress

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't's are smaller and also have decorative flourishes.

Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is also large and has a similar flourish. The 'c' and 't' are smaller and more standard in style.

Hypertension

Vtct

Medication

- Diuretics – diabetes, leg cramps, hyperlipidaemia
- Beta blockers – hypoglycaemia and low heart rate
- Calcium channel blockers – dizziness, postural hypotension
- Alpha blockers – nausea, weakness, postural hypotension
- ACE inhibitors – dry cough, dizziness
- Angiotensin II receptor antagonists – dizziness, fatigue, hypotension

Source: BMA. 2011. in Lawrence. 2013

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Side effects and exercise

Side effects of medication that may have an implication on the exercise response:

- Bradycardia
- Hypotension
- Leg cramps
- Postural hypotension
- Heart failure
- Nausea and vomiting
- Fatigue
- Headaches
- Flushing to face
- Ankle swelling
- Constipation
- Dry cough
- Renal impairment



Hypercholesterolemia

The logo for VTCT (Venous Thrombosis Clinical Trials Trust) is displayed in a purple, serif font. The letters 'V' and 't' are connected, and the 't' has a distinctive flourish.

Medication

- **Statins** – GI upset, muscle weakness
- **Lipid-regulating** – aching legs
- **Fibrates** – GI upset, dizziness
- **Cholestyramine** - GI upset, raised triglycerides

Source: BMA. 2011. in Lawrence. 2013

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Lifestyle interventions

CVD, Hypercholesterolemia and hypertension

- Regular exercise & physical activity
- Relaxation techniques
- Dietary modification
- Reduce alcohol, caffeine and salt
- Smoking cessation
- Weight management
- Reduce waist circumference

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Risks and benefits of exercise and activity

Vtct

Activity

What are the risks and benefits of exercise and activity?



Vtct

Exercise and blood pressure

Short term:

- No change in diastolic pressure.
- Progressive increase in systolic pressure during CV training.
- Rapid and greater increase in SBP during resistance training.
- Reduced BP for up to 24 hours after physical activity.

Long term:

- Reduction in resting blood pressure.
- Improved regulation of blood pressure.

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Risks - the Valsalva effect

- Attempt to exhale while airway(s) closed (nose and mouth).
- May occur during resistance training.
- Sometimes practised during powerlifting to assist heavier lifting.
- Can cause a sharp severe increase in blood pressure followed by a sudden drop in blood pressure.
- Decreases preload to heart.

The logo for VTCT, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that loops over the top of the 't's.

Exercise benefits

- Increased heart strength and efficiency
- Increased capillary network
- Increased stroke volume and cardiac output
- Increased elasticity of blood vessels
- Improved blood flow distribution
- Improved blood cholesterol profile
 - Lower LDL
 - Higher HDL
- Reduced blood pressure
- Improved ability to tolerate heat
- Reduced risk of cardiovascular diseases, e.g. stroke
- Improve glycaemic control

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Exercise risks

- Overexertion
- Aggravation of cardiovascular risks
 - Increased blood pressure
- Effects of medication
 - Hypotension
 - Postural hypotension

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Exercise guidelines, restrictions and considerations

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	<ul style="list-style-type: none">• 4-7 days/week• 30-60mins per session• 55-69% HR max• RPE 11-13• Increase activities of daily living
Muscular	<ul style="list-style-type: none">• 2-3 times a week• 1 set 8-12 reps• 60%-80% 1RM• Circuit weight training approach
Flexibility	<p>2-3 days minimum, ideally 5-7 days a week. To point of mild discomfort. Static stretches – up to 30 seconds Whole body approach</p>

Considerations

- Longer warm up
- More gradual increase of intensity
- Low to moderate intensity cardiovascular – lower working heart rate
- Low to moderate intensity muscular fitness – lower repetitions and resistance Ensure correct breathing
- For pool based exercise - blood pressure increases on entry to a swimming pool
- Keep feet moving throughout the exercise session to reduce risk of postural hypotension
- Be mindful of risk post exercise hypotension
- Longer cool down
- More gradual decrease of intensity to reduce risk of hypotension

Source: Lawrence. 2013

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Avoid

- High intensity
- Holding the breath
- Isometric work
- Excessive tension or gripping of equipment
- Heavy resistance training
- Sustained overhead movements
- Inverted exercises (e.g. yoga shoulder stands, down facing dog)
- Exercise environments that may increase blood pressure, e.g. high temperatures.
- Sudden changes in position (risk of postural hypotension)

Source: Lawrence. 2013

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Comorbidities

- Multiple CVD risk factors – may increase to high risk
- Obesity
- Diabetes
- Depression and anxiety
- Other medical conditions due to inactivity, e.g. muscular-skeletal

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Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion.
- Effects of multiple medications must be considered
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions



Recommended reading

Larry Durstine et al, eds. (2009) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Lawrence, D (2013) ***The Complete Guide to Exercise referral*** . UK. Bloomsbury publishing.

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that extends upwards and to the right, crossing over the 't's.

Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 't's are lowercase. The logo is positioned in the bottom right corner of the slide.

Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions
2. Explain how exercise can benefit patients with specified medical conditions
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions
2. Identify considerations for exercise when dealing with comorbidities

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vict

Understanding medical conditions for exercise referral

Depression and anxiety-related conditions

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that extends upwards and to the right, crossing over the 't's.

Depression



Vtct

Activity

- What are the signs and symptoms of:
 - Depression
 - Stress
 - Anxiety (General Anxiety Disorder – GAD)
- What causes each condition?
- How may each condition progress?

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Depression Symptoms

Emotions

- *Sadness*
- *Anxiety*
- *Guilt*
- *Anger*
- *Mood swings*
- *Irritability*

Thoughts

- *Self-criticism*
- *Impaired memory*
- *Indecisiveness*
- *Confusion*
- *Thoughts of death and suicide*

Physical

- *Chronic fatigue*
- *Lack of energy*
- *Sleeping too much or too little*
- *Weight gain or loss*
- *Loss of motivation*
- *Substance abuse*

Behavior

- *Withdrawal from others*
- *Neglect of responsibilities*
- *Changes in personal appearance*



Signs and symptoms

- At least 2 out of 3 core symptoms.
- All day, every day for at least 2 weeks.

Core Symptoms:

1. Low mood
2. Fatigue or lack of energy
3. Lack of interest or enjoyment in life

PLUS 3 other symptoms.

Diagnosis may be mild, moderate or severe depending on number and intensity of symptoms

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right.

Other signs and symptoms

Other symptoms:

1. Poor concentration and attention
2. Poor self-esteem and confidence
3. Feelings of guilt, worthlessness, self reproach
4. Bleak, pessimistic views of the future
5. Ideas or acts of self harm or suicide
6. Continuing state of worry and apprehension
7. Disturbed sleep (Insomnia or hypersomnia)
8. Poor appetite with weight loss or increased appetite with weight gain
9. Physical inactivity or hyperactivity
10. Decrease in sexual drive



Signs and symptoms



Diagnoses

Mild

- Negative but limited effect on daily life, e.g. difficulty concentrating at work or motivating self to do things normally enjoyed.

Moderate

- More symptoms are present and usually more obvious.
- A clear reduction in functioning at home and in the workplace.

Severe (clinical or major depression)

- Significantly interferes with ability to cope with daily life - eating, sleeping and many other everyday activities seem impossible.
- Can be life-threatening.
- Person may be unable to look after themselves.
- High risk of suicide.
- Inability to function can lead to hospitalisation.

Rethink 2010

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right.

Other types of depression

Bipolar Disorder (manic depression)

- Less common form
- Characterised by cyclical mood changes of severe highs (mania) and lows (depression).

Psychotic depression

- May present in rarer cases of severe depression.
- Depressive symptoms accompanied by form of psychosis, e.g. hallucinations or delusions.

Rethink 2010

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish that extends upwards and to the right, looping over the 't's.

Other types of depression

Post-natal depression

- Can occur from about 2 weeks and up to a year after the birth.
- Around 1 in every 10 women affected after having a baby.

Seasonal affective disorder (SAD)

- Linked to winter months and lack of exposure to sunlight.
- Bright light therapy can be helpful.

Rethink 2010

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't's are smaller and also have decorative flourishes.

Prevalence

- Annually, 8-12% of the population experience depression.
- Mixed anxiety & depression most common in Britain (9%).
- 1 in 20 GP visits due to depression.
- >100 patients per GP list BUT 50% unrecognised.
- Affects twice as many women than men.
- More than 50% experience more than once.
- After 3rd episode, relapse risk is 90%.
- For 1 in 5 people condition is chronic (20%).
- 121 million worldwide experience a depressive episode in a year.
- Forecast to be second only to coronary heart disease as the leading contributor to the global burden of disease by 2020 (World Health Organisation)

Source: MHF. 2010, in Lawrence, 2011 and 2013.

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Prevalence

1 in every 4
People
experience
mental
health
conditions



Anxiety and stress



Vtct

Signs and symptoms

- Chronic anxiety that persists for at least 6 months
- Not accompanied by panic attacks, phobias or obsessions
- Anxiety focused on 2 or more stressful life experiences, e.g. finances
- Sustained by 'basic fears' and triggered by events that elicit these (e.g. losing control, failure, ability to cope, etc.)
- Difficulty controlling the worry
- Restlessness
- Easily fatigued
- Difficulty concentrating
- Irritability
- Muscle tension
- Sleep difficulties
- Impacts ability to function
- Usually accompanied with depression

*General Anxiety
Disorder – GAD*

Vtct

Signs and symptoms

- Fight or flight response
- Clenched Jaw
- Muscles tense (fight or flight)
- Sweating
- Pupils dilate to see better
- Heart rate, blood pressure and breathing rate increase
- Palpitations
- Increased blood sugar for energy
- Anxious, gurgling, tummy (blood diverted away)
- Body gets bigger (aggressive) or smaller (shrinks)
- Increased adrenaline
- Sickness
- Jelly limbs

Prevalence

- Various links between stress and ill-health, other chronic health conditions, e.g. CHD, Hypertension.
- Work-related stress accounts for approximately 35% of all work-related illnesses
- Over 105 million work days are lost to stress each year (HSE)
- Cost to UK employers in region of £1.24 billion (HSE)

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is particularly large and has a decorative flourish extending from its top.

Contributory factors

- Chemical imbalance – (medical)
- Genetics (biological)
- Early experiences – attachment/loss (psychodynamic)
- Family relationships and support systems (systemic)
- Environment/life events, e.g. unemployment, debt (social),
prolonger stress
- Lack of self worth and blocks to actualisation (humanistic)
- Thinking patterns, perception (cognitive)
- Alcohol misuse
- Experiences/comfort zones – knowledge of resources and ability to
handle Cultural & Social background
- Inner resources – locus of control, coping
mechanisms

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't's are smaller and also have decorative flourishes.

Treatments and interventions

Vtct

Activity

- What are common treatments for depression, stress and anxiety?
- What are the desired effects, and side-effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is smaller and has a similar flourish. The 'c' and 't' are also in the same font style.

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is also large and has a similar flourish. The 'c' and 't' are smaller and more standard in style.

Treatments and interventions

- Medication.
 - Treat symptoms.
 - Not recommended as first line treatment for mild depression (NICE 2006).
 - Risks may outweigh benefits.
- Counselling and psychotherapy
 - Useful to help client understand factors that create or exacerbate symptoms.
- Lifestyle
 - Exercise – growing evidence base
 - Dietary changes – food stressors (caffeine, alcohol, sugar)
 - Sleep modification
 - Social support
 - Stress management
 - Counselling and psychotherapy
 - Relaxation, meditation, mindfulness
 - Self-help books

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Medication and side effects

Selective serotonin re-uptake inhibitors (SSRIs)

- Most commonly prescribed
- Fewer side effects.
- Nausea, vomiting, insomnia.

Tricyclic antidepressants (TCAs)

- Drowsiness, dry mouth, blurred vision, constipation, urinary retention, sweating

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Medication and side effects

Monoamine oxidase inhibitors (MAOIs)

- Dry mouth, insomnia, tachycardia, drowsiness, blurred vision, muscle twitching

Serotonin-norepinephrine re-uptake inhibitors (SNRIs)

- Weight gain, sedation

Tranquilizers (Benzodiazepines)

- Drowsiness, clumsiness, confusion, depression, dizziness, nausea
- Highly addictive and not recommended for long term use.
- Suicide risk.

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Side effects and exercise

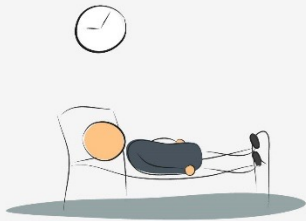
Side effects that have an implication on the exercise response:

- Tachycardia
- Dizziness
- Nausea
- Confusion
- Headaches
- Dry mouth

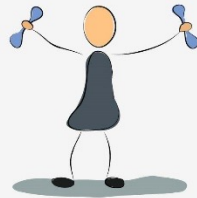
The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't's are smaller and also have decorative flourishes.

8 WAYS TO LIVE WITH DEPRESSION

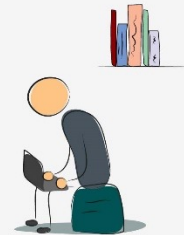
FACTS THAT EVERYONE SHOULD KNOW



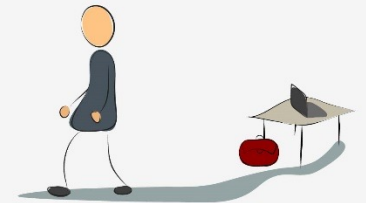
SLEEP ENOUGH
REST MORE OFTEN AND LONGER



EXERCISE REGULARLY
CHOOSE THE RIGHT EXERCISES
FOR YOURSELF



LEARN ABOUT
READ LEARN INVESTIGATE
EVERYTHING ABOUT DEPRESSION



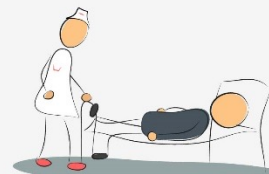
**LEAVE WORK AT
THE WORKPLACE**
YOUR HOUSE FOR YOUR REST



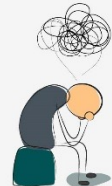
TALK WITH FRIENDS
DO NOT REJECT ALL



WATCH FOR NUTRITION
IT SHOULD BE HEALTHY WITH VITAMINS



ACCEPT TREATMENT
DO NOT REFUSE ON MEDICAL AID



HAVE HOPE
POSITIVE ATTITUDE HELPS

Risks and benefits of exercise and activity

Vtct

Activity

1. What are the risks and benefits of exercise and activity for clients with depression, stress or anxiety.



Exercise and activity

Benefits to mental health include:

- Improved mood
- Improved self-esteem and confidence
- Decreased risk of clinically diagnosed depression
- Increased physical self worth and improved body image
- Distraction from negative thinking
- Improved self efficacy
- Reduced anxiety

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Benefits of exercise and activity

- **Tranquillising:** Increased heart rate, circulation, endorphins, thermoregulation.
- **Improved mood:** Chemical balance - serotonin, dopamine, etc.
- **Feel good factor:** Increased endorphins
- **Cope with stress:** Increased adrenal activity, steroid reserves
- **Physical release:** Expend muscular tension (fight or flight)
- **Mental focus:** Distraction from other thoughts, sense of mastery
- **Structure for day:** Routine, planned schedule.
- **Reduced isolation:** Opportunity to socialise, promotes inclusion, interaction with others

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Risks

- Risk stratification will be affected by various factors.
- Specific condition symptoms make exercise challenging:
 - Low motivation
 - Low energy
 - Lack of enjoyment
 - Hopelessness
- Medication side effects add risk, e.g. tachycardia
- Other lifestyles factors, e.g. smoking add risk.
- Comorbidities will increase risk

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Exercise guidelines, restrictions and considerations

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Activity

1. What are the exercise guidelines and restrictions for clients with depression, stress or anxiety?
2. What are the considerations for exercise when dealing with comorbidities?

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Exercise Guidelines

Larry Durstine & Moore (2003:318)

Cardiovascular

- 3-5 days a week
- RPE 11-14 (on 6-20 scale)
- 20-30 minutes (shorter sessions may be needed initially)
- Large muscles, walk, run, swim, cycle

Muscular Fitness

- 2 days a week
- 1 – 2 sets
- 8-12 reps
- 50-70% 1RM
- 20-40 minutes
- Whole body approach
- Low resistance, high reps (>12 reps)

Flexibility

- 5 days a week
- To point of mild discomfort
- 20-60 seconds
- Whole body approach

Functional

- Promote ADL daily
- Moderate
- 30 minutes
- Activity related to daily living
- Walking
- Gardening
- Housework

Restrictions

- Symptoms - low energy, self-belief, anxiety, and motivation
- Exercise response similar to symptoms of anxiety, e.g. increased heart rate, sweating.
- Locus of control – hopelessness – exercise won't help
- Medication and side effects
- Current fitness and activity levels
- Co-morbidities
- Other lifestyle factors, e.g. smoking

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Considerations

- Awareness of symptoms and affects, low energy
- Awareness of medication and side effects
- Awareness of risks, e.g. suicide, drop-out
- Current fitness and activity levels
- Co-morbidities
- Other lifestyle factors, e.g. smoking, alcohol misuse
- Accumulative - realistic frequency, intensity, time, type of activity
- Progress very gradually
- Promote enjoyment and fun and socialisation
- Use/recommend other complementary practices, e.g. relaxation, breathing, mindfulness, positive self talk and affirmations.
- Increase support
- Encourage social support

Comorbidities

- Coronary heart disease - CHD
- High blood pressure
- High cholesterol
- Diabetes
- Irritable bowel syndrome
- Some cancers
- Obesity
- Substance misuse, e.g. smoking, alcohol
- Self harm
- Suicide

The logo for VTCT, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that extends upwards and to the right, crossing over the top of the 't's.

Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion
- Effects of multiple medications
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions



Recommended reading

Larry Durstine et al, Eds. (2003) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Davies, T & Craig, T Eds. (2009) ***ABC of Mental Health***. 2nd ed. UK. BMJ books. Wiley-Blackwell.

Johnstone, M (2007) ***I had Black Dog***. London. UK. Constable & Robinson Ltd.

Faulkner, G and Taylor. A (2005) Eds. ***Exercise, Health and Mental Health. Emerging Relationships***. Oxon. UK. Routledge.

Lawrence, D & Burns, J (2011) ***Exercising your way to health - Depression***. UK. Bloomsbury publishing.

Lawrence, D & Bolitho, S (2011) ***The Complete Guide to Physical Activity for Persons with Mental Health Conditions***. UK. Bloomsbury publishing.

Lawrence, D (2013) ***The Complete Guide to Exercise referral***. UK. Bloomsbury publishing.

Mental Health Foundation (2007) ***Fundamental Facts***. UK. MHF

The logo for vtct (Victory Through Community and Teamwork) is displayed in a stylized purple font. The letters 'vtct' are lowercase and connected, with a decorative flourish above the 't'.

Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 'tct' are uppercase. A decorative flourish is attached to the top of the 't'.

Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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A large, faint watermark of a university crest is visible on the left side of the slide. The crest features a shield with a cross, topped by a crown and surrounded by ornate flourishes. Below the shield, a banner contains the Latin motto "ET VENUSTAS PER SCIENTIAM".

vict

Understanding medical conditions for exercise referral

Diabetes

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

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Signs, symptoms and common causes

Vtct

Activity

- What are the signs and symptoms of diabetes?
- What causes diabetes?
- How may diabetes progress?



Vtct

Diabetes



Diabetes

- A group of disorders characterised by having excess glucose in the blood.
- Main types:
 - Type 1 diabetes mellitus
 - Type 2 diabetes mellitus
 - Gestational diabetes mellitus
- **Diagnosis** based on symptoms, physical examination and laboratory tests:
 - Fasting plasma glucose - $>6.0\text{mmol/l}$, or
 - 2 hour plasma glucose - $>11.1\text{mmol/l}$ following an oral glucose tolerance test (OGTT)

Source: Diabetes UK. In Lawrence. 2013

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DIABETES

infographic

TYPE OF DIABETES

Type 1 DM

"insulin-dependent diabetes mellitus"(IDDM) or "juvenile diabetes"

Type 2 DM

"non insulin-dependent diabetes mellitus" (NIDDM) or "adult-onset diabetes"

Gestational DM

is the third main form and occurs when pregnant women without a previous history of diabetes

Diabetes

- Occurs when there is lack of the hormone insulin and/or the body is unable to respond to action of insulin
- The main hormones responsible for controlling blood sugar levels are:
 - **Insulin** – produced by the *beta* cells in the pancreas
 - **Glucagon** – produced by the *alpha* cells in the pancreas

Source: Lawrence. 2013

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Diabetes

Type 1

- Pancreas no longer produces insulin
- Usually develops at a younger age
- Symptoms develop rapidly – over a few weeks or months
- Cannot be cured
- Managed by insulin

Type 2

- Beta cells in pancreas unable to produce sufficient insulin usually develops at later age
- Symptoms develop more slowly, may be unnoticed
- Preventable and can be managed by lifestyle changes

Source: Lawrence. 2013

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Diabetes

Signs and symptoms:

- Increased thirst - polydipsia
- Blurred vision
- Tiredness
- Increased urination - polyuria
- Increased hunger - polyphagia
- Recurrent infection, e.g. thrush
- Unexpected weight loss (usually in type 1)

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SYMPTOM OF DIABETES



ALWAYS HUNGRY



ALWAYS THIRSTY



DIZZINESS



UNEXPLAINED WEIGHT LOSS



FREQUENT URINATION



NUMB OR TINGLING
HANDS OR FEET



CANDIDA



WEIGHT GAIN



SKIN PROBLEMS



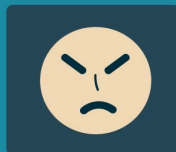
WOUNDS HEAL SLOWLY



SEXUAL PROBLEMS



BLURRY VISION



TANTRUM



HIGH BLOOD SUGAR



PRESSURE



EXTREME FATIGUE

Diabetes

Contributory factors and causes:

Type 1:

- Genetic factors – other family members with type 1 diabetes
- Environmental factors – e.g. triggered by exposure to specific chemicals or viral infections

Type 2:

- Family history of type 2 diabetes
- Increasing age
- Obesity or central obesity
- High blood pressure
- Physical inactivity
- Diet
- Impaired glucose tolerance
- Impaired fasting glycaemia
- Ethnicity

The logo for Vtct (Vascular and Tissue Care Trust) is displayed in a purple serif font. The letters 'Vtct' are stylized, with a decorative flourish above the 't'.

Diabetes Risk Factors

Overweight



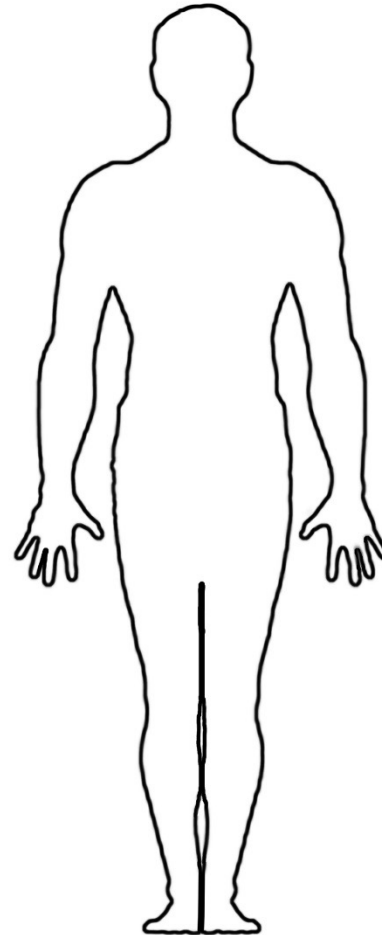
High blood pressure



High level of cholesterol



Genetics/
Family history



Complications

Vtct

Hypoglycaemia ('Hypo')

- Low blood glucose - below 4mmol/l
- Occurs when too much insulin in body
- May be caused by change in food intake or missing meals, exercise, alcohol consumption, insulin.

Signs and symptoms include:

- Trembling
- Sweating
- Anxiety
- Feeling faint
- Feeling hungry
- Paleness
- Mood changes
- Confusion
- Elevated pulse
- Slurred speech



Hyperglycaemia

- Elevated blood sugar levels – above 10mmol/l
- Is a common effect of uncontrolled diabetes
- Long term hyperglycaemia increases risks of other complications
- Caused by changes in food intake, exercise, medication timings, stress, illness.

Signs and symptoms include:

- Restlessness and nervousness
- Increased thirst
- Dry mouth
- Decreased appetite
- Fatigue
- Nausea
- Vomiting
- Acetone breath



Diabetic ketoacidosis

- Build up of ketones
- Blood becomes more acidic
- Acetone smell
- Rapid deep breathing
- Can lead to drowsiness and coma
- Potentially life threatening
- Rare in type 2
- More likely if insulin management insufficient

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Diabetes

Long term complications reduce life expectancy.

Micro vascular

- Peripheral neuropathy – damage to nerves of lower limbs
- Autonomic neuropathy – damage to nerves that affect involuntary function
- Retinopathy – damage to small arteries at the back of the eye
- Nephropathy – damage to the kidneys

Macro vascular

- Ischaemic heart disease
- Stroke
- Peripheral vascular disease

The logo for Vtct (Vascular and Tissue Care Trust) is displayed in a large, purple, serif font. The 'V' is particularly large and stylized, with a thin purple line curving over the top of the 't's.

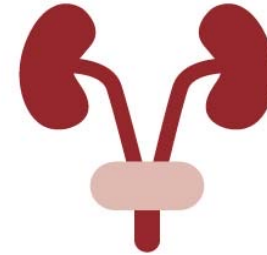
COMPLICATIONS



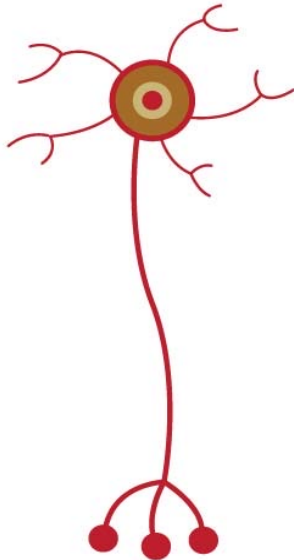
CEREBROVASCULAR DISEASE



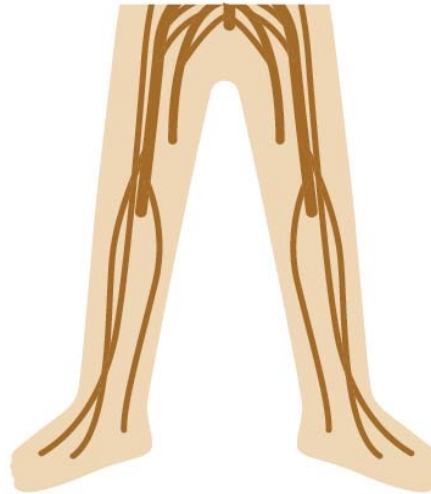
CORONARY HEART DISEASE



DIABETIC NEPHROPATHY



PERIPHERAL NEUROPATHY



PERIPHERAL ARTERIAL DISEASE



EYE DAMAGE



DIABETIC FOOT

COMPLICATIONS

MACROVASCULAR

- Transient ischemic attack
- Cerebrovascular accident
- Cognitive impairment
- Stroke



- Coronary syndrome
- Myocardial infarction
- CHF



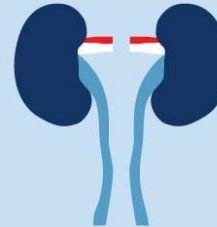
EXTREMITIES

- Gangrene
- Ulceration

MICROVASCULAR



- Retinopathy
- Glaucoma



- Microalbuminuria
- Kidney failure

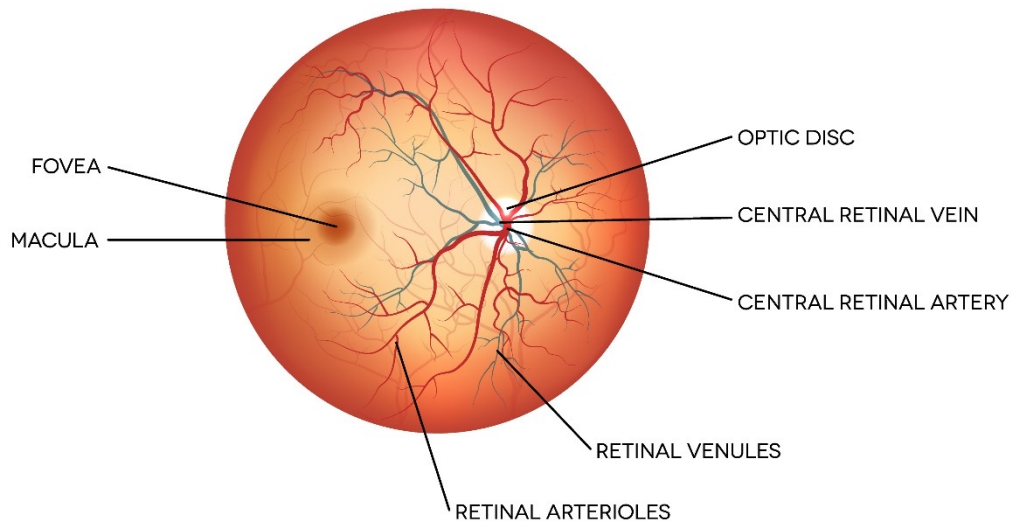


- Peripheral neuropathy
- Autonomic neuropathy

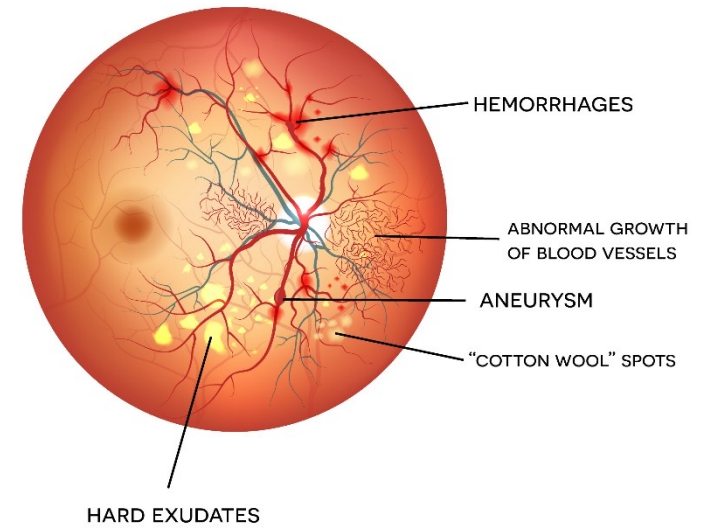


DIABETIC RETINOPATHY

NORMAL RETINA



DIABETIC RETINOPATHY



Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

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Medication and side effects

Insulin

- Hypoglycaemia
- Consider injection site irritation

Metformin

- Gastrointestinal discomfort
- Nausea
- Vomiting
- Diarrhoea

Sulphonylureas

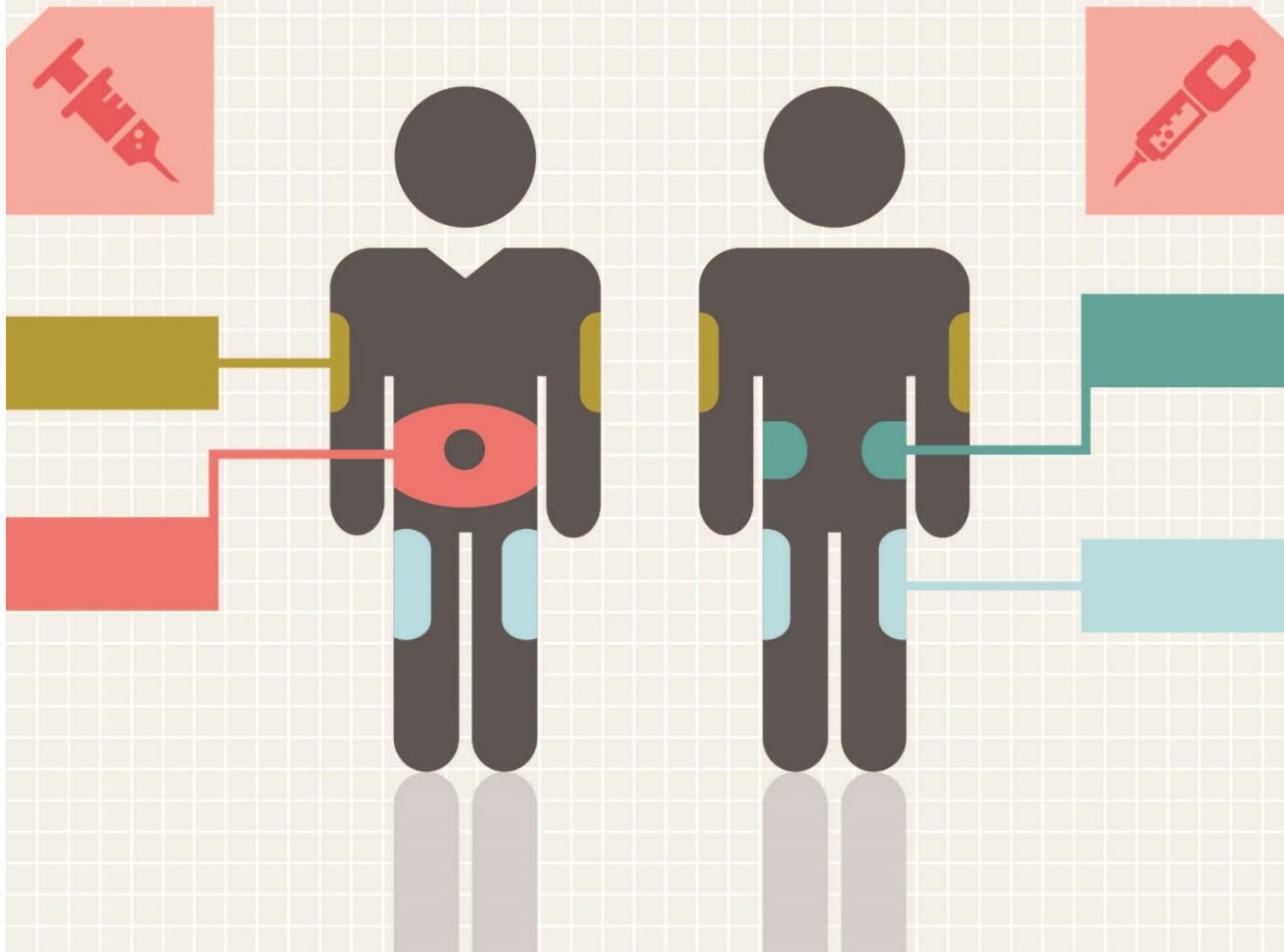
- Hypoglycaemia
- Weight gain
- Nausea and diarrhoea

Source: NHS choices. 2012. in Lawrence. 2013

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is particularly large and has a decorative flourish extending from its top.

DIABETES MELLITUS

INSULIN INJECTION SITES



Side effects and exercise

- Hypoglycaemia is key effect both during and after exercise
- Key considerations:
 - Food intake & blood glucose before and after exercise
 - Timing of medication
- Advise clients to check blood glucose levels during and after exercise

Source: NHS choices. 2012. in Lawrence. 2013

Vtct

Side effects and exercise

Other side effects of medication that may have an implication on the exercise response:

- Hypoglycaemia
- Dizziness
- Nausea
- Weight gain
- Effects of other CVD risk factors and medications

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Lifestyle intervention

- Nutritional advice
- Physical activity
- Weight management
- Smoking cessation
- Alcohol reduction
- Medication management
- Complication surveillance and management, e.g. foot care, eye care etc.

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PREVENTION



**KEEP NORMAL
BODY WEIGHT**



HEALTHFUL DIET



SWEET FOOD CONTROL

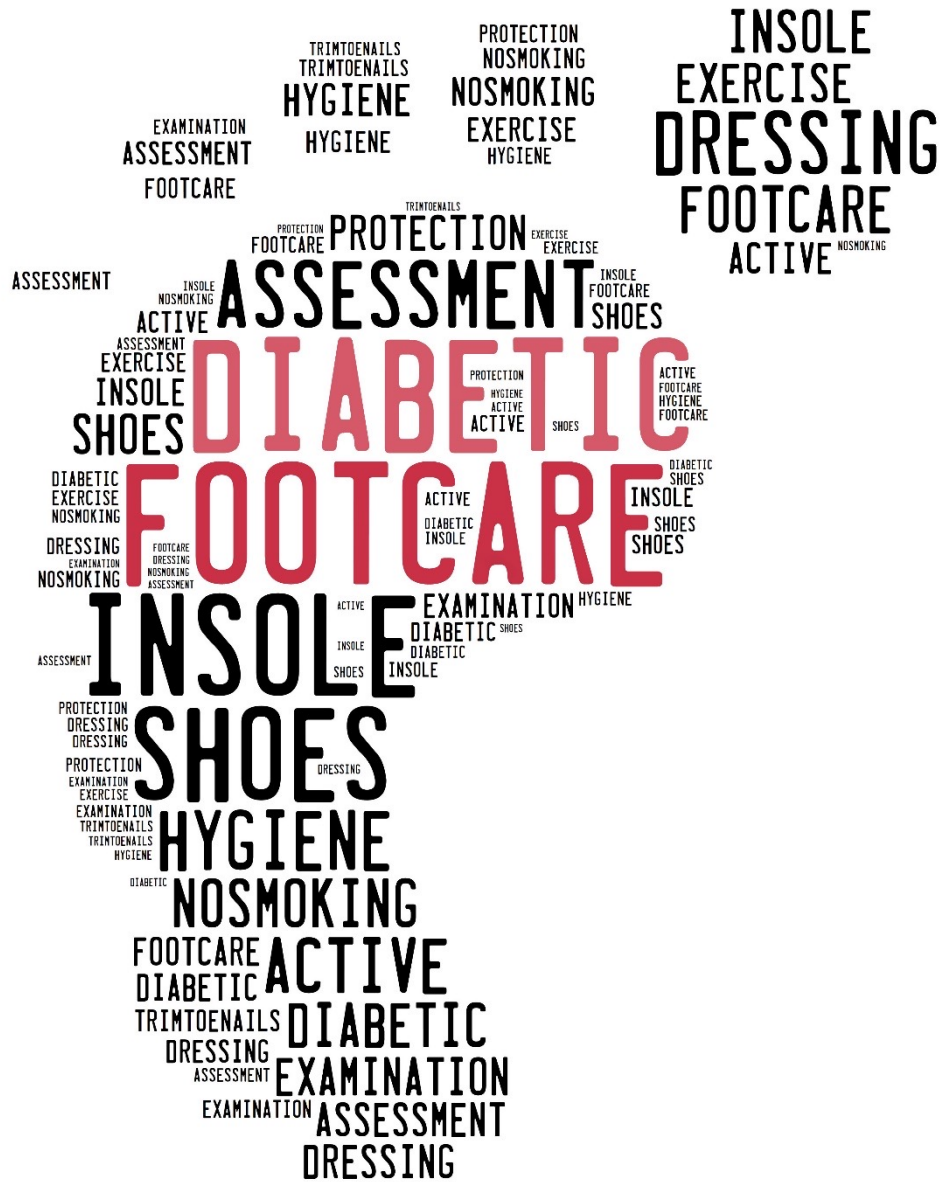


EXERCISE



NO SMOKING

Vtct



Risks and benefits of exercise and activity

Vtct

Activity

What are the risks and benefits of exercise and activity?



Vtct

Benefits

- Improves insulin sensitivity
- Improves hypertension
- Improves lipid control
- Reduces CVD risk factors
- Improves non-insulin dependent muscle glucose uptake
- Increases insulin sensitivity and glucose uptake long after aerobic exercise

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Risks

Key considerations before starting an exercise programme

- Client is assessed by GP, is stable and exhibits no contra-indications to exercise
- Diabetes is well controlled
- Client is taught about appropriate footwear and ongoing foot care
- Client is aware of the effect of activity on blood glucose levels (hypoglycaemia and hyperglycaemia)
- Client knows the signs and symptoms of hypoglycaemia and knows what action to take
- Client is able to self-monitor blood glucose levels
- Client has discussed treatment changes such as adjusting insulin dosage and/or carbohydrate intake prior to exercise and for 24 hours afterwards
- Instructor is first aid trained and can manage hypoglycaemia and hyperglycaemia in the exercise environment

Source: Lawrence. 2013

The logo for Vtct (The Voluntary Transport and Civil Taxi Council) is displayed in a purple serif font. The letters 'Vtct' are stylized, with a decorative flourish above the 't'.

Exercise guidelines, restrictions and considerations

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	<ul style="list-style-type: none">• 4-7 sessions per week• 20-60mins per session• 50%-80%peak HR• Monitor RPE during exercise
Muscular	<ul style="list-style-type: none">• 1-3 days/week• 1 set. 10-15 repetitions• 40-60% of 1RM• Higher resistance OK for clients with well controlled diabetes
Flexibility	<ul style="list-style-type: none">• 2-3 sessions per week, ideally every day• Static stretches hold for 10-30 secs

Considerations

Do not exercise if:

- Blood glucose level is >13 mmol/l and ketone testing is inappropriate or not possible.
- Blood glucose level is >13 mmol/l with ketones (Diabetes UK 2004a).

The American Diabetes Association (2004) suggests that this may be over-cautious for a person with Type 2 diabetes, especially if the person has recently eaten.

- If the person feels well and ketones are negative, it may not be necessary to postpone low to moderate exercise based simply on hyperglycaemia.
- It is important to encourage good glycaemic control and the aim is to exercise in the presence of optimal glycaemic control.

Source: Lawrence. 2013

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 't's are lowercase, with a decorative flourish above the first 't'.

Considerations

Exercise with caution if:

- Blood glucose level is >13 mmol/l without ketones, as there may not be enough insulin to mobilise sufficient glucose for exercise (Diabetes UK 2004)

Source: Lawrence. 2013

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Considerations

- Encourage clients to measure their blood glucose levels before and after exercise
- Clients should reduce their insulin dose for planned activity/exercise. This will involve some degree of experimenting. Advise clients to discuss this with their diabetes team or healthcare professional
- Plan exercise 1–2 hours after meals. It is best to avoid exercising during the peak insulin action as this, combined with exercise, increases the risk of hypoglycaemia

Source: ACSM 2005; AACVPR 2004; NICE 2004. in Lawrence. 2013

The logo for Vtct (The Virtual Trainer) is displayed in a purple serif font. The 'V' is large and stylized, with a thin purple line curving over the top of the 't's.

Considerations

- Use injection sites away from areas of the body predominantly used during exercise
- Clients should always carry fast-acting carbohydrate snacks or drinks when exercising
- Delayed hypoglycaemia can occur up to 36 hours after intense exercise as the muscles refuel

Source: ACSM 2005; AACVPR 2004; NICE 2004. in Lawrence. 2013

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Considerations

- Clients with Type 2 diabetes who are not on insulin or sulphonylureas are unlikely to have a hypo; however, they may need to eat soon after exercise.
- Certain medications can mask or increase the risk of hypoglycaemia, including beta-blockers, calcium channel blockers and diuretics
- Clients should drink plenty of water before, during and after activity to avoid dehydration
- Alcohol inhibits glucose production, causing a hypoglycaemic effect. This hypoglycaemic effect can last up to 24 hours
- Encourage daily foot inspection and remind clients to inform you about any changes such as blisters or inflammation

Source: ACSM 2005; AACVPR 2004; NICE 2004. in Lawrence. 2013

The logo for VTCT (The Voluntary Training Council for the Tackling of Type 2 Diabetes) is displayed in a stylized purple font. The letters 'V', 't', and 'c' are significantly larger and more prominent than the 't' and 't'.

Contra-indications

- Active retinal haemorrhage
- Client has recently received laser therapy for retinopathy
- Illness or infection
- Blood glucose above 13.8mmol/L and ketones (hyperglycaemia)
- Blood glucose less than 3.9mmol/L

Source: Larry Durstine and Moore (2009) in Lawrence. 2013

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Comorbidities

- CVD if history of prolonged inactivity
- Hypertension
- Obesity

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Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion
- Effects of multiple medications must be considered
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

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Recommended reading

Larry Durstine et al, eds. (2009) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Lawrence, D (2013) ***The Complete Guide to Exercise referral*** . UK. Bloomsbury publishing.

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

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Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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A large, faint watermark of a university crest is visible on the left side of the slide. The crest features a shield with a cross, topped by a crown and surrounded by ornate flourishes. Below the shield, a banner contains the Latin motto "ET VENUSTAS PER SCIENTIAM".

vict

Understanding medical conditions for exercise referral

Low back pain

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions.

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

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Signs, symptoms and common causes

Vtct

Activity

- What are the signs and symptoms?
- What causes low back pain?
- How may low back pain progress?



Vtct

Non-specific low back pain

- Mechanical back pain
- Has a physical cause
- No serious structural damage
- Not attributed to other pathologies
- Most common form of back pain
- Can be
 - Acute – less than six weeks
 - Chronic – more than 12 weeks
- Causes physical limitation
- Psychological distress – response to pain
- Pain can be mild to severe



Signs and symptoms

- Pain in the lower back (*on waking; when moving, walking, sitting, bending and when coughing or sneezing*)
- Discomfort
- Soreness and stiffness in the lower back
- Sensation of pain can vary from:
 - Throbbing
 - Tingling
 - Pins and needles
 - Stabbing
 - Spasms
- Limited range of movement
- Loss of mobility

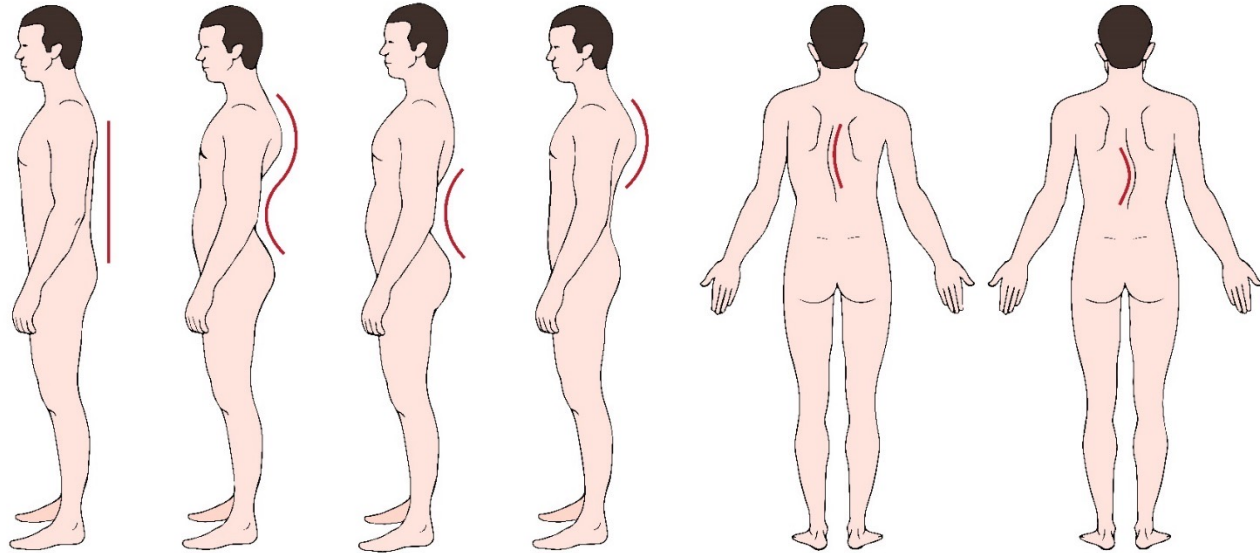


Contributory factors and causes

- Usually physical – musculoskeletal, e.g. sprains or strains
- Poor lifting and manual handling
- Sustained poor posture
- Whole body vibration, e.g. drilling
- Heavy physical work
- Heavy sporting activities, e.g. weight lifting
- Overweight or obesity
- Pregnancy
- Stress – which increases tension in muscle
- Other mechanical causes include:
 - Degenerative of discs
 - Sciatica
 - Scoliosis
 - Pelvic misalignment



Posture deviations



Flat back	Hyperkyphosis Hyperlordosis	Hyperlordosis	Hyperkyphosis	Scoliosis	Scoliosis
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Vtct

Prevalence of low back pain

- Affects 8/10 people in the UK
- 150 million working days lost each year
- Equal occurrence between men and women
- 4/5 people will experience at some point in their lifetime
- Almost all cases of acute back pain are classified as non-specific
- Most cases are pain-free after 4 weeks

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Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
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Please note:

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Medications and side effects

Pain relievers

- Constipation, nausea, vomiting, and drowsiness

NSAIDs

- Indigestion, diarrhoea, gastrointestinal discomfort/bleeding and can trigger asthma attack in asthmatics.

Antidepressants - to manage chronic pain

- Drowsiness, dry mouth, blurred vision, constipation

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Lifestyle interventions

The aim of any lifestyle interventions should be to maintain functioning and reduce pain and inflammation.

- Stay physically active to maintain mobility and functioning
- Mobility exercises to maintain joint range of motion
- Physiotherapy
- Correct work station set-up and lifting technique
- Pain management guidance
- Maintain correct posture
- Complementary therapies, e.g. massage, relaxation, stress management, deep abdominal breathing
- Reduce alcohol and smoking
- Sleep on a firm mattress
- Positive mental attitude

Source: Lawrence. 2013

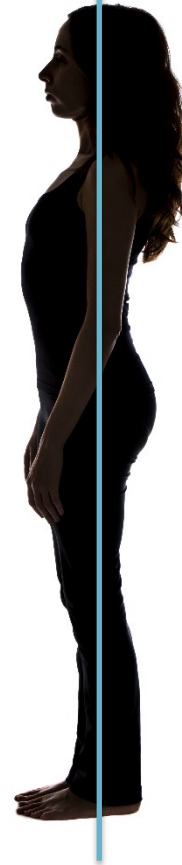


Static posture

Side view

Plumb line:

- Anterior to lateral malleolus (ankle)
- Midline of knee
- Greater trochanter (hip)
- Pelvis – ASIS and PSIS
- Lumbar spine
- Thoracic spine
- Midline shoulder (acromion process)
- Ear lobe
- Crown of head



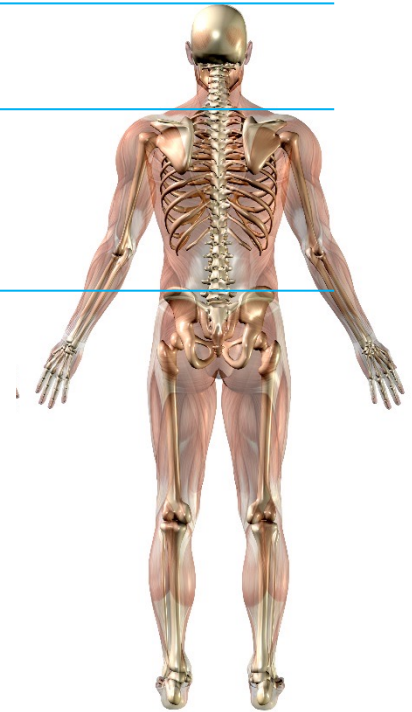
Vtct

Static posture

Posterior.

Check symmetry:

- Head
- Shoulders
- Waist creases
- Hips
- Feet turn out
- Muscle bulk
- Arch of foot-supinated/pronated



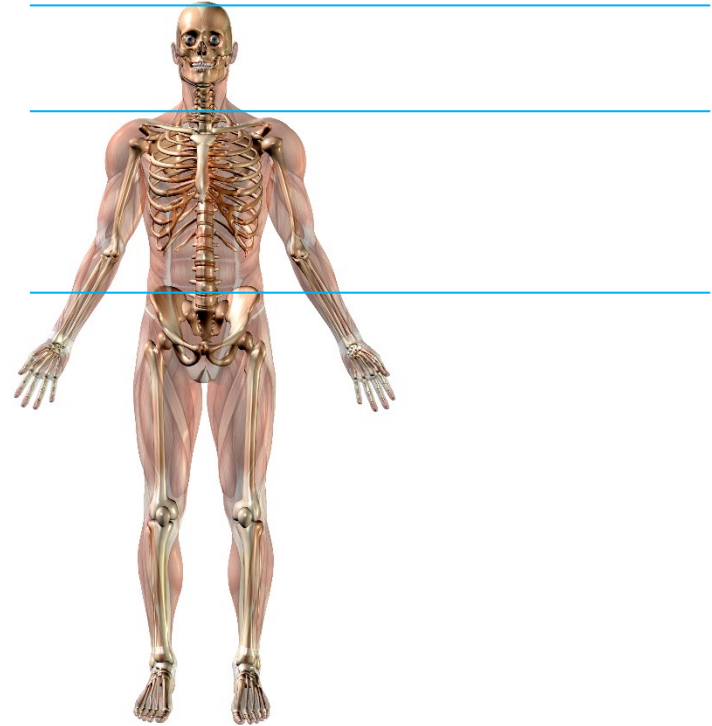
Vtct

Static posture

Anterior.

Check symmetry:

- Head
- Shoulders
- Hips
- Knee over 2nd/3rd toe
- Feet turned out
- Arch of foot - supinated/pronated



Vtct

Risks and benefits of exercise and activity

Vtct

Activity

1. What are the risks and benefits of exercise and activity?



Vtct

Benefits

- Maintain mobility
- Maintain independence
- Reduce disabling effects
- Promote recovery and improve recovery rate
- Reduce stiffness
- Assist pain management
- Improve mobility
- Assist with management of mood

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Risks

If activity inappropriate:

- Aggravate condition
- Discomfort
- Pain or injury



Vtct

Exercise guidelines, restrictions and considerations

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	<ul style="list-style-type: none">• 3-5 days per week• 55%-70% maximum heart rate• 15-60 mins per session• Intensity, duration and type depending on pain and mobility
Resistance	<ul style="list-style-type: none">• Core focus – abdominals and spine extensors• Under 50 years – 10-15 repetitions• Over 50 years – 8-12 repetitions• 2 days a week
Functional training	<ul style="list-style-type: none">• 3-5 days/week• Brisk walking
Flexibility	<ul style="list-style-type: none">• 2-4 days/week.• 2 mins per muscle group• Static stretches – 30 second hold• Range of motion stretching once pain-free ROM achieved and no mobility limitations

Considerations

- Free up movement restrictions through mobility and flexibility before attending to core strengthening
- Correct posture and spine alignment
- Use lifting and moving techniques
- Use spine sparing strategies, e.g. lifting, moving from floor to standing, etc.
- A longer warm up for greater mobilisation
- Gentle mobility and stretching, including some modified Pilates and yoga exercises
- Walking should be encouraged (pace, stride length and distance may need to be modified)
- Light abdominal exercises
- Abdominal breathing and relaxation exercise and positive thinking can assist with pain management
- Controlled movements

Source: Lawrence. 2013

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Avoid

- High impact
- Excessive repetitions
- Prolonged activities in same position
- Quick direction changes or stop start activities
- Heavy lifting
- Repetitive movements
- Fast twisting or bending movements

Source: Lawrence. 2013

The logo for VTCT (Vocational Training Charitable Trust) is displayed in a purple serif font. The letters 'V' and 't' are connected, and the 't' has a decorative flourish.

Comorbidities

- CVD if history of prolonged inactivity
- Depression and anxiety in response to discomfort and pain



Vtct

Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion
- Effects of multiple medications must be considered
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions.

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McGill, S (2007) ***Low Back Disorders. Evidence-based Prevention and Rehabilitation***. USA. Human Kinetics.

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

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Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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vict

Understanding medical conditions for exercise referral

Obesity

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions.

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

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Signs, symptoms and common causes

Vtct

Activity

- What is obesity?
- What are the causes?
- What is the progression pathway?



Vtct

Obesity

Signs and symptoms:

- High levels of body fat
- Increased breathlessness on mild exertion
- Increased sweating
- Joint pain and risk of osteoarthritis

Longer term risks:

- Hypertension - high blood pressure
- Hypercholesterolemia
- Gall bladder problems
- Type 2 diabetes

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Obesity

In 2008, 25% adults over 16 were classified as obese.

Predicted that by 2025 50% of men and 1/3rd of women will be classified as obese.

Source: NHS choices. 2012 in Lawrence, 2013.

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BMI Classification of obesity

Body Mass index BMI (kg/m ²)	Classified as:
< 18.5	Underweight
18.5 to 25	Normal
25-30	Overweight
> 30	Obese
> 40	Morbidly obese

Classification and waist circumference

Increased health risk

- **Men** - waist circumference of 94 cm or 37 inches or more
- **Women** - waist circumference of 80 cm or 32 inches or more

High health risk

- **Men** - waist circumference of 102 cm or 40 inches or more
- **Asian men** - waist circumference of 90 cm or 36 inches or more
- **Women** - waist circumference of 88 cm or 35 inches or more
- **Asian women** - waist circumference of 80 cm or 32 inches or more

Source. NICE. 2006, NOO 2009 in Lawrence 2013.

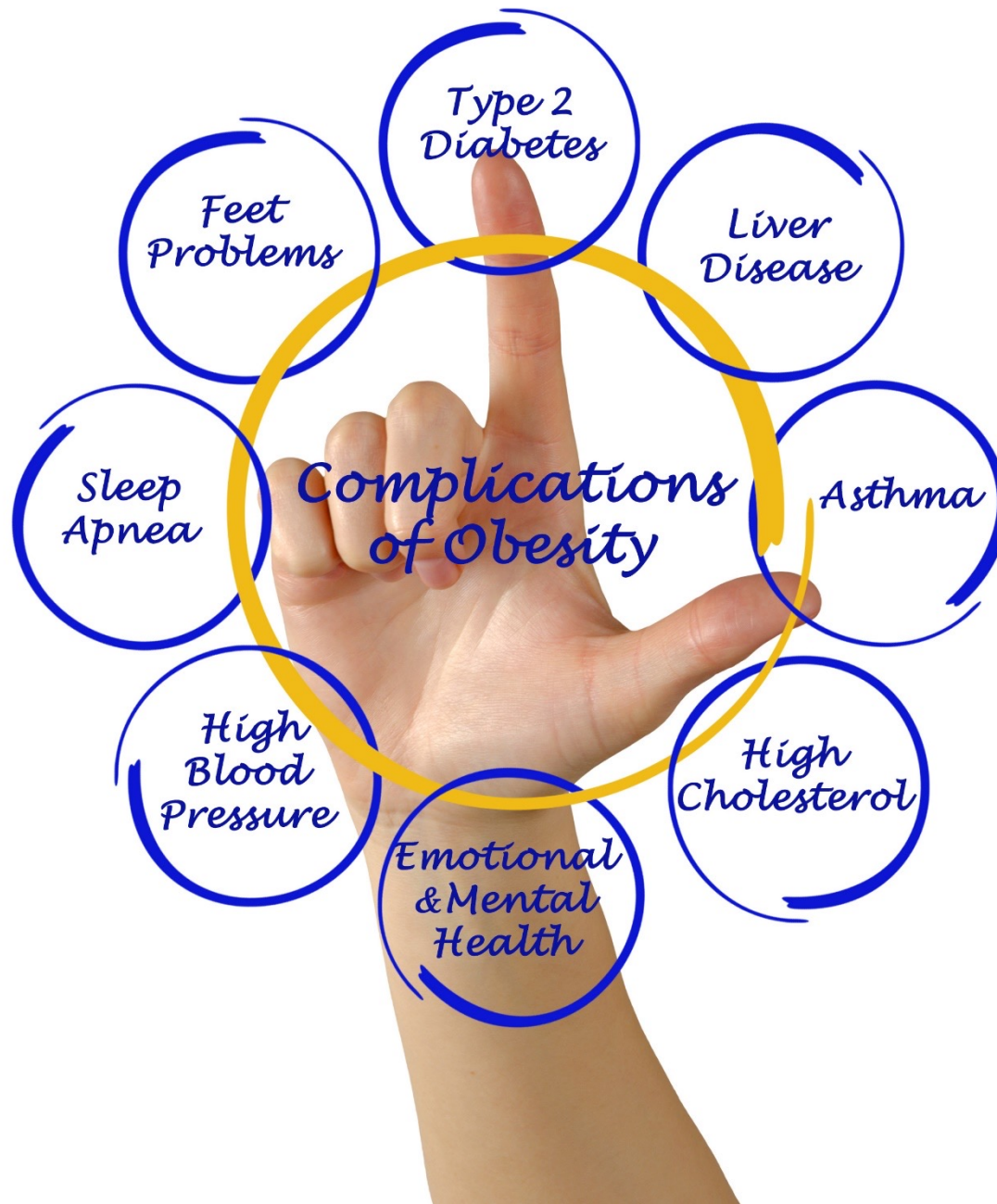
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Possible contributory factors and causes:

- Genetic predisposition or following family lifestyle (unhealthy)
- Age – more prevalent in adults, but increasing in children
- Inactivity or low levels of activity or exercise in daily life
- Food intake and calories in excess or needs
- Unhealthy diet – excess alcohol, fast foods, long term ‘yo-yo’ dieting
- Hormonal causes – thyroid
- Long working hours and high stress levels
- Ethnicity – more common in African Caribbean and Pakistani women
- Sedentary work and labour saving technology
- Stopping smoking may contribute to weight gain
- Some medications
- Pregnancy
- Low socio-economic status

There is no conclusive evidence of the causes





Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't' is also stylized with a small loop at the top.

Lifestyle interventions

- Reduce and maintain a healthy weight
- Increasing physical levels
- Eat more healthily
- Reduce fast foods if eaten
- Reduce alcohol
- Reduce calorie intake

A dietician may prescribe low calorie diets for Individuals with BMI over 30

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Other interventions

Medication

May be prescribed for individuals with BMI over 30 who have not managed weight loss with lifestyle interventions

Surgery

Surgery is always a last resort and would only be used for individuals who are classified as morbidly obese and who have not managed weight loss with lifestyle interventions

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish that extends upwards and to the right, curving over the 't's.

Medication and side effects

Orlistat:

- Inhibits gastric and pancreatic enzymes
- Increases excretion of undigested fats.

Side effects:

- Flatulence
- Fatty or oily stools or discharge from rectum
- Needing to use toilet urgently and more often
- Gastrointestinal discomfort

Source: NHS choices. 2012. in Lawrence. 2013

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Side effects and exercise

Side effects of medication that may have an implication on the exercise response:

- Fatty or oily stools or discharge from rectum
- Needing to use toilet urgently and more often
- Gastrointestinal discomfort

No specific implications on the exercise response

Consider effects of medications taken for other comorbid conditions, e.g. Diabetes, CVD, Hypertension, Hypercholesterolaemia

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Risks and benefits of exercise and activity

Vtct

Activity

What are the risks and benefits of exercise and activity?



Vtct

Benefits

- Increase energy expenditure
- Assist weight loss and management
- Reduce body fat
- Improve fitness
- Reduce the risk of cardiovascular disease
- Maintain independence

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Risks

If activity inappropriate:

- Joint stress or strain
- Overheating
- Dehydration
- Consideration should be given to risks associated with other comorbid conditions

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Exercise guidelines, restrictions and considerations

Vtct

Exercise guidelines

Components	FIT guidelines
Aerobic	<ul style="list-style-type: none">• 5 days a week or more• 30-60 minutes• 40%-60% of VO₂ Max• Low weight bearing• Emphasise duration over intensity
Resistance	<ul style="list-style-type: none">• 1-3 sets• 10-15 reps• 40-50% of maximal voluntary contraction• 2 days a week 8-10 exercises• Circuit approach
Flexibility	<ul style="list-style-type: none">• Daily or at least 5 sessions per week• Static stretches• To point of mild discomfort

Considerations

- Be sensitive to functional capacity, e.g. time required to move from standing to floor or inability to perform these movements
- Use a supportive, encouraging and optimistic approach
- Exercise at cooler times of day
- Loose fitting clothing
- Low impact and lower intensity
- Low or no weight bearing – e.g. exercise in water or cycling
- Be sensitive to restrictions from body bulk, e.g. unable to use some equipment
- Modify and adapt exercises and positions
- Be sensitive to stigma around weight and confidence issues

Source: Lawrence. 2013

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Avoid

- High impact
- High intensity
- Excessive repetitions
- Excessive weight bearing
- Prolonged activities in same position
- Quick direction changes or stop start activities
- Exercising during very hot weather or environments
- Unnecessary use of floor to standing transitions

Source: Lawrence. 2013

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Comorbidities

- CVD or other risk factors, e.g. diabetes, hypertension, high cholesterol
- Depression in relation to stigma
- Joint conditions, e.g. osteoarthritis

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DIABETES MELLITUS

HYPERCHOLESTEROLE

DIABETES MELLITUS

CIRRHOSIS

CIRRHOSIS

GOUT

DIABETES

HYPERCHOLESTEROLEMIA

DEPRESSION

PRESSURE

DISEASE

SWEATING

JOINT

ARTHRITIS BONE

OBESITY

STROKE

VARIC

DEPRESSION

HEART DISEASE

INFERTILITY

GALLBLADDER DISEASE

VARICOSE VEIN

HIGH BLOOD

EOARTHRITIS IN JOINTS

STROKE

ARTHRITIS BONE

HIGH BLOOD PRESSURE

HEART DISEASE

DIABETES

SWEATING

Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion
- Effects of multiple medications must be considered
- Consider exercise recommendations for all diagnosed conditions
- Modify the frequency, intensity, duration, type in accordance with client needs
- May require further adaptations and modifications

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

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Recommended reading

Larry Durstine et al, eds. (2009) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Lawrence, D (2013) ***The Complete Guide to Exercise referral*** . UK. Bloomsbury publishing.

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 't's are lowercase, with a decorative flourish on the top of the first 't'.

Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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A large, faint watermark of a university crest is visible on the left side of the slide. The crest features a shield with a cross, topped by a crown and surrounded by ornate flourishes. Below the shield, a banner contains the Latin motto "ET VENUSTAS PER SCIENTIAM".

vict

Understanding medical conditions for exercise referral

Osteoarthritis, rheumatoid arthritis and joint replacement

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 'tct' are lowercase, with a decorative flourish above the 't'.

Signs, symptoms and common causes

Vtct

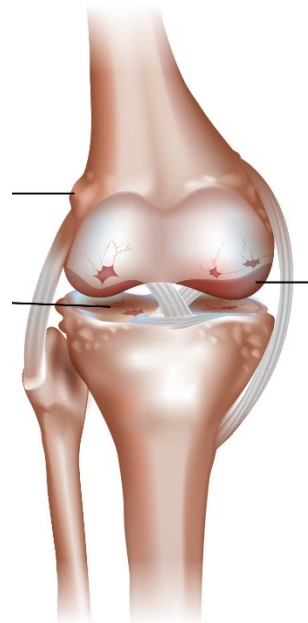
Activity

- What are the signs and symptoms of osteoarthritis and rheumatoid arthritis?
- What causes osteoarthritis and rheumatoid arthritis?
- How may osteoarthritis and rheumatoid arthritis progress?



Vtct

Osteoarthritis



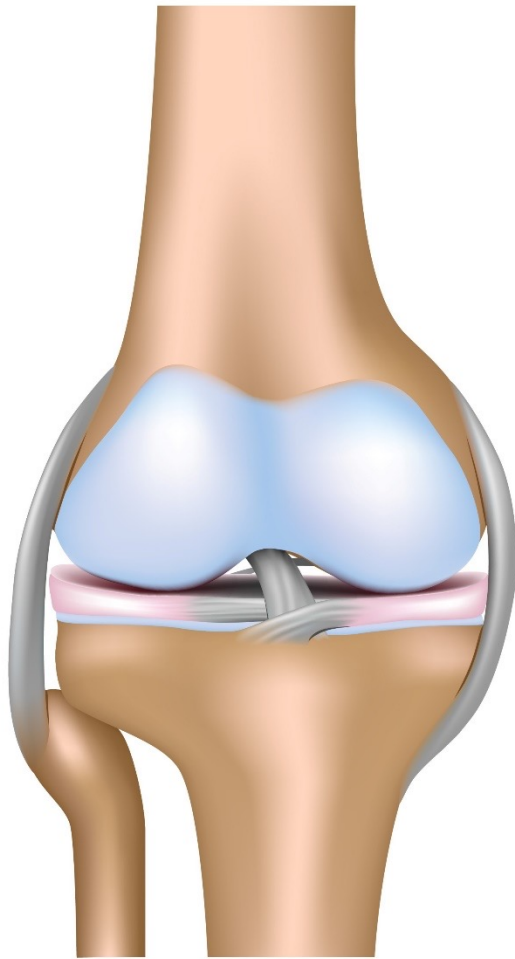
Vtct

Osteoarthritis

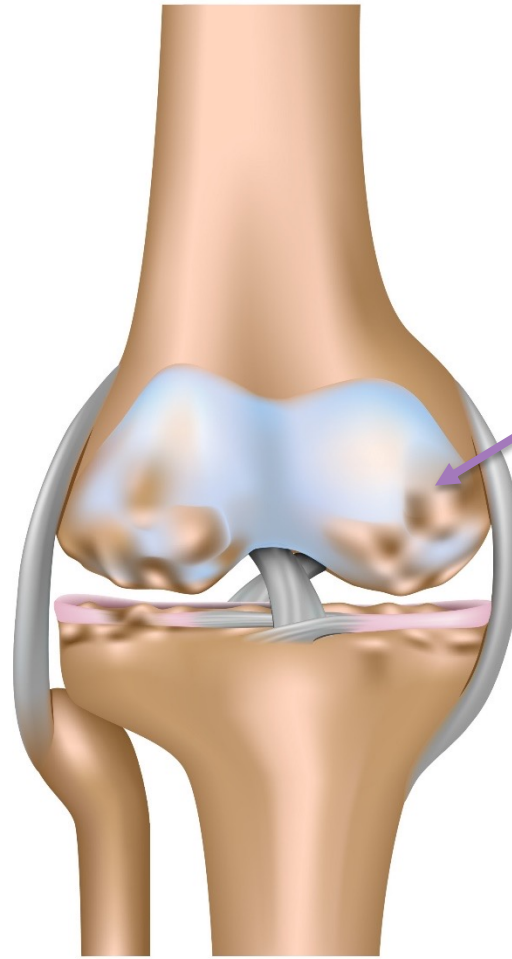
- Degenerative condition
- Affects the synovial joints
- Usually brought on by wear and tear

Joint most affected: hips, knees, lumbar spine, wrists and hands

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Healthy knee joint



Wear and tear and degeneration of cartilage

Osteoarthritis

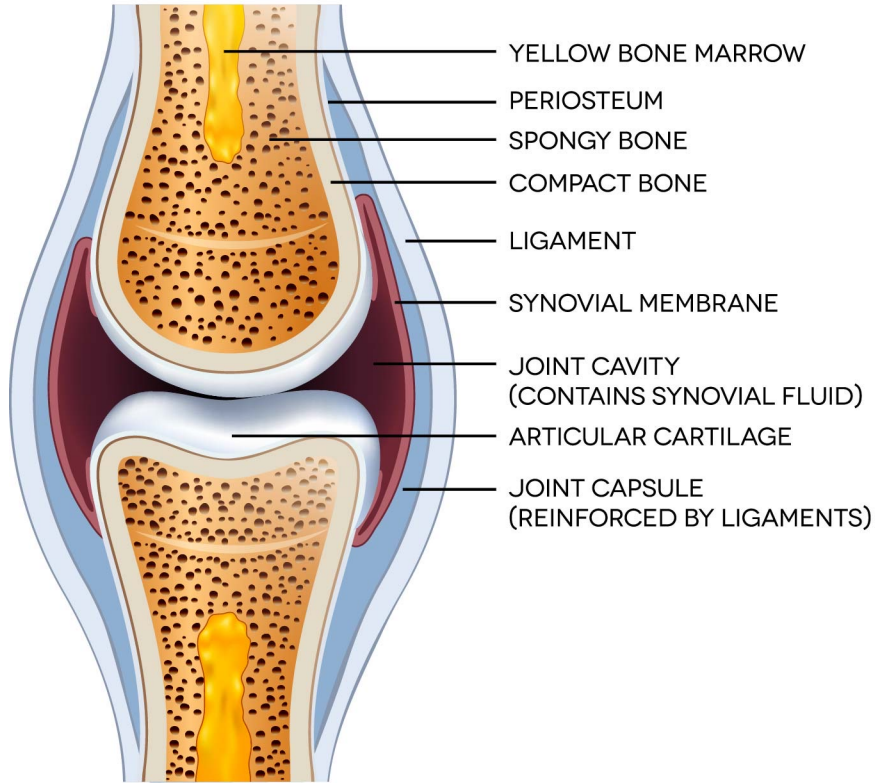
Osteoarthritis

Signs and symptoms:

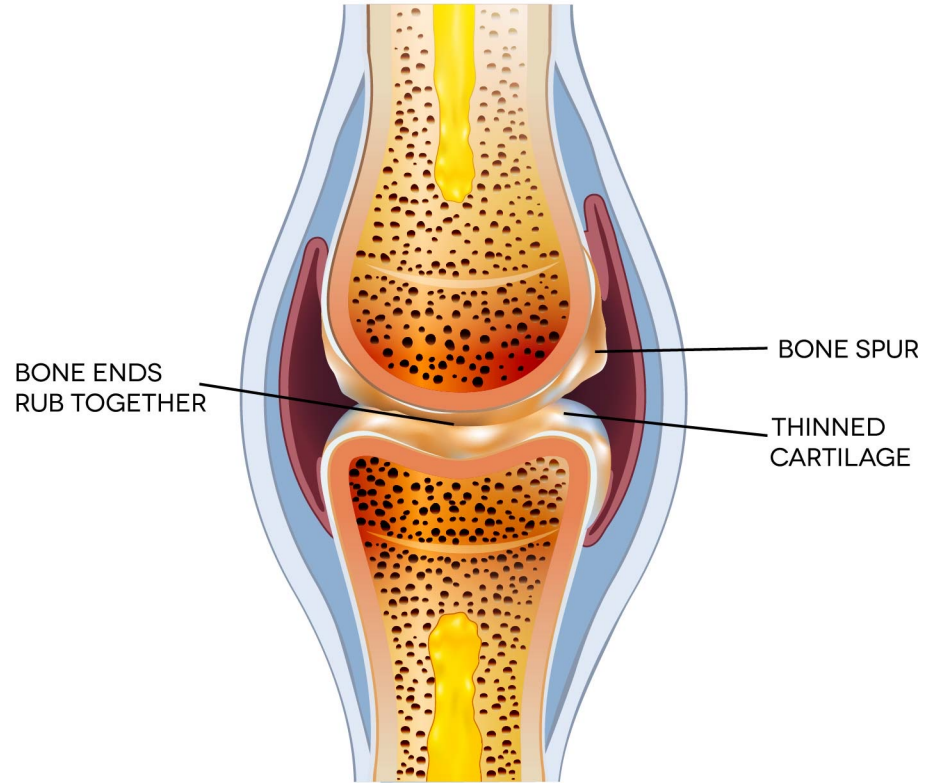
- Damage to the articular cartilage – calcification
- Pain and stiffness in and around the joint(s) affected
- Joints usually affected - knee, hip, hand and spine
- Discomfort and pain when moving the joint
- Limitation or loss of function, e.g. range of motion
- Swelling
- Joint instability

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NORMAL JOINT

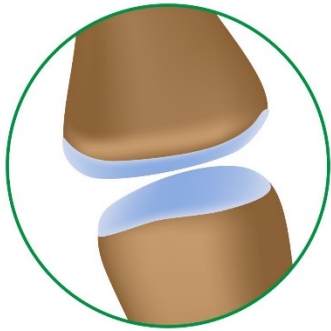
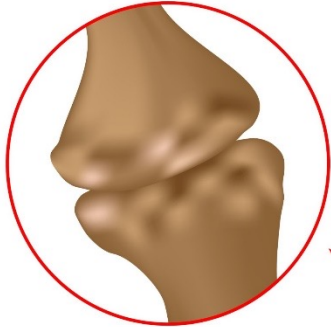


OSTEOARTHRITIS

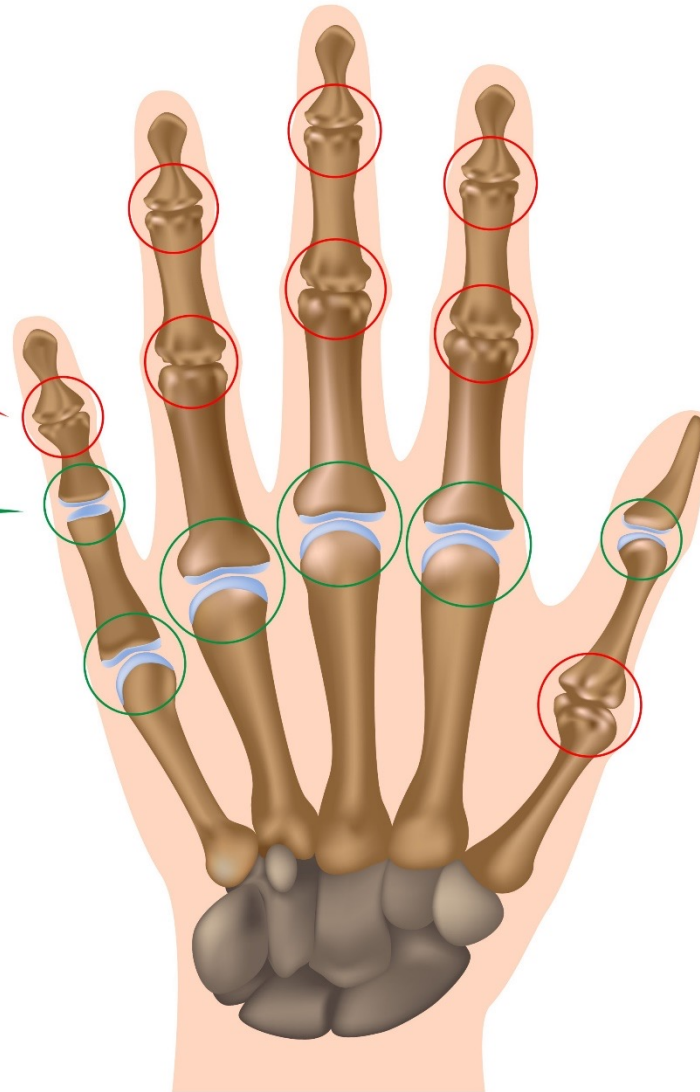


Hand Osteoarthritis

Osteoarthritis



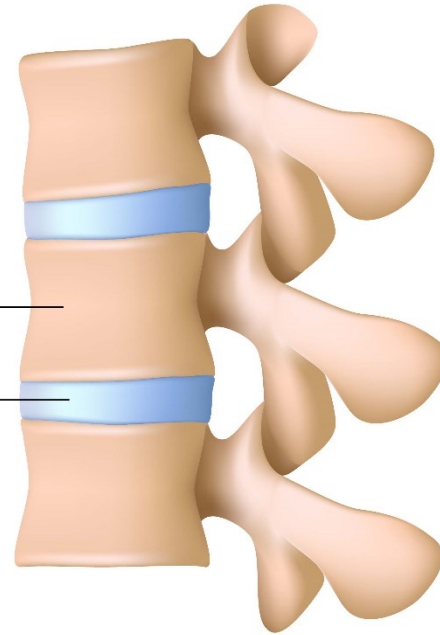
Healthy joint



Healthy spine

Body of vertebra

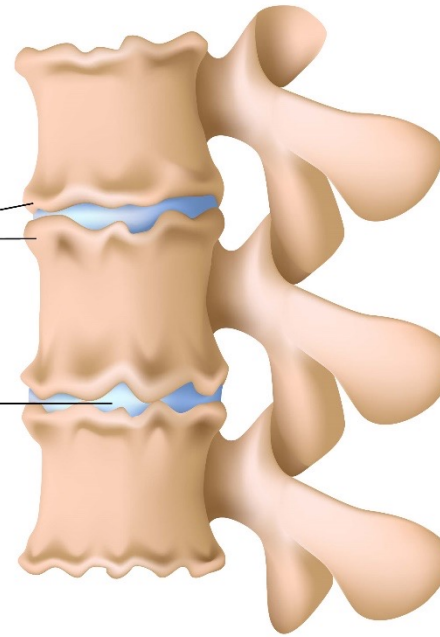
Intervertebral disk



Osteoarthritic spine

Bone spurring

Narrowed disk



Osteoarthritis

Osteoarthritis (OA) affects an estimated 8.5 million people in the UK and is more common in women than men.

Source: NHS choices. 2012. in Lawrence. 2013

Vtct

Osteoarthritis

Contributory factors and causes:

- Ageing
- Gender – more common in women
- Being heavily overweight
- Injury to the joints
- Overuse of the joint – repetitive movements
- Family history, genetics and inherited diseases, e.g. Wilson's disease or hyperparathyroidism
- Medical conditions, e.g. neurological disorders that cause loss of nerve function
- Reduced muscle strength and joint stability

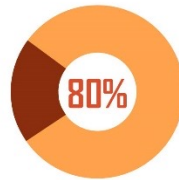
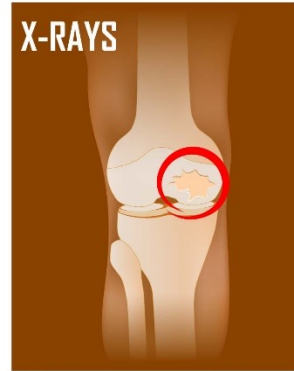
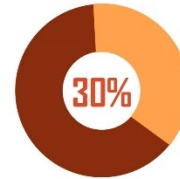
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Osteoarthritis



Approximately 30% of the population (ages of 45 to 65) worldwide were affected by osteoarthritis



80% of the population have evidence of osteoarthritis by age 65

Risk



Age



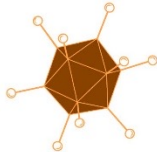
Heredity



Obesity



Hormones



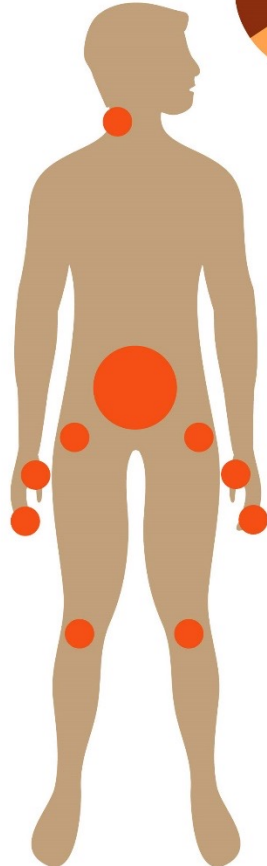
Infections



Diabetes mellitus



Mechanical injury



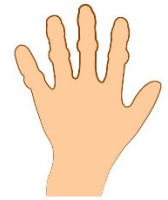
Signs and symptoms



Joint pain



Increased pain with cold temperature



In smaller joints hard bony enlargements

Management



Weight loss



Exercise



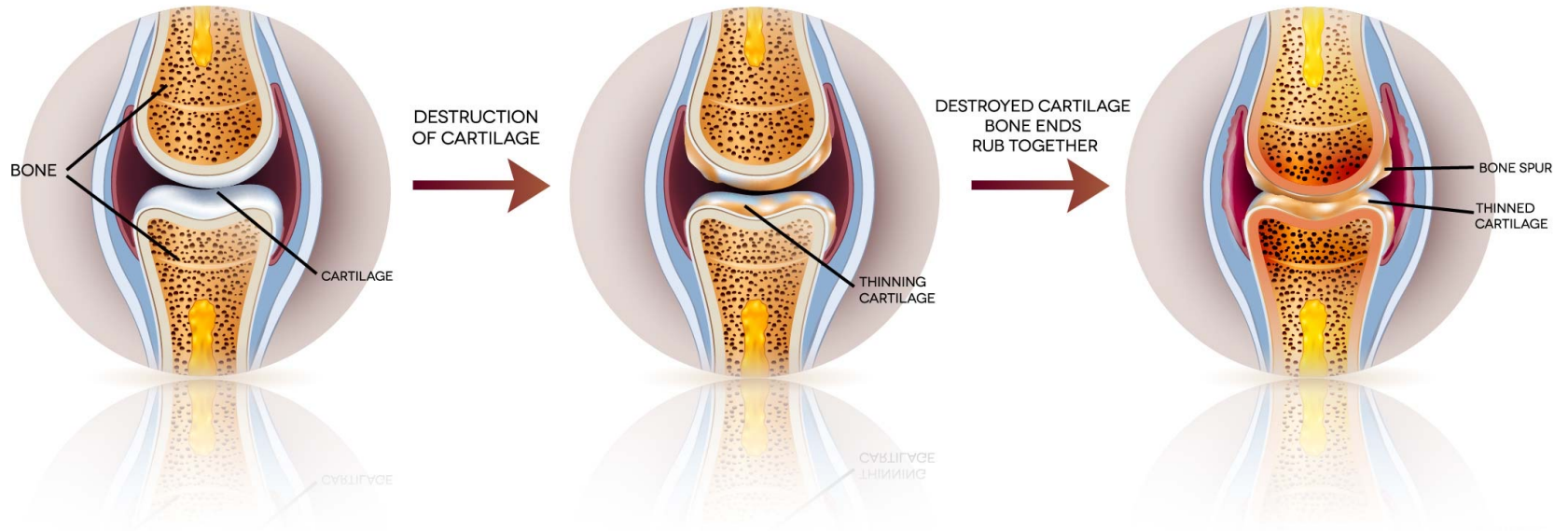
Medication



Surgery

Progression

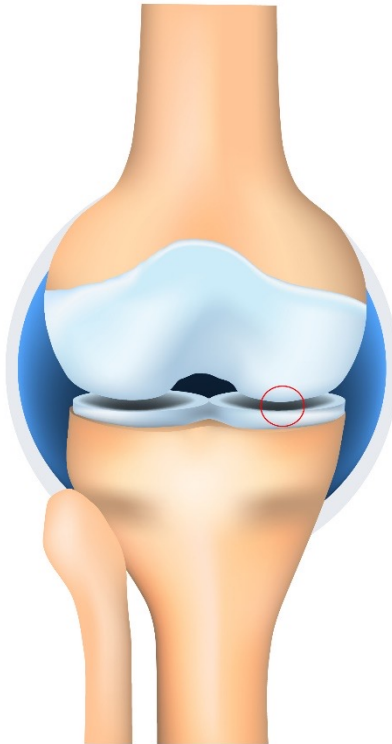
OSTEOARTHRITIS



Progression

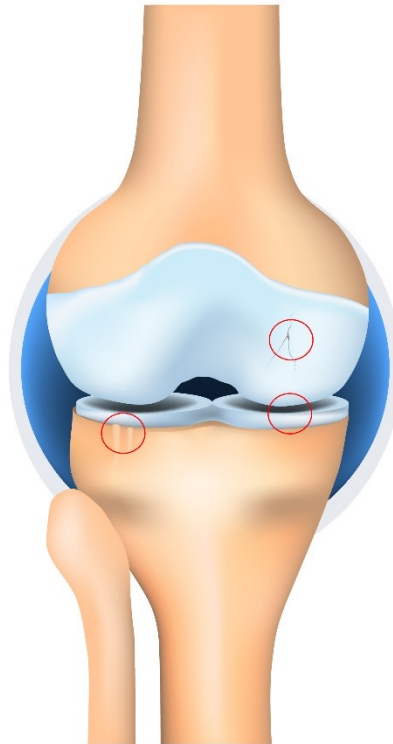
STAGE OF KNEE OSTEOARTHRITIS

I
Doubtful



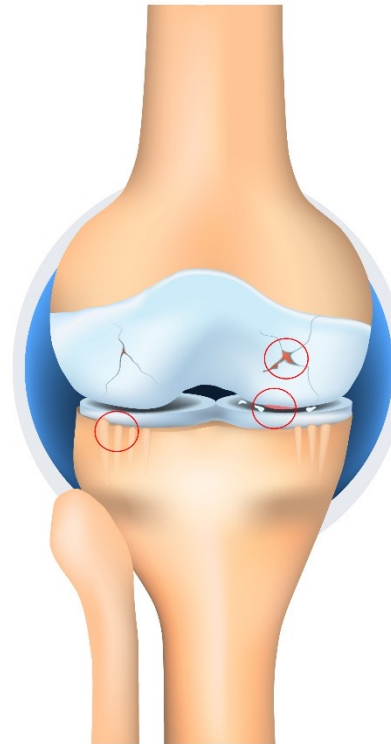
Minimum disruption.
There is already
10% cartilage loss.

II
Mild



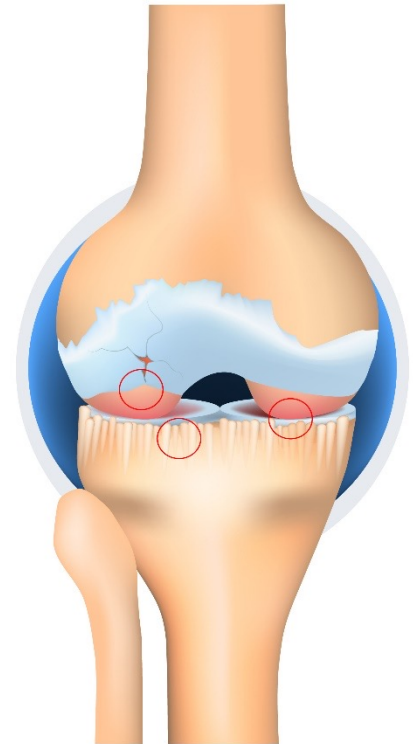
Joint-space narrowing.
The cartilage to begin breaking down.
Occurrence of osteophytes.

III
Moderate



Moderate joint-space reduction.
Gaps in the cartilage can
expand until they reach the bone.

IV
Severe



Joint-space greatly reduced.
60% of the cartilage is already lost.
Large osteophytes.

Rheumatoid arthritis



Vtct

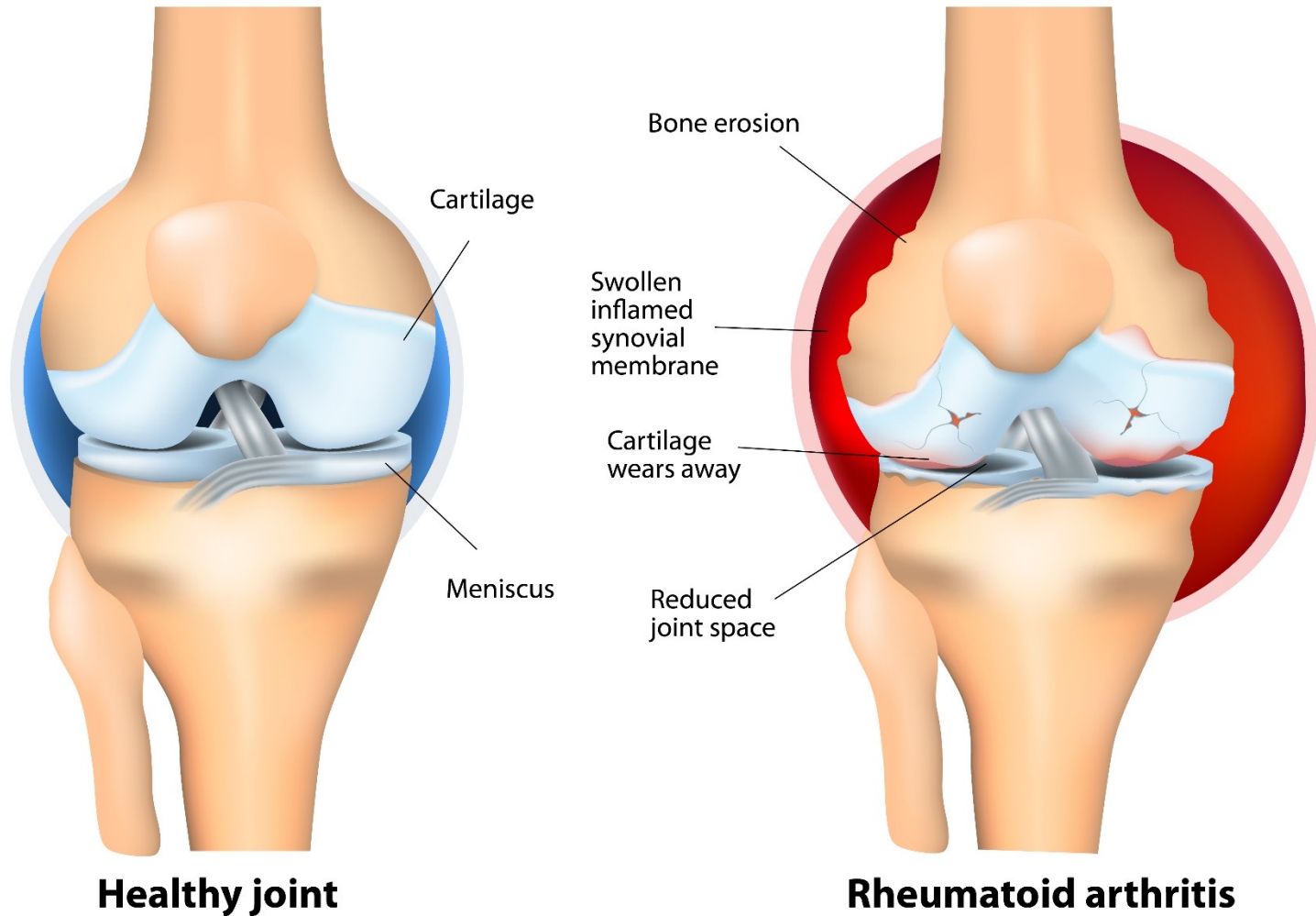
Rheumatoid arthritis

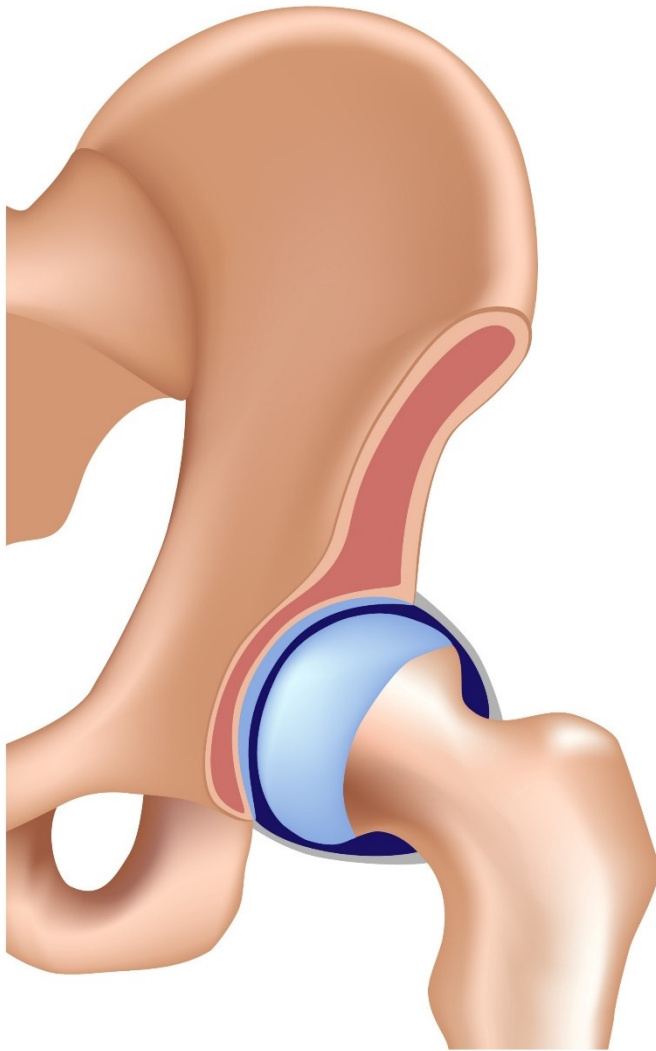
- **Autoimmune condition** – where antibodies attack own body tissues because they recognise them as foreign tissue
- **Systemic condition** - it affects multiple organs of the body, not just the joints (Lawrence. 2013)
- Causes chronic inflammation
- Highly debilitating

Joint most affected: Smaller joints of the wrists, hands, fingers and toes, but can affect other joints

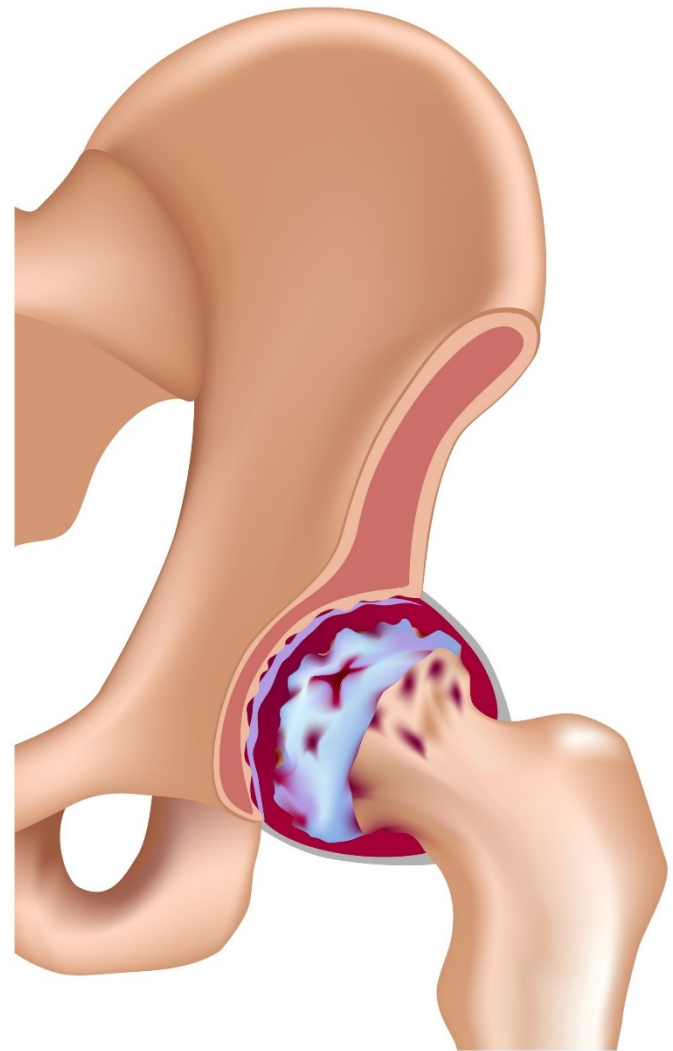
The logo for Vtct (The Victorian Tenosynovitis and Connective Tissue Centre) is displayed in a purple serif font. The 'V' is large and stylized, with a thin purple line curving over the top of the 't's.

RHEUMATOID ARTHRITIS





Healthy hip joint



Rheumatoid arthritis

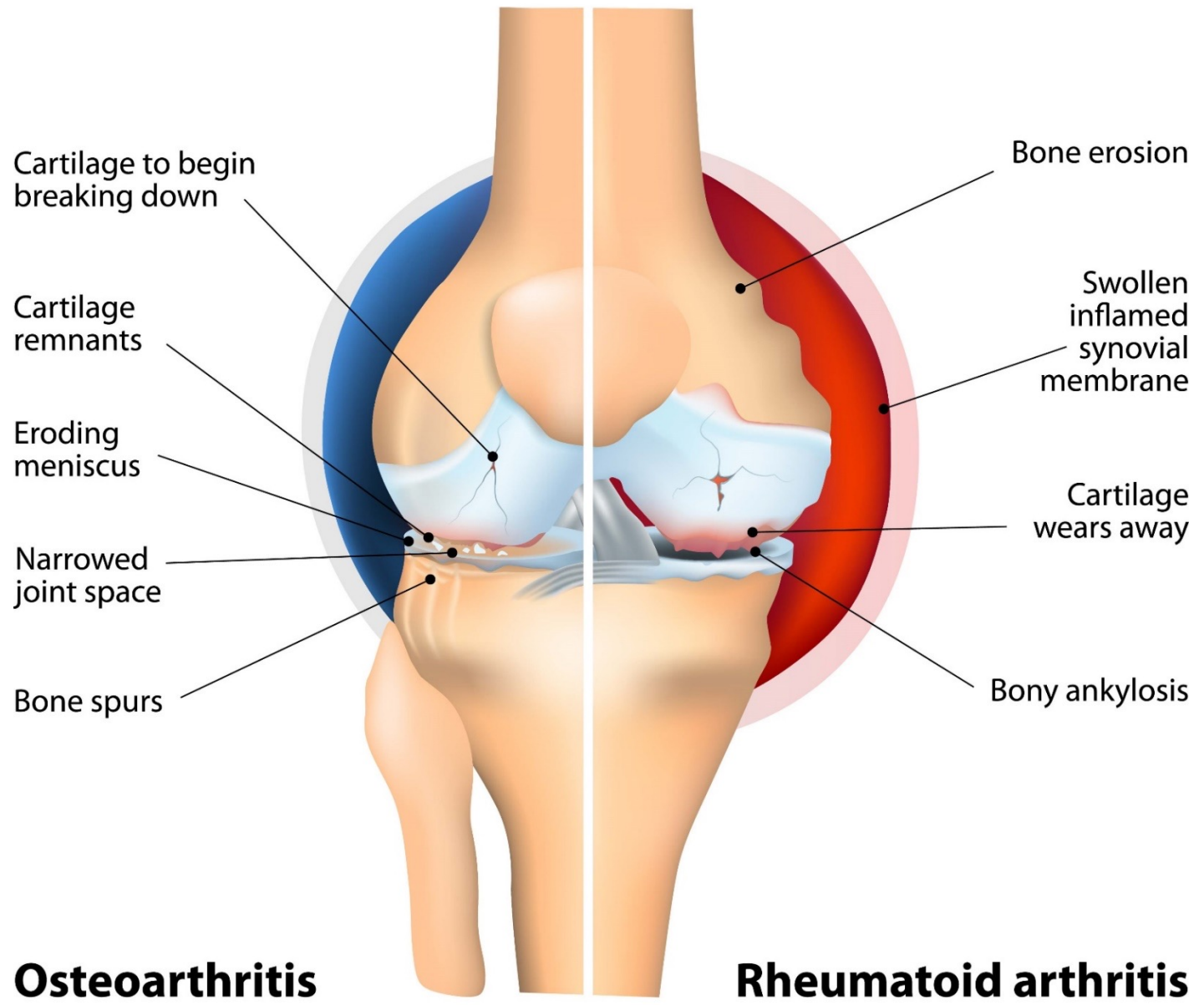
Rheumatoid arthritis

Rheumatoid arthritis (RA) is less common than osteoarthritis (OA), but is more severe. It affects around 400,000 people in the UK. It is three times more common in women than men and most commonly occurs between the ages of 40-60 years.

Source: NHS choices. 2012. in Lawrence. 2013

Vtct

Differences between OA and RA



Rheumatoid arthritis

Flare up and remission phases

- **Flare up** when symptoms are active
- **Remission** when symptoms subside

Flare up symptoms:

- Fatigue
- Loss of appetite
- Muscle aches
- Fever
- Joint stiffness – especially in the morning
- Red, painful and swollen joints
- Joint deformity –in severe cases (nodules)

The logo for Vtct (The Voluntary Tissue and Cellular Therapy Centre) is displayed in a purple serif font. The letters 'Vtct' are stylized, with a decorative flourish above the 't'.

Deformity caused by RA



Rheumatoid arthritis

Contributory factors and causes:

- Cause and trigger is unknown
- Suspected that environmental triggers or infections may cause the body to attack its own tissues
- More common in women and between age 40-60
- Some family links (genetic)
- Smoking

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Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?



Vtct

Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

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Medication

Rheumatoid arthritis

For pain relief, to reduce inflammation and decrease rate of progression

- Pain relievers, e.g. paracetamol, co-codamol
- Non-steroidal anti-inflammatory drugs (NSAIDs), e.g. ibuprofen
- Corticosteroid injections
- Disease-modifying anti-rheumatic drugs (DMARDs)

Osteoarthritis

For pain relief and to reduce inflammation

- Pain relievers
- Non-steroidal anti-inflammatory drugs (NSAIDs)
- Corticosteroid injections

Source: NHS choices. 2012. in Lawrence. 2013

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Medications and side effects

Pain relievers

- Constipation, nausea, vomiting, and drowsiness

NSAIDs

- Indigestion, diarrhoea, gastrointestinal discomfort/bleeding and can trigger asthma attack in asthmatics.

Corticosteroids (long term)

- Increase risk of osteoporosis, weight gain, muscle weakness, can worsen diabetes

DMARDS

- Sickness and diarrhoea, gastrointestinal discomfort, mouth ulcers, skin rashes

Source: NHS choices. 2012. in Lawrence. 2013

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Side effects and exercise

Side effects of medication that may have an implication on the exercise response:

- Dizziness
- Nausea
- Weight gain
- Risk of osteoporosis
- Headaches
- Muscle weakness
- Triggering of asthma attack
- Worsening of diabetes

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Lifestyle interventions

The aim of any lifestyle interventions should be to maintain functioning of the joint and reduce pain and inflammation.

Osteoarthritis - OA

- Maintain a healthy weight
- Stay physically active to maintain joint strength and function
- Mobility exercises to maintain joint range of motion
- Physiotherapy
- Wear shock absorbing insoles in shoes
- Surgery in extreme cases
- Use of walking aids – extreme cases
- Avoid extreme activities or repetitive activities

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Lifestyle interventions

The aim of any lifestyle interventions should be to maintain functioning of the joint and reduce pain and inflammation.

Rheumatoid arthritis - RA

- Stay physically active to maintain function
- Support groups and counselling to assist emotional stress caused by debilitation and pain
- Surgery in extreme cases
- Healthy eating
- Physiotherapy

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Surgery and joint replacement

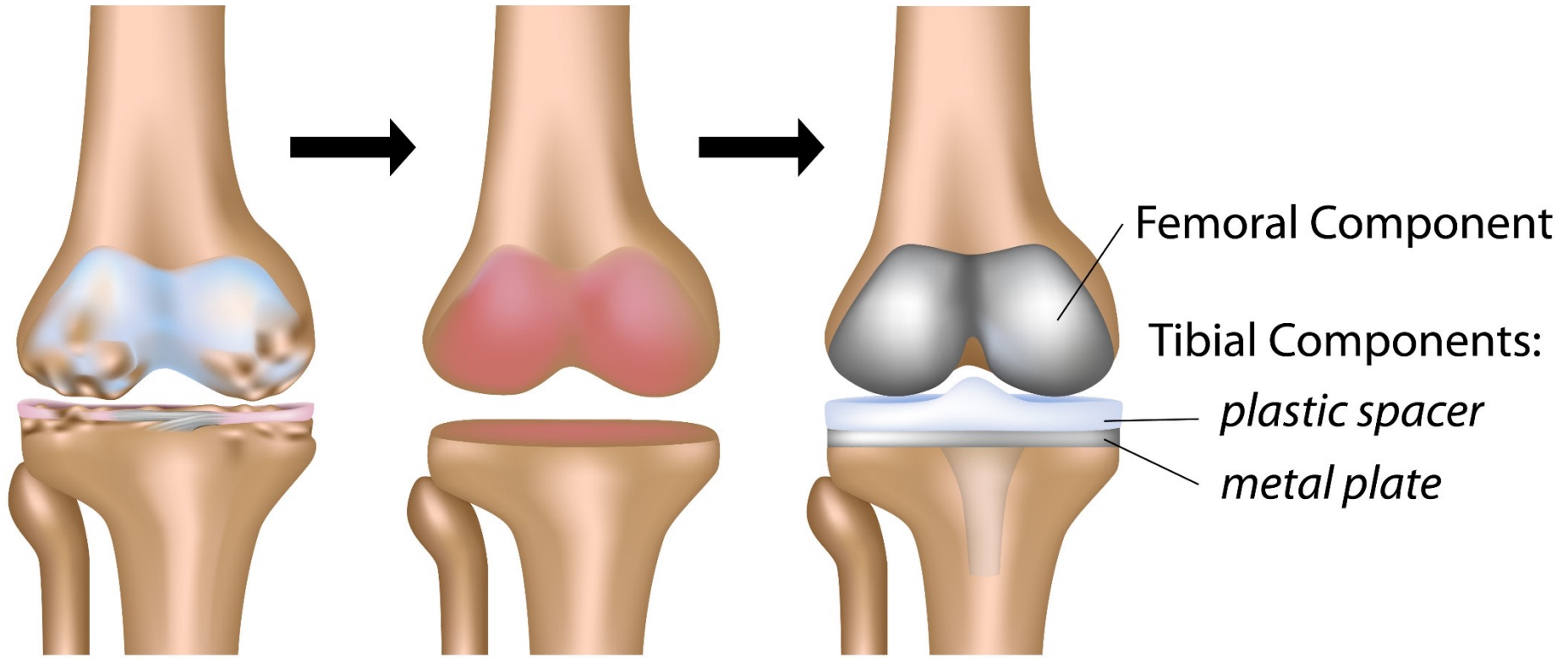
Vtct

Joint replacement / arthroplasty

- An intervention for extreme cases of osteoarthritis and rheumatoid arthritis
- Diseased joint surfaces replaced to restore pain-free function of the joint.
- Replacements mimic bone shape and may be polyethylene, metal, or ceramic
- Most hip and knee replacement surgery around 65-67 years old
- Hip and knee are most common surgeries but all joints can be replace - ankle, foot, shoulder, elbow, wrist, and fingers

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Total Knee Replacement



Diseased joint

Bones cut
and shaped

Implants in place

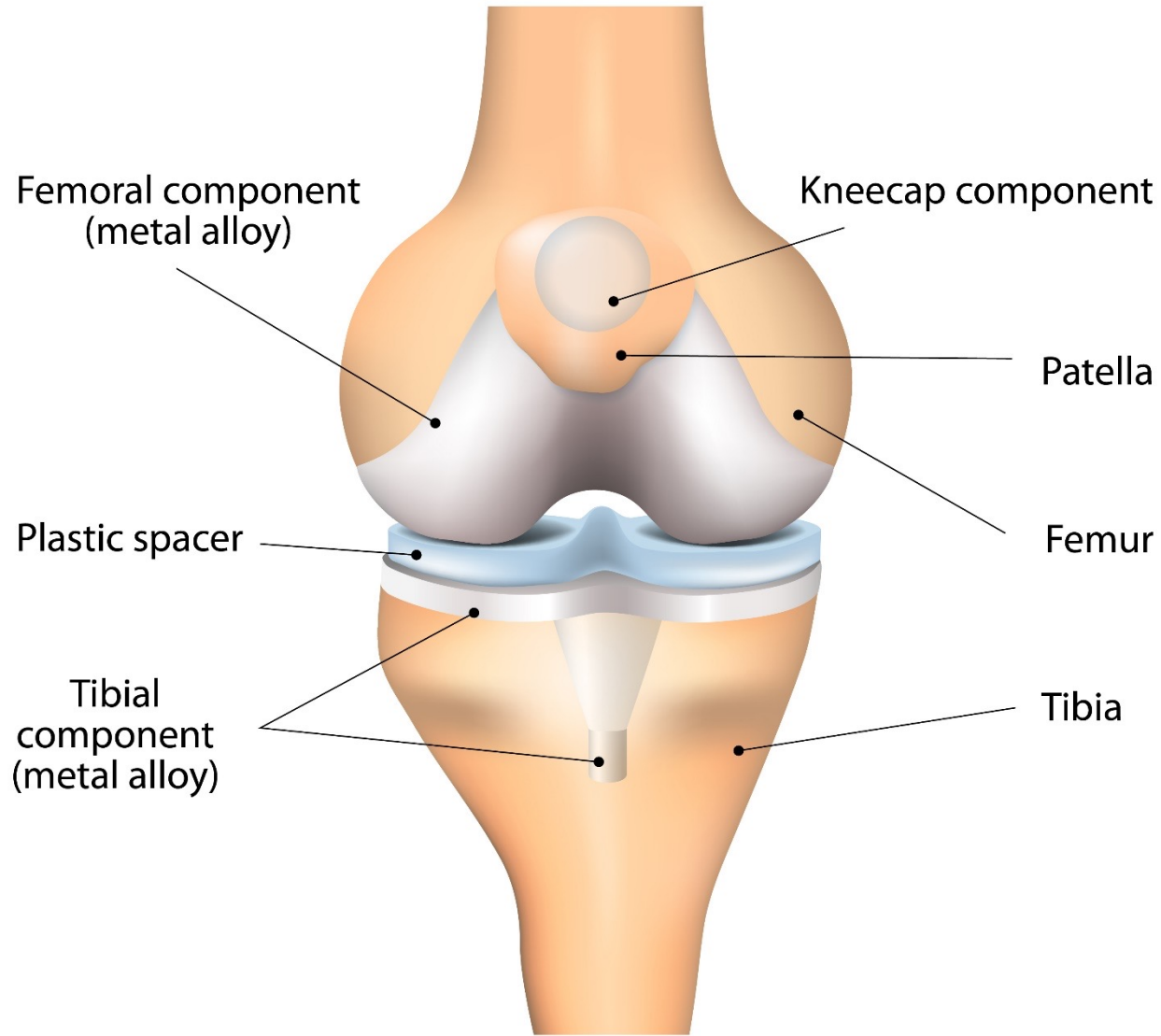
Femoral Component

Tibial Components:

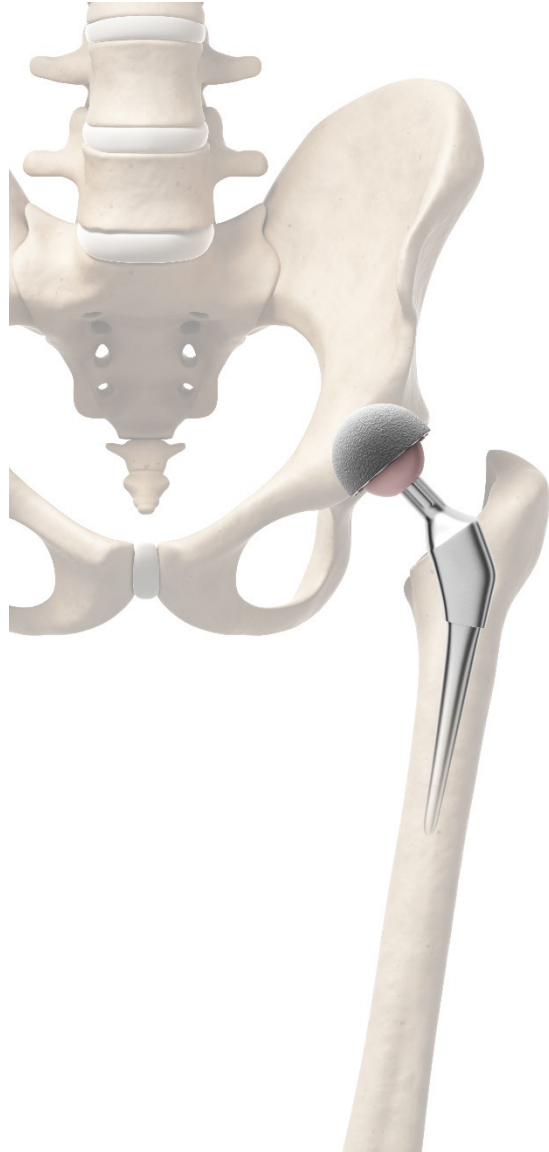
plastic spacer

metal plate

TOTAL KNEE IMPLANT



Hip replacement



Post-surgery interventions

- Medication maintained for underlying condition, e.g. RA or OA
- Warfarin may be prescribe for post-operative clients to reduce the risk of blood clots
- Physiotherapy as part of rehabilitation
- Exercise and physical activity to assist functioning
- Counselling to assist coping and manage emotional distress



Risks and benefits of exercise and activity

Vtct

Activity

1. What are the risks and benefits of exercise and activity?



Vtct

Benefits

- Maintain independence
- Reduce disabling effects
- Reduce stiffness
- Assist pain management
- Improve mobility
- Increase muscle strength
- Reduce deconditioning
- Assist with management of mood
- Assist coping
- Reduce risk of depression
- Develop aerobic fitness and endurance
- Reduce risk of cardiovascular disease

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Risks

If activity inappropriate:

- Further joint damage
- Aggravate condition
- Discomfort
- Pain or injury
- Repetitive strain



Vtct

Exercise guidelines, restrictions and considerations

Vtct

Exercise guidelines

Component	FIT guidelines
Aerobic	<ul style="list-style-type: none">• 3-5 days per week• 5-10mins, building to 30mins• 60%-80% peak HR
Strength	<ul style="list-style-type: none">• 2-3 reps , building to 10 reps• 1 or more sets• 2-3 days a week• Low resistance
Flexibility	<ul style="list-style-type: none">• At least 5 days a week, ideally every day• Before aerobic/strength exercises• Static stretches
Functional	<ul style="list-style-type: none">• Maintain balance• Increase activities of daily living

Considerations

- Wear correct footwear with shock absorbing insoles
- Reduce intensity and duration
- Change exercise mode to non-weight bearing if weight bearing is uncomfortable
- Chair-based and water-based reduce weight bearing
- Build functional strength
- Focus on mobility
- Stop exercise if swelling appears or pain experienced
- Exercise late morning or early afternoon when joints are more mobile and less stiff
- Be considerate to joint deformity or damage
- Adapt exercise positions and movements to maximise comfort
- Resistance bands can be appropriate for initial strengthening

Source: Lawrence. 2013

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Avoid

- High impact
- Contact sports
- Excessive repetitions
- Prolonged activities in same position
- Quick direction changes or stop start activities
- Excess weight bearing
- Prolonged single leg positions
- Never exercise during RA flare up phases as this may cause damage (only gentle mobility)
- During remission phases - strengthening muscles around the joint

Source: Lawrence. 2013

The logo for VTCT (The Victorian Tennis and Table Tennis Club) is displayed in a purple serif font. The letters 'V', 't', and 't' are lowercase, while 'i' and 'c' are uppercase. A decorative flourish is attached to the top of the 'V'.

Joint replacement guidelines

- Start low resistance (body weight and assisted moves) and gradually build
- Low or no impact – swimming or walking
- Avoid hip adduction – contra-indicated for hip replacements
- Minimal hip abduction
- Generally advised to avoid breaststroke swimming
- increase joint stability, balance and gait
- Be sensitive to client cautiousness or fear
- Be considerate to reduced range of motion
- Be mindful of load bearing on the joint
- Perform isometric exercises at different angles through full movement range
- Select comfortable exercise positions
- For seated exercise ensure chair height allows the hips to be positioned higher than the knees
- Work within pain-free range of motion

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Comorbidities

Clients with OA, RA or joint replacements may present with the following comorbidities:

- CVD if history of prolonged inactivity
- Depression and anxiety in response to discomfort and pain
- Other medical conditions may contribute to cause of OA/RA
- Medications used to treat OA/RA may contribute to other conditions, e.g. osteoporosis/corticosteroids

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Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion.
- Effects of multiple medications must be considered.
- Consider exercise recommendations for all diagnosed conditions.
- Modify the frequency, intensity, duration, type in accordance with client needs.
- May require further adaptations and modifications.

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Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions



Recommended reading

Larry Durstine et al, eds. (2009) ***ACSM's Exercise Management for Persons with Chronic Diseases and Disabilities***. USA. Human Kinetics.

Lawrence, D (2013) ***The Complete Guide to Exercise referral*** . UK. Bloomsbury publishing.

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and the 'tct' are uppercase. A decorative flourish extends from the top of the 't'.

Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

The logo for Vtct, featuring the letters 'Vtct' in a stylized, purple, serif font. The 'V' is large and has a decorative flourish extending from its top right. The 't's are smaller and also have decorative flourishes.

Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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A large, faint watermark of a university crest is visible on the left side of the slide. The crest features a shield with a cross, topped by a crown and surrounded by ornate flourishes. Below the shield, a banner contains the Latin motto "ET VENUSTAS PER SCIENTIAM".

Vict

Understanding medical conditions for exercise referral

Osteoporosis

Learning outcomes

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions.

NB: Assessment criteria for each learning outcome are listed at the end of this presentation.

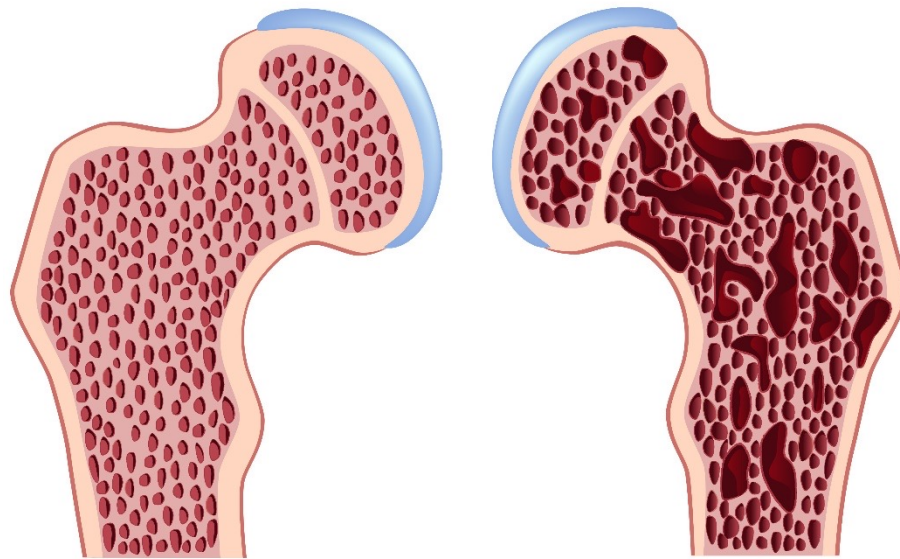
The logo for vtct, featuring the letters 'vtct' in a stylized, purple, serif font. The 'v' is lowercase and has a decorative flourish that extends upwards and to the right, crossing over the 't's.

Signs, symptoms and common causes

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Activity

- What are the signs and symptoms of osteoporosis?
- What causes osteoporosis?
- How may osteoporosis progress?



Vtct

Osteoporosis

Means – porous bones

It is characterised by:

- Low bone mineral content, e.g. calcium
- Loss of bone mass
- Progressive deterioration of bone tissue
- Bones become more fragile and susceptible to fracture

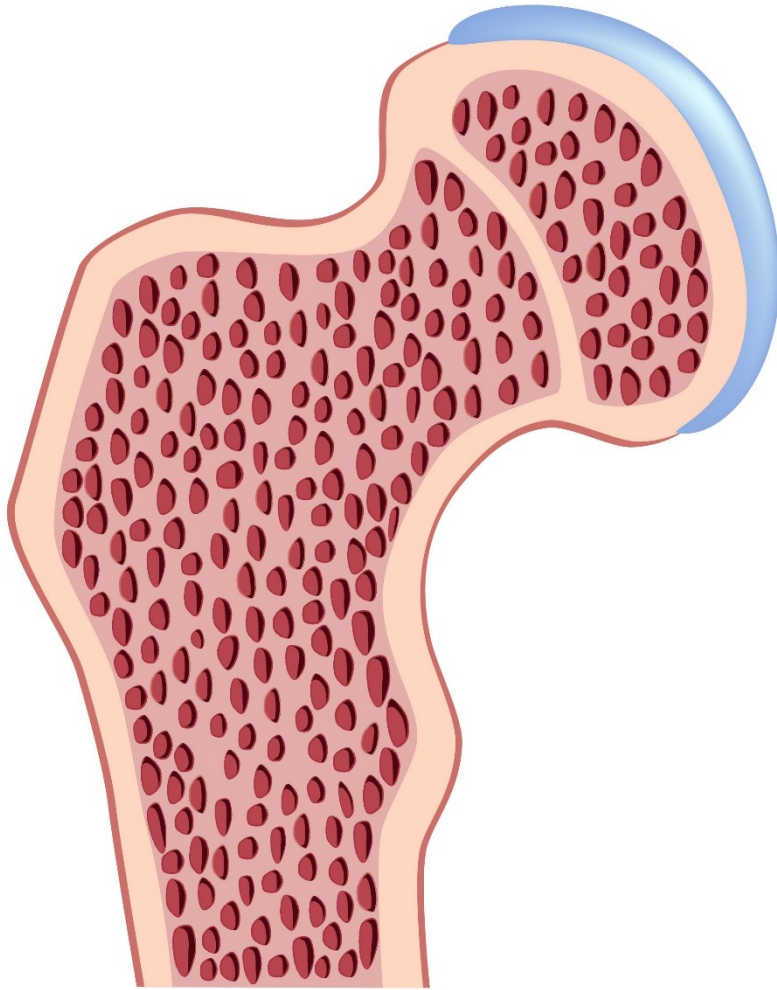
Bone fracture sites:

- Wrist – usually middle age women preventing a fall
- Hip – older adults
- Thoracic and lumbar spine – more frail older adults at risk

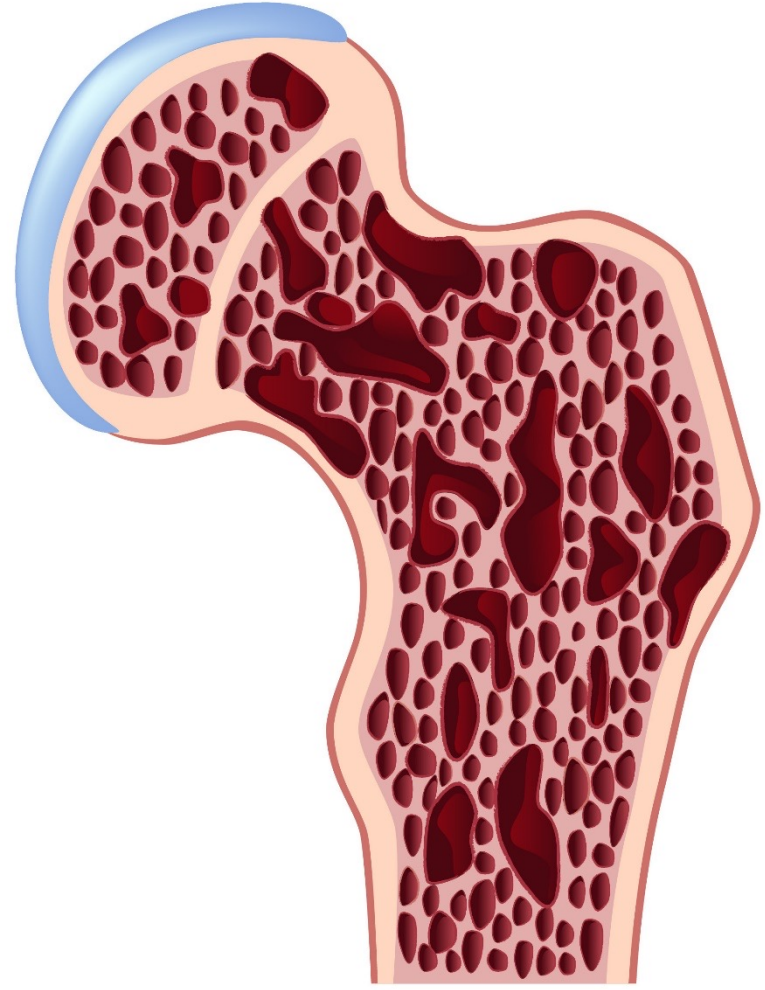
Source: Lawrence. 2013

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Osteoporosis



Healthy bone



Osteoporosis

Classifications

Osteopenia

- Bone mineral density >1 standard deviation below young normal values

Osteoporosis

- Bone mineral density >2.5 standard deviation below young normal values

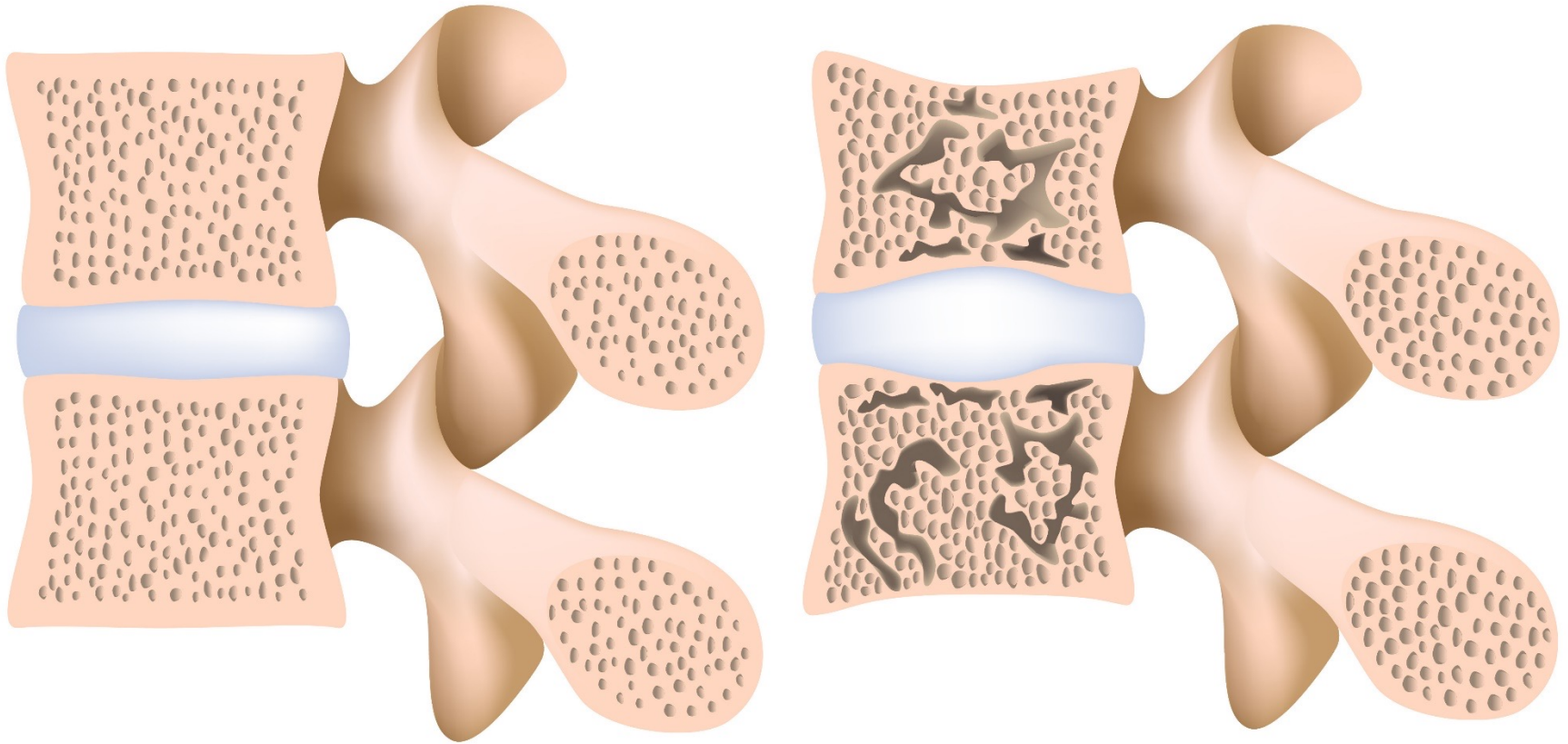
Primary type 1 - Postmenopausal - most common in women after menopause

Primary type 2 - Senile – after age 75, females : males ratio of 2:1

Secondary - Usually the result of a predisposing health condition (coeliac disease or eating disorders) or prolonged use of medications, e.g. corticosteroids. Affects men and women equally at any age

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Aging of the lumbar spine

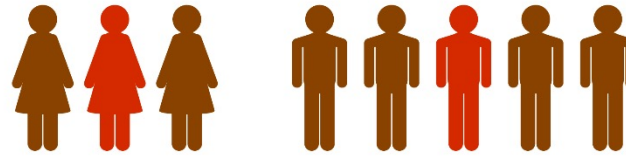


Common causes

Vtct




Osteoporosis





1 in 3 women and 1 in 5 men over 50 will experience osteoporosis fracture





Risk

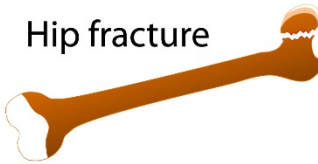
Genetic susceptibility 

Inactive lifestyle 

Age (over 45) 

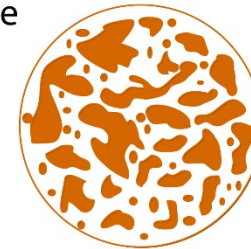
Insufficient mass 

Growth 



Hip fracture

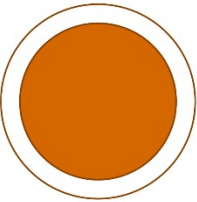
Normal bone




Osteoporosis



Prevention and treatment

Diet 

Dairy products 

Restful sleep 

Calcium and Vitamin D 



Limit coffee



Stop smoking



Limit alcohol

Prevalence

- 1 in 3 women and 1 in 12 men over 50 will fracture a bone due to osteoporosis (National Osteoporosis Society. 2011)
- Around 60,000 osteoporotic hip fractures each year (DoH. 2004:54)

Source: in Lawrence (2013)

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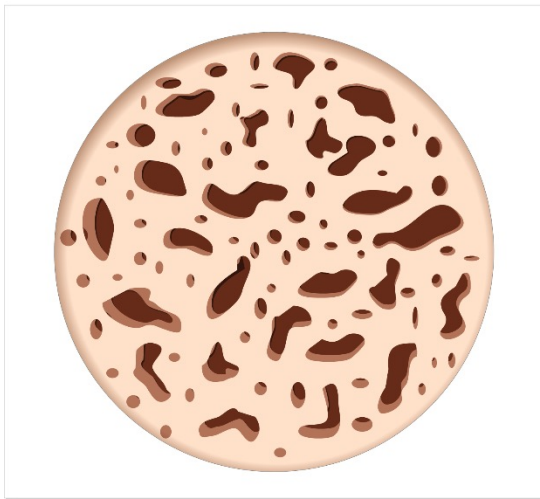
Progression

- Progresses steadily over a number of years with no visible signs or symptoms
- First symptom is usually a bone fracture after a minor injury or fall
- As the condition progresses it can lead to changes of posture (hyperkyphosis), loss of height, persistent back pain and breathing problems

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STAGES OF OSTEOPOROSIS

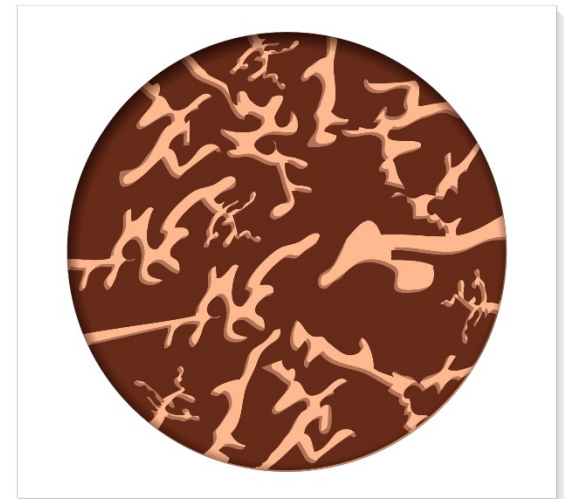
NORMAL BONE



OSTEOPOROSIS



SEVERE OSTEOPOROSIS



Risk factors

- Female gender
- Age
- Heredity – family history
- Ethnicity – Caucasian and Asian
- Diet – lack of calcium and vitamin D
- Hormones – low oestrogen and testosterone
- Physical inactivity and sedentary lifestyle
- Slender body type with low BMI and low body weight
- Prolonged amenorrhea – menopause or eating disorders
- Nulliparity – no pregnancy
- Smoking and alcohol



Vtct

Treatments and interventions

Vtct

Activity

- What are common treatments?
- What are the desired effects, and side effects, of common medications?
- How can lifestyle modification, including nutrition and physical activity changes, be used in addition to medical therapies?

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Credible sources

- British National Formulary (BNF)
- MIMs
- Patient UK
- NICE
- NHS choices
- ACSM

Please note:

Treatment guidance and medications are subject to change as new guidance is provided.

Always use appropriate sources to check the currency of information.

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Medications and side effects

- **Bisphosphonates** - nausea, diarrhoea
- **Hormone Replacement Therapy (HRT)** - risk of breast cancer, thromboembolism, stroke, breast pain and swelling, swelling of the legs and feet. Weight gain
- **Calcium and vitamin D supplements**
- **Selective Oestrogen Receptor Modulators** - risk of thromboembolism

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Side effects and exercise

Side effects of medication that may have an implication on exercise and the exercise response:

- Dizziness
- Nausea
- Weight gain
- Thromboembolism
- Stroke
- Breast pain and swelling
- Swelling of the legs and feet.

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Lifestyle interventions

- Reduce alcohol intake
- Smoking cessation
- Increase physical activity – weight bearing
- Improve diet - calcium and vitamin D

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OSTEOPOROSIS



HIP

FRACTURE
FRACTURE

CALCIUM



EXERCISE



YOGURT



AVOID
ALCOHOL

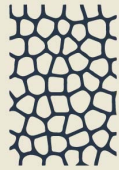


SUN

SMOKING



VITAMIN D



BONE
DENSITY

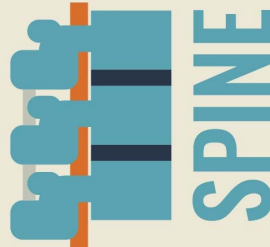
POTENTIAL
FRACTURE
SITES



CAFFEINE



+65 AGE



SPINE

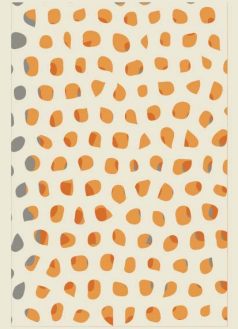
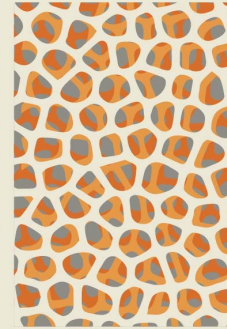
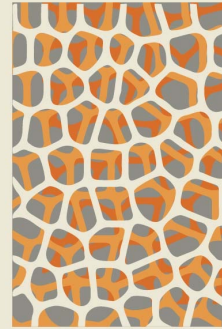


BONE MATRIX

OSTEOPOROSIS

OSTEOPENIA

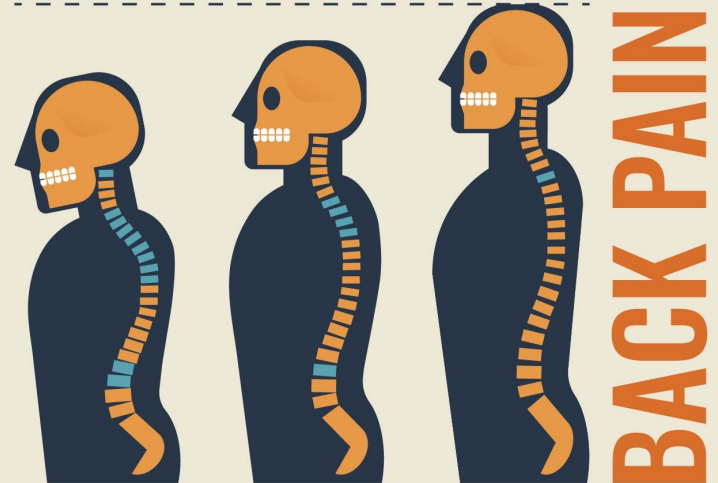
NORMAL



T-SCORE



LOST OF HEIGHT



BACK PAIN

Considerations

- Include specific functional exercises - balance and co-ordination
- Target fracture sites - wrist, spine and hip
- Include weight-bearing exercises - upper body, trunk and lower body - extensor muscle groups
- Consider progression of condition - May need to signpost to falls prevention (level 4) – frail older adults
- If weight-bearing exercise is not possible - chair-based or water-based alternatives

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Risks and benefits of exercise and activity

Vtct

Activity

1. What are the risks and benefits of exercise and activity?



Vtct

Benefits and risks

Benefits

- Improve and maintain bone density
- Reduce risk of falls
- Maintain mobility and independence
- Maintain posture

Risks

- Falls
- Fractures

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Exercise guidelines, restrictions and considerations

Vtct

Exercise recommendations

Exercise mode	FIT principles
Aerobic	<ul style="list-style-type: none">• Maximum heart rate - 40%-70%• 3-5 days a week for 30-60 mins per session
Resistance	<ul style="list-style-type: none">• 2-3 sets of 8-12 reps @ 75% of 1RM• 2-3 days/week, 20-40 mins per session• Emphasis on trunk, lower limbs, hips (fracture sites)
Functional training	<ul style="list-style-type: none">• 3-5 days/week• To decrease risk of falls and improve balance
Flexibility	<ul style="list-style-type: none">• 5-7 days/week.• Static stretches hold for 10-30 secs• Hip, knee and pectoral muscles

Avoid

- High impact
- Prone and supine lying positions
- Ballistic and bouncing movements
- Choreography, e.g. crossing legs
- High impact
- Forward flexion exercises (crunches or sit-ups) - may increase the risk of vertebral fractures
- Prone and supine lying positions
- Rolling the neck backwards (National Osteoporosis Society)

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Comorbidities

- Coronary heart disease - CHD
- High blood pressure
- High cholesterol
- Stroke
- Diabetes
- Irritable bowel syndrome
- Some cancers
- Substance misuse, e.g. smoking, alcohol

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Dealing with comorbidities

- Risk stratification may increase – high risk = exclusion.
- Effects of multiple medications.
- Consider exercise recommendations for all diagnosed conditions.
- Modify the frequency, intensity, duration, type in accordance with client needs.
- May require further adaptations and modifications.

The logo for VTCT (The Voluntary Training Council for the Tackling of Crime) is displayed in a purple serif font. The letters 'V', 't', and 't' are lowercase, while 't' and 'c' are uppercase. The 'V' is the largest and most prominent letter.

Learning check

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes.

LO3: Understand the relationship between exercise and specified exercise referral medical conditions

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

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Learning outcomes and assessment criteria

LO1: Understand the clinical features of medical conditions relevant to exercise referral programmes.

1. Describe the pathophysiology, and clinical signs and symptoms of specified medical conditions
2. Describe how pathophysiology, and clinical signs and symptoms change with progression of specified medical conditions
3. Describe the common causes of specified medical conditions

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Learning outcomes and assessment criteria

LO2: Know the accepted methods for treatment and management of medical conditions relevant to exercise referral programmes

1. Using a range of credible sources, identify the common drug, surgical or therapeutic interventions used to treat specified medical conditions
2. Describe the desired effects, and side effects, of common medications on the patient's exercise response for specified medical conditions
3. Describe how lifestyle modification, including nutrition and physical activity changes, can be used in addition to medical therapies for specified medical conditions

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Learning outcomes and assessment criteria

LO3: Understand the relationship between exercise and specified exercise referral medical conditions.

1. Explain the risks of exercise for patients with specified medical conditions.
2. Explain how exercise can benefit patients with specified medical conditions.
3. Evaluate the risks of exercise against the benefits for patients with specified medical conditions.

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Learning outcomes and assessment criteria

LO4: Understand how to programme safe, effective exercise programmes for patients with specified exercise referral medical conditions

1. Outline exercise guidelines and restrictions for patients with specified medical conditions.
2. Identify considerations for exercise when dealing with comorbidities.

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