Circulatory System

The circulatory system, through the medium of the blood, works to maintain homeostasis, which is the tendency to maintain a stable internal environment

Massage can help or impair this system.

Delivery of nutrients and oxygen	If cells do not receive blood they die as in stroke, heart attack, pulmonary embolism, renal infaction and decubitus ulcers
Removal of waste products	Waste includes carbon dioxide and noxious compounds. If blood and lymph supply is limited, affected cells can drown in their own waste products
Temperature	Blood vessles dilate when it's hot and constrict when cold. Also, prevents hot places (heart, liver, working muscles) from getting too hot. Helps to maintain a stable environment
Clotting	Occurs when a rough place develops in the endothelium of a blood vessel, causing a chain of chemical reactions that results in the spinning of tiny fivers that catch cells to plug

	any gaps. Sometimes a curse rather than benefit.
Protection from Pathogens	Defends against hords of microorganisms that try to gain access to the body's internal environment.
Chemical Balance	Supplied with enzymes and other buffers that keep pH balance within the safety zone.

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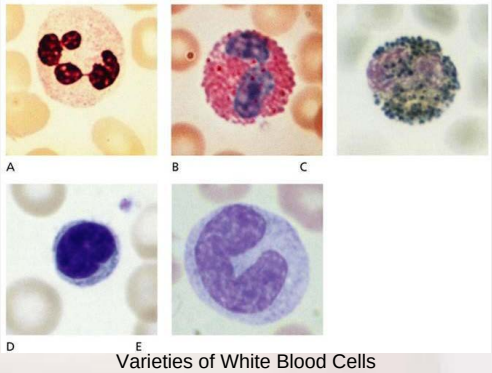
The Blood

Includes Red Blood cells (Erythrocytes), White Blood cells (Leukocytes) and Platelets (Thrombocytes)

All are produced in the red bone marrow.

Red Blood Cells	Produced and dying at 2 million per second Comprise 98% of blood cells. Life span is about 4 months Deliver oxygen to cells and carbon dioxide to lungs
White Blood Cells	Not really white, they're clear Different type fight different type infections in different stages of development Types include: neutrophils, basophils, eosinophils, monocytes and lymphocytes
Platelets	Fragments of huge cells born in red bone marrow. Usually smooth, but become spiky and sticky when stimulated Travel system looking for leaks or rough places in blood vessels. When found,



Varieties of White Blood Cells
A. Neutrophil; B. Eosinophil; C. Basophil; D. Lymphocyte; E. Monocyte

they create a clot.

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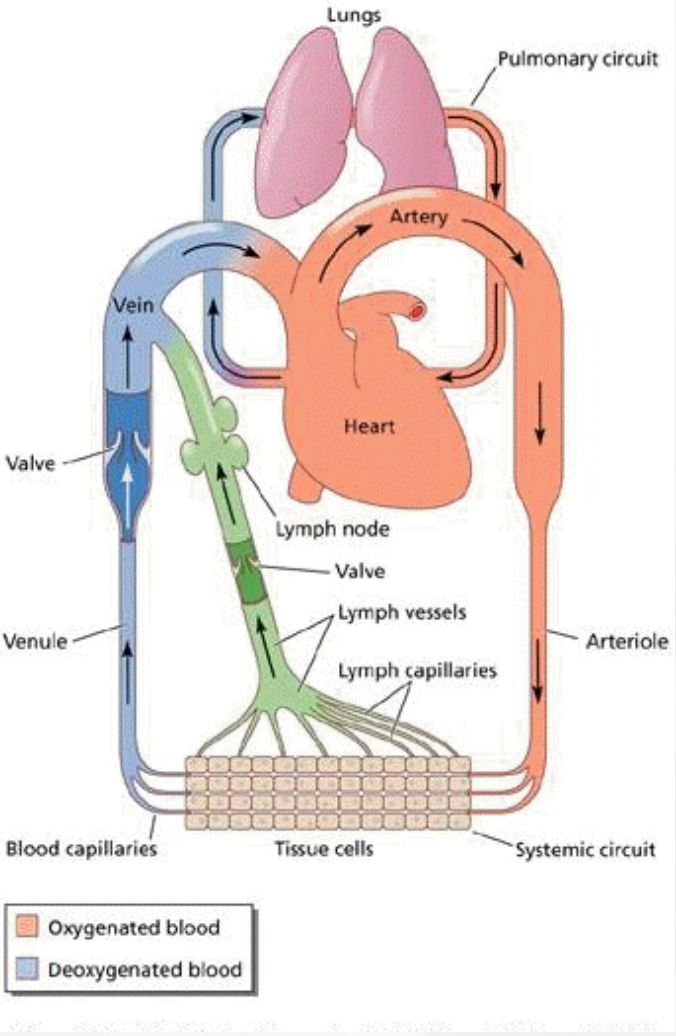
The Heart

Divided into left and right halves by the septum; right half pumps to the lungs and left half pumps to the rest of the body.

Each half divided into top and bottom; small top chambers are called atria and is where blood from lungs and body returns; lower chambers are called ventricles.

Muscles of the atria are thinner and weaker; ventricle muscles are thicker and stronger



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Blood Vessels

Arteries/Arterioles = Vessels **leaving** the heart

Veins/Venules = Vessels **going toward** the heart

Capillaries = Vessels that **connect** Arteries and Veins

Circulatory System consists of 60,000 miles of tubing

Arteries and Veins consist of 3 layers:

- Internal layer (tunica intima) of epithelium
- Middle layer (tunica media) of smooth muscle
- External layer (tunica externa) of tough connective tissue.

Capillaries are delicate variations thereof and as such are much more delicate and easy to damage

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Blood Disorders

Anemia

Embolism, Thrombus

Hematoma

Hemophilia

Leukemia

Malaria

Myeloma

Sickle Cell Disease

Thrombophlebitis, Deep Vein Thrombosis

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Anemia

Insufficient oxygen-carrying capacity ; Often a symptom or complication rather than freestanding problem

Demographics

3.4 million people in the United States

Mostly women

People with chronic diseases: cancer, infection, bone marrow suppression

Etiology

Idiopathic anemia

No identified cause, massage may offer temporary improvement

Nutritional anemia

Some deficiency; massage won't have much affect

Cautions for pernicious anemia

Iron deficiency anemia

Needed to form hemoglobin

Most common in women: need twice as much iron as men; get fewer calories

Pregnant women especially

Folic acid deficiency anemia

Needed to form RBCs

Water soluble: any excess can't be stored

Pernicious anemia

Inadequate Vitamin B_{12}: not enough in diet (vegans) or poor access in stomach (lack of intrinsic factor)

Can lead to central nervous system (CNS) damage, anemia

Other nutritional deficiencies

Copper, protein, others

Aplastic anemia

Suppressed bone marrow activity

Shortage of all blood cells

Autoimmune problem, renal failure, folate deficiency, viral infection, radiation, some toxins

Myelodysplastic anemia: similar problem, related to leukemia, myeloma

Secondary anemias

Complication of other disorders

Ulcers

Kidney disease

Hepatitis

Acute infectious disease

Leukemia, myeloma, lymphoma

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more Anemia

Signs and Symptoms	Massage
Pallor	Depends on cause
Dyspnea	May offer temporary improvement; probably not long term
Fatigue	Won't reverse etiology of most types of anemia
Rapid heart rate	Cautions: heart rate; pernicious anemia may change sensation
Intolerance to cold	Sickle cell and malaria are discussed elsewhere

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Embolism, Thrombosis

Embolism: traveling clot ; Thrombus: lodged clot

Etiology

Platelets flow through circulatory system; activated by any rough spot or inflammatory chemicals

Clots form at sites of damage, areas of slow, irregular blood flow

Emboli travel until vessel is too small

Pulmonary embolism

From a clot that forms on venous side of systemic circuit

650,000 pulmonary emboli/year

200,000 deaths

Often related to deep vein thrombosis (DVT), complications of trauma, orthopedic surgery

Risk factors for pulmonary embolism

Other types of cardiovascular disease, recent trauma, bed rest, surgery, pregnancy, recent childbirth, overweight, smoking, birth control hormones, hormone replacement therapy

Number 3 cause of death in hospital setting

Signs and symptoms of pulmonary embolism

Usually none till after damage has occurred

Dyspnea, chest pain, coughing with bloody sputum

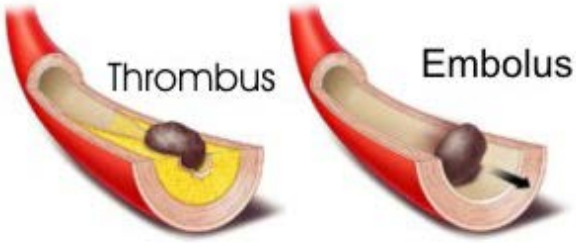
Can look like heart attack

Demographics

3.4 million people in the United States

Mostly women

People with chronic diseases: cancer, infection, bone marrow suppression



Complications of pulmonary embolism

Increased risk of another event

Loss of lung function → right-sided heart failure

Treatment

Thrombolytics, anticoagulants

Surgery if necessary

Prevention

Identify risk

- Low-dose presurgical anticoagulants
- Elevation of legs
- External compression of legs
- Early ambulation

Arterial embolism

Complication of atherosclerosis

- Could also be from bacterial infection, atrial fibrillation, rheumatic heart disease

Emboli are usually clots

- Can also be plaque, bone chip, bubble, knot of cancer cells

When septum is intact

All venous emboli travel to lungs

Arterial emboli can go anywhere except the lungs

- Coronary artery (heart attack)
- Carotid/ cervical artery (stroke)

Renal artery (renal infarction)

Femoral artery (muscle infarction)

Other

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more Embolism, Thrombosis

Signs and Symptoms	Treatment	Massage
May be silent May involve sharp tingling pain, tissue damage and death	Prophylactic anticoagulants	Rigorous circulatory massage is contraindicated for clients who tend to form clots Cautions with anticoagulant medications

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Hematoma

Bleeding, pooling of blood

Bruise = superficial capillaries (ecchymosis)

Between muscle sheaths, in brain = more serious

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more Hematoma

Signs and Symptoms	Treatment	Massage
Bruises reddish/purple, black/blue when acute Yellow/green when subacute Larger intermuscular bleeds Inflammation with discoloration Heat, pain, usually in fleshy areas	Bruises nothing, or hot and cold Subungual hematomas may have to be aspirated Intermuscular bleeds should be watched Compartment syndrome Myositis ossificans	Locally contraindicated while acute and painful Work gently, use hydrotherapy, stay within tolerance

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Hemophelia

Genetic disorder ; Absence of various clotting factors

Etiology

Hemophilia A (80% of cases)

- Deficiency in clotting factor VIII

Hemophilia B (also called Christmas disease) (15% of cases)

- Deficiency in clotting factor IX

Other: much rarer than A or B

Person with hemophilia has difficulty forming solid, long-lasting clots

- Don’t bleed faster, do bleed longer than others

Rated as mild, moderate, severe

- Severe hemophilia = 60% of diagnoses; <1% normal clotting factors

Demographics

About 18,000 men in the United States

About 400 new cases/year

- Carried on X-chromosome: women are carriers who pass it to their sons

About one-third of cases are spontaneous mutations

It is possible but rare for women to have hemophilia

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more Hematoma

Signs and Symptoms	Complications	Treatment	Massage
Signs at birth: umbilical cord bleeds excessively Early childhood: infant/toddler accidents Bruising, hematomas, nosebleeds, hematuria, joint pain from bleeds into capsule	Leading cause of death in children with hemophilia is intracranial bleeding Bleeding into joint capsules with inflammation and extensive damage - Hemophiliac arthritis - Ankles, knees, elbows Muscle and nerve damage Infected blood products - Vaccinate for hepatitis A, B Resistance, hypersensitivity to synthetic clotting factors	Supplement clotting factors - Can be done at home now, prophylactically or after injury Careful exercise, weight control	Rigorous mechanical massage is contraindicated Energetic work appropriate and helpful for stress, pain relief

Leukemia

White blood ; Cancer of bone marrow

Demographics

35,000 diagnoses/year

22,000 deaths

Leading cause of death by cancer in children; more common in adults

208,000 patients in the United States

Etiology

Myeloid or lymphoid cells from bone marrow

Bone marrow produces multitudes of non-functioning WBCs

Can be acute (aggressive) or chronic (slow-growing)

Usually acquired genetic mutations

Exposure to toxins, radiation

Untreated leads to death from excessive bleeding, infection

Four main types

AML: acute myelogenous leukemia

CML: chronic myelogenous leukemia

ALL: acute lymphocytic leukemia

CLL: chronic lymphocytic leukemia

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more Leukemia

Signs and Symptoms	Diagnosis	Treatment	Massage
Bone marrow dysfunction - Suppressed production of normal blood cells - Fatigue, anemia - Easy bruising, bleeding - Chronic infections	Blood tests, bone marrow biopsies, spinal tap Crossover with lymphoma	Depends on what cells have been affected Chemotherapy Four stages - Induction - Consolidation - CNS prophylaxis - Maintenance therapy Radiation therapy if unresponsive to chemo Bone marrow transplant Biologic therapies Treatments can exacerbate symptoms	Rigorous circulatory massage may be too demanding Other types of work may be helpful Work as part of health care team

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Malaria

Vector-borne infection of blood cells ; Four species of protozoa

- Plasmodium ovale
- Plasmodium vivax
- Plasmodium malariae
- Plasmodium falciparum

Spread by Anopheles mosquitoes

Demographics

Worldwide: 500 million/year

1.5 million to 3 million deaths/year, average age = 4 years old

90% of cases in sub-Saharan Africa

No longer common in the United States : 1,000–2,000 diagnoses a year (mostly travelers)

Etiology

Life cycle of Plasmodium

Human is bitten by female mosquito

Immature parasite introduced to bloodstream

Travels to liver, grows 6–9 days

Reenters bloodstream

Invades healthy RBCs

- Feeds on hemoglobin
- Replicates

Infected cells rupture, releasing parasites and toxins

P. falciparum can be fatal

Transmitted through blood, mother to child

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more Malaria

Signs and Symptoms	Diagnosis	Prevention	Massage
Physical symptoms Often missed in the United States Blood smears Other tests in development	Some parasites becoming resistant to chloroquine Important to treat fully	Prophylactic medication Mosquito nets, insecticide, etc. Vaccine in development Bacille Calmette-Guérin (BCG) has many problems	Contraindicated while acute Get information on kidney, liver damage to make other choices

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Myeloma

Cancer of bone marrow, specifically maturing B cells

Demographics

16,700 diagnoses/year

58,300 current patients

11,000 deaths/year

Usually diagnosed around age 70

- Older black men more than other groups

Etiology

Normally, only a few B cells in bone marrow before they migrate to lymph tissue

Usually spine, pelvis, ribs, skull

While B cells mature in bone marrow, they undergo a DNA mutation

- Proliferate into tumors
- Secrete cytokines that block osteoblast activity, stimulate osteoclasts ; Bone thinning, holes

Produce faulty antibodies

- Monoclonal immunoglobulins (M-proteins)
- Fragments can show in urine: Bence Jones proteins
- Progress can be tracked through urinalysis
- Kidneys can sustain damage

(Tumors outside bone = *plastocytomas*)

- Three types of myeloma

Multiple myeloma

Solitary myeloma

Extramedullary plastocytoma

more Myeloma

Signs and Symptoms	Diagnosis and Staging	Treatment	Massage
Silent early Bone pain, fractures Anemia, infections, bleeding Kidney problems Amyloidosis	Urinalysis Bone marrow biopsy, aspiration Blood test Radiography, magnetic resonance imaging (MRI) Stages I–III	Watchful waiting Chemotherapy, bone marrow stem cell transplantation	As with other blood cancers, support rather than challenge stability Work for immune support, pain relief High risk of fractures

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Sickle Cell Disease

Autosomal recessive genetic condition ; Production of abnormal hemoglobin

Etiology

Recessive gene: one copy = SC trait, not disease

Two people with SC trait have 25% chance of passing it on to each child

SC trait has no health consequences

SC disease: hemoglobin is abnormal, RBCs have sickle shape ; Lifespan of RBC = 10 days

Three variations

SS form (most common)

SC form

S-beta thalassemia

Demographics

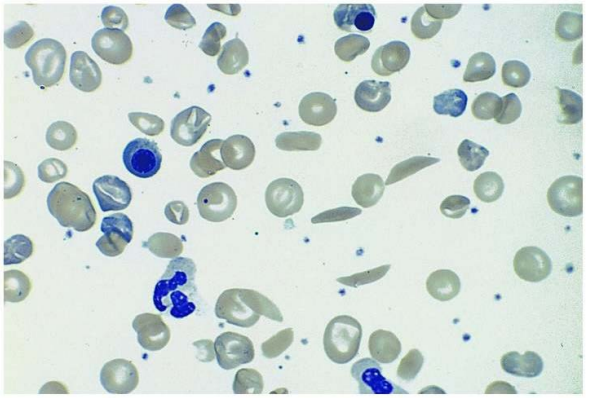
SC gene most common in blacks, Hispanics, Mediterraneans, from Middle East

2 million people with SC trait in the United States

72,000 have SC disease

8,000 births/year

500 deaths/year



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more Sickle Cell Disease

Signs and Symptoms	Complications	Treatment	Massage
Inadequate oxygen-carrying capacity - Fatigue - Shortness of breath - Pallor Jaundice, splenomegaly Other complications	Sickle cell crises: infarctions - Hand-foot syndrome - Organ damage Infections (lost spleen function) Gallstones Vision loss Acute chest syndrome (looks like pneumonia) Others - Delayed growth, chronic skin ulcers at lower legs, priapism	Work to limit severity, frequency of SC crises - Over-the-counter (OTC) pain medication, hot pack - Heavier painkillers - Prophylaxis for pneumonia	Rigorous exercise *not* recommended - Circulatory, mechanical massage contraindicated - Reflexive, energetic may be helpful - Warm packs, gentle stroking for pain

Aortic Aneurysm

Veins have become obstructed with clots ; Usually calves, thighs, pelvis

- Thrombophlebitis = lesser, greater saphenous veins
- DVT = popliteal, femoral, iliac veins

Demographics

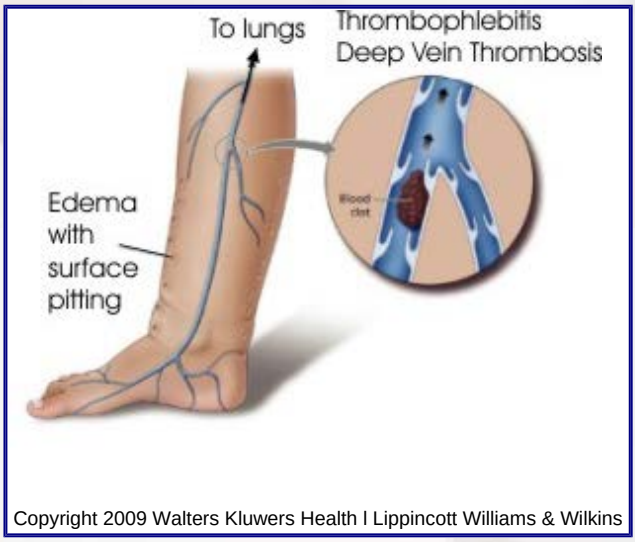
Often unrecognized, untreated

DVT may happen 2 million times

Diagnosed in 600,000

200,000 deaths

Up to 5% population may have a DVT at some point



Etiology

Thrombi = stationary clots; can fragment and travel

- Usually to lung → pulmonary embolism
- (exception with patent foramen ovale; cross over to arterial side)

Virchow triad

- Injury to endothelium
- Hypercoagulability
- Venous stasis

Possible triggers

- Physical trauma
- Varicose veins
- Local infection
- Reduced circulation
- Immobility
- Pregnancy and childbirth
- Certain types of cancer
- Surgery
- High-estrogen birth control pills or hormone replacement therapy

Other factors: cigarette smoking, hypertension, paralysis, and some genetic conditions

Clot forms; sudden movement or change in position causes debris to break off and travel

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more Thrombophlebitis, Deep Vein Thrombosis

Signs and Symptoms	Diagnosis	Treatment	Massage
May be obvious with signs of inflammation Sometimes distal edema Chronic problem → skin rashes, ulcers With infection: fever, malaise DVT more dangerous, higher risk of serious damage ; May show pitting edema	Ultrasound: fast, noninvasive, high chance of false positive Venography: more accurate, slower, more risk of damage MRI: fast, noninvasive, accurate, expensive, not available everywhere	Thrombolytics to break clots; anticoagulants to prevent future ones Risk of bleeding Pneumatic compression, support hose for DVT Superficial thrombophlebitis: hot packs, analgesics, gentle exercise Vena cava filter	A client with diagnosed blood clots is not a good candidate for circulatory massage Signs may be indistinct, misleading

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Vascular Disorders

Aneurysm

Atherosclerosis

Hypertension

Raynaud Syndrome

Varicose Veins

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Aortic Aneurysm

Bulge in blood vessel wall or heart ; Usually at aorta or in brain. If an aneurysm ruptures, extensive bleeding can happen

Demographics

Most patients are men 60 years or older

About 15,000 deaths/year

Etiology

If walls of high-pressure arteries lose elasticity, they can bulge

- As aneurysm grows, walls get thinner

Usually happens at thoracic or abdominal aorta or base of brain

- Sometimes the whole ventricle of heart can bulge

Factors

- Compromised smooth muscle
- Smoking
- Congenitally weak arterial wall muscle
- Inflammation
- Untreated syphilis
- Trauma

Types of aneurysms

- Saccular
- Fusiform
- Berry
- Dissecting

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more Aortic Aneurysm

Signs and Symptoms	Diagnosis	Treatment	Massage
Sometimes silent May press on other structures - Dysphagia, chest pain, hoarseness, coughing (thoracic aorta) - Throbbing lump near umbilicus back pain (abdominal aorta)	Blood makes specific sound (bruit) Palpable in thin people Ultrasound, computed tomography (CT), MRI **Complications** Pressure on nearby structures Blood clots Rupture, hemorrhage - Ruptured cerebral hemorrhage is fatal 50% of time - Ruptured aortic hemorrhage is nearly always fatal	Endovascular or open surgery - Replacement graft, Dacron substitute, stent Small bulges may not need immediate repair	Circulatory massage requires too much adaptation A client with a diagnosed aneurysm may get benefit from reflexive, energetic work to lower blood

Atherosclerosis

Subtype of arteriosclerosis

- Hardening of arteries due to plaque
- Damage causes spasm, blood clots
- Diameter is occluded

Coronary artery disease (CAD) = atherosclerosis at coronary arteries

Etiology

Multifactorial process ; Influenced by gender, age, race, diet, others

Basic progression

1. Endothelial damage
   - Carbon monoxide; high levels of low-density lipoproteins (LDLs) and triglycerides; high iron
   - Occurs most readily at branches or sharp curves
2. Monocytes arrive, move in, become macrophages
3. Macrophages take up LDL.
   - Become foam cells: beginning of plaque
4. Foam cells infiltrate and damage smooth muscle tissue.
   - Secrete growth factors that cause smooth muscle cells to proliferate
   - Release enzymes that damage arterial walls, promote clotting
5. Platelets arrive
   - Secrete growth factors
   - Form clots

- Cause vascular spasm
- Unchangeable risk factors

Heredity, genetics

- Gender
- Age
- Kidney disorders

Modifiable risk factors

- Smoking
- High cholesterol levels
- High blood pressure
- Sedentary lifestyle
- Diabetes

Other Risk Factors

- C-reactive protein
- Homocysteine
- Others: BMI, fibrinogen, lipoproteins, stress management…

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more Atherosclerosis

Signs and Symptoms	Diagnosis	Treatment	Massage
None early: 50% occlusion before dysfunction (angiogenesis, adaptability) Later: poor stamina, shortness of breath, complications **Complications** High blood pressure Aneurysm Arrhythmia Thrombus or embolism, peripheral vascular disease Angina pectoris Stable angina pectoris Unstable angina pectoris Heart attack	Angiogram, CT, blood tests, echocardiogram, ultrasound, ankle-brachial index	Diet and exercise Drugs Lower blood pressure, cholesterol, platelet activity Surgery Bypass, angioplasty, endarterectomy	Determined by client's resilience: is it safe to exercise rigorously? Adjust for medications as needed

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Hypertension

High Blood Pressure: Consistently above 140/90

Etiology

Blood pressure variables

- Pressure inside vessels
- Pressure outside vessels
- Blood volume
- Vessel diameter

Types of high blood pressure

- Essential: 95%
- Secondary (temporary complication)
- Malignant hypertension: diastolic rises very quickly —medical emergency

Blood pressure readings

- Risk of damage to vessels begins when systolic > 115, diastolic > 75
- A measurement is based on two or more readings at different office visits

Category	Systolic	Diastolic
Optimal	<120	<80
Prehypertension	120–139	80–89
Hypertension		
Stage 1	140–159	90–99
Stage 2	160+	100+

Demographics

65 million people in the United States

- 1 in 3 adults

Men > women until menopause, then men = women

African Americans more than other races

Age: -half of people 60 years or older have hypertension

Other factors

- Obesity, smoking, high cholesterol, atherosclerosis, water retention
- Genetic predisposition

more Hypertension

Signs and Symptoms	Treatment	Massage
Silent killer Shortness of breath; headache/dizziness; swelling of ankles; sweating, anxiety **Complications** Edema Atherosclerosis Stroke Enlarged heart, heart failure Aneurysm Kidney disease Vision problems	Of 65 million with hypertension in the United States 63.4% know 45.3% treat it at all 29.3% treat it successfully 70% of people with hypertension don't control it well enough to prevent complications DASH diet Exercise Medication Diuretics, vasodilators, beta-blockers Medication causes side effects; high blood pressure has no symptoms	Depends on health, resilience of client Massage can lower blood pressure and stress Get info on kidney, heart problems No deep abdominal work

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Raynaud Syndrome

Primary Raynaud disease: vasoconstriction in extremities (also nose, ears, lips) ; Secondary Raynaud phenomenon: complication of underlying disorder

Demographics

Primary: mostly women 15–40 years old

Some kind of Raynaud syndrome may affect 5–10% of general population

Etiology

Arterioles spasm

Temporary episodes, can become permanent

Chemical components: tunica intima secretes chemicals that affect vasospasm, viscosity of blood

May be related to hyperreactivity to cold, stress

Causes (primary)

Stress (sympathetic response), cold, mechanical irritation

Slow onset, less severe than secondary

Both hands and feet often affected

Causes (secondary)

Arterial diseases: diabetes, atherosclerosis, Buerger disease

Autoimmune connective tissue diseases: scleroderma, lupus, rheumatoid arthritis

Sensitivity to some drugs: beta-blockers and ergot compounds

Neurovascular compression: carpal tunnel syndrome, thoracic outlet syndrome, crutch use

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more Raynaud Syndrome

Signs and Symptoms	Treatment	Massage
Usually bilateral Cycle of colors White Blue Red Episodes last < 1minute to several hours Secondary can be extreme and long lasting: atrophy, ulcerations, skin and nail damage	Depends on cause Quit smoking, avoid vasoconstrictors, soak in warm water, dress for weather, protect hands when working in cold, etc. Deal with stress: biofeedback, massage Medication to dilate blood vessels, counteract norepinephrine Surgery: sympathectomy	Depends on cause Primary indicates massage Secondary: be guided by underlying disorder, general health

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Varicose Veins

Varix= twisted

Valves in superficial veins collapse, vein is stretched, distorted ; Can happen at anus (hemorrhoids), esophagus, scrotum, legs

Demographics

Women > men

- Progesterone weakens vein walls
- History of pregnancy

Half of people 50 years or older

Etiology

In the leg

- Small veins pick up blood from internal muscle capillaries
- Run on superficial aspect, feed into larger veins that perforate leg muscles
- Muscle contraction/relaxation moves blood from superficial to deep and up legs

Damage to valves in superficial veins

- Wear and tear
- Standing all day
- Mechanical obstruction ; Knee socks, brace, pregnancy
- Systemic problems: kidney, liver congestions
- Structural anomalies

When a valve is damaged

- Blood adds pressure on the next valve down
- Veins become twisted, ropy

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more Varicose Veins

Signs and Symptoms	Treatment	Massage
Lumpy, bluish wandering lines Protrude from skin Back, medial aspect of calf and thigh Itching, throbbing pain **Complications** Varicose ulcers Leg cramps Blood clots (melt easily) Risk of DVT, especially with sudden onset or change in size	Support hose, elastic bandages Avoid long periods on feet, rest with feet up Avoid constricting clothes Surgery Vein stripping Ambulatory phlebectomy Other Sclerosing injections Laser Radiofrequency	Local contraindication Heavy massage distal also contraindicated For mild cases: avoid deep, sharp pressure Telangiectasias okay for massage

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Heart Conditions

Heart Attack

Heart Failure

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Heart Attack

Damage to cardiac muscle from ischemia ; Muscle tissue doesn't repair; replaced by scar tissue

Damaged area = infarct

Heart attack = myocardial infarction

Etiology

Usually blockage in coronary artery impedes blood flow

- Could be clot, debris that travels from elsewhere
- Prolonged coronary spasm (drug overdose)

New plaques more likely to break off than old ones

- Cardiac cells die of ischemia
- Can't contract with coordination
- May trigger fibrillations

Ventricular fibrillation → high risk of sudden death

Seriousness determined by size, location of infarct

- May impair muscle function
- May damage conduction system

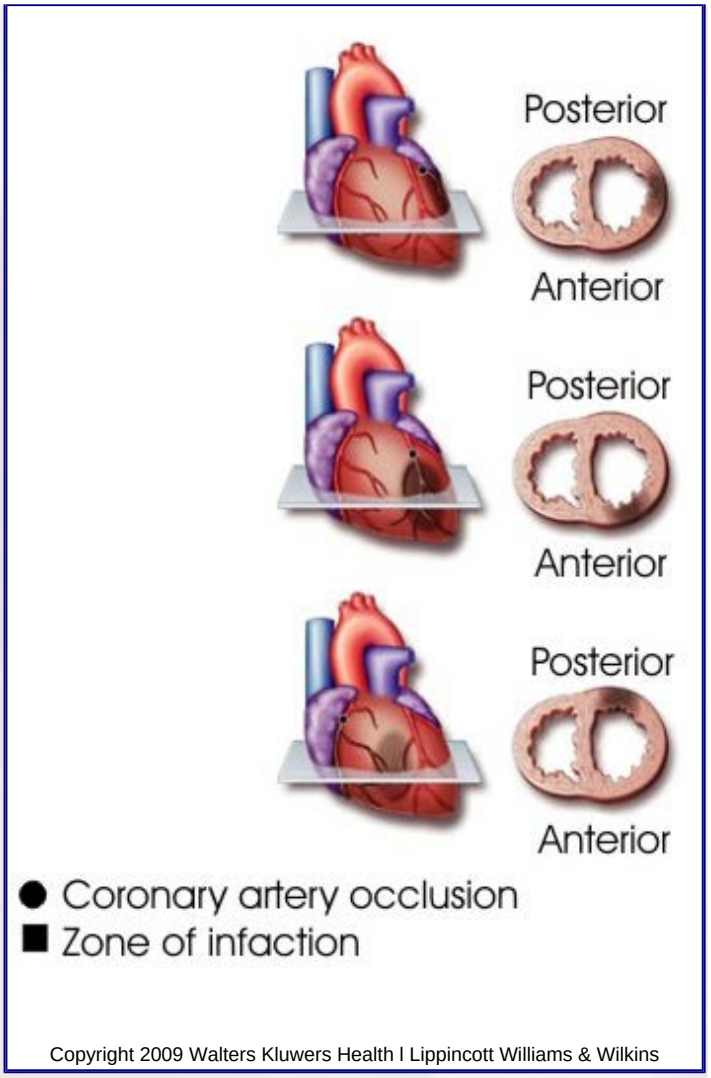
Demographics

Number 1 cause of death in the United State

- 1 million heart attacks/year (1:5 deaths)
- 500,000+ deaths/year
- 13 million survivors alive today

Risk profile

- Sedentary, hypertension, high cholesterol, smoking, overweight
- Male 45+, Female 55+
- Family history
- Female 35+ who takes birth control pills



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more Heart Attack

Signs and Symptoms	Diagnosis	Treatment	Massage
Pressure, pain in the chest Spreading pain Light-headedness, nausea, sweating Others: shortness of breath, nausea, anxiety, weakness, fainting, palpitations, cold sweat, stomach/abdominal pain Angina pectoris (chest pain) *Stable angina* 6.5 million have it 400,000 diagnoses/year Triggered by extra effort *Unstable angina* Sudden onset of severe chest pain, no trigger Reliable predictor Dynamic process Blockage may accrue over hours Early intervention	Hard to identify ahead of time Angiogram for high-risk patients Other tests High speed CT Contrast echocardiogram Blood test for C-reactive protein MRI for plaque	Identify location of blockage, break it up as soon as possible Thrombolytics Percutaneous transluminal coronary angioplasty Oxygen, pain management Later care: anticoagulants, nitroglycerin, observation, evaluation Lifestyle changes	Depends on resilience, ability to adapt to changes

can limit damage **Complications** Embolism Atrial and ventricular fibrillations Aneurysm Heart failure Shock			

Heart Failure

Progressive loss of heart function ; Not cardiac arrest

Demographics

3 million in the United States have heart failure

400,000 new diagnoses/year

Mostly among survivors of heart attacks, CAD, aneurysm, etc.

Men> women till age 75; then men = women

African Americans two times more than others

1 million hospitalizations/year

Etiology

Heart pumps 2,000 gal/day

If resistance develops, heart compensates

- Heart grows (cardiomegaly)
- Ventricles become stiff, inelastic

Stress hormones boost short-term function, damage in long-term

Heart may fibrillate → circulatory system collapse

Heart failure usually related to other cardiovascular disease

Can be related to congenital weakness with heart muscle or valves

Types of heart failure: systolic v. diastolic

Systolic heart failure: left ventricle is enlarged; can't push hard enough

Diastolic heart failure: both ventricles are enlarged and inelastic

Types of heart failure: left side v. right side

Left-sided heart failure

- Resistance in arteries (atherosclerosis, etc.)
- Back up of fluid in lungs: pulmonary edema, shortness of breath, cough

Right-sided heart (cor pulmonale)

- Resistance in lungs (emphysema, pulmonary embolism, pulmonary edema)

Back up of fluid into legs or lowest structure

Can also cause liver, kidney damage

Biventricular heart failure

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more Heart Failure

Signs and Symptoms	Diagnosis	Treatment	Massage
Depends on which side of heart is dysfunctional Shortness of breath, low stamina, edema, chest pain, indigestion, arrhythmia, distended vessels in neck, cold sweaty skin…	Observation, auscultation Radiography for cardiomegaly Electrocardiogram May be rated I–IV or A–D	Depends on location, severity Rest, change in diet, modify physical activity Medication Beta-blockers, digitalis, diuretics, vasodilators Surgery: repair damaged valves, mesh bag, transplant	Heart can't keep up with needs; massage shouldn't challenge any further Energetic/reflexive work may be helpful

part 1

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To Test

Access Code: K5Y38

Please write down code. You will be asked for it

Once you have successfully passed the test (70% correct), please email Kim Jackson at kim_hotschool@yahoo.com. We will email you your CE certificate within 7 business days.