Weekend 7: APP Homework
Digestive, Respiratory, Cardiovascular, Lymphatic, Urinary Systems

Long Answer section:

1. How does food in the mouth become an energy source used in cellular respiration? Refer to the digestive and cardiovascular systems in your answer.
What are i) constipation and ii) irritable bowel syndrome?
How might massage help in each case and why?

Digestive

- *The relevant stages of digestion here are – eating, digestion and absorption*
- *In the mouth, food starts to be broken down, in 2 ways: chewing with the teeth does this mechanically and & saliva from the salivary glands moistens the food and mixes it with enzymes that start chemically to break down starches into sugars.*
- *The bolus of food travels down oesophagus, moved by peristalsis*
- *It enters the stomach and is now a thick liquid called chyme. It mixes with gastric juice, containing hydrochloric acid and enzymes, in the stomach. Muscular stomach walls create a washing machine churning effect to break down proteins and kill bacteria.*
- *The chyme empties into duodenum – bile from the liver & pancreatic juice aid breakdown of fats and prepare vitamins for absorption.*
- *Food enters the small intestine, where the final breakdown of proteins and sugars takes place.*

Cardiovascular

- *Food is absorbed through walls of small intestine (aided by villi), into capillaries*
- *Useful nutritional elements are vitamins, minerals, starches, fats and proteins.*
- *Capillaries & circulatory system (via portal vein) transport nutrients direct to liver – for storage, processing and filtering out many substances*
- *The rest continues via the general circulatory system – through veins back to the heart, via the pulmonary artery to the lungs where the blood picks up more oxygen, then via the pulmonary vein back to the heart. Blood rich with nutrients and oxygen is then pumped via the aorta, arteries, arterioles and capillaries to organs & cells, where cellular respiration can take place.*

Constipation

- *Occurs when faeces pass very slowly though the intestines, peristalsis is often sluggish. This can be due to stress.*
- *Massaging clockwise around the abdomen can encourage peristalsis to be more efficient. Some pressure may be appropriate, providing it is comfortable for the client, to help soften the stuck faecal matter. Then kneading and effleurage in a clockwise flow, following the direction of the large intestine, can help the elimination process.*

Irritable Bowel Syndrome

- *The peristaltic waves in the bowel become irregular, perhaps due to stress or dietary intolerance. Results in periods of diarrhoea and constipation, pain and bloating.*
- *Abdominal massage is a local contraindication, holds and light stroking only, to help facilitate relaxation.*
- *This is through nurturing touch being interpreted as pleasant and enabling the hypothalamus to switch from the sympathetic nervous system to the parasympathetic. Also the vagus nerve can activate the PNS directly.*

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2. Describe the following parts of the respiratory system and explain the function of each:

- **Larynx**
- **Trachea**
- **bronchi**
- **alveoli**
- **diaphragm**

Explain, with reasons, how you would massage someone with 1) a bad cold 2) asthma 3) bronchitis.

- ***Larynx*** - is the voice box. It is made of cartilage joined by ligaments and membranes. Folds of tissue vibrate as air passes over them, to make a sound. Air is also warmed and moistened.
- ***Trachea*** *is the breathing tube, strengthened by rings of cartilage. Also known as the windpipe, it is a muscular tube reinforced by rings of cartilage.*
- *The trachea branches into 2* ***bronchi*** *– tubes also ringed with cartilage which convey air to the lungs – one to each. In the Lungs, the Bronchi divide and sub-divide into thousands of tiny tubes called Bronchioles*
- *The Bronchioles end in clusters of air-sacs called* ***Alveoli****. These are little air sacs, with elastic walls which can stretch and recoil as air enters and is expelled. Surrounded by a network of capillaries, this is where gaseous exchange takes place, with oxygen breathe in from the air diffusing through the alveolar walls into the blood in capillaries. Also carbon dioxide diffuses from the blood in capillaries into the alveoli, to leave the body as air is expelled.*
- ***Diaphragm*** *is a dome shaped muscle forming the floor of the Thoracic Cavity. It is a mixture of smooth and skeletal muscle, which means it can be subject to both conscious and unconscious control. When the diaphragm contracts, the dome is flattened, pushing downt he abdominal contents and creating more space in the thoracic cavity. The lungs expand, the air pressure in them drops and air rushes in from outside. As the diaphragm relaxes, this reverses, the lungs decrease in volume and air is expelled.*

Bad Cold

- *Common Cold – viral, highly infectious, so there is a risk of practitioner catching it, but little more risk than if meeting lots of people anyway;*
- *Client more likely to be infectious in early stages;*
- *Client will probably not wish to be touched if "in full flow"; vigorous massage inadvisable; good hygiene (washing hands tissues etc).*

Asthma

- *Asthma – spasm of bronchioles, cases breathing difficulties, can be very serious.*
- *Often an allergic reaction caused by stress or sudden environmental changes eg from entering a centrally house on a cold day.*
- *Massage= effleurage and kneading - to overworked neck and upper chest muscles can be helpful; holds over rib cage to re-educate breathing patterns.*
- *Keep warm as cold can bring on an attack, make sure inhaler is available, adapt positioning as lying flat may be a problem.*

Bronchitis

- *Is inflammation of the bronchi causing a build up of mucus and cough and often follows an upper respiratory infection.*
- *In the acute phase, massage is contraindicated but in the chronic phase, massage can be very helpful. Again, effleurage and kneading can help relax tired muscles such as the pectorals and intercostals, as well as holds over the ribs to facilitate deeper breathing.*
- *May need to prop up client as lying down often makes breathing problems worse*

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3. Compare the structure and function of arteries, veins and capillaries.

State your massage recommendations for the following conditions, giving reasons for your answers.

1) deep vein thrombosis, 2) varicose veins, 3) angina

Veins:

- *Carry de-oxygenated blood back to the heart*
- *They have thin walls containing one-way valves to keep the blood flowing in the right direction*
- *Veins have no pump. Blood moves through them through muscular contraction – for this reason the soleus is sometimes called the "second heart" as its powerful contractions help the venous return.*
- *Veins are nearer the surface of the body, hence medium depth draining massage can be effective in supporting venous blood flow.*

Arteries:

- *Carry oxygenated blood from the heart to the body*
- *They have thick, elastic, muscular walls to propel the blood under pressure as it leaves the heart*
- *They are deeper in the body than veins and pass on the inside of joints eg the armpit, elbow, wrist or back of knee. This is to protect the arteries, as if damaged, a great deal of blood can be lost very quickly.*

Capillaries:

- *Are the network of fine blood vessels throughout the body.*
- *They are found in all body areas except the epidermis of the skin, hair and nails.*
- *Some tissues eg skeletal muscle have extensive capillary networks.*
- *The walls of capillaries are very thin, so they are permeable. This means materials can easily pass through them eg gaseous exchange in the alveoli of the lungs; nutrients, hormones, antibodies and white blood cells into the intercellular fluid and waste material back into the capillaries. where exchange of materials takes place*

1) ***Deep Vein Thrombosis****: a blood clot in a deep vein, sometimes after a stroke or periods of immobility, such as a long flight. If the clot were to break loose, it could travel to the lungs and cause a pulmonary embolism, with potentially fatal results. For this reason,* ***massage is totally contraindicated for 3-6 months*** *after diagnosis. DVT in a leg would be too painful to massage in any case. Thereafter, it is important to consult the client's doctor and to ensure the client is on anti-coagulatant medication such as warfarin, to proceed with gentle effleurage and holds only.*

2) ***Varicose veins****: damaged veins due to failure of the valves. Blood can pool beneath the damaged valve. Massage: is a local contraindication: no massage below the affected area; ok to massage gently with effleurage and draining around and above to help draw blood away from the damaged area.*

3) ***Angina*** *is a condition caused by inadequate blood supply to the heart muscle. Symptoms include cramp like pains in the chest, which are made worse by stress or exercise and eased by rest. In terms of massage, it is important to keep the client warm. Stable angina responds well to relaxing massage, such as slow effleurage, rhythmic gentle kneading and holds to any part of the body. Make sure the client has any medication to hand. People with unstable angina should not be massaged unless the practitioner has consulted the client's doctor.*

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Short Answer Section:

1. What is peristalsis?

- *Wave-like movement in digestive tracts, pushing food through digestive tubes*

2. Which of the following are disorders of the digestive system?

- *Nausea, bronchitis, diverticulitis, cystitis, colitis, kidney stones, phlebitis*

3. List four functions of the liver.

- *Produces bile, a substance which beaks down fats and is stored in the gall bladder*
- *Stores glycogen; released when there is a demand for energy, to maintain temperature or during stress*
- *Stores vitamins and minerals*
- *Produces, stores and breaks down haemoglobin*
- *Breaks down toxins, including alcohol and nocotine*

4. In which direction would you massage the abdomen and why?

- *Clockwise – to follow the direction of flow of material in the colon*

5. Which of the following are disorders of the respiratory system?

- *Bronchitis, pneumonia, nausea, asthma, impetigo, pleurisy, dermatitis, cough*

6. Where in the lungs does gaseous exchange take place?

- *The alveoli*

7. What happens when the diaphragm contracts?

- *Volume in the thorax is increased, air enters lungs to equalize pressure with outside (breathing in)*

8. Name the four chambers of the heart.

- *Left Atrium, Left Ventricle, Right Atrium, Right Ventricle*

9. Name the 3 main types of blood cell and what are their functions?

- *Red blood cell – transport oxygen around the body from the lungs*
- *White blood cell – defend body from attack*
- *Platelets – clotting or coagulation*

10. What is the fluid part of blood called?

- *Plasma*

11. What is haemaglobin?

- *Protein in red blood cells with the capacity to combine with oxygen (& 'carry' oxygen around body)*

12. What is the function of lymph vessels?

- *Pick up interstitial fluid and transport it to concentrations of lymph nodes as lymph, then back into general circulation*

13. What is the function of a lymph node? Give two major locations of lymph nodes.

- *To filter lymph*
- *Groin, neck, armpit, central thoracic cavity*

14. What is the function of lymphocytes?

- *Fight infection*

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