

Investigating heart failure

Worksheet

Name:	Date:
Aim:	

Complete the following tables during the practical.

Baseline Values: Time to transfer 300mL when depressing the pump once every second (noting the time at 100mL increments):

Transfer Volume	Elapsed Time(s)	Transfer time for each 100mL(s)	Stroke Volume (volume/ number of pump depressions) (mL)	Cardiac Output (volume/ transfer time, then multiply by 60 seconds) (mL)
100mL				
200mL				
300mL				
Average:				

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Rapid Transfer with 3 fingers: Time to transfer 300mL when depressing the pump with 3 fingers as fast as possible (noting the time at 100mL increments):

Transfer Volume	Elapsed Time(s)	Transfer time for each 100mL(s)	Stroke Volume (volume/ number of pump depressions) (mL)	% Baseline Cardiac Output (cardiac output/ baseline cardiac output, then multiple by 100)
100mL				
200mL				
300mL				

Rapid Transfer with 1 finger: Time to transfer 300mL when depressing the pump with 1 finger as fast as possible (noting the time at 100mL increments):

Transfer Volume	Elapsed Time(s)	Transfer time for each 100mL(s)	Stroke Volume (volume/ number of pump depressions) (mL)	% Baseline Cardiac Output (cardiac output/ baseline cardiac output, then multiple by 100)
100mL				
200mL				
300mL				

You can answer the following questions after the practical and post your results to the course site:

Question	Answer
1. When we mimicked exercise with the rapid transfer (3 fingers) what happened to the "heart rate" (speed of pumping)?	

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2. When we mimicked exercise with the rapid transfer (3 fingers) what happened to the "heart rate" (speed of pumping)?	
3. Does this value imply that the "heart" is providing a greater, equal or smaller supply of blood and oxygen to the tissues than at rest (baseline)?	
4. When we mimicked exercise with the rapid transfer (3 fingers), what happened to the % cardiac output during the 3rd (or last) 100mL transferred?	
5. Does this value imply that the "heart" is providing a greater, equal or smaller supply of blood and oxygen to the tissues than at rest (baseline)?	
6. When we mimicked exercise, how did your hand feel after completing the rapid transfer (3 fingers)?	
7. If you practiced the rapid transfer regularly, what would happen to the muscles of your hand and forearm?	
8. What happens to a healthy heart muscle with regular cardiovascular exercise?	
9. When we mimicked a damaged or weakened heart in the rapid transfer (1 finger), what happened to the % cardiac output during the 1 st 100mL transferred?	
10. Does this value imply that the "heart" is providing a greater, equal or smaller supply of blood and oxygen to the tissues than at rest (baseline)?	
11. When we mimicked a damaged or weakened heart in the rapid transfer (1	

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finger), what happened to the % cardiac output during the 3rd (or last) 100mL transferred?	
12. Does this value imply that the “heart” is providing a greater, equal or smaller supply of blood and oxygen to the tissues than at rest (baseline)?	
13. When we mimicked a damaged or weakened heart, how did your hand feel after completing the rapid transfer (1 finger)?	
14. Did your body try to adapt (or cheat in any way?	
15. If the supply of blood and oxygen provided by a damaged or weakened “heart” drops too low, what are the consequences for the body's tissues?	
16. Measure your resting heart rate by feeling on the thumb side of your wrist and counting how many pulses you feel in a minute. Assuming a typical adult has a resting cardiac output of about 5000mL per minute , calculate your resting stroke volume (stroke volume = cardiac output/heart rate).	