

Lab 11: Blood Pressure

Purpose: Blood pressure generally refers to the pressure of blood that is applied to the arterial walls. Systolic, the highest, blood pressure results when the ventricles contract. Diastolic, the lowest, blood pressure results when the ventricles relax. Blood pressure is normally expressed as systole over diastole.

Procedure:

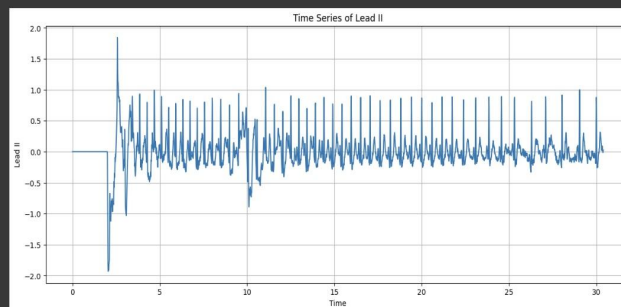
1. Wrap the pressure cuff of the sphygmomanometer snugly around the upper left arm of your lab partner. Your lab partner should assume a relaxed, sitting or supine position.
2. Place the stethoscope securely over the brachial artery. Close the pressure valve and begin pumping up the rubber ball.
3. You will begin to hear your partners pulse. Continue pumping until the pulse is not heard, approximately 10 mmHg above your partner's normal systolic pressure.
4. Slowly open the pressure valve and listen for the pulse sounds to reappear as the pressure drops.
5. The first sound heard signals the systolic blood pressure. Record this value from the scale.
6. The sound will become louder as the pressure drops until it finally starts to become muffled. Record the pressure at which the sound vanishes. This signals the diastolic blood pressure. Record your blood pressure as systole/diastole.
7. Alternate with your lab partner and repeat steps 1-6.
8. Next, measure the blood pressure of each of you upon standing. Have your cuff inflated prior to standing, so that you can begin to release pressure immediately upon standing.
9. Lastly, measure the blood pressure three minutes after standing. Record the values.
10. Select a few students who exercise regularly and few students who do not. Each student will take his/her resting pulse rate for one minute and record this value.
11. Each student will then run the track twice at a fast but comfortable pace. Immediately upon returning to the laboratory, each student will record his/her pulse for 1 minute
12. Determine the target heart rate range for each student and for yourself. To determine your target heart rate range do the following calculations for the Karvonen formula.
13. Select one student volunteer and hook him/her up to the computer.
14. Recordings of a Lead II ECG and pulse pressure from a thumb will be obtained with the student at rest for a baseline measurement

Results:

	Time	Lead II
0	0.00	0.000000
1	0.01	0.000000
2	0.02	0.000000
3	0.03	0.000000
4	0.04	0.000000
...
3035	30.35	0.031240
3036	30.36	0.008320
3037	30.37	-0.014132
3038	30.38	0.005045
3039	30.39	0.025656
3040 rows × 2 columns		

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[ ] df = pd.DataFrame(control)

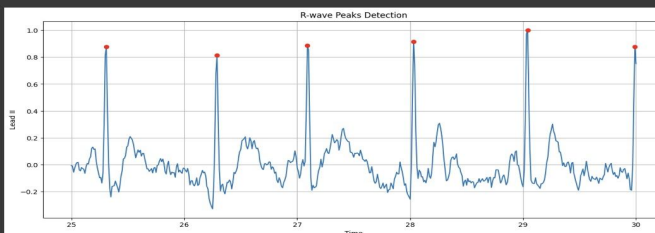
# Plot the data to visually inspect
plt.figure(figsize=(15, 6))
plt.plot(df['Time'], df['Lead II'])
plt.xlabel('Time')
plt.ylabel('Lead II')
plt.title('Time Series of Lead II')
plt.grid(True)
plt.show()
```



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[ ] # Filter the DataFrame for the specific time window
windowed_df = df[(df['Time'] >= 25) & (df['Time'] <= 30)]

# Assuming you have a method to detect peaks
# (You might need to adjust this depending on your data)
windowed_peak_indices, _ = find_peaks(windowed_df['Lead II'])

# Plot the data with detected peaks
plt.figure(figsize=(15, 6))
plt.plot(windowed_df['Time'], windowed_df['Lead II'])
plt.plot(windowed_df['Time'].iloc[windowed_peak_indices],
         windowed_df['Lead II'].iloc[windowed_peak_indices], 'r')
plt.xlabel('Time')
plt.ylabel('Lead II')
plt.title('R-wave Peaks Detection')
plt.grid(True)
plt.show()
```



Discussion: Blood pressure results vary depending if checking it after any kind of activity. Our blood pressure didn't change much. We measured it sitting, then standing. We learned that our blood pressure was normal after being sitting down and after standing.

Conclusion: Blood pressure measures the pressure in the arteries as the heart pumps. Systolic blood pressure measures the pressure in the arteries when the heart beats. The second number diastolic measures pressure in the arteries when the heart rest between beats.