Regularity

Fast & Easy ECGs – A Self-Paced Learning Program
Second step of analyzing an ECG rhythm is determining its regularity.
Regularity

- Normally the heart beats in a regular, rhythmic fashion
- Distance between consecutive P waves and consecutive QRS complexes should be the same
Regularity

- If the distance of the R-R intervals and P-P intervals is the same the rhythm is *regular*.
- If the distance differs, the rhythm is *irregular*.
- Irregular rhythms are considered abnormal.
Regularity

In this rhythm, each R-R and P-P interval is 21 small boxes apart. For this reason, it is considered regular.

In this rhythm, the number of small boxes differs between some of the R-R and P-P intervals. For this reason, it is considered irregular.
Determining Irregularity

• Several methods can be used to determine rhythm regularity including:
  – Caliper Method
  – Paper and Pen Method
  – Counting the Small Squares Method
Caliper Method

• Place ECG tracing on a flat surface
• Position one point of caliper on a starting point
• Open calipers by pulling the other leg until the point is positioned on the next R wave or P wave
• With the calipers open in that position and keeping the point positioned over the second P wave or R wave rotate the calipers across to the peak of the next consecutive (the third) P wave or R wave
Caliper Method
Paper and Pen Method

- Place the straight edge of a piece of paper above or over the ECG tracing so that the intervals are still visible.
- Identify a starting point and place a mark on paper in the corresponding position above it.
- Find peak of the next consecutive R wave or P wave and place a mark on the paper in the corresponding position above it.
- Move the paper across the ECG tracing, aligning the two marks with succeeding R-R intervals or P-P intervals.
Paper and Pen Method
Counting the Small Squares Method

• Count the number of small squares between the peaks of two consecutive R waves (or P waves) and then compare to the other R-R (or P-P) intervals
• If the number is the same, the rhythm is regular, if it isn’t it is irregular

For this figure, we started counting from the last R wave because it fell on the bold line making counting of the small squares easier.
Types of Irregularity

- Evaluating regularity
  - Regular
  - Irregular
    - Occasional or very
    - Slightly
    - Sudden acceleration in heart rate
    - Patterned
    - Totally
    - Variable conduction ratio
Occasionally or Very Irregular

*Occasionally irregular*
- Mostly regular but from time to time there is an area of irregularity

*Very irregular*
- Has many areas of irregularity
Slightly Irregular

- Pacemaker changes location from site to site producing a slightly irregular rhythm
- Referred to as wandering atrial pacemaker
Sudden Heart Rate Acceleration

- A normal rate that suddenly accelerates to a rapid rate producing an irregularity in the rhythm
- Referred to as paroxysmal tachycardia

Normally, the SA node initiates impulses, resulting in a repetitive cycle of P, QRS, and T waveforms. An ectopic site from above the ventricles fires rapidly and takes over as pacemaker.
Patterned Irregularity

- Irregularity repeats itself in a cyclic fashion
- Examples are sinus dysrhythmia, 2nd-degree AV heart block, Type I
Totally Irregular

• No consistency to the irregularity
• Typically atrial fibrillation
Another Type of Irregularity

- Irregularity can also be seen in dysrhythmias with a varying atrial to ventricular conduction ratio.
Practice Makes Perfect

- Determine the regularity
Practice Makes Perfect

• Determine the regularity
Practice Makes Perfect

• Determine the regularity
Practice Makes Perfect

- Determine the regularity
Practice Makes Perfect

- Determine the regularity
Summary

• Determining regularity is the second step of analyzing an ECG rhythm.

• Irregular rhythms are considered abnormal and can be caused by a variety of conditions.

• If the distance of the R-R intervals or P-P intervals is the same, the rhythm is regular – if the distance differs, the rhythm is irregular.
Summary

• Several methods can be used to determine rhythm regularity, including using calipers, marking a paper with a pen, and counting the small squares between each R-R interval.

• Irregularity may be occasionally irregular, very irregular, or slightly irregular.

• A normal rate that suddenly accelerates to a rapid rate produces irregularity in the rhythm.
Summary

• Patterned irregularity is where the irregularity repeats in a cyclic fashion.

• A totally irregular rhythm has no consistency to the irregularity (atrial fibrillation).

• Irregularity can also be seen in dysrhythmias that have a varying atrial-to-ventricular conduction ratio.