

Chapter 7: Atrioventricular Blocks

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After this chapter you should be able to Recognize first-degree atrioventricular block; distinguish second-degree type I from second-degree type II; explain why 2:1 AV block cannot be classified from a single strip; recognize advanced second-degree and third-degree (complete) block; relate the site of the block to QRS width, escape rate, coronary blood supply, and management. Reading: Aehlert, *ECGs Made Easy*, 7th ed., Chapter 7 (p. 180 to 206).

Note to students: Rates and cutoffs follow **Aehlert, 7th edition**, because that is the edition this guide follows. **Bring calipers to every session this week.** Almost every wrong block answer is a caliper error rather than a knowledge error, so this guide teaches you what to measure and in what order; keep Aehlert Chapter 7 and your lab strips open beside it. **One honesty note up front:** the classic Wenckebach “footprints” are what the textbook strip looks like, not a requirement. Only about **41 percent** of spontaneous 4:3 sequences meet all of them, so learn them and then do not reject a genuine Wenckebach because one was missing. **What Chapter 6 gives you:** ventricular rhythms trained you to ask *where did this beat start*. Chapter 7 asks *did it get through*, but the QRS-width habit carries straight over, because where the block sits determines how wide the escape beats below it are.

At a Glance: this chapter in one box

Numbers you must know

- Normal PR is **0.12 to 0.20 s** (3 to 5 small boxes). First degree is **greater than 0.20 s**, constant, every P conducting.
- **Wenckebach pause rule:** the R-R containing the dropped beat is **less than twice** the shortest R-R.
- **Mobitz II pause rule:** the R-R containing the dropped beat is an **exact multiple** of the underlying R-R, typically double.
- Third-degree escape: **junctional 40 to 60, narrow QRS; ventricular 20 to 40, wide QRS** (0.12 s or more).
- **2:1 AV block cannot be classified** as type I or type II from a single strip. Classification requires at least 3:2 conduction.

The one rule this chapter is built on

- **Fatigue versus fracture.** In Mobitz I the AV node grows progressively tired, gives up for one beat, rests, and recovers. That is functional suppression, and it is reversible. In Mobitz II the tissue below the node is structurally damaged and fails without warning. **A tired node rests and recovers. A fractured cable does not.** That one contrast explains the benign-versus-dangerous split, the anatomical site, the atropine rule, and the pacemaker decision.

Top 3 traps

- Writing “Wenckebach” off grouped beating and a dropped QRS without ever measuring a sequence of PR intervals.
- Classifying a 2:1 strip as type I or type II. The information is genuinely not on that strip.
- Sorting type I from type II by QRS width. About **1 in 4** Mobitz II blocks sit inside the bundle of His and are **narrow**.

You Already Know This: Chapter 6, Asking a New Question

The two questions stack rather than compete. You still measure the QRS on every strip, because in third-degree block the QRS width tells you which escape pacemaker took over, and therefore how much trouble the patient is in.

	Chapter 6	Chapter 7
The question	Where did this beat start?	Did the impulse get through?
The measurement	QRS duration	PR interval, then the pause
P waves	Absent or dissociated	Always present , always marched out first
The habit	Measure width before naming	Measure the PR sequence before naming

The Boom Gate: One Object, Three Severities

Picture the AV node as a boom gate on the one road running from point A, the atria, to point V, the ventricles. The three degrees of block are not three diseases in three places. They are **one severity scale on one object**, and saying that out loud fixes the filing problem most students have with this chapter. **First degree:** the gate lifts every single time, just slowly; all traffic gets through and nothing is turned away. **Second degree:** the gate lifts for some cars and stays down for others; some traffic through, some blocked. **Third degree:** the gate never lifts, so no traffic gets through at all and the far side of the road has to generate its own vehicles. That scale is also why “block” is misleading in first degree. Nothing is blocked; every impulse conducts, it simply takes longer than 0.20 s. Define that twice, because the name fights the physiology and the exam will use the name.

Fatigue Versus Fracture

This is the load-bearing idea of the module. Both second-degree blocks drop beats, so students file them together and then cannot say why one is watched and the other gets a pacemaker.

Mobitz I is fatigue. Each conduction leaves the AV node a little less recovered than the last, so it takes longer, then longer still, until it gives up for one beat. That skipped beat is a rest, and the rest is exactly what it needed, so the next beat conducts at the shortest PR of the cycle and the slide begins again. This is **functional suppression** of tissue that is fundamentally intact, which is why Mobitz I is usually benign, transient, and reversible.

Mobitz II is fracture. The problem is not a tired node. It is **structural damage** to conducting tissue *below* the node, in the bundle of His or the bundle branches. Damaged cable conducts normally right up until the moment it does not. There is no buildup because there is no fatigue process to build up, and a broken wire gives no warning before the light goes out.

	Mobitz I, fatigue	Mobitz II, fracture
Mechanism	Functional suppression	Structural damage
Site	AV node (above the His bundle)	Infranodal , His bundle or below
Warning	Progressive PR lengthening	None
QRS	Usually narrow	Often wide, but 1 in 4 is narrow
Course	Often transient, often reverses	Progresses to complete block
Setting	Inferior MI (RCA), vagal tone, digoxin	Anterior MI (LAD), degenerative disease
Atropine	Usually responds	Does not respond; can worsen it
Disposition	Observe	Pacemaker

Every row falls out of one sentence: **a tired node rests and recovers, a fractured cable does not.** If you can rebuild the table from that sentence, you have the module.

The PR Consistency Check

Ask one question before you name anything: **is the PR interval consistent from beat to beat?** That single question cuts four blocks down to two.

	Nothing is dropped	QRS complexes are dropped
PR consistent	First degree. One PR, always longer than 0.20 s, every P conducts.	Mobitz II. PR identical on every conducted beat, then a sudden drop.
PR inconsistent	(Check your measurements; something else is going on.)	Wenckebach if it lengthens progressively then resets. Third degree if it varies randomly with no pattern.

Run it as a ladder on every strip, in this order:

1. **March out the P waves.** Set the calipers to one P-P interval and walk it the length of the strip, marking every P wave including those hiding inside T waves. **Is the P-P steady?** If the P-P is *lengthening*, this is sinus slowing from vagal tone, not an AV block. Stop here. Ignoring sinus slowing is the single most common cause of Mobitz II overdiagnosis.
2. **Count P waves and QRS complexes.** Equal means nothing is dropped. More P waves than QRS complexes means something is.
3. **Is there any conducted beat at all?** If no P wave on the strip conducts, you are done: **third degree**. If some conduct, keep going.
4. **Write out the PR interval of every conducted beat, in order, as a row of numbers.** Not in your head. The pattern in that row is the answer. Record an **atrial rate** and a **ventricular rate separately** while you are there; that habit is what catches advanced second-degree and third-degree block, and it is the most common omission on the graded assignment.

The Heart Block Rhyme, and the Line You Must Correct

You will meet this rhyme in study groups and on every ECG website, so learn it. It is traditional, widely attributed to NursesLabs, with no verified single author.

*If the R is far from P, then you have a FIRST DEGREE.
Longer, longer, longer, drop! Then you have a WENCKEBACH.
If some P's don't get through, then you have MOBITZ II.
If P's and Q's don't agree, then you have a THIRD DEGREE.*

Now the correction, and do not skip it. Line 3 is misleading taken literally. In Wenckebach, some P waves also fail to get through; that is what the dropped QRS is. The distinguishing feature is the **constant PR interval**, not the dropping.

Both second degree blocks drop beats. The PR interval is what tells them apart.

Without that sentence attached, the rhyme creates the most common error on the exam. Read line 3 as “if some P’s don’t get through *and the PR interval never changes*, then you have Mobitz II,” and it becomes safe to use.

The Employee and the Timeclock

One person, one timeclock, four patterns. It survives being repeated back under exam pressure, which is the only test of an analogy that matters.

Block	What she does	On the strip
First degree	Clocks in ten minutes late every single day, but never misses a day.	Long PR, constant, nothing dropped.
Mobitz I	Later and later each day, until one day she does not show up. The next day she is back on time and the slide starts over.	PR lengthens, a QRS drops, PR resets.

Block	What she does	On the strip
Mobitz II	Clocks in at exactly the same time every day she comes, but some days she simply does not come, with no warning.	PR constant, then a QRS vanishes.
Third degree	She and the schedule have nothing to do with each other. She works her own fixed schedule, the schedule runs on its own, and the two never line up.	P waves and QRS complexes unrelated.

The Pause Rule: The Best Measurable Discriminator in This Module

Everything else here asks you to judge whether a PR interval is “lengthening,” and judgment under time pressure is what students get wrong. The pause rule replaces judgment with calipers.

Wenckebach: $\text{pause} < 2 \times \text{shortest R-R}$ **Mobitz II:** $\text{pause} = \text{exact multiple of R-R}$

Why it works. In Wenckebach the R-R intervals shorten as the cycle runs, so the gap you measure starts from an already-shortened R-R and lands short of double. In Mobitz II every conducted beat behaves identically, so a missing one leaves precisely the space two beats would have occupied. **Typically double, and exactly so.** Measure the pause as the R-R that **contains the non-conducted P wave**, from the QRS before it to the QRS after it, and compare it to the **shortest** R-R on the strip. Ten seconds of caliper work, and it does not care how confident you feel.

The R-R Shortening Paradox, Resolved With Arithmetic

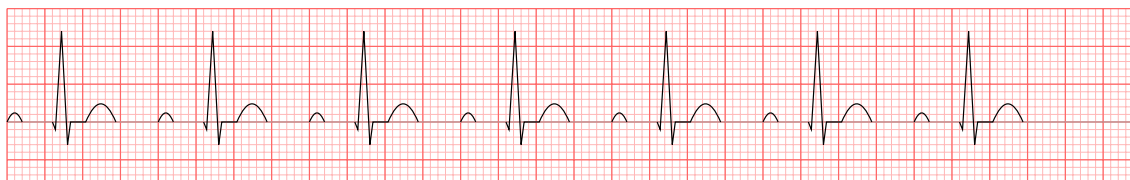
Students refuse to believe PR intervals can lengthen while R-R intervals shorten. The resolution: **the amount the PR grows shrinks each beat**. The P waves keep arriving on schedule, but each QRS is pushed back by a smaller extra amount than the one before, so the QRS complexes creep *closer together*. Cover the last two columns, work them out yourself, then check.

Beat	P wave arrives at	PR interval	QRS falls at	R-R from previous QRS
1	0.00 s	0.20 s	0.20 s	
2	1.00 s	0.30 s	1.30 s	1.10 s
3	2.00 s	0.38 s	2.38 s	1.08 s
4	3.00 s	0.44 s	3.44 s	1.06 s
5	4.00 s	blocked	none	pause

The PR increments are **+0.10, +0.08, +0.06**, each smaller than the last. That is the whole trick, and it is why the R-R intervals go **1.10, 1.08, 1.06**, shortening even as the PR lengthens. **Now check the pause rule on the same numbers.** The next conducting P arrives at 5.00 s with the PR reset to 0.20 s, so its QRS falls at 5.20 s. The pause runs 3.44 s to 5.20 s, which is **1.76 s**. The shortest R-R was 1.06 s and twice that is 2.12 s. Since 1.76 is less than 2.12, the pause rule confirms Wenckebach. Had this been Mobitz II with a steady 1.00 s R-R, the pause would have measured exactly 2.00 s.

First-Degree AV Block

★ PR over 0.20 s, constant, nothing dropped



Regularity	Regular, matching the underlying rhythm
Rate	That of the underlying rhythm, commonly 60 to 100
P waves	Upright and uniform, one before every QRS, all of them conduct
PR	Greater than 0.20 s and constant beat to beat
QRS	Usually normal, 0.06 to 0.10 s, unless another block widens it

Causes Vagal tone, athletic conditioning, inferior wall MI, AV nodal medications (beta blockers, calcium channel blockers, digoxin), electrolyte disturbance, normal aging of the conduction system.

Patient Usually asymptomatic and frequently incidental; it rarely requires treatment by itself. What it does require is that you look at what else is on the strip, because it often travels with whatever caused it.

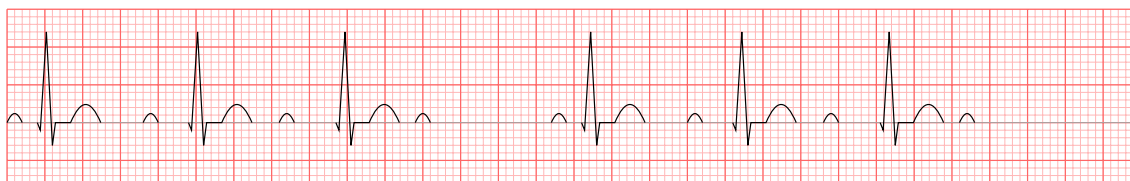
Memory hook The employee clocks in ten minutes late every single day, but never misses a day. The boom gate lifts every time, just slowly.

Fast tell Count P waves and QRS complexes. They are *equal*. Nothing dropped. Then measure the PR and find it over 0.20 s.

Where students go wrong The name. Nothing is actually blocked; every impulse conducts 1:1. Students also forget to *measure*, because one P per QRS looks normal at a glance.

Second-Degree AV Block, Type I (Wenckebach, Mobitz I)

★ longer, longer, drop, reset



PR runs 0.16, 0.24, 0.30, then the fourth P wave stands alone with no QRS behind it. After that pause the PR resets to 0.16 s, the shortest of the cycle, and the slide starts again.

Regularity	Atrial regular; ventricular irregular with grouped beating
Rate	Atrial rate normal; ventricular rate slower, because beats are dropped
P waves	Uniform and upright, marching out at a steady rate ; more P waves than QRS complexes
PR	Progressively lengthens until a P wave fails to conduct, then resets to the shortest
QRS	Usually narrow, 0.06 to 0.10 s, because the block sits in the AV node

Causes Vagal tone, **inferior wall MI** in right coronary artery territory, digoxin, beta blockers and calcium channel blockers, myocarditis, athletic training. Often transient.

Patient Frequently asymptomatic. If the rate falls far enough to cause symptoms, this is the block that generally responds to atropine, because the problem is in the node and atropine speaks to the node.

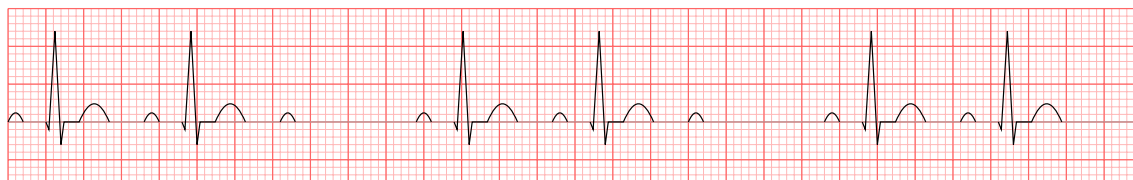
Memory hook **Fatigue.** The node gets a little more tired with each conduction until it gives up for one beat. That skipped beat is the rest it needed, so the next PR is the shortest of the cycle and the slide starts over.

Fast tell **Grouped beating.** QRS complexes cluster into groups separated by pauses, and you can spot that across the room before touching calipers. Confirm with the pause rule: less than twice the shortest R-R.

Where students go wrong Naming it from the grouping alone. Grouping gets you to *suspect* Wenckebach; only a written row of PR measurements lets you *say* it. Students also reject genuine Wenckebach because the R-R did not visibly shorten, but only about 41 percent of spontaneous 4:3 sequences show all the classic footprints.

Second-Degree AV Block, Type II (Mobitz II)

★ PR constant, then a QRS vanishes



Fixed 3:2 conduction. Every PR measures 0.20 s and never changes; then a P wave arrives with nothing behind it. The pause spanning that P is exactly twice the underlying R-R.

Regularity Atrial regular; ventricular irregular when drops are sporadic, but **entirely regular** at a fixed ratio such as 3:2 or 4:3

Rate Atrial rate normal and steady; ventricular rate slower, set by the conduction ratio

P waves Uniform, upright, **constant P-P**; more P waves than QRS complexes

PR **Constant** on every conducted beat. It may be normal or prolonged, but it **does not change**

QRS **Often 0.12 s or more**, because the disease is below the node, but roughly **1 in 4** is narrow

Causes **Anterior wall MI** in left anterior descending territory, and degenerative disease of the conduction system. Destroyed tissue, not irritated tissue.

Patient The dangerous one. It progresses to complete heart block without notice, does not respond reliably to atropine, and usually earns a pacemaker. A new Mobitz II during an anterior MI signals a large infarct that has taken out septal conducting tissue, and carries a considerably worse prognosis than block in an inferior MI.

Memory hook **Fracture**. A light switch with a bad wire behind the wall. On, on, on, then nothing. No flicker and no warning, because there is no fatigue process to warn you.

Fast tell The pause rule. The R-R spanning the dropped beat is an **exact multiple** of the underlying R-R, typically double, because the conducted beats are all identical.

Where students go wrong Three errors. First, believing Mobitz II “has no pattern.” It very often runs at a fixed, entirely regular ratio like 3:2 or 4:3; what is absent is *progressive PR lengthening*, not pattern. Second, calling it Mobitz II without first confirming the **P-P interval is steady**; a lengthening P-P is sinus slowing from vagal tone, not a block. Third, sorting type I from type II by QRS width. A wide QRS raises your suspicion that the block is infranodal, but **a narrow QRS rules nothing out**, and about 25 percent of Mobitz II sits inside the bundle of His and is narrow.

2:1 AV Block

★ two P waves per QRS; do not classify it



Every second P wave conducts, so no two conducted beats ever sit side by side. The blocked P waves are drawn clear of the T waves here so you can count them; on a real strip they usually sit on top of the T and must be found by marching out the P-P.

Regularity Ventricular rhythm **regular**; atrial rhythm regular

Rate Ventricular rate is **exactly half** the atrial rate

P waves **Two P waves for every QRS**. The non-conducted P often hides inside the preceding T wave

PR Constant on the conducted beats, but **only one PR is available per conducted beat**

QRS Narrow or wide. Width hints at the site; it does not classify the block

Why it cannot be classified Every conducted beat is followed by a blocked P wave, so the strip **never shows two conducted beats in sequence**. Without two consecutive PR intervals to compare, you cannot assess whether the PR is lengthening or constant, and lengthening versus constant is the classification. You are not missing a trick; the information genuinely is not on that strip. Classification requires at least **3:2 conduction**.

What to write and what to do Write “**2:1 AV block**.” Then **get a longer strip**: periods of 2:1 conduction are often interspersed with more characteristic sequences, and one 3:2 run settles it. Until then, the safe clinical default is to **assume Mobitz II**.

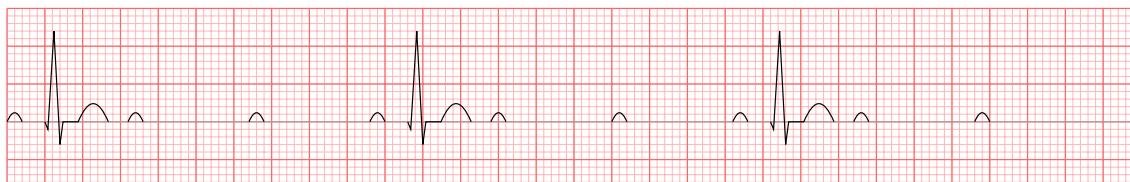
Memory hook Judging whether someone is speeding up or slowing down when you only get to see every other footstep. No amount of staring produces the missing footsteps.

Fast tell Two P waves per QRS, ventricular rate exactly half the atrial rate. Find the hidden P by marching out the P-P; it lands on a T wave that looks slightly too tall or deformed.

Where students go wrong Writing “Mobitz II” because the PR intervals looked constant. Of course they looked constant; you only measured one per beat. The correct answer on the exam and in the chart is **2:1 AV block**.

Advanced (High-Grade) Second-Degree AV Block

★ two or more Ps blocked in a row, but some still conduct



3:1 conduction: two consecutive P waves are blocked, then one conducts at a constant 0.20 s PR. Those conducted beats are what rule out third-degree block.

Regularity	Atrial regular; ventricular irregular and usually slow
Rate	Ventricular rate well below the atrial rate; conduction ratios of 3:1, 4:1 or worse
P waves	Two or more consecutive non-conducted P waves, with some conduction still present
PR	Constant on the beats that do conduct
QRS	Narrow or wide, depending on where the block sits

The distinction that earns the point Advanced second degree and third degree look similar and are graded differently. **Third degree means no conducted beats at all.** Advanced second degree shows **occasional conducted beats plus two or more consecutive non-conducted P waves**. Find one beat where a P wave clearly produced that QRS at a plausible, repeatable PR interval and you have ruled out third degree. Treat it as serious: it carries the same concern as Mobitz II and frequently precedes complete block.

Memory hook The boom gate is now down far more often than it is up. Traffic is still getting through, but only barely and only sometimes.

Fast tell Count. Two or more P waves in a row with no QRS between them, *and* at least one P somewhere on the strip that clearly did conduct.

Where students go wrong Calling it third degree. If any beat conducted, it is not complete block, and the two answers are not interchangeable.

Third-Degree (Complete) AV Block

★ two regular rhythms that ignore each other



Atria near 88, a narrow junctional escape near 50, and no relationship between them. March the P waves and you will find them drifting through the QRS complexes and T waves. Every PR you appear to measure here comes out a different length, because those P waves are not conducting at all.

Regularity	Both regular, independently. P-P regular, R-R regular, no relationship between them
Rate	Atrial rate typically 60 to 100 and faster than the ventricular. Ventricular rate set by the escape: junctional 40 to 60, ventricular 20 to 40
P waves	More P waves than QRS complexes. Some land on QRS complexes, ST segments, and T waves and deform them
PR	No PR interval exists. Any PR you appear to measure varies randomly
QRS	Narrow if the escape is junctional, 0.12 s or more if it is ventricular

Causes Acute MI, degenerative disease of the conduction system, medications, electrolyte disturbance. The atria and ventricles are electrically divorced, and the ventricles run on a backup pacemaker.

Patient Frequently symptomatic: syncope, chest pain, hypotension, heart failure. Transcutaneous pacing is the bridge, a permanent pacemaker usually the destination. Look for ST depression and inverted T waves reflecting the poor perfusion this rate produces.

Memory hook **Two drummers wearing headphones.** One keeps perfect time in the atria at 80, one keeps perfect time in the ventricles at 35. Both are metronomic. Neither can hear the other.

Fast tell March out the P waves *and* the QRS complexes separately. Each marches out perfectly on its own. That is the

finding.

Where students go wrong Expecting chaos. Students assume the worst block must look the most disorganized; it does not, it looks like two tidy rhythms overlaid. That also separates it from Mobitz II, where the R-R is *irregular*. And it is not always wide: a junctional escape gives a narrow QRS in complete block.

March Out the P Waves: Naming the Trap Before You Fall In

Here is the trap, stated before you meet it. On a third-degree strip, **at a glance it appears there are PR intervals**. Some P waves happen to sit a plausible distance in front of a QRS and your eye reads that as conduction. It is not. Measure two of those apparent PR intervals and they come out **unequal**; extend the strip and the P waves and QRS complexes drift apart entirely. **Coincidental proximity is not conduction**. Set the calipers to one P-P interval and walk the fence line, then set them to one R-R interval and walk it again. In third degree both walks succeed independently, which is the definition of AV dissociation.

It catches students the other direction too. If the PR interval varies, it is not automatically Wenckebach. **The PR varies in third-degree block too, but randomly and with no pattern**, because those P waves are not conducting at all. In Wenckebach it lengthens *progressively*, and every PR you measure belongs to a beat that genuinely conducted.

The Higher the Block, the Better the Backup

In third-degree block the escape focus sets both the rate and the QRS width, so measure both and let them tell you where the escape came from.

Block sits	Escape comes from	Rate	QRS
At the AV node	Junction, just below the block	40 to 60	Narrow , relatively dependable
Below the node	Ventricle	20 to 40	Wide , slow and unreliable

The higher the block sits, the more healthy conducting tissue remains beneath it to serve as backup, and the better that backup performs. Which gives you the sentence worth carrying into clinical: **in third-degree block, QRS width tells you how much trouble the patient is in**. A narrow escape at 50 buys you time. A wide escape at 28 does not.

Blood Supply, Atropine, and the Patient

The AV node is fed by the right coronary artery in roughly **90 percent** of people; the bundle branches are fed largely by septal perforators off the **left anterior descending** artery. So an **inferior MI** (RCA territory) tends to produce **nodal** block: first degree or Wenckebach, often transient, often atropine responsive, usually watched. An **anterior MI** (LAD territory) with new block has destroyed septal conducting tissue, so the block is **infranodal**: Mobitz II or complete block, wide unreliable escape, considerably worse prognosis. Those two patients look similar on a monitor for about four seconds, and the coronary anatomy from Chapter 1 is what tells them apart.

The atropine rule. Atropine blocks vagal input, which is delivered to the SA and AV nodes, so **atropine speaks to the AV node** and can only help when the problem is *at* the node. **Mobitz I responds**, because the block is nodal and the tissue is intact. **Mobitz II does not**, and atropine can **worsen** it: if the problem is below the node, atropine just makes the atria talk faster into a broken cable, so more impulses arrive at a segment that cannot carry them and the rate can fall rather than rise. Same reasoning for third degree with a wide escape. Pace that patient.

And the framing that keeps all of this honest: **we don't treat rhythms. We treat patients who have rhythms**. An asymptomatic, perfusing patient in Wenckebach at 58 needs a rhythm strip and a set of vitals, not a drug. A confused, hypotensive patient in complete block at 28 needs pacing before anyone finishes arguing about the label.

Common Trap

The strip shows grouped beating and a dropped QRS. Is that enough to call Wenckebach?

No. Grouped beating gets you to *suspect* Wenckebach, which is useful because you can see it from across the room. But three other things produce grouping and a dropped beat: **non-conducted premature atrial complexes** (a premature P wave hiding in the preceding T wave, which is a PAC and not a block at all), **Mobitz II** at a fixed ratio, and **sinus slowing** from vagal tone.

The fix is mechanical and takes ten seconds. **March out the P waves to confirm the P-P is steady, then write the PR interval of every conducted beat as a row of numbers.** If that row climbs and resets, it is Wenckebach. If it does not climb, it is not. Make that written sequence a habit now; it is a hard requirement for credit on lab and the Chapter 7 assignment.

Common Trap

Every other P wave conducts, and the PR interval on the conducted beats looks constant. Mobitz II?

No. Write **2:1 AV block**, and nothing more. Of course the PR looked constant; you only ever measured **one PR per conducted beat**, because every conducted beat is followed by a blocked P. Constant compared to what? There is no second consecutive PR interval on that strip to compare it against. Classification requires at least **3:2 conduction**, where two beats in a row conduct and their PR intervals can be laid side by side.

The practical instruction: **get a longer strip**. Periods of 2:1 conduction are frequently interspersed with more characteristic 3:2 or 4:3 sequences, and one of those settles it. Until then the safe clinical default is to **assume Mobitz II until proven otherwise**, because that is the assumption whose consequences you can live with.

Common Trap

Your patient is bradycardic and symptomatic at 32 with a wide QRS, more P waves than QRS complexes, and no fixed PR. Atropine?

No. This is third-degree block with a **ventricular escape**, so the ventricles are not listening to the atria at all. Making the atria fire faster changes nothing on the far side of a gate that never lifts. This patient needs **pacing**, and the wide QRS at 32 tells you how little margin there is. **Atropine speaks to the node. If the problem is below the node, it has nobody to talk to.**

Before You Move On

You should now be able to:

- run the PR consistency check and cut four blocks down to two with one measurement
- separate Wenckebach from Mobitz II by measuring the pause rather than by judging whether the PR is lengthening
- explain why 2:1 conduction cannot be classified from a single strip, and what to do instead
- march out P waves in complete heart block and explain why the QRS width tells you how much trouble the patient is in

The next chapter is what happens when an artificial pacemaker takes over the job the conduction system can no longer do.