

THE PELVIS LEAKING TOWARD THE ARM SIDE

Off the *Line*

Third base for a right hander, first base for a left hander. The pelvis slides toward the throwing arm side instead of travelling down the line to the plate, and every bit of force that goes sideways is force the delivery does not get.

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He is still driving hard. He is just **driving somewhere other than the plate.**

This is the direction failure, and it is the one that hides best. The athlete looks like he is working, the back leg is pushing, the stride is long enough. But the pelvis is escaping laterally toward the arm side dugout rather than translating toward home, so a large share of what the ground gave him is spent moving him across the mound. Everything downstream then has to correct for a body that is not where it should be, and the corrections cost more than the leak did.

What it is, precisely

Same fault, mirrored. Naming it by base is convenient and only works if you fix the reference frame first.

THE SAME LEAK, BOTH HANDS			
	RIGHT HANDER	LEFT HANDER	THE GENERAL VERSION
Leaks toward	Third base	First base	The throwing arm side . Facing home plate, third base sits on a right hander's arm side and first base on a left hander's.
What moves	The pelvis translates laterally, away from a line drawn from the rubber to the plate.		Not rotation. This is the hips sliding sideways, and it can happen with the pelvis perfectly closed.
When	From leg lift through to foot contact, worst in the middle of the stride.		By the time the front foot lands the pelvis is off the line, and every position measured at that frame inherits the error.

	RIGHT HANDER	LEFT HANDER	THE GENERAL VERSION
What it is not	Falling off toward the glove side after release.		That is the follow through and it is usually fine. This is a leak during the drive, in the opposite direction.

A note on naming, so this holds up

Describing a fault by base is only unambiguous once you say where the pitcher is looking. Facing home plate, first base is on his left and third base is on his right. That makes third base the arm side for a right hander and first base the arm side for a left hander, which is why the two descriptions in the title are the same fault.

If you share this with someone who sets it up differently, the reliable version is **the pelvis translating toward the throwing arm side, off the line to the plate**. That sentence survives any convention.

Why it costs so much

Force has a direction, and this fault is entirely about direction.

ON THE LINE

The push goes where he is going

The drive leg presses against the ground and the reaction carries the pelvis toward the plate. The whole magnitude of that push counts, because it is pointed at the destination.

The stride lands on the line. The pelvis arrives square and level, the front hip has a clean axis to rotate around, and the block converts forward momentum into rotation.

OFF THE LINE

Only part of the push counts

The same force applied across the line contributes only its forward component. The sideways component moves him across the mound and then has to be arrested, which costs again.

He arrives at foot contact displaced. The front hip is no longer where the delivery assumed it would be, so the block, the rotation and the release all inherit an error nobody measured.

The correction is more expensive than the leak

A pelvis off the line has to be recovered, and the recovery is the part that shows up in the arm. The trunk counter leans to get the head back over the target, which raises **sideways lean at release**, and sideways lean is positively associated with elbow load. The stride direction changes to compensate, which changes where the front foot lands. The release point drifts toward the arm side.

So the bill is paid twice: once in the force that went sideways, and once in the compensations that put him back on target.

Why the pelvis goes there

Grouped by what is actually responsible. Groups A and B account for most of it.

A · The drive is pointed wrong

The push itself is going sideways. The most common group and the most direct to fix.

- 01 **Pushing off the outside of the back foot.** If the weight sits on the outer edge, the reaction drives the pelvis toward the arm side. Check where the wear is on his spikes and where the pressure is at peak load.
- 02 **Back knee caving inward.** Frontal plane collapse at the drive leg. The knee falls in, the pelvis slides out, and the force that should have gone forward goes across.
- 03 **Weak side hip on the drive leg.** The muscles on the side of the hip hold the pelvis level and centred over the leg. Without them the pelvis escapes laterally under load, and it gets worse as the outing goes on.
- 04 **Quad driven knee extension.** A push that straightens the knee early sends the body up and out rather than down the line, and the lateral component comes with it.

B · The pelvis was never over the leg

Loading faults. If the weight never arrived over the drive foot, the pelvis has nowhere to push from and sliding is what is left.

- 05 **Hip hiking instead of shifting.** The pelvis gets lifted on the free side rather than the body moving over the drive leg. A hiked pelvis is already tilted in the frontal plane, and a tilted pelvis translates sideways more easily than a level one.
- 06 **Limited back hip range.** Without room to rotate around the loaded femur, the pelvis substitutes translation for rotation. It goes sideways because it cannot go around.

07/ **No hinge at the back hip.** If he cannot sit into the hip, there is no loaded position to drive out of, and the pelvis drifts rather than being launched.

C · Timing and direction

Where the leak is a consequence of something happening at the wrong moment.

- 08** **Stride direction off the line.** A stride aimed across the line makes the pelvis follow it. Worth establishing whether the foot leads the pelvis or the pelvis leads the foot, because the fix differs.
- 09** **Trying to stay closed too long.** The pelvis has to go somewhere. An athlete holding rotation past the point his hips can tolerate will squirt sideways instead, and the harder he is cued to stay closed the worse it gets.
- 10** **Glove side pulling.** A hard glove pull to the glove side produces linear trunk movement and can drag the whole system off line, often with the pelvis chasing it.

D · State

Not mechanical. Changes what he can do rather than what he knows.

- 11** **Fatigue.** Frontal plane control is active work and it degrades early. A leak that appears in the fifth and not the first is a capacity problem, not a technique one.
- 12** **Guarding after a lower body injury.** The nervous system shifting load off a leg it does not trust. The pelvis moves away from the side that hurts.
- 13** **Mound and footing.** A worn landing area or a slope he is unfamiliar with. Rule this out before you build a training block around it.

What it looks like

Film from directly behind, on the line. This is a frontal plane fault and the side view hides it almost completely.

BEHIND

The belt line drifts off centre

Draw a line from the middle of the rubber to the plate. Watch the centre of the belt line travel. It should stay near that line and move down it, not away from it.

BEHIND

The back knee falls inward

The frontal plane collapse that sends the pelvis the other way. Easy to see from behind and invisible from the side.

BEHIND

Weight rolls to the outside of the back foot

Watch the back ankle at peak load. Pressure on the outer edge points the reaction toward the arm side.

BEHIND The stride lands across the line Frequently the compensation rather than the cause. If the pelvis went one way, the foot often goes the other to keep him aimed at the target.	FRONT ON He counter leans to find the target The trunk tipping away from the arm to bring the head back over the line. It works, and it raises the sideways lean that comes with elbow load.	BALL FLIGHT Release point drifts to the arm side A release that has moved laterally without any deliberate arm slot change is worth filming from behind. Release side is one of the four numbers the hitter actually sees.
COMMAND Misses spread arm side Not a diagnosis on its own, but a pattern of misses in one horizontal direction is consistent with a delivery that starts off line.	INNINGS It deepens late Compare the first inning to the fifth on the same camera. Frontal plane control is the kind of thing fatigue takes early.	

Screening it

Almost all frontal plane, and most of it overlaps with the ground connection screen.

WHAT TO TEST AND WHAT IT POINTS AT		
TEST	FLAG IF	WHAT IT MEANS
Single leg stance , thirty seconds, then repeated tired	Pelvis drops, hikes, or the whole body drifts	Group A and B together. The drive side specifically. Passing fresh and failing tired matches a leak that only appears late.
Side lying hip abduction, or a loaded hip airplane	Weak or asymmetric on the drive side	The muscles that hold the pelvis over the leg. This is the most directly responsible capacity on the list.
Single leg squat or step down	Knee falls inward	Frontal plane collapse under load, which is cause two seen standing still.
Back hip rotation , both directions	Limited, or five degrees or more asymmetry	Group B. A hip that cannot rotate around the femur substitutes sliding for turning.
Hip hinge quality	Cannot load the hip without the low back	Whether there is a loaded position to drive out of at all.
Foot pressure in single leg stance	Weight sitting on the outer edge	Cause one, testable without a mound. Also check spike wear.
Lateral bound, both directions	Asymmetric distance or a wobbly landing	Frontal plane force production and control, which is the quality the drive phase is actually running on.
Video from behind, on the line	Belt line centre leaving the line	The measurement itself. Everything above explains it, this confirms it.

Fixing it, in order

Capacity first, because the two most common causes are both strength and control rather than skill. Direction work only lands once the hip can hold the pelvis.

STAGE 1

Build the hip that holds the pelvis over the leg

If the side of the hip cannot keep the pelvis centred in single leg stance, it will not do it under a drive, and no cue changes that.

- **Banded hip abduction** and **side lying work** for direct capacity on the drive side
- **Copenhagen planks** for the inner thigh side of the same job
- **Single leg stance progressions**, then the same under fatigue, since that is the state the leak appears in
- **Loaded hip airplane** once basic control is there

STAGE 2

Get the weight over the foot, and keep it inside

A pelvis that never arrived over the drive leg cannot push forward from it. This overlaps heavily with the hiking fault and the two often travel together.

- **Lateral shift drills** against a wall or a bar, so arriving over the back foot is a task rather than a feeling
- **Foot pressure work** — short foot, toe splay, and awareness of where the load sits on the back foot
- Check whether he is hiking rather than shifting. If so, that fault comes first

STAGE 3

Point the force down the line

Direction is trained with direction specific work. More strength pointed sideways is still pointed sideways.

- **Heavy sled marches** straight down a line, which force a horizontal vector and long contact
- **Skater bounds** for controlled frontal plane force, landing stuck rather than drifting
- **Broad jumps** down a taped line, using distance and straightness as the feedback
- Cue it laterally rather than downward. Clawing or pulling the rubber back recruits the glutes rather than the quad

STAGE 4

Constrain the line, do not cue it

The task can carry the instruction. Telling an athlete to stay on line describes a position he cannot see from inside the delivery.

- **A tape line or a lane** from the rubber to the plate, so drifting is something he notices rather than something he is told
- **Step back and rocker patterns** to rebuild the shift before the drive
- **Stop cueing him to stay closed** if that is what is producing the squirt. The pelvis has to go somewhere
- Re film from behind and check the belt line centre, not the feet

STAGE 5

Recheck what the leak was costing

The point is not a tidier looking delivery. It is the things the leak was charging for.

- **Stride length** as a share of height, since a leak wastes drive that would have gone into it
- **Sideways lean at release**, which should fall once he stops needing to counter lean
- **Release side**, which should stop drifting toward the arm
- **Consistency at foot contact**, since command lives in that frame

When it is not a fault

CASE 01

He throws from a crossfire

A deliberately closed landing changes what the line even means. If the whole delivery is aimed differently and it works, judge the pelvis against his line rather than against the rubber to plate line.

CASE 02

The drift is small and resolved by contact

Some lateral movement mid stride that is gone by the time the front foot lands has largely spent itself in a phase where it costs little. Judge the contact frame first.

CASE 03

He is a low slot or sidearm pitcher

Lower slots come with more lateral movement through the whole delivery by design. The question is whether the force is still going toward the plate, not whether the body stayed narrow.

BUT PRICE IT

Three things to keep watching

Even when tolerated: it wastes drive that stride length would have used, it invites a counter lean that costs elbow load, and it makes foot contact a moving target, which is the frame command depends on.

Where this sits in the library

The direction half of the drive phase

Losing the Ground frames the drive as three separable losses: force, time and direction. This document is the direction one, treated in detail, and the two share most of their screens. Group B overlaps with *False Load*, since a hiked pelvis is a tilted pelvis and a tilted pelvis slides more easily. Group C touches *Nothing Left to Turn*, because being cued to stay closed past what the hips tolerate produces both faults.

And the compensation it forces, a counter lean to bring the head back over the line, is one of the seven published levers on elbow load in *Position, Not Effort*. **A lower half direction problem ends up on the arm's bill, four links away.**

Sources

- Tread Athletics — Problem Solving Your Lower Half Pitching Mechanics
- Lumbopelvic-hip Control, Upper Extremity Joint Moments, and Drive Leg Ground Reaction Force in Adolescent Pitchers
- Gluteus Medius and Scapula Muscle Activations in Youth Baseball Pitchers
- Decreased Hip Internal Rotation Increases the Risk of Back and Abdominal Muscle Injuries, 258 player seasons
- Fleisig et al. — Kinematic Parameters Associated With Elbow Varus Torque in Elite Adult Baseball Pitchers, sideways lean and load
- The Effect of Trunk and Lower Body Mechanics on Fastball Velocity, SportRxiv, stride length and velocity
- Driveline — How We Interpret Biomechanics Reports
- Driveline — The Interaction of Biomechanics and Command, foot plant consistency
- Driveline — Why We Don't Teach Equal and Opposite or Firm Front Side
- ASMI — The Clinician's Guide to Baseball Pitching Biomechanics

Film it from directly behind, on the line, and watch the middle of the belt. The side view will not show you this at all.