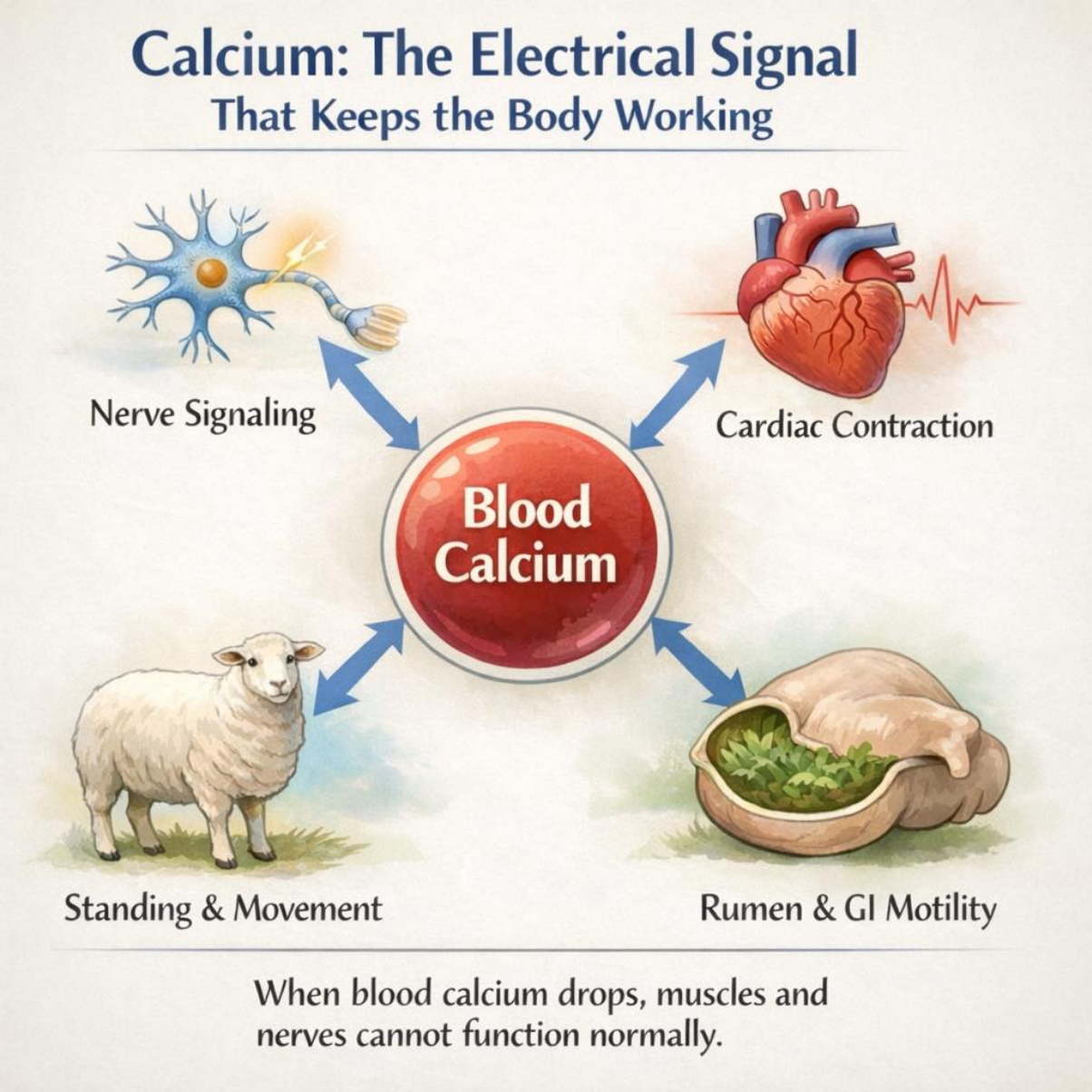
2026

Hypocalcemia in Sheep and Goats

A PRACTICLE GUIDE TO UNDERSTANDING



Hypocalcemia in Sheep & Goats — Article 1

Calcium: The Signal That Keeps the Body Working

When most people think about calcium, they think about bones.

That makes sense. Bones store the vast majority of the body's calcium. But the calcium circulating in the bloodstream is doing something far more important on a moment-to-moment basis.

Calcium acts as one of the body's primary signaling molecules.

It allows nerves to communicate with muscles and organs throughout the body. When calcium levels fall too low, those signals begin to fail.

This is why hypocalcemia — often called milk fever — can affect multiple body systems at once.

To understand hypocalcemia, we first need to understand what calcium actually does in the body.

Calcium and Nerve Signaling

Every movement in the body begins with a nerve signal.

For a nerve to transmit that signal, calcium must move across the nerve cell membrane.

If blood calcium drops too low, those signals become weaker and less effective.

This is why animals developing hypocalcemia may appear:

• slow

• weak

• uncoordinated

• reluctant to move

The nervous system simply cannot communicate with the muscles the way it normally does.

Calcium and Muscle Contraction

Muscles depend directly on calcium in order to contract.

This includes:

• Skeletal muscle – the muscles that allow the animal to stand and move

• Cardiac muscle – the heart

• Smooth muscle – the muscles that control many internal organs

When calcium levels drop, muscles cannot contract normally. The result can range from weakness and trembling to animals becoming unable to stand.

But skeletal muscle weakness is only part of the story.

The Rumen Is a Muscular Organ

The rumen is often thought of simply as a fermentation chamber, but its walls are made of smooth muscle.

These muscles contract rhythmically throughout the day. These contractions mix feed, move digesta through the digestive tract, and help maintain normal rumen function.

Those contractions also depend on calcium.

When blood calcium falls, rumen contractions slow down or become irregular. As rumen motility decreases, animals often lose their appetite and eat less.

This becomes especially important in late gestation, when the rumen already has less space available because of the growing fetuses.

Calcium and the Heart

The heart is also a muscle, and it depends on calcium to contract properly.

Calcium plays a role in the electrical activity that controls the heartbeat. Severe hypocalcemia can interfere with this process.

This is one reason veterinarians are careful when administering intravenous calcium treatments. Calcium levels must be corrected carefully rather than simply flooded into the bloodstream.

A System Problem, Not Just a Bone Problem

When blood calcium levels begin to fall, several systems begin to slow down at the same time:

• Nerve signaling becomes less efficient

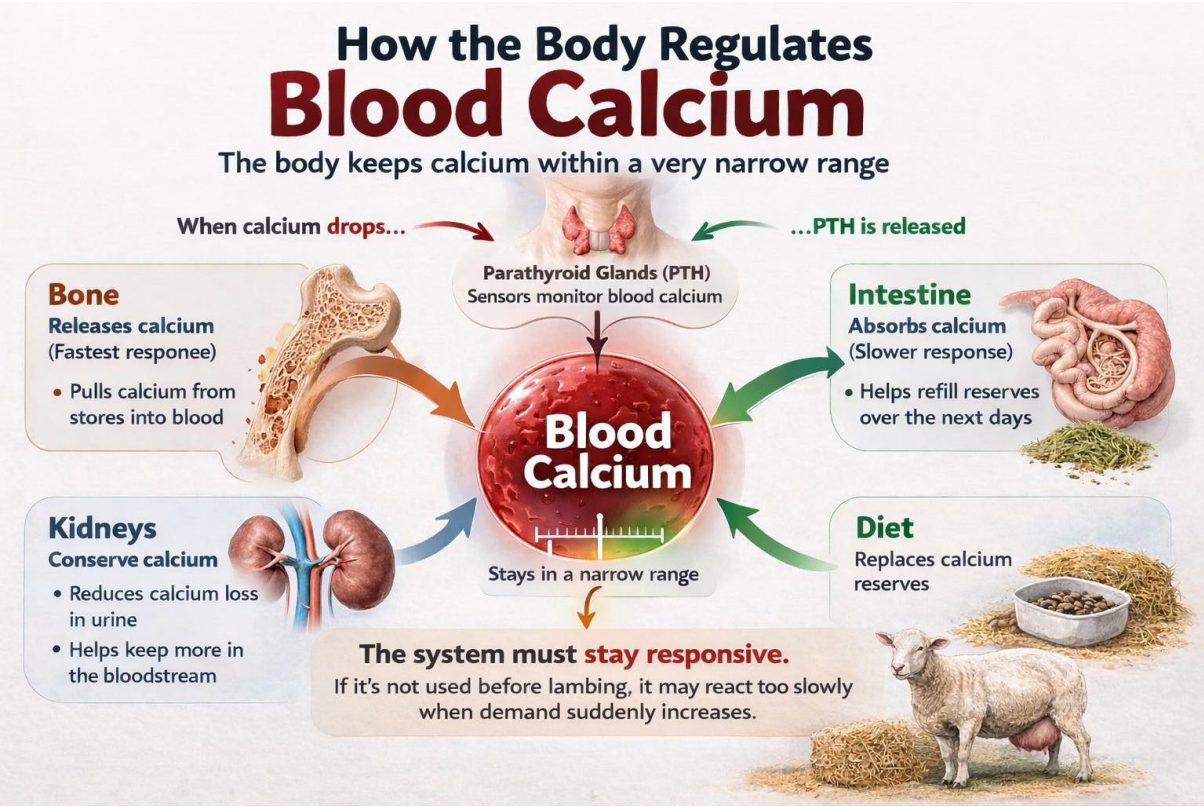
• Muscles weaken

• The rumen slows or stops contracting

• Feed intake drops

For animals in late gestation or early lactation, this combination can become dangerous because their metabolic demands are already high.

Hypocalcemia is not simply a problem of low calcium in the blood. It is a system problem, where the body cannot move calcium quickly enough to meet demand.



Hypocalcemia in Sheep & Goats — Article 2

How the Body Regulates Calcium

In the previous article we discussed the many roles calcium plays in the body. Calcium allows nerves to signal, muscles to contract, and organs like the rumen and heart to function properly.

Because calcium is so important, the body keeps blood calcium within a very narrow range. Even small changes can affect how the body functions.

Fortunately, animals have a very effective system for regulating calcium levels. This system relies on three major components:

• Bone calcium reserves

• Hormonal signaling

• Calcium absorption from the digestive tract

Understanding how this system works helps explain why hypocalcemia develops.

Bone: The Body's Calcium Reservoir

Most of the calcium in the body is stored in bone.

Bone is not just a structural material that supports the body. It also serves as a large mineral reservoir that the body can draw from when needed.

When blood calcium levels begin to fall, the body can quickly release calcium from bone and move it back into the bloodstream. This process allows animals to correct many small calcium fluctuations without any visible symptoms.

In other words, most animals already have large calcium reserves available.

The Hormone That Controls the System

The primary regulator of blood calcium is parathyroid hormone, commonly called PTH.

Small glands located near the thyroid constantly monitor calcium levels in the blood. When calcium begins to drop, these glands release PTH.

PTH signals the body to take several actions:

• release calcium from bone

• increase calcium absorption from the intestine

• reduce calcium loss through the kidneys

Together, these responses help restore blood calcium to a healthy range.

The Role of the Digestive Tract

While bone provides the quickest response to falling calcium levels, the digestive tract plays an important role in longer-term calcium balance.

Hormonal signals increase the intestine's ability to absorb calcium from feed. This process takes more time than bone mobilization, but it helps replenish calcium reserves over the following days.

In this way, the body is constantly balancing mobilization from bone with replacement from the diet.

A System That Usually Works Very Well

Under normal conditions this calcium regulation system works extremely well.

Animals experience small fluctuations in calcium every day, but the body adjusts quickly and keeps blood calcium levels within a healthy range.

Most of the time, the animal never notices these adjustments happening.

When Demand Suddenly Increases

Problems begin when calcium demand rises very quickly.

Late gestation and early lactation are two of the most demanding periods in an animal's life. Large amounts of calcium may suddenly be required for:

• fetal development

• colostrum production

• milk production

If the body cannot move calcium from bone into the bloodstream quickly enough to meet this demand, blood calcium levels begin to fall.

This is when hypocalcemia begins to develop.

The Key Concept

One of the most important things to understand is that hypocalcemia is usually not a simple lack of calcium in the animal's body.

Most animals have large calcium reserves stored in bone.

Instead, hypocalcemia usually occurs when the body cannot mobilize those reserves quickly enough to meet demand.

Keeping the System Responsive

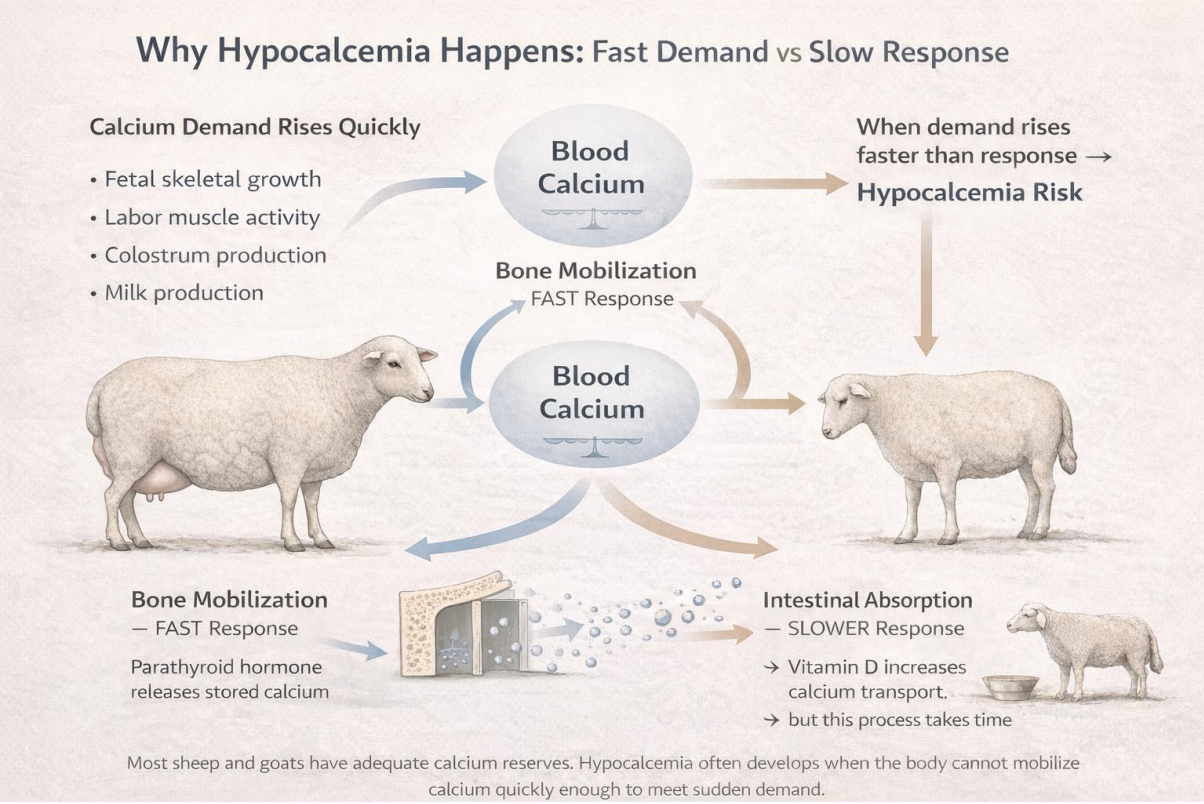
The calcium regulation system works best when it remains active and responsive.

If the system has been idle for long periods of time, it may respond more slowly when calcium demand suddenly increases.

This becomes especially important in the weeks leading up to lambing or kidding.

Many producers assume that providing large amounts of calcium before birth will help prevent hypocalcemia. In reality, the opposite can sometimes occur. When calcium intake is consistently very high, the body may not need to mobilize calcium from bone very often.

When lactation begins and calcium demand suddenly increases, the mobilization system may simply react too slowly.



Hypocalcemia in Sheep & Goats — Article 3

When the Calcium System Cannot Keep Up

In the first two articles we discussed what calcium does in the body and how animals normally keep blood calcium levels within a narrow, safe range.

Now we need to talk about why that system sometimes fails.

One of the most important ideas for producers to understand is that hypocalcemia is usually not caused by a simple lack of calcium in the diet.

In many cases the animal already has large calcium reserves stored in bone.

The real problem is often that the body cannot mobilize calcium quickly enough when demand suddenly increases.

This is a timing issue — not just a supply issue.

When Demand Changes Overnight

Late gestation and early lactation represent one of the most dramatic metabolic transitions in a ewe or doe's life.

Calcium demand can rise rapidly due to:

• fetal skeletal growth

• uterine muscle activity during labor

• colostrum production

• milk production

• reduced feed intake near parturition

At the same time, rumen space is decreased because of the growing fetuses.

This alone can reduce dry matter intake during the very period when mineral and energy demands are increasing.

If the regulatory system is not primed and responsive, blood calcium levels may fall faster than the body can correct them.

The Fast Response vs the Slow Response

When calcium levels begin to drop, the body activates several emergency mechanisms.

The fastest response is the release of calcium from bone under the influence of parathyroid hormone (PTH).

This is the body's "fire extinguisher" — rapid mobilization of stored calcium into the bloodstream.

A slower response involves increasing calcium absorption from the digestive tract.

Hormonal signals activate vitamin D, which helps the intestine move more calcium into the blood over the following hours and days.

This means survival during sudden calcium demand depends largely on how quickly the animal can mobilize calcium from body reserves — not just how much calcium is present in the diet.

The Intestinal "Doorway"

A helpful way to picture calcium absorption is to think of the intestinal lining as a controlled doorway.

Calcium in the digestive tract is like a crowd of people trying to pass through that doorway into the bloodstream.

No matter how many are waiting outside, only a certain number can move through at a time.

Hormones determine how wide that doorway opens.

Parathyroid hormone and activated vitamin D gradually increase the intestine's ability to absorb calcium, but this process takes time.

It is not an instant correction for falling blood calcium.

Why Too Much Calcium Can Sometimes Cause Problems

It may seem logical that feeding large amounts of calcium before lambing or kidding would prevent hypocalcemia.

However, when animals receive consistently high calcium intake, the body may rely less on mobilizing calcium from bone.

Over time, this can reduce the responsiveness of the regulatory system.

Then when lactation begins and calcium demand rises sharply, the body's response may be too slow to keep up.

In metabolic disease, slow response often equals clinical signs.

This is why hypocalcemia is best thought of as a regulation disorder rather than simply a deficiency disorder.

The Rumen and Digestive Effects

Calcium also plays a major role in smooth muscle contraction, including the muscles that control rumen and intestinal motility.

When blood calcium begins to fall, rumen contractions may slow or become uncoordinated.

Feed intake often decreases, and digestive efficiency may decline.

This can create a cascade of metabolic stress that overlaps with other conditions such as pregnancy toxemia.

In real-world situations, metabolic diseases rarely occur in isolation.

Genetics and Modern Production Pressure

Modern sheep and goats are often selected for:

• increased milk production

• larger litter sizes

• faster growth rates

• improved body condition

While these traits improve productivity, they also increase metabolic demand.

The calcium regulation system must not only function —

it must respond rapidly and efficiently to sudden changes.

Mineral Balance Matters

Calcium metabolism does not operate alone.

Adequate magnesium status is important for proper hormonal responsiveness, and broader mineral balance supports overall metabolic stability.

This is another example of why prevention strategies must focus on the whole nutritional system rather than a single nutrient.

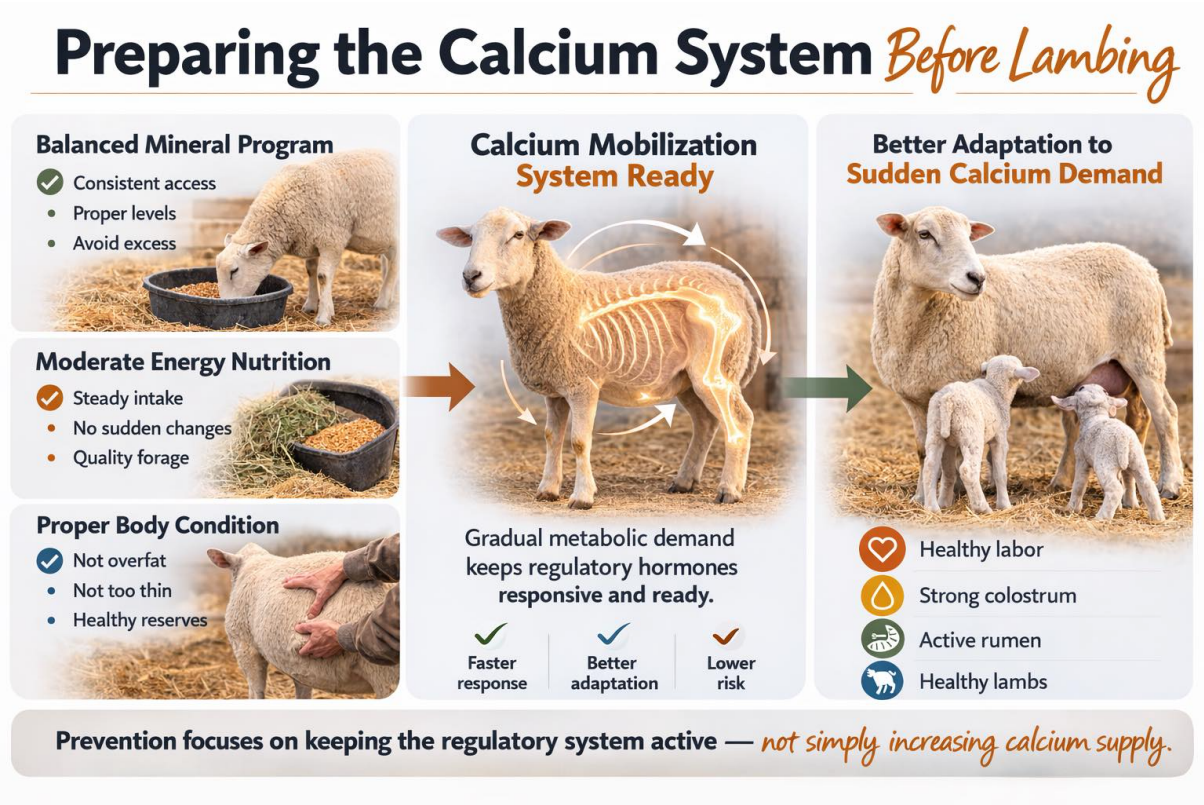
The Take-Home Message

In many cases hypocalcemia does not occur because calcium is missing from the animal's body.

It occurs because the animal cannot mobilize and regulate calcium fast enough when demand suddenly increases.

Good management is not about extremes.

It is about maintaining a nutritional and metabolic environment that keeps the system responsive and adaptable.



Hypocalcemia in Sheep & Goats — Article 4

Before the Crisis: Building a Responsive Calcium System

One of the biggest misunderstandings I see with hypocalcemia in sheep and goats is the belief that it is simply a calcium shortage that happens at lambing or kidding.

In reality, most cases begin developing weeks before birth, when the animal's calcium regulation system is either well prepared — or struggling to keep up.

By the time an animal is weak, down, or unable to eat, the metabolic imbalance has usually been building quietly for some time.

This is why prevention is less about giving calcium at the moment of crisis and more about supporting the body's ability to respond to rising demand.

Calcium Demand Does Not Rise Equally in Every Animal

Late gestation is not a uniform experience.

Some females carry singles and produce modest milk.

Others carry multiples and are genetically wired for heavy lactation.

This difference matters.

Animals at higher risk for hypocalcemia often include:

• Older ewes and does

• Animals carrying twins or triplets

• High milk-producing genetics

• Overconditioned females

• Animals experiencing sudden diet changes

• Animals under environmental or social stress

These factors increase how quickly calcium demand rises — sometimes faster than the body can adjust.

Why “More Calcium” Is Not Always the Answer

It may seem logical that providing large amounts of calcium late in pregnancy would prevent hypocalcemia.

However, the body’s regulatory system does not work that way.

When blood calcium remains consistently high due to excessive dietary intake, the hormonal response responsible for mobilizing calcium from bone can become less responsive (think down-regulation).

In practical terms, the body may become slower to react when demand suddenly increases.

This is why long-term oversupply of calcium — such as very heavy high-calcium forage feeding or frequent unnecessary supplementation — can sometimes increase risk rather than reduce it.

The issue is not simply how much calcium is present in the diet.

It is whether the mobilization system remains responsive and ready.

Hypocalcemia Is Often a Speed Problem

Most sheep and goats actually have adequate total calcium reserves stored in their skeleton.

The challenge is that calcium must move from storage sites into the bloodstream quickly enough to support:

- Rapid fetal skeletal growth
- Uterine muscle contractions during labor
- Colostrum production
- Early milk synthesis

• Normal rumen and intestinal muscle activity

If demand rises faster than calcium can be mobilized or absorbed, blood calcium levels fall.

This can lead to reduced feed intake, slower rumen contractions, weakness, and difficulty during delivery.

In many cases, these early changes are subtle and may be mistaken for fatigue, late pregnancy discomfort, or reduced appetite from space limitations in the abdomen.

Management Focus: Supporting Adaptation, Not Chasing Crisis

Preventing hypocalcemia is less about finding a single “correct” feeding system and more about avoiding extremes that interfere with normal physiology.

Practical considerations include:

• Providing a consistent, balanced mineral program

• Avoiding sudden late-gestation ration changes

• Managing body condition before breeding and during pregnancy

• Recognizing animals with higher milk or litter potential

• Minimizing unnecessary stress and competition for feed

Different farms achieve these goals using different feeding strategies.

Pasture-based systems, forage-heavy rations, and more supplemented programs can all work when they maintain metabolic stability.

The important concept is not the exact diet itself — it is whether the animal’s calcium regulation system is being allowed to stay responsive.

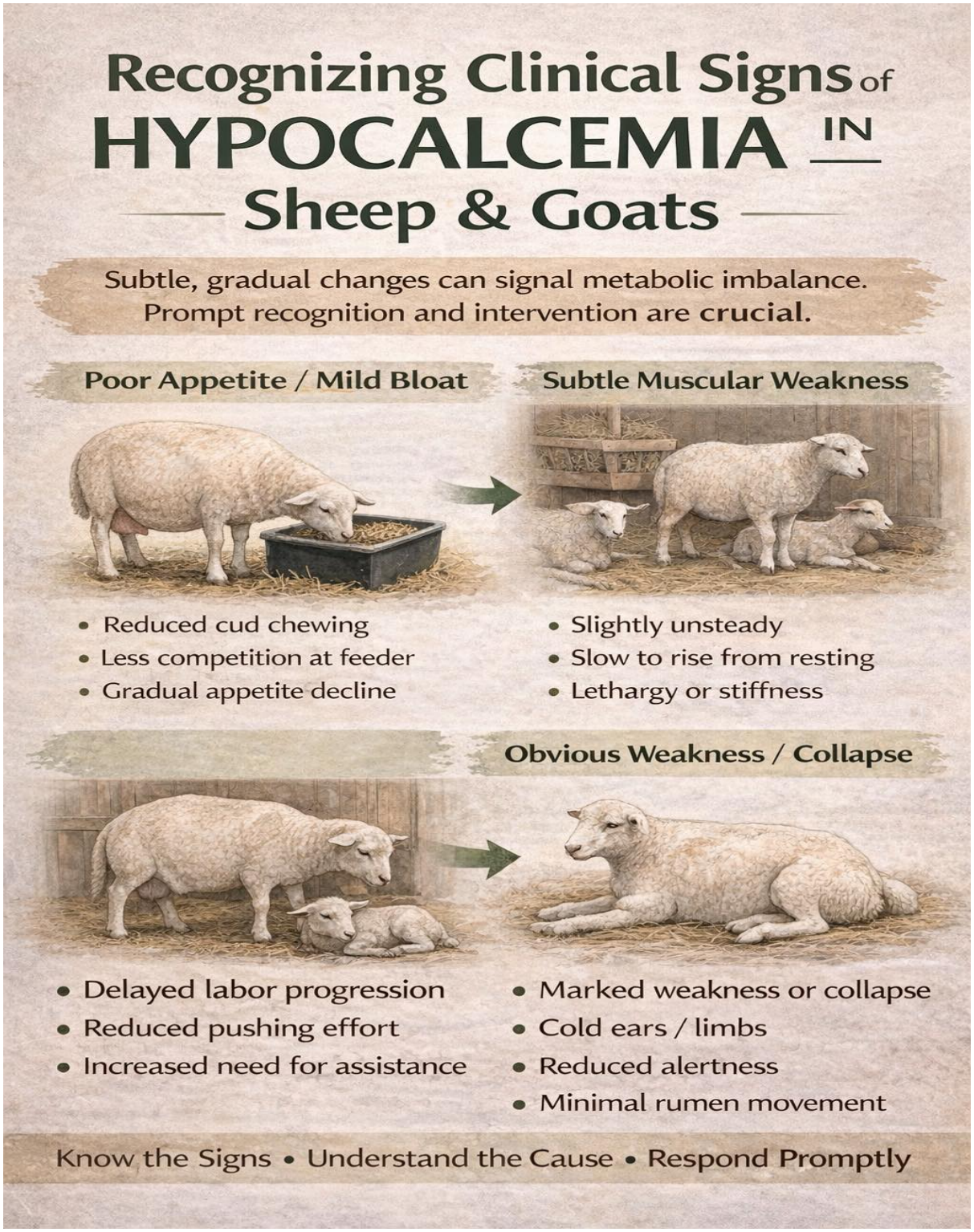
Understanding the System Changes How We Respond

When producers understand hypocalcemia as a mismatch between demand and response speed, management decisions become clearer.

Rather than reacting only when animals become weak or recumbent, the focus shifts toward recognizing risk earlier and supporting physiological balance before problems occur.

This perspective does not eliminate every case.

However, it allows producers to make calmer, more informed decisions and reduces the likelihood of sudden, severe metabolic breakdowns.



Hypocalcemia in Sheep & Goats — Part 5

Recognizing Early Warning Signs and Knowing When to Act

In the previous articles, we discussed what calcium does in the body, how it is regulated, why demand can rise faster than the body can respond, and how management decisions can influence risk.

Now we shift from physiology to observation.

Because in real farm settings, hypocalcemia rarely announces itself dramatically at first. More often, it develops gradually through subtle changes that are easy to overlook or attribute to late pregnancy discomfort.

Understanding these early signs can help producers intervene sooner and reduce the likelihood of severe metabolic collapse.

The First Changes Often Involve Appetite and Rumen Function

Calcium plays a key role in smooth muscle contraction, including the muscles that drive rumen motility and intestinal movement.

As blood calcium begins to decline, one of the earliest observable changes may be:

• Reduced feed intake

• Slower cud chewing

• Mild abdominal “stillness”

• Less interest in competition at the feeder

Because late gestation already limits abdominal space, these changes are sometimes dismissed as normal.

However, decreased rumen activity can quickly worsen overall metabolic stability.

Subtle Weakness Can Precede Recumbency

As hypocalcemia progresses, muscle function becomes less efficient.

Producers may notice:

• Slight unsteadiness

• Reluctance to rise

• Stiff or cautious gait

• Preference for lying down longer than usual

At this stage, animals are often still alert and responsive, which can make the condition appear less serious than it actually is.

Labor May Be Slower or Less Effective

Calcium is essential for coordinated uterine contractions.

When levels are insufficient, parturition may be prolonged or less productive.

Possible observations include:

• Delayed progression once labor begins

• Reduced abdominal pushing effort

• Fatigue during delivery

• Increased need for assistance

These situations are often multifactorial, but metabolic weakness can be an important contributor.

Later Signs Reflect System-Wide Muscle Impairment

If hypocalcemia continues to worsen, more obvious signs can develop:

• Marked weakness or inability to stand

• Reduced ear or limb tone

• Cold extremities

• Minimal rumen movement

• Reduced responsiveness

At this point, the condition has moved beyond early metabolic imbalance and may require prompt intervention.

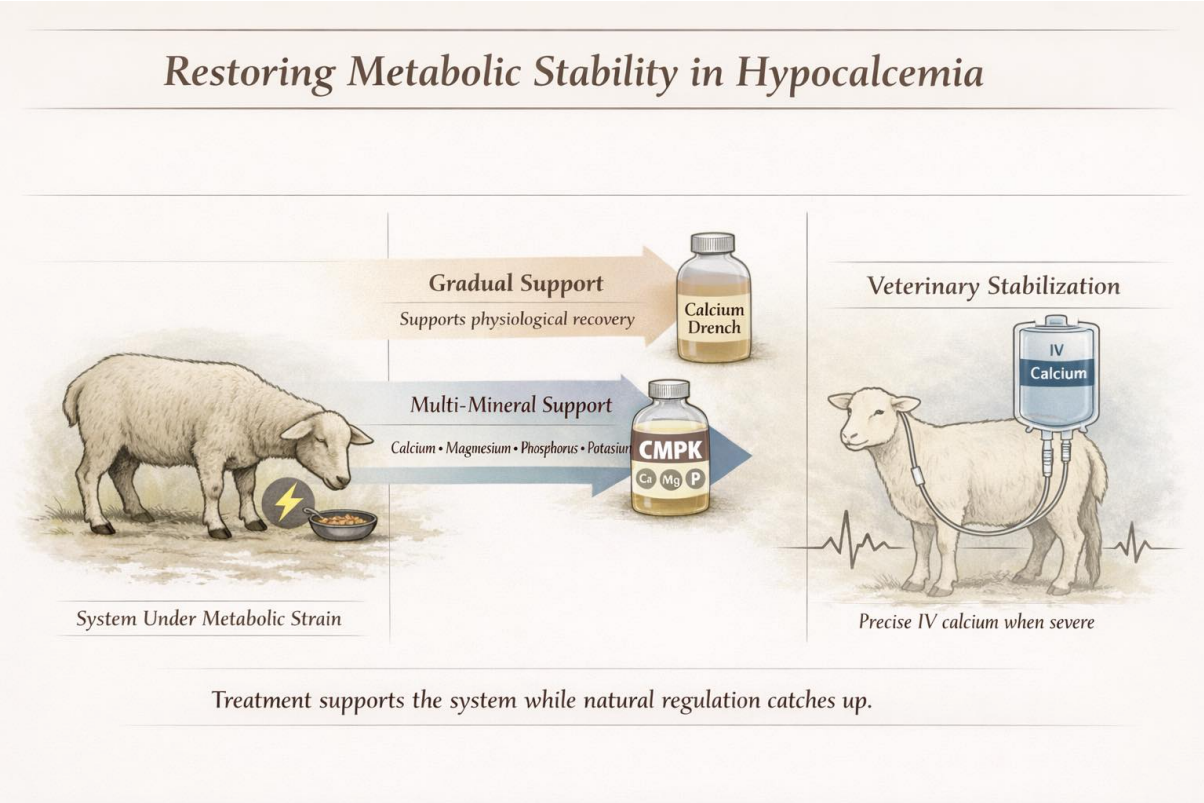
Recognizing Patterns Matters More Than Memorizing Symptoms

Not every animal will show every sign.

Some may progress quickly, while others decline gradually.

What matters most is recognizing when behavior, appetite, posture, and labor progress no longer fit the animal's normal pattern.

Producers who understand the underlying physiology are better able to interpret these changes calmly and respond appropriately.



Hypocalcemia in Sheep & Goats — Part 6

Treatment Realities: Stabilizing the System

By the time an animal shows clear signs of hypocalcemia,

the issue is no longer theoretical.

At this stage, the goal is not simply to “add calcium.”

The goal is to restore metabolic stability while supporting the animal through a period of extreme physiological demand.

This is an important distinction.

Understanding What Treatment Is Really Doing

Hypocalcemia is not just a shortage of calcium intake.

It is a mismatch between how fast calcium is needed

and how fast the body can mobilize and regulate it.

Treatment strategies are therefore aimed at:

• supporting blood calcium levels

• restoring muscle and rumen function

• improving appetite and feed intake

• allowing normal hormonal regulation to catch up

When treatment works well, the animal begins eating again, rumen motility improves, and overall metabolic balance starts to return.

Oral Calcium Support

In mild or early cases, oral calcium supplementation is commonly used.

This approach:

• provides additional calcium entering the digestive tract

• supports gradual increases in blood calcium

• works with the animal’s natural regulatory systems

Oral support is generally safer than aggressive intervention,

but it still requires observation and judgment.

Simply giving large amounts repeatedly does not guarantee success

and in some cases may interfere with normal hormonal signaling if used indiscriminately.

Injectable Calcium and Veterinary Care

Some animals deteriorate despite oral support.

When you see:

• inability to stand

• severe weakness

• marked depression

• cold extremities

• rumen shutdown

this is no longer a “wait and see” situation.

Intravenous calcium (often calcium gluconate solutions) may be required.

This is a precise medical treatment, not something to guess at.

Dosage, rate of administration, and cardiac monitoring all matter.

Over-administration can lead to fatal heart rhythm disturbances.

This is the point where veterinary involvement is not just helpful —

it is appropriate and often life-saving.

Why CMPK Products Are Commonly Used

Many producers are familiar with CMPK formulations.

These products typically contain:

• calcium

• magnesium

• phosphorus

• potassium

They are designed to support multiple metabolic pathways at once.

Magnesium supports hormonal responsiveness and neuromuscular function.

Phosphorus contributes to cellular energy systems.

Potassium helps maintain normal muscle activity and metabolic balance.

The goal is not simply to “treat low calcium,”

but to stabilize a stressed physiological system.

Treatment Is Often Temporary Support

Even when animals respond well,

treatment does not eliminate the underlying metabolic pressure.

Late gestation and early lactation remain periods of intense demand.

Animals may appear improved yet still be operating close to their physiological limits.

Careful observation, consistent feeding routines,

and minimizing stress remain essential during recovery.

Bottom Line

Hypocalcemia treatment is not about chasing one mineral.

It is about recognizing when the system is overwhelmed

and providing appropriate support —

sometimes on the farm,

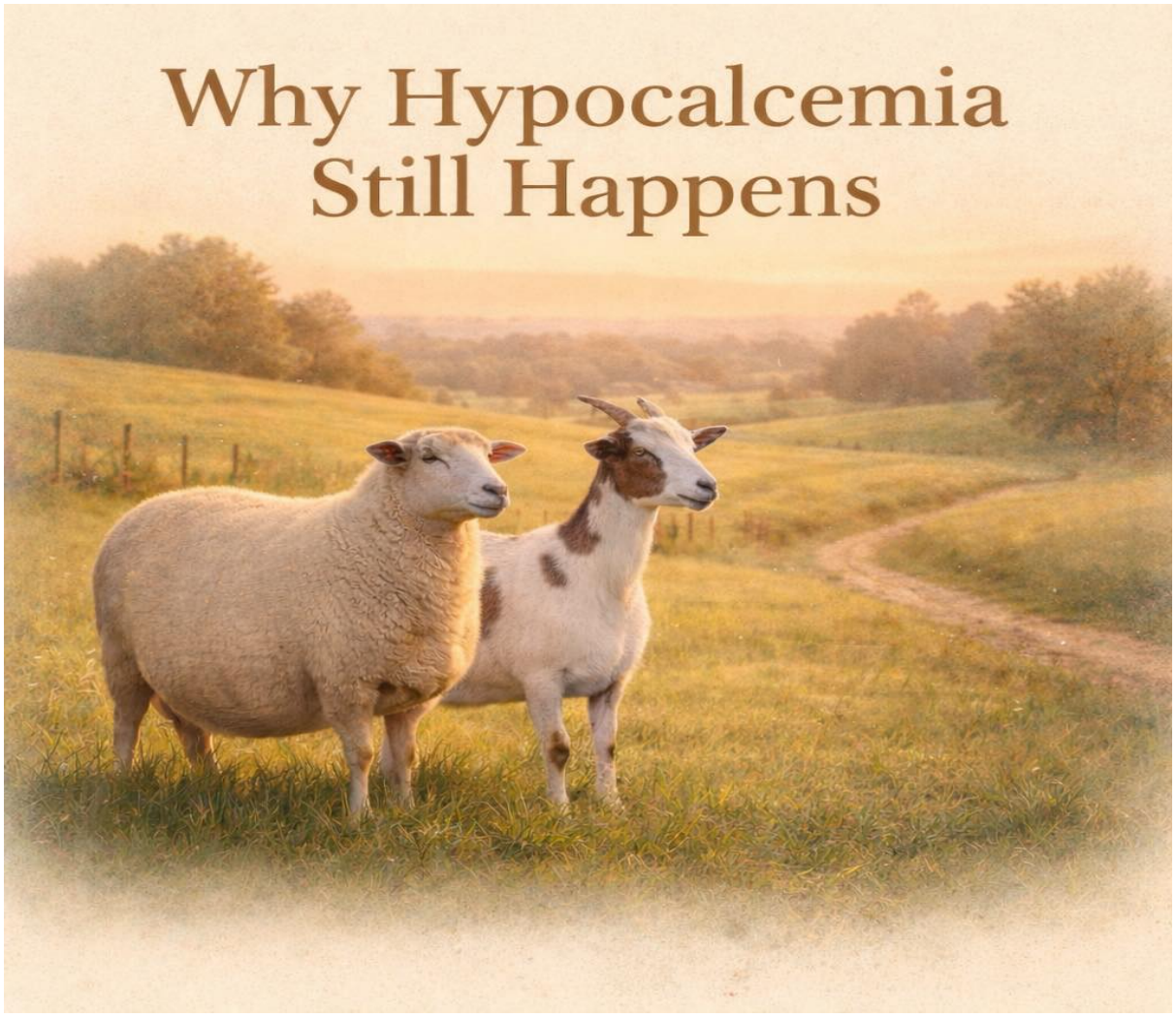
and sometimes with veterinary assistance.

Despite careful feeding and attentive management, some animals will still develop hypocalcemia.

Modern livestock production has increased physiological demands through selection for higher milk output, larger litter sizes, and faster growth.

In many cases, this condition represents a mismatch between biological capacity and metabolic demand, not simply a single mistake in nutrition or management.

Understanding this helps producers respond calmly and effectively rather than assuming failure.



Hypocalcemia in Sheep & Goats — Article 7

Why Does This Keep Happening?

After learning how hypocalcemia develops, how to recognize early warning signs, and how we support animals during a crisis, many producers still ask an important question:

If we understand this condition better than ever...

why do we still see it?

The honest answer is that hypocalcemia is not always completely preventable.

In many cases, this condition reflects the intersection of biology, management, and long-term genetic selection.

Modern Livestock Are Asked to Do More Than Ever

Over time, sheep and goats have been selected for:

• Higher milk production

• Faster growth rates

• Larger litter sizes

• Greater feed efficiency

These traits can improve productivity and profitability.

However, they also increase metabolic demand, particularly during late gestation and early lactation.

The calcium regulatory system that once supported more modest production levels is now expected to respond to sharper and more sudden physiological stress.

This does not mean progress is wrong —

but it does mean there are biological trade-offs.

The System Has Limits

Even with excellent nutrition, mineral programs, and body condition management, the calcium mobilization system may sometimes struggle to keep pace with rapid metabolic change.

Some animals appear especially sensitive to these shifts.

This may reflect:

• Individual physiologic variation

• Underlying metabolic efficiency

• Hormonal responsiveness

• Genetic predisposition

This is why two animals in the same environment, eating the same ration, can have very different outcomes.

One may transition smoothly.

Another may develop clinical hypocalcemia.

Prevention Reduces Risk — It Does Not Eliminate It

Balanced minerals, consistent nutrition, and thoughtful management improve the odds that the system will respond effectively.

But prevention should be understood as risk reduction, not absolute protection.

Recognizing this helps producers avoid misplaced guilt when problems occur despite good care.

Good livestock management is not about controlling every variable.

It is about understanding systems well enough to respond appropriately when challenges arise.

Looking Forward

As producers, veterinarians, and educators, we continue learning how nutrition, genetics, and metabolic physiology interact.

Future progress will likely come from:

• Better selection for metabolic resilience

• Improved understanding of mineral balance

• Continued emphasis on observation and early intervention

Hypocalcemia is not simply a feeding mistake or a management failure.

It is often a reflection of the biological complexity of modern livestock production.

Understanding that complexity is what allows us to make better decisions moving forward.

Series Wrap-Up — Ketosis & Hypocalcemia

Over the past several weeks we have spent a lot of time talking about ketosis and hypocalcemia in sheep and goats.

These have probably been some of the most challenging articles I have ever written — not just because of the science, but because of the volume of discussion and the depth of emotion behind the comments.

Many people have mentally tied these two conditions together, and rightfully so.

They both remind us of something that can be uncomfortable to accept:

Livestock biology is complex, and we don't control every outcome.

As humans, we naturally want to control problems.

We want a clear answer.

We want a guaranteed solution.

We want to believe that if we "do the right thing," the result will always be good.

I understand that feeling very well.

I have seen it in my professional life caring for people.

I have seen it on the farm caring for animals.

I have seen situations where everything was done correctly and the outcome was still not what we hoped for.

I have also seen moments that felt like miracles.

After a complex issue is all said and done, I sometimes ask myself a difficult question:

“Were you being irrational… or were you simply doing your best in a complex situation?”

Good livestock management is not about controlling every variable.

It is about understanding systems well enough to respond thoughtfully when challenges arise.

These articles were never meant to tell you there is only one way to feed, manage, or treat your animals.

They were meant to help you understand what is happening under the surface so you can make better decisions on your own farm (that’s my goal).

Some people may not fully understand what drives a person to spend this much time teaching.

From a financial standpoint, writing educational content like this rarely “makes sense.”

But education has value that cannot always be measured in dollars.

We all carry knowledge that was passed down to us — from mentors, veterinarians, professors, neighbors, family members, and hard experience.

Sharing that knowledge keeps the process moving forward.

In many ways, teaching is about legacy.

It is about keeping useful understanding alive for the next group of producers who will face the same challenges we face today.

Thank you to everyone who read, asked questions, shared experiences, and participated respectfully in the discussion.

That is how real learning happens.

In the coming weeks we will begin shifting our focus toward other seasonal metabolic and management topics, including magnesium balance and early pasture risks.

As always, remember:

Good livestock management isn’t about always having the right answer —

it’s about learning how to think when the answer isn’t obvious yet.

Tim

Linessa Farms