

Croup

Croup is caused by a virus (usually parainfluenza) that swells the narrow airway below the voice box. Steroids shrink the swelling and help the child breathe easier.

THE ONE-LINE TRUTH

Croup is a viral infection that swells the airway just below the voice box, making a child's breathing sound like a seal barking.

The chain — how it unfolds

1. Virus (usually parainfluenza) enters the airway and infects the cells lining the subglottic space. — why: Parainfluenza virus accounts for about 75% of croup cases. The virus attaches to cells in the mucosa just below the voice box and starts to multiply.
2. The immune system detects the virus and sends white blood cells and fluid to the infected area, causing the tissue to swell. — why: This swelling (edema) is the body's normal response to infection—it is trying to wall off the virus and bring in cells to fight it. But in a narrow child's airway, that swelling takes up space the child needs to breathe.
3. The swollen tissue narrows the subglottic airway, and air moving through that tight space makes a harsh, barking cough and a high-pitched noise on the way in (inspiratory a high-pitched noise on breathing in (stridor)). — why: The barking sound comes from air vibrating the swollen vocal cords and tissue nearby. A high-pitched noise on breathing in (Stridor) is the sound of turbulent airflow through a narrow tube—like the whistle of wind through a crack.
4. Symptoms get worse at night. — why: When the child lies flat, gravity shifts fluid toward the head and neck, and the airway naturally narrows a little at night. Both of these things make the swelling feel tighter and the a high-pitched noise on breathing in (stridor) louder.
5. Symptoms get worse when the child cries or gets upset. — why: Crying increases heart rate and blood flow to the swollen tissue, which makes it swell even more. Crying also makes the child breathe faster and harder, pulling more air through the narrow space and making the a high-pitched noise on breathing in (stridor) louder.
6. Most children have mild croup: they cough and have a high-pitched noise on breathing in (stridor) only when upset or active, but they can play, eat, and drink normally. — why: In mild cases, the swelling is small enough that the child can still move enough air when calm. The body's compensation keeps oxygen levels normal without much extra work.

7. Some children have moderate to severe croup: a high-pitched noise on breathing in (stridor) at rest, visible chest retractions (skin pulling in between the ribs or at the neck with each breath), and trouble drinking or staying calm. — why: More swelling means a tighter airway. The child has to work much harder to breathe, and even at rest the airway is so narrow that every breath makes noise. This is when steroids and sometimes nebulized epinephrine are needed.
8. Steroids (usually a single dose of dexamethasone by mouth or injection) shrink the swelling and improve symptoms within a few hours. — why: Steroids calm the immune system's inflammatory response, which reduces fluid buildup and opens the airway. One dose lasts long enough (up to 72 hours) to cover the worst part of the illness while the body clears the virus.

Spot it — what you see, and why

- Barking cough (sounds like a seal): The airway below the vocal cords swells and narrows, so when air rushes through during a cough it makes a harsh, barky sound instead of a normal cough.
- A high-pitched noise on breathing in (Stridor) (high-pitched breathing sound when breathing in): The swollen airway is so narrow that air squeaks as it rushes past the tight spot—like blowing across a bottle opening—especially when the child breathes in deeply or gets upset.
- Hoarse voice or cry: The virus causes swelling around the vocal cords (the two bands of tissue that vibrate to make sound), so the voice sounds rough, scratchy, or weak.
- Runny nose and low fever (usually under 102°F): Croup is caused by a virus (usually parainfluenza) that first irritates the nose and throat lining, triggering mucus and a mild immune response that raises body temperature slightly.
- Chest wall retractions (skin pulls in between ribs or above collarbones when breathing): The narrow airway makes it harder to pull air in, so the child works much harder—the strong breathing muscles suck the soft skin inward with each breath.
- Restlessness or agitation: When a child is not getting enough oxygen because the airway is very tight, the brain senses the drop and the child becomes fussy, scared, or confused.

Red flags — act now

- A high-pitched noise on breathing in (Stridor) at rest (high-pitched sound even when the child is calm)
- Severe chest retractions or the child looks like they are working very hard to breathe
- Blue or pale lips or skin (sign of low oxygen)
- Drooling or unable to swallow (suggests a more dangerous throat blockage)

- The child is very sleepy, limp, or hard to wake up

Treat it — in this order

1. Dexamethasone 0.6 mg/kg by mouth or IM injection (single dose, maximum 10 mg) → Steroid medicine shrinks the swollen tissue below the voice box (subglottic area), making the airway opening bigger so air flows easier. This reduces the noisy breathing (stridor) and seal-bark cough within 6 to 12 hours and keeps working for 24 to 48 hours.
2. Nebulized racemic epinephrine (0.5 mL of 2.25% solution in 3 mL saline) for moderate-to-severe croup; watch the child for 3 to 4 hours afterward → Epinephrine shrinks the blood vessels in the swollen airway lining (like how a cold pack shrinks swelling on a bruise), making the airway opening bigger fast—within 10 to 30 minutes. A high-pitched noise on breathing in (Stridor) and breathing work improve quickly.
3. Keep the child calm and comfortable in a caregiver's lap; avoid upsetting the child or doing unnecessary exams → Calm behavior keeps the child from crying hard, which would make them breathe faster and suck the swollen airway walls inward more, making a high-pitched noise on breathing in (stridor) and breathing worse. Staying calm keeps the airway as open as it can be.
4. Cool mist from a humidifier or sitting in a steamy bathroom during episodes (traditional home remedy) → Moist air may soothe the dry, inflamed airway lining and might help loosen sticky mucus, making the cough a bit easier and the throat feel less scratchy.
5. Send to the hospital if a high-pitched noise on breathing in (stridor) continues at rest after epinephrine wears off, oxygen level stays below 90 to 92%, or the child looks exhausted from breathing hard → Hospital means access to continuous monitoring, repeat epinephrine treatments, oxygen support, and emergency airway tools (intubation) if the swelling gets so bad the child can't breathe at all.

Your top priorities at the bedside

1. Keep the child calm and sitting upright in the caregiver's lap; do not lay the child flat or do upsetting exams — why: Agitation and crying make the child breathe faster and harder, which increases turbulent airflow (rough air movement) through the already swollen airway and worsens a high-pitched noise on breathing in (stridor) and obstruction
2. Watch for a high-pitched noise on breathing in (stridor) at rest, severe retractions, bluish skin (cyanosis), or altered mental status every 15 minutes and notify the provider immediately if any appear — why: These signs mean critical airway narrowing or low oxygen (hypoxia); the child may need emergency intubation (a breathing tube placed in the windpipe) or epinephrine within minutes to prevent respiratory arrest

3. Administer dexamethasone 0.6 mg/kg by mouth or intramuscular injection as ordered (maximum 10 mg single dose) — why: Dexamethasone is a corticosteroid (anti-swelling medicine) that reduces airway swelling (edema) (swelling); it works within 30 minutes to 6 hours and decreases the need for hospitalization and return visits