CONDITION

Amniotic band sequence

Learn how amniotic band sequence can affect a baby's limbs or other body areas, how it is diagnosed, and what prenatal and postnatal care may involve.

WHAT IT IS
Group of birth differences caused by amniotic tissue bands

BODY SYSTEM
Limbs and other body structures

MAIN SYMPTOMS
Ring-like grooves, swelling, missing or shortened digits, abnormal limb position

WHAT CAUSES IT
Early tearing of the amnion, usually sporadic

HOW IT IS DIAGNOSED
Prenatal ultrasound pattern or postnatal examination

MAIN TREATMENT
Monitoring, surgery and rehabilitation

CAN IT BE CURED?
Sometimes - surgery can release constricting bands

IS IT AN EMERGENCY?
Sometimes - affected part becomes pale, blue or cold

LONG-TERM OUTLOOK
Highly variable, from no lasting problem to serious complications

Overview

Amniotic band sequence is a group of birth differences caused when thin strands of tissue develop inside the amniotic sac and become attached to a developing baby. The amniotic sac is the fluid-filled structure that surrounds the baby during pregnancy.

The word "sequence" means that one event may lead to several related effects. A band may press on or wrap around part of the body. This can limit normal growth, reduce blood flow, or interfere with movement. The effects range from a shallow groove around a finger or limb to major differences involving a hand, foot, arm, leg, face, chest, or abdomen.

Amniotic band sequence is highly variable. Some babies have one minor finding and need little treatment. Others have several affected areas and need care from multiple specialists. Bands involving the umbilical cord or major body structures can cause serious problems, but these

situations are uncommon.

This condition is usually sporadic, meaning it occurs by chance rather than running in families. In most cases, nothing a parent did or did not do caused it. The chance that it will happen again in a later pregnancy is generally considered low when the findings are typical of amniotic band sequence.

Symptoms

Amniotic band sequence does not usually cause symptoms that a pregnant person can feel. It may be found during a prenatal ultrasound or recognized after birth.

Possible findings include:

A band can sometimes restrict circulation. On ultrasound, this may appear as swelling, reduced movement, or abnormal blood flow in the affected area. After birth, poor circulation may cause skin beyond the band to look pale or blue, feel cool, or become increasingly swollen.

The pattern is often uneven. For example, one hand may be affected while the other is not. Findings may also cross areas that do not match the usual pattern of an inherited limb condition.

Thin bands seen on ultrasound do not always touch or harm the baby. Other structures, such as amniotic sheets caused by scar tissue in the uterus, can look band-like but usually behave differently. A specialist can help explain what the imaging shows.

- A ring-like groove around a finger, toe, arm, or leg
- Swelling beyond a tight band because normal fluid drainage is blocked
- Fingers or toes that are joined, shortened, missing, or unusually shaped
- A hand or foot held in an abnormal position
- Clubfoot, in which the foot turns inward and downward
- Reduced growth or loss of part of a limb
- Differences involving the lip, palate, jaw, skull, chest, or abdominal wall

Causes and risk factors

The most widely accepted explanation is that the inner layer of the amniotic sac, called the amnion, tears early in pregnancy. Strands of tissue may then float in the amniotic fluid and attach to or wrap around the baby. The outer layer of the sac may remain intact, so the

pregnancy does not necessarily involve leaking fluid.

When a strand tightens around a developing body part, it can act like a constricting thread. The result depends on where the band attaches, how tightly it pulls, and when during development the event occurs. Early and extensive disruption may cause larger structural differences. Later or less severe constriction may leave only a groove or localized swelling.

Researchers have also considered whether problems with early blood flow or tissue development could produce some cases. This may help explain why the appearance is not identical in every affected pregnancy. Amniotic band sequence is therefore diagnosed from the overall pattern rather than from one single test.

Clear, preventable risk factors have not been established. Reports have described possible associations with certain pregnancy events or exposures, but an association does not prove that one caused the condition. Most affected pregnancies have no identifiable trigger.

Typical amniotic band sequence is not usually caused by a chromosome change or a gene variant. However, some genetic syndromes and other developmental conditions can resemble it. Genetic evaluation may be offered when the pattern is unusual, several organ systems are affected, or there is a relevant family history.

Diagnosis

Prenatal ultrasound is the main test used to evaluate possible amniotic band sequence. A band itself may be visible, but diagnosis often depends on indirect signs. These can include an unusual limb position, swelling below a constriction, reduced movement, an irregular amputation-like limb ending, or a defect that does not follow a typical genetic pattern.

A detailed ultrasound examines the baby's limbs, face, spine, chest, abdominal wall, placenta, membranes, and umbilical cord. Doppler ultrasound can measure blood flow through vessels in an affected limb or the cord. Follow-up scans may show whether a constriction is stable or becoming tighter.

Fetal magnetic resonance imaging, or MRI, is sometimes used when ultrasound does not fully define complex findings. MRI uses a magnetic field rather than ionizing radiation. It is not needed for every pregnancy.

Amniocentesis does not diagnose amniotic band sequence. This procedure tests a sample of amniotic fluid for certain chromosome or genetic conditions. It may be discussed if imaging suggests another diagnosis or shows additional abnormalities that are not typical of isolated bands.

After birth, clinicians examine circulation, skin, nerves, movement, and the shape of the

affected area. X-rays or other imaging may be used to assess bones and joints. If surgery is expected, the care team may also evaluate blood vessels, muscles, and nerves. Examination of the placenta and membranes can sometimes support the diagnosis.

Treatment and management

Care depends on which body parts are involved and whether a band is causing active harm. A maternal-fetal medicine specialist may coordinate prenatal assessment. Pediatric orthopedic, plastic, hand, craniofacial, and rehabilitation specialists may help plan care before or after birth.

During pregnancy, many cases are managed with repeat ultrasound examinations. Monitoring may focus on growth, movement, swelling, and blood flow in the affected area. The umbilical cord is also assessed when its relationship to a band is unclear.

Fetoscopic surgery may be considered in a small number of carefully selected pregnancies. Fetoscopy involves passing a very small camera and instruments into the uterus to cut a threatening band. The goal may be to protect a limb from severe loss of blood flow or release a band involving the umbilical cord.

Fetal surgery is not appropriate for every visible band. Evidence is limited because the condition is uncommon and varies widely. The procedure can cause complications, including bleeding, infection, rupture of the membranes, pregnancy loss, and preterm birth. Assessment should take place at an experienced fetal treatment center, where the team can compare possible benefits with maternal and fetal risks.

Amniotic band sequence alone does not automatically require cesarean delivery. The timing and method of birth depend on the baby's condition, the location of the findings, and standard obstetric factors. Complex differences may make delivery at a hospital with neonatal and surgical services helpful.

After birth, a tight band that is reducing circulation may require prompt surgical release. Less urgent procedures can be planned after the baby has been fully assessed. Surgery may release a constriction, reduce swelling, improve movement, separate joined fingers or toes, or reshape soft tissue. Some procedures are completed in stages as the child grows.

Treatment can also include:

The goal is not only appearance. Care focuses on circulation, comfort, function, development, and the child's ability to take part in age-appropriate activities.

- Physical or occupational therapy to improve strength, movement, and daily skills
- Splints, braces, or treatment for clubfoot and joint stiffness

- Prosthetic care when part of a limb is absent
- Reconstructive treatment for facial, chest, or abdominal differences
- Support for feeding, speech, hearing, or breathing when related structures are affected

Complications

Possible complications depend on the depth and location of the constriction. A shallow band may cause no lasting problem. A deeper band may damage nerves, muscles, lymph channels, or blood vessels. Lymph channels drain fluid from tissues, so damage can lead to ongoing swelling called lymphedema.

Other possible complications include joint stiffness, uneven limb growth, reduced sensation, weakness, skin breakdown, or difficulty using a hand or foot. Children who have reconstructive surgery may need additional procedures as they grow.

Complex craniofacial or body-wall differences may affect breathing, feeding, vision, or protection of internal organs. Umbilical cord involvement can threaten the baby's oxygen and blood supply. The care team can explain which complications are relevant to the specific findings rather than assuming that every child faces the same risks.

Follow up

During pregnancy, keep scheduled ultrasound and specialist visits. Ask who to contact if concerns arise between appointments. Reduced fetal movement, vaginal bleeding, leaking fluid, or regular painful contractions need prompt assessment according to the maternity team's instructions. These symptoms have many possible causes and do not by themselves mean that a band has worsened.

After birth, routine follow-up may involve surgeons, orthopedists, rehabilitation therapists, prosthetists, and the child's primary care clinician. Visits may assess circulation, swelling, skin health, growth, joint movement, comfort, and progress with developmental skills. Treatment plans may change as the child grows and becomes more active.

Seek urgent medical advice if an affected finger, toe, hand, or foot becomes increasingly swollen, painful, pale, blue, cold, or difficult to move. Emergency care is appropriate for severe breathing difficulty, unresponsiveness, or another immediately life-threatening symptom.

Children may also benefit from emotional and social support, especially when a limb difference becomes more noticeable to them or their peers. School accommodations, adaptive

equipment, peer groups, and counseling can support independence and confidence.

Sources

- International Society of Ultrasound in Obstetrics and Gynecology. "Amniotic Band Syndrome." ISUOG Patient Information Series. Accessed March 8, 2025.
- National Organization for Rare Disorders. "Amniotic Band Syndrome." Rare Disease Database . Accessed March 8, 2025.
- The Fetal Medicine Foundation. "Amniotic Band Syndrome." Fetal abnormalities educational resource. Accessed March 8, 2025.
- Johns Hopkins Medicine. "Amniotic Band Syndrome." Fetal Therapy clinical information. Accessed March 8, 2025.
- Cignini P, Giorlandino C, Padula F, et al. Epidemiology and risk factors of amniotic band syndrome, or ADAM sequence. Journal of Prenatal Medicine . 2012;6(4):59-63.
- Javadian P, Shamshirsaz AA, Haeri S, et al. Perinatal outcome after fetoscopic release of amniotic bands: A single-center experience and review of the literature. Ultrasound in Obstetrics & Gynecology . 2013;42(4):449-455.