CONDITION

Silver-russell syndrome

Silver-Russell syndrome is a rare genetic growth condition that begins before birth and can affect growth, feeding, blood sugar, and body symmetry.

WHAT IT IS
Rare genetic condition affecting growth before and after birth

BODY SYSTEM
Whole-body growth and metabolism

MAIN SYMPTOMS
Poor growth, feeding difficulty, low blood sugar, body asymmetry

WHAT CAUSES IT
Genetic imprinting changes, usually not inherited

HOW IT IS DIAGNOSED
Clinical criteria plus genetic and epigenetic testing

MAIN TREATMENT
Growth, nutrition, glucose, and developmental support

CAN IT BE CURED?
No - underlying imprinting change remains

IS IT AN EMERGENCY?
Sometimes - severe low blood sugar symptoms

LONG-TERM OUTLOOK
Most reach adulthood; short stature and asymmetry may persist

Overview

Silver-Russell syndrome, usually shortened to SRS, is a rare condition that affects growth. It is present from birth, although some features become clearer during infancy or childhood.

Babies with SRS usually grow less than expected during pregnancy. After birth, they may gain weight and height slowly. The head often grows closer to the expected rate than the rest of the body, making it appear relatively large. Some people have one side or part of the body that is smaller than the other.

SRS is linked to changes in genomic imprinting . Imprinting is a system that controls whether certain genes inherited from the mother or father are switched on. In SRS, altered gene regulation affects growth. It does not mean that a whole gene is necessarily missing or damaged.

The condition matters because feeding problems and low blood sugar can be significant in early childhood. Growth, movement, dental development, puberty, and emotional wellbeing may also need support. Care is usually coordinated by a team that may include specialists in child growth, nutrition, genetics, digestion, development, and bone health.

Symptoms

The features of SRS differ from one person to another. A child does not need to have every possible feature.

Growth-related features may include:

Feeding can be difficult during infancy and early childhood. A baby may have a weak appetite, tire during feeds, or feel full quickly. Reflux, in which stomach contents move back toward the throat, may contribute. Some children have delayed stomach emptying or strong dislikes of certain food textures.

Young children with SRS have limited energy stores because they have low muscle and body fat. They can develop hypoglycaemia , meaning low blood sugar, particularly when ill, fasting, or unable to eat. Possible signs include sweating, shaking, unusual irritability, pallor, weakness, confusion, or marked sleepiness. Severe hypoglycaemia can cause a seizure or loss of consciousness.

Other possible features include:

Most people with SRS have intelligence within the usual range. Learning, speech, attention, or coordination difficulties can still occur and deserve individual assessment.

- Low weight or length at birth
- Slow weight gain and short stature
- A head that looks large compared with the body
- A prominent forehead, especially in early childhood
- One arm, leg, or side of the body being smaller
- Curving of the spine or a difference in leg length
- Low muscle strength or delayed movement skills
- Speech or learning differences
- Crowded teeth or a small lower jaw
- A high or narrow roof of the mouth

- Early or rapidly progressing puberty
- Genital or urinary differences in some children
- Constipation or other digestive symptoms

Causes and risk factors

SRS is usually caused by changes that affect imprinted genes involved in growth. These changes happen around conception or during early development. They are not caused by anything a parent did during pregnancy.

The most common known cause involves altered imprinting in a region of chromosome 11 called 11p15 . Chromosomes are packages of genetic material. This region contains genes that help regulate growth.

Another recognised cause is maternal uniparental disomy of chromosome 7 . This means that both copies of chromosome 7 came from the mother rather than one copy coming from each parent.

Less commonly, SRS-like features result from other chromosome changes or variants in particular genes. In some people who meet the clinical criteria, testing does not find a specific genetic or imprinting change.

Most cases are not inherited and happen only once in a family. However, a small proportion can be passed through families, and recurrence risk depends on the exact genetic change. A genetics specialist can explain what a test result may mean for parents, siblings, and future pregnancies.

Diagnosis

SRS may be considered when a baby or child has restricted growth together with features such as relative head size, a prominent forehead, feeding difficulty, or body asymmetry.

Clinicians often use the Netchine-Harbison clinical scoring system. It considers growth before and after birth, head size relative to the body, forehead shape, body asymmetry, and feeding problems or low body mass. The score helps identify who should have molecular testing and who may meet a clinical diagnosis.

Testing usually begins with a blood sample. It may look for:

Methylation is a chemical marker that helps switch genes on or off. Testing it is different from standard DNA sequencing.

A positive molecular result can confirm SRS. However, a negative result does not completely rule it out because current tests do not find a cause in everyone. In that situation, the clinical features and scoring criteria remain important.

Other conditions can also cause poor growth or body asymmetry. Assessment may therefore include growth records, blood tests, nutritional review, bone imaging, or testing for other genetic conditions.

- Imprinting or methylation changes at chromosome region 11p15
- Maternal uniparental disomy of chromosome 7
- Other chromosome or gene changes when appropriate

Treatment and management

There is no treatment that removes the underlying imprinting change. Management aims to support safe nutrition, prevent low blood sugar, improve growth and strength, and address individual complications.

Feeding and blood sugar support are especially important in infancy and early childhood. A dietitian may help plan meals that provide enough energy without causing excessive weight gain. Some children need feeding therapy, treatment for reflux, or temporary tube feeding. Families may be given a plan for illness or times when the child cannot eat.

Growth hormone treatment may be considered even when the body produces growth hormone normally. It can improve height and may also support muscle development, appetite, and physical stamina. A specialist monitors growth, blood sugar, puberty, and possible adverse effects. Availability and approval criteria differ by country.

Other support may include:

Puberty should be monitored because it may begin early or progress quickly in some children. A growth specialist may discuss options if puberty threatens remaining growth or causes other concerns.

Body asymmetry does not always need treatment. Decisions are based on function, comfort, the size of the difference, and how it changes over time.

- Physical or occupational therapy for strength and movement
- Speech, feeding, or developmental therapy
- Shoe inserts or other measures for a small leg-length difference
- Orthopaedic assessment for a larger difference or spinal curvature

- Dental and orthodontic care
- Psychological support for body image, eating stress, or social difficulties

Complications

Low blood sugar is one of the most important early complications. Repeated or severe episodes can affect the brain, which is why prevention plans and prompt treatment are important.

Persistent feeding problems may lead to inadequate nutrition and slow weight gain. At the same time, encouraging very rapid catch-up weight gain can increase body fat. Care aims for steady growth rather than making weight match the average as quickly as possible.

A difference in leg length can affect walking or contribute to hip, knee, back, or spinal problems. Regular measurements help determine whether simple support or specialist treatment is needed.

Some children develop early adrenarche, which means early body odour or pubic hair, or early and fast puberty. This can shorten the period available for growth.

Research suggests that people born small who gain excess weight may have a higher later risk of insulin resistance and metabolic health problems. Insulin resistance means the body has more difficulty using insulin to control blood sugar. Long-term monitoring can focus on healthy growth, blood pressure, and metabolic health without promoting restrictive eating.

Prevention

SRS usually cannot be prevented. The genetic or imprinting change generally occurs by chance during egg or sperm formation or early development. It is not linked to a parent's diet, activity, or behaviour during pregnancy.

Complications can sometimes be reduced through early recognition. Regular feeding, an illness plan, blood sugar monitoring when advised, growth review, and timely developmental or orthopaedic support may help.

If a specific molecular cause is found, genetic counselling can explain the chance of SRS occurring again in the family. Most families have a low recurrence risk, but certain rare inherited changes carry a different risk.

Living with it and what to expect

Feeding problems and vulnerability to low blood sugar are often greatest in infancy and early childhood. These issues may improve as the child develops larger energy stores and can communicate hunger or symptoms. Some people continue to have a small appetite or digestive difficulties.

Children generally remain shorter than their peers, although growth hormone treatment can improve adult height for many. Body asymmetry may stay stable, become less noticeable, or require treatment if a leg-length difference increases during growth.

Puberty can change the growth pattern quickly. Regular follow-up during later childhood helps identify early puberty and allows time to discuss its effect on height and emotional wellbeing.

Developmental progress should be reviewed over time rather than predicted from the diagnosis alone. Some children need extra help with speech, coordination, attention, or schoolwork. Many attend mainstream school and take part in usual family, social, and physical activities, sometimes with practical adjustments.

Information about adulthood is more limited than information about childhood. Short stature and some asymmetry usually remain, but SRS itself is not generally considered a condition that shortens life expectancy. Adults may benefit from routine primary care, attention to healthy body composition, and follow-up for any continuing bone, dental, digestive, or metabolic concerns.

When to get medical help

Arrange routine medical follow-up if growth slows, feeding becomes more difficult, puberty seems early, or a difference between the limbs appears to increase. Ongoing visits are also useful for reviewing nutrition, development, dental health, movement, and emotional wellbeing.

Seek prompt medical advice if a child:

Call emergency services if the person has a seizure, loses consciousness, is very difficult to wake, or has severe confusion. These can be signs of dangerously low blood sugar or another urgent problem. Follow any emergency glucose plan already provided while waiting for help.

- Is eating or drinking much less than usual
- Has repeated vomiting or diarrhoea
- Shows possible low blood sugar, such as sweating, shaking, pallor, or unusual behaviour

- Becomes unusually sleepy, weak, or difficult to engage
- Has new pain, limping, or worsening spinal curvature

Common questions

Is Silver-Russell syndrome the same as Russell-Silver syndrome?

Yes. The names describe the same condition. "Silver-Russell syndrome" is widely used internationally, while "Russell-Silver syndrome" is also used, particularly in the United States.

Will my child always be very small?

Short stature often continues into adulthood, but the degree differs. Nutrition, the molecular cause, puberty timing, family height, and response to growth hormone can all affect final height.

Can a child with SRS catch up in growth without treatment?

Some catch-up growth may occur, but many children remain shorter and lighter than expected. Trying to force rapid weight gain is not advised because it may increase body fat without improving height or muscle.

Does Silver-Russell syndrome affect intelligence?

Most people have intelligence within the usual range. Some have speech, learning, attention, or coordination difficulties, especially with certain genetic causes. Early assessment can identify useful support.

Can Silver-Russell syndrome be passed to my children?

Most cases are not inherited, so the chance is usually low. Rare inherited chromosome or gene changes can raise that chance. The most accurate estimate comes from the specific molecular result and family history.

Why can a negative genetic test still mean SRS?

Current testing does not detect every cause of SRS. A person may still meet recognised clinical criteria even when blood testing does not identify an imprinting or genetic change.

Sources



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