

# Avascular Necrosis in Children and Teenagers with Cancer



Physiotherapy department

The aim of this leaflet is to provide information to anyone affected by avascular necrosis (AVN), especially children, teenagers and their parents. It is designed to explain the condition, causes and treatments. This is a physiotherapy leaflet, so will focus on the physiotherapy management. For more detailed information on other treatments please see the references.

## **What is AVN?**

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AVN is a disorder resulting from loss of blood supply to the bone. When the blood supply is disrupted (avascular), the bone tissues begin to break down (necrosis). This can weaken the bone. If this occurs near a joint, it can lead to the collapse of the joint surface, resulting in pain and inflammation. AVN is also referred to as osteonecrosis, aseptic necrosis, or ischemic bone necrosis.

AVN can occur in any bone, but most commonly affects the ends (epiphysis) of long bones such as the thigh bone (femur), causing hip and knee problems. Other common sites include the bones of the upper arms, shoulders, and ankles. AVN can occur in a single bone, but more commonly occurs in several bones at one time. AVN can sometimes affect your ability to walk or complete your daily tasks. This depends on what part of the bone is affected, how large an area is involved, and how well the bone rebuilds itself.

## **What are the causes of AVN?**

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AVN is caused by interruption of the blood supply to the bone. If blood vessels are blocked with fat, become too thick or too small, or get too weak, they may not be able to provide the amount of blood necessary for the bone tissue to survive. Steroids (such as prednisolone and dexamethasone) given during cancer treatment can affect the bone and blood vessels, resulting in AVN.

Other factors that increase the risk of AVN include treatment with high doses of radiation to weight-bearing bones, being older than 10 at the time of treatment, and having sickle cell disease. AVN is most likely to occur during cancer treatment, but it can sometimes happen after completion of cancer therapy.

## What is the link between steroids and AVN?

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Steroids are commonly used for treatment of many cancers, such as leukemia and lymphoma. Dexamethasone is also sometimes used for treatment of nausea and vomiting associated with chemotherapy and to control brain swelling. There is no clear explanation as to how steroids cause AVN, but it is believed that they interfere with the body's ability to break down fatty substances. These substances can clog the blood vessels, causing them to narrow. This reduces the amount of blood that gets into the bone.

## What are the symptoms of AVN?

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People in the early stages of AVN may not have any symptoms. However, as the disorder progresses, most people will experience some joint pain. At first, the person may only experience pain when bearing weight on the affected bone or joint. As the disorder progresses, symptoms may be present even at rest. Pain may develop gradually and its intensity can range from mild to severe.

If AVN progresses and the bone and surrounding joint surfaces collapse, the pain can increase considerably and may become severe enough to limit movement in the joint. The period of time between the first symptoms of AVN and the loss of joint function is different for each person and ranges from several months to years.

## How do you diagnose AVN?

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An X-ray is usually the first test performed when AVN is suspected. It can help distinguish AVN from other causes of bone pain, such as a fracture. Once the diagnosis is made, and in the later stages of AVN, X-rays are useful in monitoring the condition.

MRI is sometimes used to diagnose AVN because it can detect AVN in the earliest stages, when symptoms are not yet present.

Bone scans may also be used to diagnose AVN. They are useful because one scan can show all the areas in the body affected by AVN. However, bone scans do not detect AVN at the earliest stages.

A CT scan provides a three-dimensional image of the bone and can be useful in determining the extent of bone damage.

## How do you treat AVN?

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The goals of treatment for AVN are to improve the person's use of the affected joint, reduce pain, stop bone damage, and ensure joint survival. Treatment can be categorized as conservative or surgical. Physiotherapy treatment will be a part of conservative management. In order to determine the most appropriate treatment, the following factors are taken into consideration:

- The person's age
- The stage of the disorder (early or late)
- The location and the amount of bone affected (small or large)
- The status of cancer and cancer treatment

## What are the conservative treatments?

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- Medication - to reduce pain.
- Reduce weight bearing – to slow the damage and promote natural healing. Crutches or pressure-relief cast may be recommended to limit weight or pressure on the affected joint.
- Range of motion exercises – to keep the joints flexible. This is also important to maintain movement and increase circulation in the joints. This can promote healing and may relieve pain.

Conservative treatments may be used alone or in combination, but they do not always provide lasting improvement. Some people may require surgery to permanently repair or replace the joint. If surgical treatments need to be considered, you will be referred to a specialist centre.

## What else can you do to help?

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- Avoid activities that put stress on your joints, including running, jumping, football, rugby, netball, and similar sports.
- Activities that are good for joints with AVN are swimming and cycling.
- Be consistent with recommended exercises.



## Contact details

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This leaflet was written by the Paediatric Physiotherapy Team. If you have any questions please do not hesitate to contact us.

Telephone: 01483 464153

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## PALS and Advocacy contact details

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Contact details of independent advocacy services can be provided by our Patient Advice and Liaison Service (PALS) who are located on the right hand side as you enter the main reception area. PALS are also your first point of contact for health related issues, questions or concerns surrounding RSCH patient services.

**Telephone:** 01483 402757

**Email:** [rsc-tr.pals@nhs.net](mailto:rsc-tr.pals@nhs.net)

**Opening hours:** 9.00am–4.00pm, Monday to Friday

If you would like information documents in large print, on tape or in another language or form please contact PALS.

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