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**CIRCULAR FRAME**  
**INFORMATION BOOKLET**  
**(Adult)**

### WHEN SHOULD THE G.P. CONTACT NOELLE OR DR GRAFF:

- If a patient is not responding to oral antibiotic treatment for a pin site infection, please contact the Orthopaedic Team at Royal Adelaide Hospital via the hospital switchboard, or Dr Graff or Noelle

### WHEN TO CONTACT NOELLE OR DR GRAFF

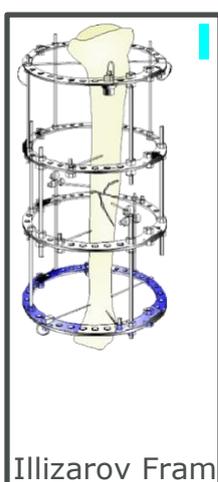
- Any increase in **pain** of the affected limb.
- Any **redness, swelling** or **tenderness** around any of the pin sites.
- Any **discharge** from the pin sites.
- **Fever** that cannot be explained by a cold, ear infection or other illness.
- Problems with the fixator, such as **broken wires** or **pressure areas** on the skin under the rings.
- Any pressure areas anywhere on the skin or under the rings

## Background

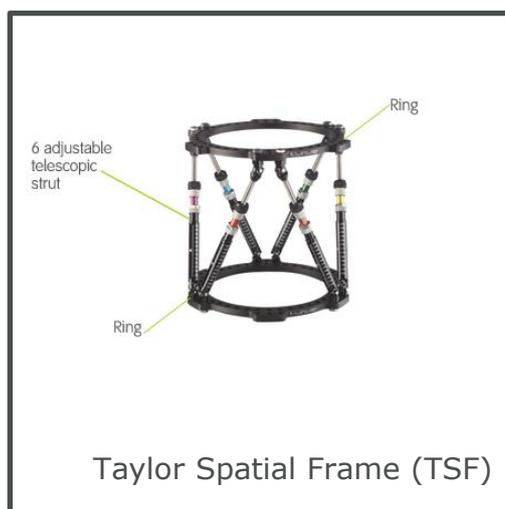
Orthopaedic surgery often involves aligning the bones correctly and using something to hold it in place while the bone is healing in the correct position (plaster, splints, internal fixation and/or external fixation).

An external fixator is a device on the outside of skin used to hold bone/s in a desired position. A circular frame is a specialized type of external fixator that surrounds a limb and is secured to the bone using wires or pins. There are different types of circular frames, and some common brand names are Ilizarov, Taylor spatial frame (TSF), T-L Hex and Maxframe.

Each frame is individually designed for each patient and depends on the aim of treatment e.g. limb deformity correction, lengthening, fracture healing or joint fusion.



Ilizarov Frame  
Image 1



Taylor Spatial Frame (TSF)

Image 2



T-L Hex

Image 3

## Indications for a circular frame

Dr Graff will discuss with you why a circular frame may be the best treatment.

The most common conditions that require a frame are:

1. Lengthening a short limb or correcting a bony deformity
2. A fracture which has not healed or has healed in an unacceptable way
3. A limb or foot and ankle deformity
4. Osteomyelitis (bone infection)
5. Complex fractures including open fractures
6. Conditions with poor healing potential of soft tissues



## Are there any other options?

There are usually other options for managing your condition.

Other surgical options will be discussed by Dr Graff and may include internal fixation (plates and screws or rods under the skin and muscle). Some conditions with limb length discrepancies can be managed with other surgeries, such as shortening the longer leg or amputation of the short leg. If you have questions about this, please write them down to discuss at your next appointment.

## What are the benefits of a circular frame?

### Walking

Weight bearing is important to improve bone and muscle strength, improve joint movement and your independence and confidence. Circular frames often allow you to weight bear through the operated leg, while maintaining the bone alignment as it heals. Other fixation devices may not be stable enough to allow this. You may need a temporary post-operative shoe that will fit securely around the frame to allow you to put weight onto the foot safely.

### Soft tissue protection

Circular frames allow the surgeon to use smaller incisions to correct major bony problems, with less risk of wound break down compared to a larger incision. Larger incisions that do not heal well can have their own complications including infection, multiple surgeries in and in extreme cases amputation.

### Infection prevention

Large wounds are often needed to insert internal metalwork. Internal metalwork can act as a place for infection, and in soft tissue with poor blood supply. Circular frames often have issues with pin site infections, but when treated early, these are usually restricted to the skin. Pins may need to be removed if the infection is more severe.

### Gradual distraction/lengthening of the limb

Circular frames often include lengthening by gradual distraction. This allows the body to generate new bone in the space created by the lengthening (1mm per day).

Gradual deformity correction and lengthening is beneficial. It ensures gradual lengthening of the nerves and blood vessels which reduces the risk of stretching them too quickly. This would otherwise result in ongoing damage and poor function.

## Who looks after the circular frame?

The main people looking after the frame are you and your family. While you are in the hospital, the medical and nursing staff will teach you how to care for the pin sites, do the adjustments, and tighten any parts of the frame that come loose. Although it seems daunting, most patients manage very well with the frame at home.

## Duration of the frame

This depends on why the frame is being used. An average length of time for a circular frame is between 3-6 months.

## The Journey

### Psychological

All patients react differently to having a circular frame. It may be helpful to write down any fears or anxieties and discuss them with your surgeon at the next appointment. **If you have ever experienced anxiety, depression or other mental health issues, please let us know.** A frame can unmask underlying mental health illness and/or psychological distress.

### Diet and nutrition

Overall fitness and good eating habits before surgery will assist in a more rapid recovery – we call this prehab. You can lose your appetite whilst undergoing treatment or gain weight due to the inability to do normal exercise. It is important that you eat a healthy diet during treatment to assist with tissue repair, growth and bone healing. Please let us know if eating or weight loss becomes a problem as we may require a dietician's support.

The Limb Reconstruction service adopts a **NON-SMOKING policy**. Active and passive smoking will delay bone formation, which will prolong healing time (and therefore treatment time).

## Admission

The length of stay is usually 5-7 days, for rest, recovery, pain relief, rehabilitation and education.

The time spent in the operating suite is generally between 2-6 hrs.

## Pain relief

Once over the acute post period, frames are not painful, but uncomfortable and inconvenient. The fracture and or osteotomy is often the most painful part of the surgery. The pain decreases as it heals. Ultimately, you will need very little, simple pain relief medicine.

**If you have new pain, numbness or tingling in their limb, contact the Orthopaedic Doctor via the hospital switchboard or present to the Emergency Department for a review.**

## Hygiene and skin care

After surgery your clothing may need to be bigger than usual so that it can go around the frame. It is important to note that the frame may catch on things such as clothes, bedding, soft furnishings and car seats. A pillow between the legs at nighttime can be helpful. Clothes often need to be modified to fit over the external fixator, and examples can be shown to you before surgery.

Suggestions for clothes include:

- Pull away track suit pants with Velcro or press-studs down the outside seam
- Underwear or boxer shorts can be worn with press-studs or velcro down the seam
- Women often find wearing a long skirt a comfortable alternative to pants
- Patients with a fixator on the thigh are able to wear their usual flat shoes. Patients with lower leg fixators may need modification of their footwear. Short ankle socks may also be needed.
- A splint may also be necessary to keep the ankle at 90 degrees to the leg.
- It may be helpful to have these options ready before coming into surgery so you can wear these on the ward.



WCHN, 2020

Examples of clothing adjustments

### Wound care/showering

Once the wounds from the surgery have healed, daily showers are encouraged to help with pin site care. Your doctor will let you know when this can start, (often after 2-3 weeks post op). A shower seat might be helpful as the frame can be heavy and awkward to stand in the shower. Baths are also allowed in clean water.

### Pin site care and infection management

During surgery, bandages and extra padding are put over the pin sites as added protection. These bandages will be removed before going home. The only time the pin sites are to be touched are if they need cleaning. **After the pin site dressings are removed at the 2-week appointment, daily showering is usually enough to keep the pin sites clean. Further pinsite care is only required if this is not possible, or if there is concern regarding an infection.**

## Physiotherapy

### After surgery

Joint contractures are a serious complication of frames. After surgery a physiotherapist will see you to begin gentle stretches and range of movement as advised by the Orthopaedic Team. In the first few days, the aim will be to sit out of bed. Most patients will be able to walk with their frame. It is important to continue physiotherapy at home, doing joint exercises at least 3 times a day.

Patients in frames can often develop joint stiffness and contractures during treatment, which once developed, are difficult to treat. It is better to try and prevent this with daily exercises during treatment as well as regular physiotherapy appointments. You will also be given exercises to do at home

### Managing at home

Most patients will spend some time in a wheelchair but all you should be up using crutches or a frame as soon as possible. This helps muscle, joints and bones to rehabilitate, as well as expediate independence.

### Swimming

Swimming in clean water is encouraged! Beach swimming is not recommended as sand may get around the pin sites and the frame. If you are swimming, please remember that the external frame is heavy. Please make sure you can safely touch the ground when swimming, and/or have someone else around. Swimming does not harm the frame and is excellent exercise and rehabilitation for the limb. You may also be able to participate in hydrotherapy (water therapy) as part of your rehabilitation process with your physiotherapist.

## Getting around with a frame

### Travel

Most patients are able to travel in the car with some minor adjustments. You may travel in the front seat of the car with the affected leg elevated on pillows or a small beanbag. A seat belt or other approved safety restraint must be used at all times.

### Positioning and lifting

Correct positioning will be taught by the physiotherapist. This is to help prevent the complication of a contracture. Common sites of contracture are knee, foot and toes.

Careful positioning, splinting and following your physiotherapy regime can prevent contractures developing. To prevent a foot deformity, always use the splint or sandal provided, particularly when resting in bed.

To prevent knee contractures, it is vital that you do not have a pillow placed under the knee. The use of pillows or a rolled up towel under the ankle will ensure that the knee remains straight.

### Weightbearing versus no weightbearing

Except for foot frames, most patients will be allowed to walk on their frames after 4-6 weeks. In fact, this is good for bone stimulation.

Foot frames are often uncomfortable to walk on, even if they are strong enough for weightbearing.

### Disabled parking permits

Ask your GP for an application form for a temporary Disability Permit for your car if it is anticipated you will have significant immobility for greater than 6 months. It can be very difficult getting in and out of a car in a confined car space. Your GP or surgeon will sign the medical section of the form then you must complete the rest and take the form to your local council to have the sticker issued.

## Possible complications

### Pin site infection

Unfortunately, most people with a circular frame get at least one pin site infection. Pin site infection can range from redness around a pin site which responds to oral antibiotics at home, to more serious infections which may require hospital admission, intravenous antibiotics and even a trip to theatre to remove the pin. **If you suspect you have a pin site infection present to your local Emergency Department for a review.**

### Joint contractures/dislocations

Joint contractures or stiffness (ie of the hip, knee and ankle) can be major problems during and after a frame. It is essential for you to get used to moving your joints from the day after surgery. If gradual correction is occurring, joint stiffness can get worse as correction continues. This is because the muscles, tendons, ligaments and other soft tissues that cross the joint are being stretched which can cause the joint to become more difficult to move. It is important for you to engage in physiotherapy both at home and at appointments.

### [Nerve changes](#)

Even if nerves are getting stretched gradually, they can still become unhappy and cause discomfort, altered sensation or loss of function. Occasionally this can be permanent.

**If you experience new numbness, tingling or pain in any part of their limb, present to the Emergency Department for a review, or call Noelle.** To prevent permanent nerve damage, it may be that the corrections or lengthening need to be paused, stopped, or even reversed. Itching or nerve sensitivities may be able to be addressed with medication.

### [Returning to surgery](#)

Everyone who has a circular frame will need another operation, and it is common for some patients to need 2 or 3 more operations. Common reasons for this include frame adjustment, removal of infected pins, removal of the frame, or nerve or joint releases. Often these surgeries are much smaller than the original surgery and you can usually go home the same day.

## Home care and follow-up

One or more family members will need to be at home for several weeks while you recover, or a period of rehab. Please consider this when considering this surgical option. You may take time to regain your independence of hygiene and getting around the house. There will also be multiple outpatient appointments, often weekly or fortnightly in the first few weeks, that you will need to attend via a car.

### [Limb reconstruction nurse](#)

Some patients will be able to contact Noelle Coleman, a nurse practitioner who specializes in circular frames. Dr Graff will give you the details of her services if you are eligible for her care.

### [Appointments](#)

You will be seen in the Orthopaedic outpatient clinic the week after you've been discharged from hospital. After this, you will be seen regularly during the correcting/lengthening of the frame (often weekly). X-rays are often done at these appointments. Some of these appointments may be able to be done via telehealth if you don't live locally. This will be discussed by your doctor.

### [NDIS](#)

Discuss with your GP and surgeon if you are suitable for funding through the NDIS. (Please note: NDIS does not provide funding for any costs relating to the surgery). The NDIS is a federal government scheme for people with long-term disabilities, to fund therapies (physio, occupational therapy, orthotics and equipment). There can be many frustrations and delays with applying for NDIS funding and starting earlier with this process is highly recommended if you are eligible.

## **Internet sites**

There are several sites that have information about external fixation devices. Please note that these sites will have some information and practices that vary from ours. This is not to say that some are right, and others are wrong, rather, all are different. Please clarify with your surgeon if you have specific questions.