

# Circular Frames - Orthopaedics

## A helpful guide for consumers

This information booklet has been created to help your child and family in the preparation for limb reconstruction surgery with a circular frame.

### Limb Reconstruction Team

#### Surgeons

Mr Paul Allcock

Dr Christy Graff

Mr Andrew Morris

#### Orthopaedic Nurse Consultants

Kylie Webb and Kory Horwood

Ph: 0466480278 or pager #3775 via switchboard Tuesday to Friday between 8am and 4pm

Email: Tues-Wed [kylie.webb@sa.gov.au](mailto:kylie.webb@sa.gov.au) or

Email: Thurs-Fri [kory.horwood@sa.gov.au](mailto:kory.horwood@sa.gov.au)

#### **Women's and Children's Hospital**

Ph: 08 8161 7000

#### **Orthopaedic Department Secretary**

Ph: 08 8161 7223

Email: [Health.CYWHSOrthopaedicAdmin@sa.gov.au](mailto:Health.CYWHSOrthopaedicAdmin@sa.gov.au)

#### **Physiotherapy Department and Occupational Therapy**

Via Allied Health Department 81617381

#### **Home equipment**

Paediatric Outpatients Department Zone A Floor 1

Mon-Fri 9am-12:30pm & 1pm-4pm

Ph: 08 81616233



#### **For more information**

Orthopaedic Department  
Women's and Children's Hospital  
72 King William Rd, North Adelaide SA 5006  
Telephone (08) 8161 7000



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### WHEN G.P. TO CONTACT ORTHOPAEDIC TEAM

- If a patient is not responding to oral antibiotic treatment for a pin site infection please contact the Orthopaedic Team via the WCH hospital switchboard 08 81617000 or alternatively speak to the Orthopaedic Nurse Consultant Tues-Fri 8-4pm on 0466480278

### WHEN TO CONTACT YOUR DOCTOR OR THE ORTHOPAEDIC NURSE CONSULTANTS

- 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

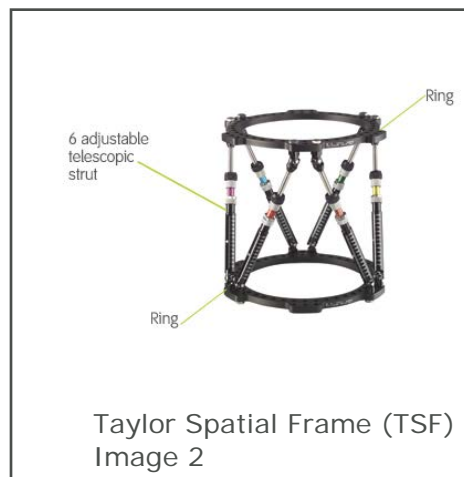
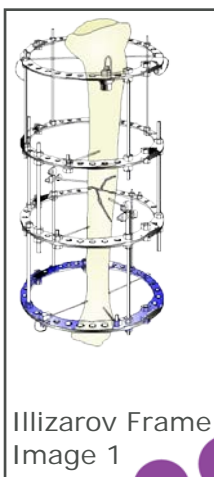
Contact the Orthopaedic Team via the WCH hospital switchboard 08 81617000 or alternatively speak to the Orthopaedic Nurse Consultant Tues-Fri 8-4pm on 0466480278

### 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.





Max Frame  
Image 4



WCHN, 2020



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### Indications for a circular frame

Your surgeon will discuss with you and your child why a circular frame is the best treatment for your child.

The most common conditions that require a frame are:

1. Lengthening a short limb
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 child's condition. Conservative options (no surgery) may include managing your child's condition with orthotics or footwear but is not appropriate for many conditions due to poor final outcomes for your child.

Other surgical options will be discussed by your doctor 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 stopping growth of the longer leg, 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.

We encourage parents to question any concerns you may have. Don't be afraid to ask and be the voice for your child. It is true that the doctors and surgeons know the medical options but you know your child better than anyone. If in doubt...ask



## What are the benefits of a circular frame?

### Walking

Weight bearing is important to improve bone and muscle strength, improve joint movement and also your child's independence and confidence. Circular frames often allow your child to weight bear through their operated leg, while maintaining the bone alignment as it heals. Other fixation devices may not be stable enough to allow this. Your child may need a temporary post-operative shoe that will fit securely around the frame to allow your child 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. Sometimes pins need to be removed if the infection is more severe, but this is usually not a serious complication.

### 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 your child is in hospital, the medical and nursing staff will teach you and your child 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 children and families 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

Supporting your child with an external fixator may seem like a huge task. Please share this information with grandparents, babysitters, schools or anyone else who assists in caring for your child.

### Preparing for surgery

There are a number of ways that your family and child can prepare for treatment. Once your family and surgeon have decided on the type of surgery needed, a referral will be made to the Orthopaedic Nurse Consultant who will contact you in the lead up to surgery. They may introduce you to other team members who will be involved in your child's recovery.

### Psychological

All children react differently to having a circular frame. You know your child better than anyone else. Please voice any concerns you may have regarding your child's personality or ability to manage the daily challenges that occur with a circular frame. It may be helpful to write these down, and get your child to write down their worries before surgery and discuss them with your surgeon at the next appointment.

It may be necessary for your child and your family to discuss concerns with a psychologist, either before, during or after the surgery. Open discussion about the treatment amongst your family is encouraged, as it helps the child come to terms with the treatment plan. If you think that your child is not coping with the idea of getting an external fixator, please let us know so that we can address these issues before surgery. **If your child has 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. Children can lose their appetite whilst undergoing treatment. It is important that your child has 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

You will be contacted by a pre-admission nurse to discuss the admission process. 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. One parent is allowed to accompany the child to theatre until they are asleep. Your child will often return straight to the ward after they have recovered from the anaesthetic. Once the operation has finished, a member of the surgical team will call one of the family members.



During your hospital stay, you will be encouraged to participate in your child's care. This is to ensure that you gain confidence and ease with handling the external fixator, as well as learning potential pin site care and any adjustment instructions. Nursing staff on the ward in conjunction with the Orthopaedic Nurse Consultant are available to answer any queries you may have, and discuss ways in which you can manage at home.

Your child may need a plastic tube (catheter) into their bladder to help them pass urine after surgery. This is usually taken out the next day. Sometimes your child may need to use a urine bottle or bed pan for the next few days until they can stand up and be able to sit onto a shower chair. This can also be wheeled over the toilet. Your nurse and physio will help you decide what equipment would be helpful to get for when going home.

### Staying comfortable and pain relief medicine

Please let us know about every medication your child is taking. This includes 'over the counter' medicines such as ibuprofen and aspirin, as well as any vitamins or 'natural remedies'. Some of these medicines slow bone healing after the frame is applied and may lead to serious problems.

Your child will be seen by the Comfy Kids Team who will make sure their pain relief is keeping them comfortable and check for and treat any side effects.

For the first night the pain relief medicine will often be given through a drip in a vein as an infusion (constant trickle all the time) or a patient controlled analgesia controlled by your child.

Once your child is able to eat and drink, the Comfy Kids Team will change to another medicine they can take by mouth as a liquid or tablets. This helps your child move out of bed easier with physio and also work out what medicine works best for your child to go home with.

For the next few days your child will need extra pain relief medicine 30 minutes before activities such as physio. Let your child's nurse know when an activity is planned.

Your child will need pain relief medicine when they go home. Your Orthopaedic doctor will order them and the hospital pharmacist will provide you with information on these.

With time, as your child recovers, they will need less pain relief medicine to be comfortable and complete their activities. Eventually, your child will need very little, simple pain relief medicine.

**If your child complains of 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 child's 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 night time 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
- Girls often find wearing a long skirt a comfortable alternative to pants
- Children with a fixator on the thigh are able to wear their usual flat shoes. Children 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 your child can wear these on the ward.



WCHN, 2020

Examples of clothing adjustments

### [Wound care/showering](#)

Once the wounds from the surgery have healed, regular showers are encouraged to help with pin site care. Your doctor will let you know when this can start, (often after 2-3 weeks). 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 and you and your child will be taught how to clean the skin around the pin sites. Taking pain relief 30 minutes before removing the additional bandages and padding as well as distraction from the Play Therapist, may be helpful. Be sure that your child does not poke things around the pin sites, or play with them. 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.**



## Physiotherapy

### Before surgery

You will meet with the physiotherapist who will give you some simple stretching and muscle strengthening exercises to do before surgery. This is part of the prehab. You will see the physiotherapist the day after your operation to start gentle stretches.

### After surgery

After surgery a physiotherapist will see your child to begin gentle stretches and range of movement as advised by the Orthopaedic Team. In the first few days, the aim will get your child sitting out of bed. A lot of children with an external fixator are able to walk and put weight through the affected limb, and are encouraged to do so. The Physiotherapist will need the help and support of the parents from the beginning. This may involve encouragement in the initial phase, and then supervision of exercises as they are carried out at home.

Children 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. Children will also be given exercises to do at home with the support of carers. We will try to arrange these at the same time as the doctor's appointments. If you cannot make your physiotherapy appointments during or after treatment, please notify the Allied Health Department.

### Managing at home

Most children will spend some time in a wheelchair but all children should be up using crutches as soon as possible. It is important that walking with crutches is encouraged, as this helps your child gain independence, and acceptance of treatment. Once your child can safely use the crutches/frame, then the wheelchair should be used only for long distances, or returned.

In the early stages, the use of interactive toys and frequent scenery changes can help to alleviate boredom. When visiting new places, it is often useful to do some 'research' into the place you intend to visit. Check that there are facilities for the disabled - wheelchair access is vital if your child is using one.

### Swimming

Swimming in clean water is encouraged! Beach swimming is not recommended as sand may get around the pin sites and the frame. If your child is swimming please remember that the external frame is heavy. Please make sure your child can safely touch the ground when swimming and adult supervision is recommended at all times. 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**

Your child will need to learn to manage with their frame as a part of them. They will look different to other children until the frame is removed. It is worth talking to your child about this. Your doctor will try to introduce your child to other children who have had a frame or have a frame on, to 'normalise' their journey.





### Travel

Most children are able to travel in the car with some minor adjustments. Many children 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 hip, 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 your child does not have a pillow placed under their knee. The use of pillows or a rolled up towel under the ankle will ensure that the knee remains straight.

Older children with an external fixator can be very heavy. If you have any concerns about lifting your child or about the amount of support you have at home, please discuss them with the Physiotherapist and/Occupational Therapist who will be seeing your child on the ward.

### Disabled parking permits

Ask your GP for an application form for a temporary Disability Permit for your car if it is anticipated your child will have significant immobility for greater than 6 months. It can be very difficult getting your child 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 your child has a pin site infection contact the WCH Orthopaedic Doctor via switchboard or 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 your child to get used to moving their 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 getting stretched which can cause the joint to become more difficult to move. It is important for your child 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 your child experiences new numbness, tingling or pain in any part of their limb, contact the Orthopaedic Doctor via switchboard for advice or present to your local Emergency Department for a review.** 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. Please let the team know if your child is experiencing these.

### Returning to surgery

Everyone who has a circular frame will need another operation, and it is common for some children 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 your child can usually go home the same day.

### **Home care and follow-up**

Remember a big family commitment is needed when your child goes home. This may mean one or more family members will need to be at home for a number of weeks while your child recovers. Please consider this when considering this surgical option. Your child may take time to regain their independence of hygiene and getting around the house. There will also be multiple outpatient appointments your child will need to attend via car.

### Appointments

You will be seen in the Orthopaedic outpatients 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.

### School

The time your child needs off school can vary, which will be discussed with you before surgery. A stepped-approach return to school can be considered. Let your child's school know of the planned surgery. If your child needs to use a wheelchair and/or additional equipment during treatment, the school may need to ensure they are set up so that your child can move about the school grounds safely. The Orthopaedic Nurse can help talk with the school to advocate for your child if you wish. Children returning to school will need to be able to toilet themselves without help.

### Equipment needs

Your child may need equipment for at home after surgery and over the course of several months while the treatment is occurring. The Orthopaedic Nurse Consultant and physiotherapist can help direct you to potential equipment that may need to be hired through an external company. Costs of these types of equipment will usually need to be funded by families. NDIS do not cover any equipment associated to elective surgery. **If you have financial concerns, please notify the Orthopaedic Nurse Consultant to discuss this.**



## NDIS

Discuss with your GP and surgeon if your child is suitable for funding through the NDIS. (Please note: NDIS does not provide funding for any costs relating to the surgery). It is a federal government scheme for children 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 your child is eligible.

## Private mobility equipment hire

Please use this list as a guide. WCHN does not endorse any external companies and this list is not exhaustive. Prices are approximate per week hire period. Additional delivery/collection fees are approximately \$80

External companies	Contact Information
Max healthcare	1800 684 277 2 Bartholomew St Richmond SA 5033
Equip 4 living	8362 6422 57 Magill Rd Stepney SA 5069
Aidacare	8118 5600 21/23 Tikalara St Regency Park SA 5010
Homecare Equipment services	8338 7988 664 South Road Glandore 5037
Independent Living Care	8346 3733 1205 South Rd St Mary's SA
Xtra Care	8266 7000 622 Regency Rd Broadview SA 5083
Equipment item	Hire Cost approx.
Wheelchairs – adult size	\$35p/w
Wheelchairs - for small children <8yrs (14 or 16inch) <b>Ask for seatbelt</b>	\$35p/w
Wheelchairs with leg raisers <b>Ask for seatbelt</b>	\$50p/w
Slide boards	\$10p/w
Rollator frames	\$9p/w
Rollator frames for small children <8yrs (ie 70cm tall)	\$10p/w
Gutter frames	\$25p/w
Gutter frames for small children	\$25p/w
Static commode chair	\$25p/w
Wheeled commode chair	\$20p/w
Wheeled commode with leg raisers	\$28p/w
Lifter	\$55w
Sling (for lifter)	\$10p/w
Hospital bed	\$65p/w
Ramps for house access	\$25p/w per ramp *dependant on size. These will need determining by a home occupational therapist

\* Please note crutches can be hired through the WCH Allied Health Dept and can be organised through the inpatient physio during the admission. The cost is \$5p/w capped at \$25



## Internet sites

There are a number of 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.

### > Images and websites

- [Ilizarov Frame](http://www0.sun.ac.za/ortho/webct-ortho/general/exfix/ilizarov.png) <http://www0.sun.ac.za/ortho/webct-ortho/general/exfix/ilizarov.png>
- Taylor Spatial Frame (TSF) <https://www.smith-nephew.com/patient/treatments/limb-restoration/what-is-the-taylor-spatial-frame-----/>
- [Max Frame](https://www.google.com/search?q=maxframe&source=lnms&tbm=isch&sa=X&ved=2ahUKEwj3z9-V5Y7oAhXiyzgGHbP-BakO_AUoAXoECA8QAw&biw=1920&bih=969#imgrc=6CPNgCIB_V2xM) [https://www.google.com/search?q=maxframe&source=lnms&tbm=isch&sa=X&ved=2ahUKEwj3z9-V5Y7oAhXiyzgGHbP-BakO\\_AUoAXoECA8QAw&biw=1920&bih=969#imgrc=6CPNgCIB\\_V2xM](https://www.google.com/search?q=maxframe&source=lnms&tbm=isch&sa=X&ved=2ahUKEwj3z9-V5Y7oAhXiyzgGHbP-BakO_AUoAXoECA8QAw&biw=1920&bih=969#imgrc=6CPNgCIB_V2xM)
- [http://synthes.vo.llnwd.net/o16/LLNWMB8/INT%20Mobile/Synthes%20International/Product%20Support%20Material/legacy\\_Synthes\\_PDF/096476-180807\\_LR.pdf](http://synthes.vo.llnwd.net/o16/LLNWMB8/INT%20Mobile/Synthes%20International/Product%20Support%20Material/legacy_Synthes_PDF/096476-180807_LR.pdf)
- [T-L Hex Frame](http://www.tlhex.com/#product-information) <http://www.tlhex.com/#product-information>
- WCHN image of de-identified patient with an external fixator, family consent approved, 2020

