



Paley

**EUROPEAN
INSTITUTE**

WARSAW POLAND

EXTERNAL APPARATUSES AND SPICA CASTS CARE



EXTERNAL APPARATUSES

Using external apparatuses for deformity correction and limb lengthening requires the application of bone implants. **Bone implants** are implants that penetrate the skin, subcutaneous tissue and bone. This way, they stabilize the limb above and below the osteotomy area. These implants stabilize the bone fragments during lengthening, bone transport and deformity correction.

In Paley European Institute, we use a few types of implants. These are **Kirschner wires** and **half-pins**, i.e. special threaded rods coated with hydroxyapatite allowing for better compatibility with the patient's tissues and better integration with tissues.

Due to the risk of loosening and infection around the implants, they should be handled with special care. In the operating room the half-pins and Kirschner wires are inserted using a special technique so as not to damage tissues and to facilitate healing. Kirschner wire insertion does not lead to damaging tissues or burning the patient. Small incisions the size of the half-pin diameter are made around the half-pins so that the skin closely covers the pin and can better heal-in in the area coated with hydroxyapatite on the half-pin.



EXTERNAL APPARATUSES

After the surgery, we apply a sterile dressing around all implants, as well as on the entire external apparatus. We leave those dressings for at least 7–10 days to create the most optimal and aseptic conditions possible for healing around implants. It is also the time when the patient does not have to undergo lengthening, as we initiate it after about 7–10 days.

The first dressing change and the first inspections of the implant areas are done at the first postoperative visit, about 7–10 days after the surgery. The first postoperative dressings are changed only if there is large bleeding and significant amount of blood is visible on the dressing.

After the first dressing change we apply sterile gauzes again in such a way that the caregiver has access to all actuators and moving elements they will operate to lengthen the limb or correct limb deformity. **When all implants are well healed-in, i.e. about 2–3 weeks after the surgery, the number of dressings is successively decreased.** We leave dressings only in the areas that have not healed-in yet.

A characteristic sign of healing is a scar, so-called scab, i.e. the part of the tissue covering the implant, around the pin. It is not an alarming sign, but a normal healing process, with tissue elements, collagen deposition and new scar tissue formation around the pin. There may also be a slight yellow and orange effusion or even slightly hemorrhagic effusion, which is not an alarming sign either. As the pins heal-in in the area where they penetrate the skin and subcutaneous tissue, the redness, swelling and pain in these areas decrease.

Correctly healed-in pins allow the patient to take a shower, take short baths in the bathtub or swim in the swimming pool.

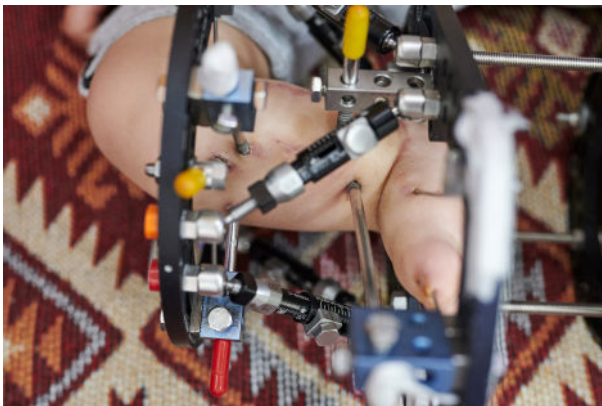
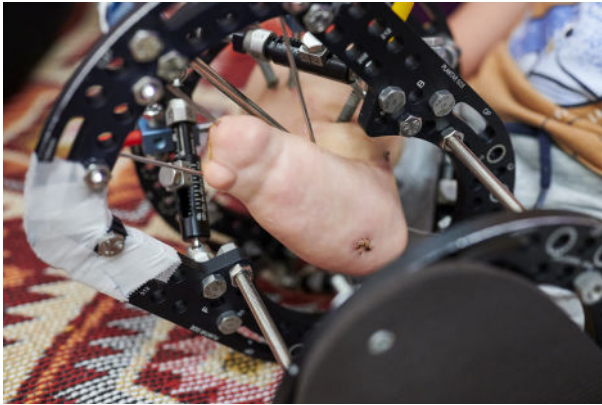
EXTERNAL APPARATUSES

In order to take proper care of the external apparatus, pins and implants, a few basic rules have to be followed:

- 1 during the transport of the little patient, the apparatus has to be protected against the external factors, covered with e.g. trousers made of fabric.
- 2 during exercise, avoid stretching and massaging the implant area; do not stretch the skin in that area in order not to damage the delicate pin heal-in barrier.
- 3 do not remove the scab in the pin area if the scab is dry, without redness and effusion, because it is a normal sign of pin healing-in.
- 4 the child has to be washed, preferentially in the shower, since the moment of removing the first dressings, i.e. about 10–14 days after the surgery. Until that time, the pins have time to heal-in.

EXTERNAL APPARATUSES

Infection in the implant area is very common during treatment with an external apparatus. Only a small percentage of patients treated with an external apparatus (about 1%) experience implant area infections requiring surgical intervention in the form of implant removal or replacement. During the entire lengthening and correction process, the majority of patients experience one or two mild infections requiring antibiotics therapy or special pin care.



EXTERNAL APPARATUSES

What symptoms indicating infection should draw your attention during treatment with an external apparatus?

- increased pain absent before and not responding to pain medications;
- redness in the implant area;
- thick yellow or green effusion or excessive grey or brown effusion from the implant area;
- fever accompanying the above-mentioned symptoms;
- the child has walked with the apparatus earlier, but suddenly cannot stand on the limb with the external apparatus;
- increasing contracture caused by swelling and redness around the pin.



If the above-mentioned symptoms occur, urgently contact the treating physician or physiotherapist at Paley European Institute.

EXTERNAL APPARATUSES

If a pin area infection is noticed and confirmed, then, depending on the infection severity, it is an indication for antibiotics therapy. The treating physician will write out a prescription, determine dosing and explain how to take the medication. The second step, next to antibiotics therapy, is special pin care. Pins have to be cleaned every day or even up to three times a day with a Q-tip or sterile gauze soaked with antiseptic e.g. Octenisept or Aqvitox – a chlorine-based solution.

Cover the infected pin areas with a sterile gauze so that the potential effusion can accumulate in this secured dressing. Gently press the dressing to the skin or gently tape it to the pin. If larger amount of liquid is accumulated, increase the frequency of pin cleaning and dressing change.

Remember that pin infection features are not always accompanied by fever. Usually, a mild implant infection does not lead to fever. However, the infection has to be detected early and no signs and symptoms can be ignored, especially redness, pain or alarming effusion from the implant area.

When taking care of the external apparatus, attention has to be paid as well to all elements that may alarm parents or caregivers, i.e. screws, actuators, rings and all elements that can loosen. **You must report loosening of an element of the external apparatus to the physiotherapist or the treating physician.**

The vast majority of pin infections stop thanks to antibiotics therapy and increased pin care. However, there are some situations in which we have to replace the pin or remove the wire. Although these situations are very rare, they must be consulted with the treating physician.

SPICA CAST

Taking care of a child in a spica cast, which allows for proper postoperative treatment of the little patient, can be a difficult experience. This guide contains tips on how to take care of the cast, avoid common mistakes and problems and reduce stress and anxiety.

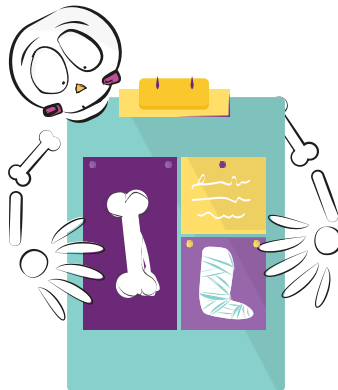
It is important to realize that the child is quite stable in the cast, although it may seem counterintuitive. Most today's spica casts are made of fiberglass, which usually dries quickly after application and is completely dry about one hour after application. Fiberglass casts weigh significantly less than plaster casts. In order to avoid skin problems, it is extremely important to keep the cast dry and clean, which is often a challenge. In order to prevent skin breakdown, the spica cast is lined with special lining. It helps to protect the cast from contamination or moisture. You may put something over the cast (e.g. an old T-shirt), because fiberglass can be rough and it may damage clothes or other materials.



Keeping the cast clean and dry

This is usually the most difficult aspect of caring for a child in a spica cast. Diaper change and skin care in infants and young children can often be challenging. The general rule is to keep the cast as dry as possible. If urine or stool remain in contact with the skin (e.g. under a wet or soiled diaper or beneath the cast edges), diaper rash and subsequent skin irritation are likely to occur. In infants and young children, diapers will have to be changed very often (about every 2 hours during the day and every 3–5 hours at night). A smaller diaper or incontinence pad is usually placed under a larger diaper. It is a good idea to experiment with different pads, diapers for newborns and incontinence pads to find the most suitable option for the child.

Every child has different urinary and bowel movement habits. It is a good practice to leave the diaper area open to air for several minutes every day. It will decrease the probability of diaper dermatitis (rash) and skin irritation.



SPICA CAST

What to do if the child's skin is reddened or irritated?

This is a very common problem with spica casts. The diaper area is the most common area of skin irritation and breakdown. It is usually caused by moisture from urine or stool, which irritate the skin. Checking the skin at least 2–3 times a day for any redness or irritation is definitely a good idea. Positioning and frequent diaper change are the key to avoid skin irritation. It is always easier to prevent skin irritation than to treat it. If skin redness or irritation occurs, the general rule is to leave the affected skin open to air. It is not a good idea to apply lotions, creams or powders on the cast, because it often worsens the skin condition. A hair dryer on cool setting (never hot or warm) held at least over a dozen centimeters from the cast may help to dry the damp body area.

If itching is a problem, first try using the hair dryer on cool setting. If that does not help, try to change the body position. The itching will also decrease when the child gets used to the cast. Never stick anything under the cast not to scratch the skin. This often leads to irritation and can also cause a secondary skin infection.



If you find out that the child has put something inside the cast, contact Paley European Institute physicians as soon as possible.

Should the child's diet be changed?

Nutrition is a very important aspect in the recovery process. Giving the child fresh fruit, vegetables and whole grain bread (increasing the fiber content) often helps to prevent constipation. It is also important to drink a lot of water to avoid dehydration.

Generally, the first weeks in a spica cast are not a good moment to introduce new food in the child's diet. New food ingredients increase the probability of loose stools or diarrhea. In such a case, diaper changes will have to be more frequent and skin care will become even more important. If the cast gets soiled or the child has diarrhea in the cast, contact Paley European Institute immediately. If the child complains of tightness in the cast, you can try giving them smaller, but more frequent meals. To prevent food from falling inside the cast while eating, use a large shirt or towel to cover the front part of the cast.

What should a child in the spica cast wear?

The spica cast adds additional volume, so larger clothes will often be necessary. The child should not feel too warm in clothes. Sweating under the cast can cause itching. The child may not need much clothes over the spica cast, especially during the summer months. For most patients, a T-shirt, nightgown or loose dress may be the necessary clothing. In addition, a larger one-piece outfit may be useful for infants and young children. Young children may want to wear clothes that cover most of the cast. Large T-shirts, buttoned pants and loose dresses can usually be worn over the spica cast. Clothes can also be adjusted by cutting the seams as needed and sewing in Velcro. It is a good idea to experiment with a few different types of clothes and find out which one is the best.

SPICA CAST

How to bathe a child in the spica cast?

The child should get a sponge bath every day. You must be very careful not to wet the cast. The skin around the spica cast should be washed with gentle soap and water.

Do not put anything underneath the cast, including lotions, powders or oils. Lotions often soften the skin, causing irritation. Powders tend to dry underneath the cast and also lead to further skin irritation. When cleaning the skin every day, it is a good idea to inspect carefully the cast edges for areas of skin irritation, redness, blisters or pressure spots. It is often helpful to use a flashlight to look down at all cast edges.

Turning and changing the position of the child in a spica cast

In the hospital, Paley European Institute personnel will show how to turn and position the child. Frequent position changes and turning often help to prevent skin irritation and breakdown. The child should be positioned often, usually about 2–3 hours during the day. Turn the child on their back, sides and abdomen and keep heels free of pressure by placing a rolled towel or a small pillow under the calf. The child may sit propped up with pillows. Ensure that the child is secure and cannot roll or fall. Strollers and seats can usually be adjusted so that the child can play and eat in different positions during the day. It is important to keep the child occupied during the entire day. To give them some independence, place items and toys in an easily accessible place, so that the child can grab them in a safe way.

Children are very resourceful and they will soon find their own way of moving. Taking the child for walks or family meetings will help to avoid isolation. The cast is not a problem to hold the baby in your arms. Hug them as often as they need to. Do not allow the child to play with very small toys that can get stuck underneath the cast.

What to do with a car seat when the child is in a spica cast?

All newborns, infants, young children and older children should be properly restrained in a car, even when they are in a spica cast. Children often fit into their regular car seats even in the cast. It is recommended to bring the car seat to the hospital after the surgery to determine if the child in the spica cast fits into it. If the child does not fit into their regular car seat, it may be necessary to buy a larger car seat. There are special car seats designed for accommodating a spica cast.



SPICA CAST

Contact Paley European Institute if any of the following symptoms related to the spica cast occur:

- breaks or blisters of the skin underneath the cast or around cast edges;
- the child's toes are pale or blue and/or cold;
- the child is unable to move toes, but was able to do it before cast application;
- the child complains of tingling or numbness of the toes;
- the child has a persistent fever over 38°C, which cannot be explained by a common cold, ear infection or other viral disease;
- the child is agitated or irritable for unknown reasons for a long time;
- an unpleasant smell is coming from the cast;
- the cast gets wet or soiled with urine or stool;
- the child experiences new pain that does not improve with pain medications or comfort measures described above (e.g. position change);
- something has fallen underneath the cast and is stuck;
- the cast has softened, broken or become damaged in any way;
- the child complains of excessive or increased pain;
- the cast seems to be too tight and feeling does not improve after elevating the limb;
- persistent limb numbness or tingling occurs;
- the child feels pain in one place underneath the cast and a position change does not bring relief;
- the limb continues to swell after elevating it.

Check the circulation of the child's foot every day by gently pressing the toes and watching the return of blood flow. The toes will turn white and then quickly return to pink if the blood flow is good.

Be extremely careful while moving a child in a cast. Before discharge, caregivers will be provided with child positioning instructions. Use proper movements to avoid hurting yourself or the child. Keep in mind all difficulties or limitations the child may have. These may include e.g. difficulty sleeping due to not adjusting the position to the cast. Depending on the child's age, they may be more comfortable propped up with pillows.

What NOT to do with a spica cast?

- do not get the cast wet;
- do not cut a hole in the cast or open it;
- do not use items such as a pencil, ruler, toothbrush or cutlery not to scratch the cast – such items can get stuck underneath the cast and scratching can cause skin irritation;
- do not break off sharp cast edges;
- do not remove the cast without permission from a Paley European Institute physician.

What can you do with with a spica cast?

- encourage the child to often move fingers and toes to reduce swelling and prevent limb stiffness;
- keep the cast as clean as possible;
- elevate the limb in the cast on a pillow and apply ice to reduce swelling;
- inspect the skin at the cast edges and underneath the cast;
- look for any changes in temperature, color or appearance;
- if the cast lining gets wet, use a blow dryer on cool setting to blow air into the cast until the padding is completely dry (you must not use a blow dryer on warm or hot setting, because hot air can burn the skin);
- wear cotton clothes to protect the skin.



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