



Transtibial Hand Casting & Modification

Version no. 2



Life Without Limitations

Introduction

The successful fitting of Transtibial prosthesis is dependent on the fit of the hard socket. Appropriate socket design is fundamental for comfort, control and suspension to be achieved. Casting can be approached in a number of ways. The following hand casting instructions are intended as a recommendation to help create a well fitting socket when an Iceross liner is being used.

Iceross liners provide comfort and protection of residual limb tissues, allowing the user secure suspension whilst maintaining optimal convenience and simplicity.

It has been shown that Iceross performs best in conjunction with a Total Surface Bearing (TSB) hard socket design, however good results have been achieved with many different socket designs.

Please read the following instructions carefully before starting a total surface bearing (TSB) hard socket design.

Equipment

- Plaster of Paris bandages (non elastic).
- Plastic Film.
- One ply casting sock.
- Indelible pencil.
- Tape measure.
- Water.
- Lanyard (L-392018).
- Scissors.



Preparation

If required carry out full amputee assessment.

Collect relevant prosthetic history and standard measurements.

Inspect residual limb. Knowledge of anatomical landmarks, scarring and sensitive areas will aid in socket fitting.

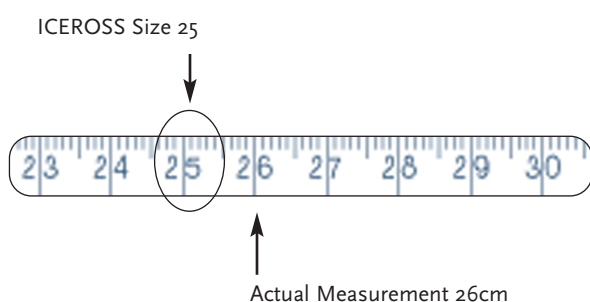
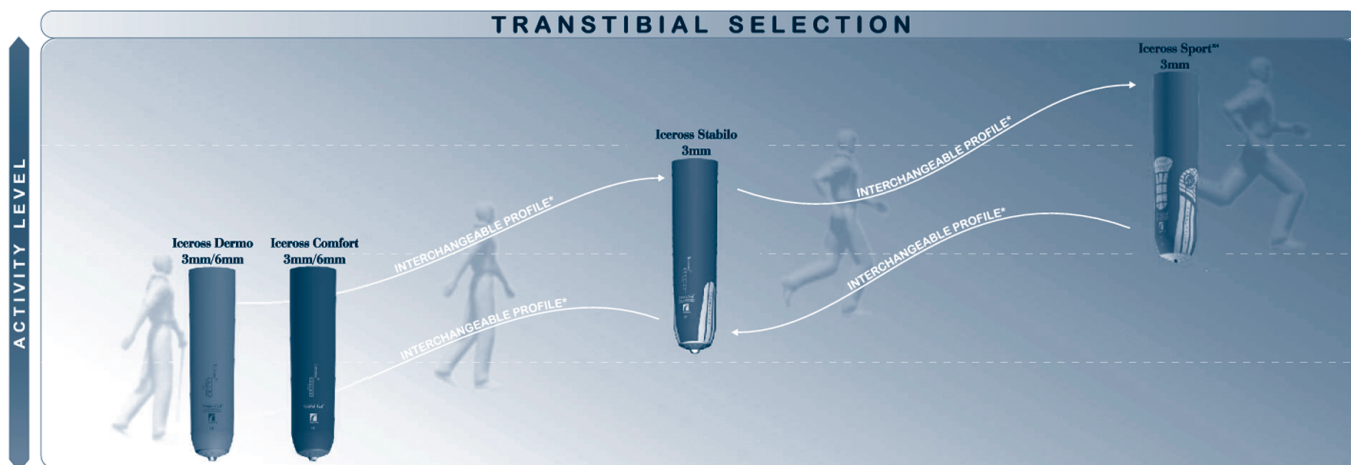


Iceross selection

Measure circumference of residual limb 4cm from distal end.

Note: Whenever possible the soft tissues must be allowed to hang distally. Soft tissues should be deformed as little as possible during measurement.





Select Iceross type according to Iceross selection chart.

Select Iceross size as measured or next below.

Example:

- Actual Measurement = 26cm select Iceross size 25.

Iceross donning technique



Ensure Iceross is clean and free from dust prior to donning.

Invert Iceross, fully exposing distal end.

Grip Liner as shown.

Note: If using a liner without a cover, apply Clean and Simple alcohol spray to outer surface before inverting.



Place exposed distal end centrally against residual limb and release grip.

Roll Iceross smoothly along residual limb.

Ensure no air pockets are trapped during rolling as this could lead to skin complaints or excessive perspiration.

Leave Iceross on for a short time to ensure that it is comfortable.

Attach lanyard; apply tension until distal shape stabilizes.

If excessive movement is observed, confirm correct liner selection and donning technique.

Note:

Undersized Iceross may cause:

- Increased pistoning movement.
- Compression of distal end.
- Difficulty in rolling.

Oversized Iceross may cause:

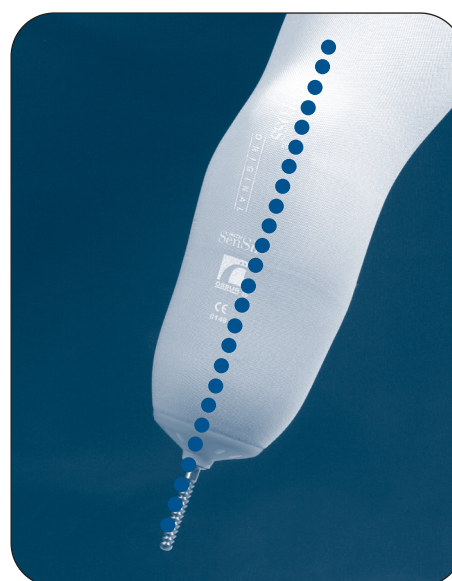
- Air pockets.
- Increased perspiration.



Ensure pin alignment follows longitudinal axis of the residual limb before proceeding to casting (See inset).

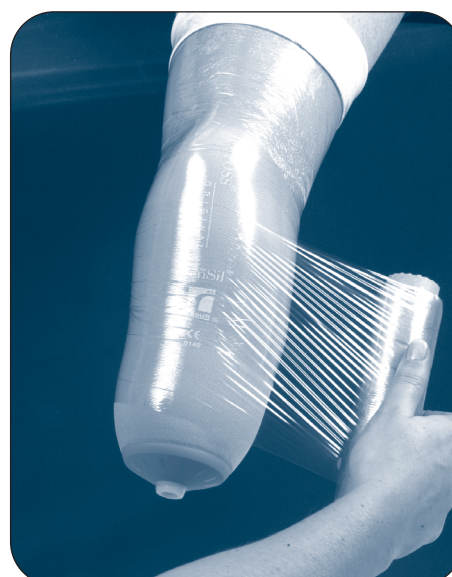
With new users, time spent educating on correct rolling/handling technique will help with acceptance and daily use.

Note: Adaptations of standard donning technique should be considered if user finds standard technique difficult.



Preparation for casting

Apply single layer of plastic film over Iceross, ensure all areas are covered.





Apply wet casting sock over plastic film; hold firmly in place with straps or tape if necessary.



Identify and mark the following:

- Patella.
- Fibula head.
- Crest of Tibia.
- Other bony areas that may contact socket wall.
- Neuroma.
- Sensitive areas.



Record circumference at 2cm intervals, distal measures should be taken with Iceross under tension.

Record length from distal edge of patella to distal end.

Casting

Knee should be extended but relaxed.

Prepare a 4-ply slab of 15cm of Plaster of Paris bandage to cover distal surface of Iceross.

Cut a small hole in the center of slab to allow lanyard to exit.



Wet, apply and smooth slab. Ensuring accurate definition of distal profile.



Wrap remainder of cast with 15cm non-elastic bandage.

Wrapping in figure of 8 ensures full coverage of cast area.

Attach lanyard and apply tension until distal shape stabilizes prior to plaster hardening.

Assistance may be required to hold lanyard, alternatively tie lanyard to a fixed point in line with the end of the Iceross.





Mould plaster from anterior to posterior defining the bony prominences and capturing residual limb shape.

Gather excess Plaster Bandage at posterior to form a ridge. This tightens the cast giving more a more accurate volume match.

It is not necessary to apply a patella bar or other specific pressure areas.

Continue molding until plaster begins to set.

Once plaster is set, carefully remove and trim.



Replace trimmed cast, with the aid of a thin stocking and Lanyard.

Refine trimlines.

Holding cast in place, assess anterior, medial and lateral trimlines.

Flex knee and assess level of posterior trim line and location/level of hamstring reliefs.

Identify and mark alignment reference lines.

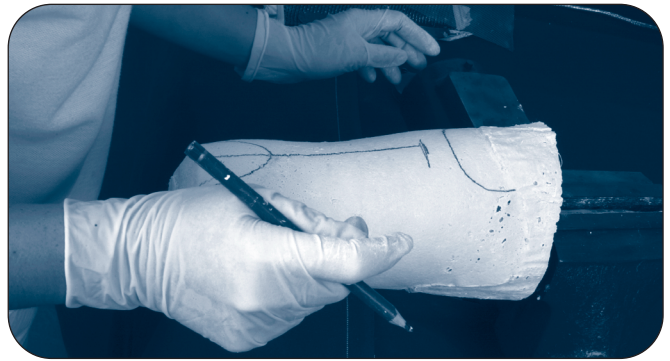
Fill negative model with plaster of Paris in preparation for modification.

Modification



Strip Cast.

Ensure all marks transfer to positive.



Remove ridge of accumulated material in posterior.



Compare measurements with recorded measure and calculate reduction.



Recommended Volume Reduction Procedure:

- Reduce Proximally by 3-5%.
- Reduce Distally to recorded measures (0% reduction).
- Do not remove plaster over bony areas.

Note: Volume is one the most important features of the socket ensure all measurements are accurate.





Volume reduction will be carried over soft tissue areas in posterior of residual limb.

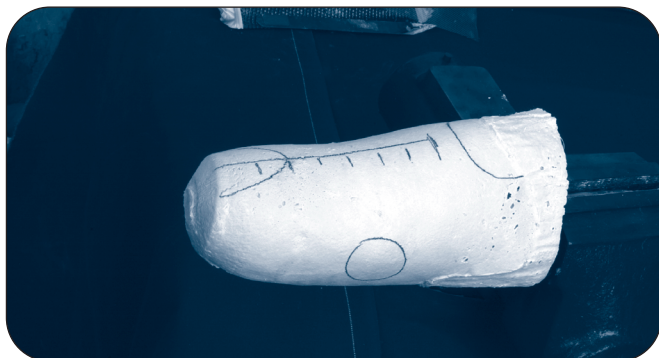
Using Pressure Pads (K-190100)



Bony prominences may develop high pressure peaks in the final socket.

- Pressure Pads offer an effective and convenient method of avoiding this. By placing a Pressure Pad over the prominence the pressure will be redistributed improving socket comfort.
- If Pressure Pads are to be used no build-ups should be required. The cast can be smoothed and finished once the trimlines have been defined.

For sockets without Pressure Pads



If Pressure Pads are not to be used, apply minimal relief to the following areas.

- Distal end of Tibia.
- Fibula head (distal and posterior).
- Posterior Wall.
- Relief's should be localized and have minimal depth.

Locate posterior wall at level defined during casting procedure.

Add plaster in area of medial and lateral hamstring.

The posterior wall should be kept minimal and be a smooth “W” shape dipping to relieve hamstring tendons.

Note: Maintaining the height of the posterior wall increases the overall weight-bearing area.



Medial and lateral supracondylar areas may be formed to increase medial/lateral stability.

Smooth cast. Do not deform distal shape of the Iceross.

Note: Maintaining the distal shape of the Iceross in the cast is of great importance for successful fitting. If the shape is modified, the Iceross may not locate fully in the bottom of the socket. This may result in fitting problems and lock noise and wear.



Flatten distal end for Icelock guide. Ensure flattening is central and perpendicular to the longitudinal axis.

Attach Icelock guide with nails provided.



Check socket fitting

- It is advisable to assess the fit with a check socket prior to fabrication of the final socket.

Checkpoints:

Volume:

- Fitting with desired sock ply.
- No air gaps under load.
- Lock engages easily, but requires force to be fully connected.

Trim-lines:

- Intimate cosmetic fitting.
- Full Flexion Possible.
- Appropriate relief for Hamstring Tendons.

Suspension:

- Little or minimal pistoning.
- No visible movement with pull.
- Require pull on distal end to don socket.

Control:

- Rotational Stability.
- Comfortable Flexion and Extension.
- Medial Lateral stability.

Ossur Head Office
Grjóthals 5
Reykjavík, Iceland
Tel: 354 515 1300
Fax: 354 515 1366

mail@ossur.com

Ossur International Markets
Grjóthals 5
Reykjavík, Iceland
Tel: 354 515 1399
Fax: 354 515 1366

international@ossur.com

Ossur North America
27412 Aliso Viejo Parkway
Aliso Viejo, CA 92656
Tel: 800 233 6263
Tel: 949 362 3883
Fax: 949 362 3888

ossurusa@ossur.com

Ossur Europe
P.O. Box 120
5690 AC Son en Breugel
The Netherlands
Tel: +31 (0) 499 462840
Fax: +31 (0) 499 462841

info-europe@ossur.com

Ossur Nordic
Salagatan 16a
P.O. Box 67
751 03 Uppsala
Sweden
Tel: 46 771556070
Fax: 46 18182218

info@ossur.com

Ossur Europe
Kundenservice Deutschland
Reiherweg 5
50259 Pulheim
Germany
Tel: +49 (0)2238 30 58 50
Fax: +49 (0)2238 30 58 01

info-deutschland@ossur.com



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