

X-ible flexible ankle joints

Fabrication of an orthosis using thermoplastic technology

Technical information 5.2.3



1 Introduction

This technical information supports you in fabricating a lower limb orthosis with the 17AF10* X-ible flexible ankle joints. All relevant steps from preparing for the vacuum forming process on the plaster model to the finished orthosis are described in this technical information.

This document is directed to trained prosthetists. It is a prerequisite that the qualified personnel are trained in the handling of the various materials, machines and tools.

This technical information does not claim to be exhaustive. Reading this technical information does not substitute reading the instructions for use for all required products.

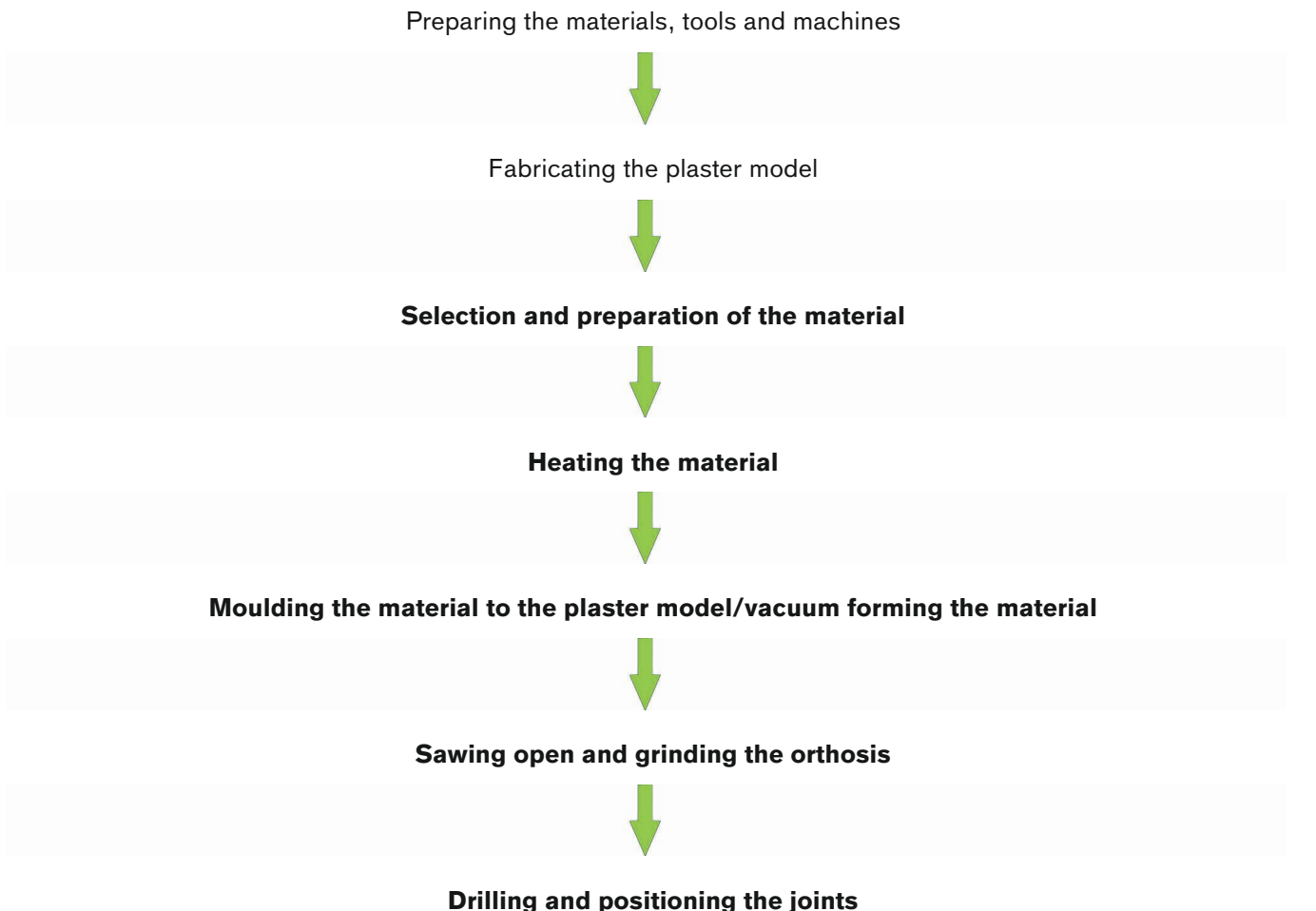
Product information

Versions	<ul style="list-style-type: none">• X-ible – freely moveable (straight)• X-ible – with dorsiflexion assist (pre-flexed)
Sizes	<ul style="list-style-type: none">• S = small• M = medium• L = large
Degrees of hardness	The X-ible with dorsiflexion assist is available in 3 different degrees of hardness: <ul style="list-style-type: none">• Hardness 75 – joints with white bushings (light)• Hardness 85 – joints with black bushings (medium)• Hardness 95 – joints with red bushings (strong)
Dummies	The same dummies are used for all versions.

INFORMATION

The dummies shrink with multiple use. Only use the dummies once.

1.1 Flowchart





Finishing the orthosis

2 Preparation

The following preparations must be made in order to work effectively:

- Collecting the materials and tools
- Preparatory work

2.1 Collecting the tools and materials

The materials and tools used in the photos within this technical information are listed in the tables below. The O&P professional assumes full responsibility for the use of any other materials.

Tools	
Designation	Reference number
Copying pen	645C1
Hammer	–
Torx wrench set	–
Scissors	–
Oscillating saw	–
Punch	–
Ø 4.5 mm drill bit	–

Materials	
Designation	Reference number
X-ible	17AF10=*
Tube sock	99B25
Plasticine clay	636K6
Silicone parting agent	519L5
ThermoLyn PP-H	616T20*

2.2 Plaster model requirements

The plaster model must meet the following requirements:

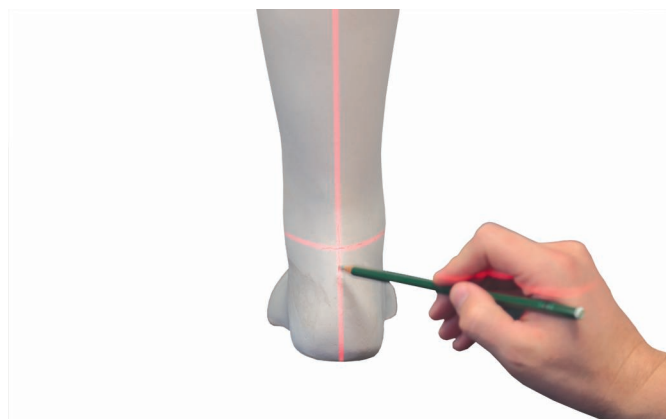
- Surface completely smoothed.

3 Procedure

Fabricate a plaster model.

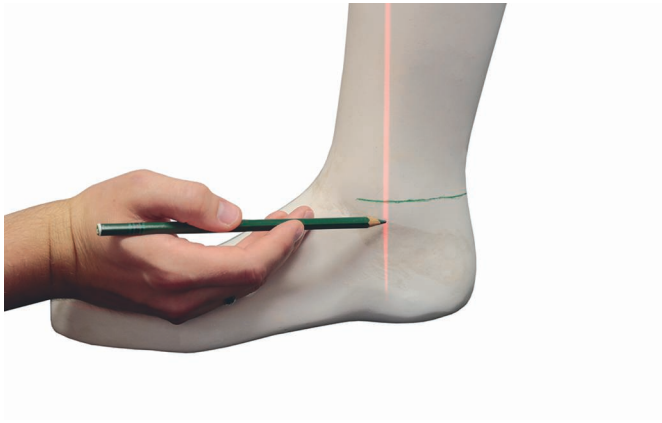
TIP: Adapt the plaster model according to individual considerations. This ensures that the required support is provided and pressure points are avoided.

The illustrations that follow show an alignment of the 17AF10* X-ible flexible ankle joints along the anatomical joint axis.



Align the plaster model.

Mark the anatomical joint axis in the frontal plane.



Mark the anatomical joint axis in the sagittal plane and the position of the dummies.



Isolate the plaster model with a tube sock. In doing so, the tube sock must be fully in contact with the plaster model.



Position the dummies on the marked pivot point of the plaster model and secure them with the nails.



Seal the undercut of the dummies with Plasticine clay.
TIP: The centre section can be left exposed to ensure exact joint positioning. Make sure that the profile of the dummies is completely exposed before vacuum forming so the placeholders are precisely encased by the ThermoLyn.



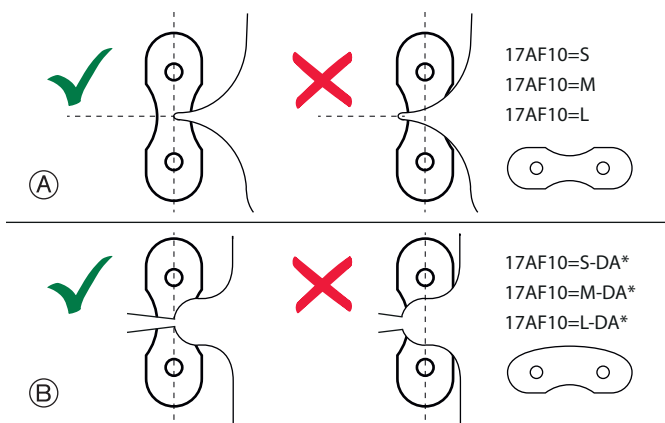
Isolate the plaster model and ThermoLyn with silicone parting agent.



INFORMATION

The following process step should be completed by two persons to obtain better results.

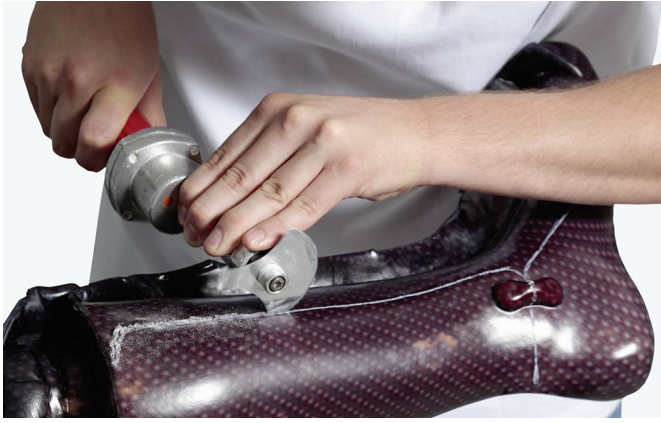
- Apply the heated material to the model from posterior or starting at the heel.
- Pull evenly and free of wrinkles in the anterior direction and weld at the anterior end.
- Press against the vacuum tube and activate the vacuum.
- Vacuum form the orthosis with ThermoLyn (max. **4 mm**).
- **Optional:** Carefully reheat on the dummies using the hot air gun to achieve a good form fit of the dummies.
- While the material is still warm, press in the bore holes of the dummies again.
- Cut off the overlapping material using scissors.
- Mark the cut lines of the foot and calf component with a pen.



Cut out the adapter according to the joint type. The form of the cut depends on the joints that are used.

Make a V-shaped cutout on the section facing in the anterior direction for straight joints (Figure A), and make a U-shaped cutout at the joint adapters for joints with dorsiflexion (Figure B).

The cut is always made vertically regardless of the joint type. Make sure that the "V" or "U" cutout does not pass the centre of the joint. The larger the supporting surface behind the joint axis, the better the X-ible ankle joints will function.

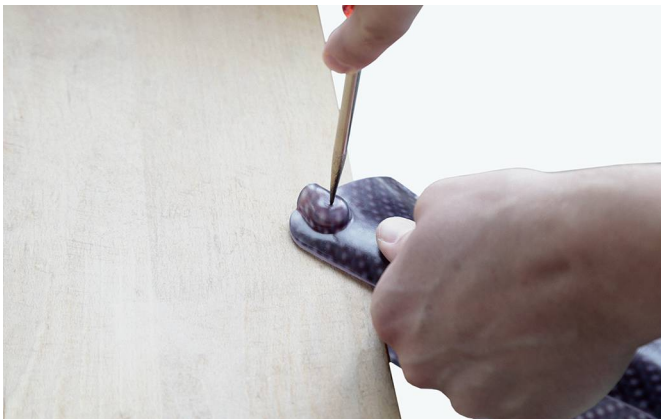


- After the material cools, cut the blank off the plaster model with the oscillating saw, separating the foot and calf component.
- Remove the nails and dummies with pliers.

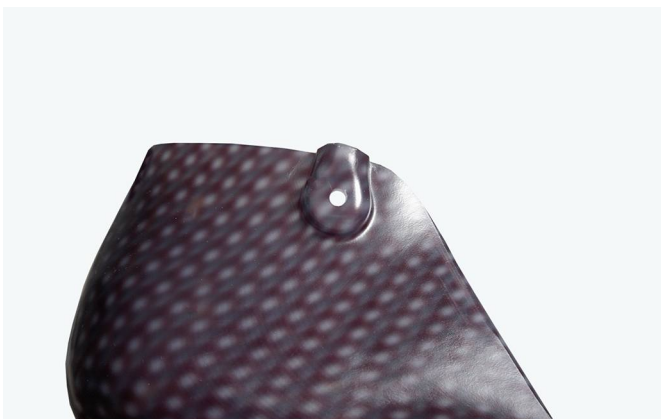


Deburr the edges of the foot and calf component.

TIP: To achieve the best results, remove as little material as possible during fabrication. If too much material is removed, the supporting surface for the joints will be too small.



Precisely mark the bore holes with a punch.



Drill the mounting holes for the joints (drill bit diameter **4.5 mm**).



Insert the joints and attach them to the orthosis with the supplied Torx screws (torque value **0.5 Nm**). In doing so, apply a Torx wrench on the inside as a counter-support so the plastic bushings in the joints are not turned excessively.

If the screws protrude from the joints on the inside of the orthosis, shorten the screws to prevent injuries.



Apply the pads with adhesive on one side to the inside of the joints.

INFORMATION

Attach the oblong pads to the surface of the foot and calf component as needed. The adhesive pads reduce noise while walking.



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A series of horizontal lines spanning the width of the page, providing a template for writing or drawing.

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