T-Tape Company

User Manual for applying Turbocast products to patients

13-1-2011

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It is recommended to print this manual on paper

1. Patient assessment and diagnosis

I. Assess patient's condition and determine the diagnosis.

II. Identify the needs for immobilization.

III. Determine the suitability of orthotic intervention to address the problem.

IV. Define the objectives of orthotic intervention.

V. Determine best orthotic design and select suitable immobilization materials.

Points to consider

- Condition of the skin with attention to:
  - » Fragile skin
  - » Quality of circulation
  - » Presence of wounds, incisions, skin grafts and/ or scars
  - » Does the patient have any allergic or hypersensitivity reactions
- Sensation
- Bony prominences
- Pain

Selecting most suitable thermoplastic

Points to consider

- Localization of the fracture/injury
- Age of the patient
- Constitutional type
- Pathological conditions and the type of injury

Continue

2. Selecting most suitable thermoplastic

Body Part	Kids	Teens	Adults (Astenik)	Adults (Normostenik)	Adults (Hyperstenik)
Finger	0.8 mm Micro	0.8 mm Micro	1.6 mm Micro	1.6 mm Micro	1.6 mm Micro
Wrist	1.6 - 2.0 mm Micro	2.0 - 2.5 mm Micro / Opti	2.5 - 3.2 mm Mini / Opti	3.2 mm Mini / Opti	3.2 mm Mini / Opti
Elbow	2.5 mm Opti	3.0 mm Mini / Opti	3.2 mm Mini / Opti	3.2 mm Mini / Opti	3.2 - 4.2 mm Mini / Opti
Shoulder	2.5 mm Opti	2.5 mm Mini / Multi / Opti	2.5 - 3.0 mm Mini / Opti	3.0 mm Mini / Opti	3.0 mm Mini / Opti
Body	3.0 mm Multi / Opti	3.0 mm Multi / Opti	3.0 mm Multi / Opti	4.0 mm Mini	4.0 mm Mini
Low leg	2.5 mm Opti	3.2 mm Mini / Opti	3.2 mm Mini / Opti	3.2 mm Mini / Opti	4.2 mm Mini

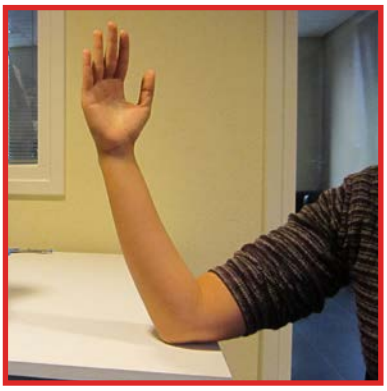
3. Recommendations for material selection

- **Turbocast®** is preferable for the orthoses with the small surface area.
- **Turbocast®** is preferable for applications in children and elderly.
- **Turbocast®** is preferable when applied over the bandage (thermoplastic does not stick to cotton or synthetic bandages), it is highly recommended for post-operative splinting and/or burn injuries.
- **Beachcast®**, **Immo+** and **Turbocast® Ortho** are preferable for orthoses with large surface area.
- Perforations in the thermoplastic materials serve facilitate ventilation and prevent skin maceration. Choices are **micro** (only available for thermoplastics with up to 2.0 mm thickness), **mini**, **multi** and **opti**.
- If you have limited experience with splinting techniques using thermoplastic materials, choose **opti** or **mini** perforated plates.
- Non-perforated plates are to be used only for non-circular orthoses (cover less than half of the surface to be immobilized) to prevent skin maceration.
- For vertical moulding choose thermoplastics with adhering surface, such as **Turbocast® Ortho** or **Beachcast®**.

4. Positioning and design

"Client positioning for moulding is not required until later in the process. However, the therapist should consider potential difficulties in positioning the client before making a final decision about the orthotic design and materials! "

P. McKee



Design

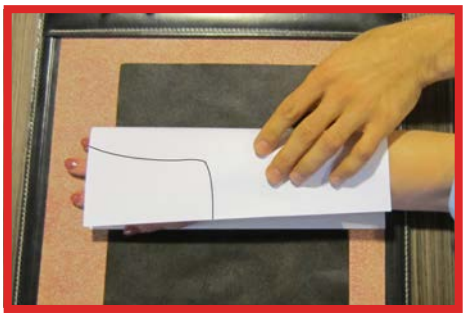
It is important to keep the design of an orthoses as simple as possible.

5. Custom made orthosis

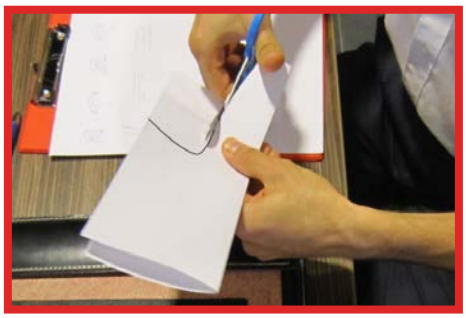
Please follow the steps listed here for custom-made orthosis from thermoplastic:

Step 1: Position a patient's limb (e.g., hand and forearm) in pronation on the paper for tracing.

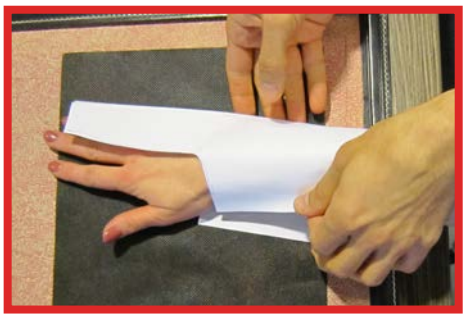
Step 2: Trace around a patient's limb and note anatomical landmarks, add guides when necessary.



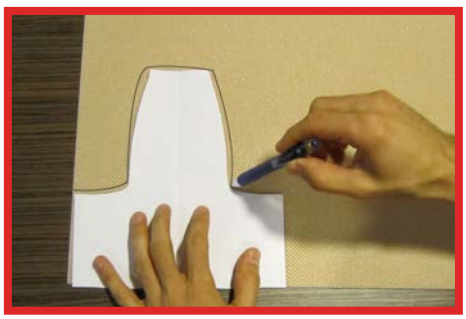
Step 3: Connect guide marks to create a custom pattern outline and cut out the paper pattern.



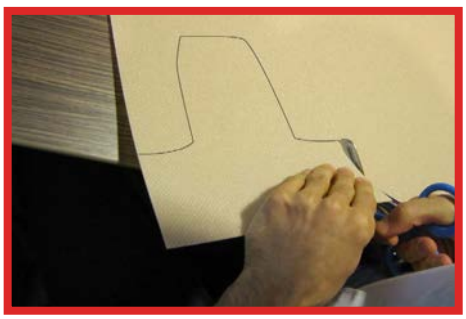
Step 4: To check the fit, apply the pattern to the patient's limb and position the joints as they will be when the orthosis is moulded.



Step 5: Transfer the pattern onto the thermoplastic.



Step 6: Cut the thermoplastic to the trace marks.



The custom-made pre-cut is now ready to be applied onto the patient. It is recommended to practice drawing correct shapes multiple times, so you can find out optimal sizes and shapes.

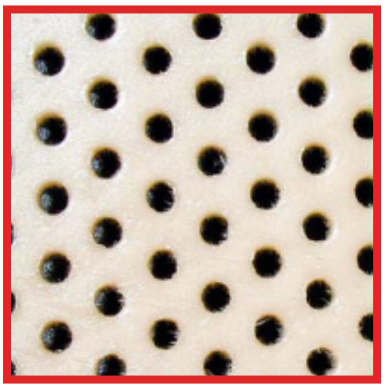
6. Prevention and protection

Protecting bony prominences

- It is important to recognize and protect the bony prominences during the moulding process.
- It is recommended to pad the bony prominence(s) before moulding the thermoplastic.
- Do not add padding *after* moulding as it may lead to tissue compression, discomfort and poor circulation.

Protecting the skin

- Use micro, multi or opti perforated sheets to achieve optimal ventilation. Mini perforated sheets do not improve ventilation. The perforation will only result in local ventilation, near the holes.
- Appropriate size stockinet or bandage material should be used under the thermoplastic (e.g., braces of the tibia, humerus, corsets, etcetera).
- If necessary, additional perforations or holes may be added to the splint.
- Removal of the splint or brace for some time every day, if possible, is recommended to improve skin ventilation.



7. Processing methods

The material may be heated in the following ways:

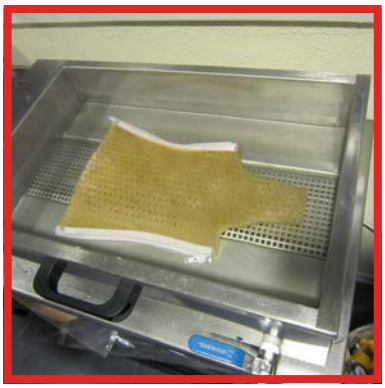
» Water (from 60 - 75°C)
» Steam (from 90°C)
» Heat gun
» Heating plate

The material becomes malleable after **2 minutes** at **65°C (149°F)** or **1 minute** at **75°C (167°F)** or until dark **"glazy"** discoloration appears. **Immo+** and **Turbocast® Ortho** become transparent when heated to the right temperature.

8. Application instructions

Turbocast®

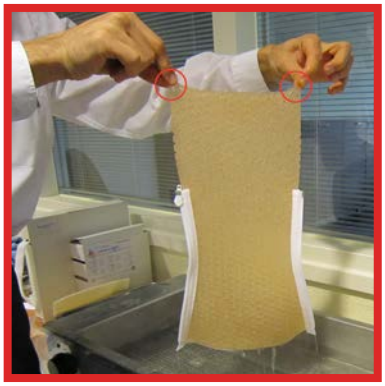
1



2

After heating in water at **70°C (158°F)** (**1**) lift the material out of the water (**2**). Avoid lifting by the ends of the material as it may deform the sheet due to gravity (**3**). Place the material immediately on a dry towel (**4**). Fold half of the towel over the whole plate and blot excess liquid (**5**).

3



4

The material is now safe to be placed directly on the bare skin (**6 + 7**) since the material's temperature quickly falls to about **40°C (105°F)** which will not cause discomfort. Make sure the body part does not move or change position during the application of thermoplastic.

5

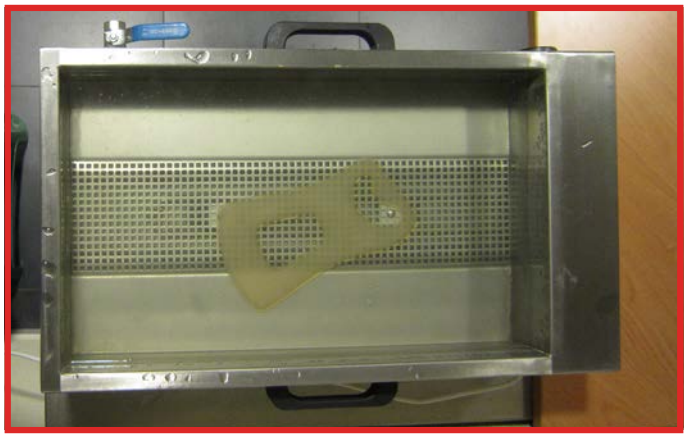
6

The material can be heated to a higher temperature if a longer modelling time (e.g., for large orthoses) is needed. In such cases, it is advisable to protect the patient's skin with stockinet (**8**) or a tubular bandage.

7

8

9. Using a waterbath



To prepare **IMMO+**, **Turbocast® Ortho** or **Beachcast®** for application, place the material into a water bath at desired temperature **60°C - 65°C (140°F - 159°F)** for **60-90 seconds** or until it becomes sufficiently malleable.

When ready, take the material out of the water and place on a flat surface (preferably a wooden board) for **~10 seconds**. Temperature will immediately drop to **~40°C (104°F)**.

Take the splint with wet hands and position it onto the patient. Immediately wet your hands with cold water:

- To speed the surface stiffening
- To prevent imprints

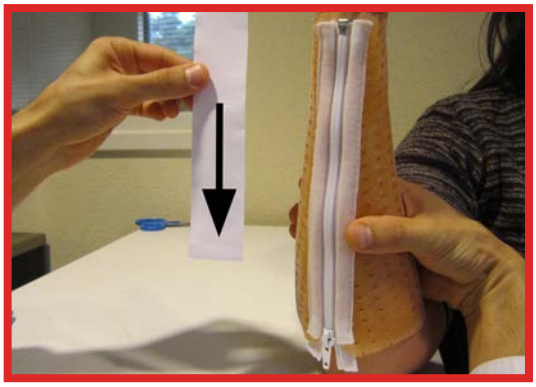
10. Shaping techniques

- The material can be easily stretched but practice is needed to prevent uneven thickness of the orthosis.
- Practice stretching a large surface every time you use your hands to stretch the material around the patient.

- When the material is fully zipped, use your hands and gently stroke the material downwards to smoothen it around the body part.
- **Do not** stroke it upward, this may cause wavelike bumps in the material.

- When connecting the zip, put your finger on the bottom to lock it. This prevents unwanted movements of the orthosis while you try to zip it.
- Practice this technique to reduce the application time as the material stiffens quickly.

- Close the zipper step by step. **Do not** attempt to close the whole zipper in a single motion as this may cause trauma to the skin. In addition, the material needs to be stretched evenly.

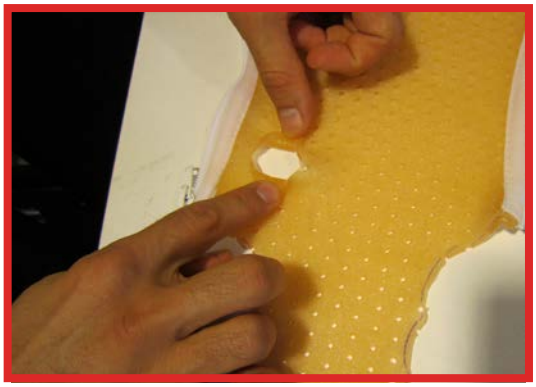


- Make sure to smoothen out the areas that have depth (e.g., a palm of the hand).
- Press the material gently; **do not** use excessive pressure. Too much pressure with fingers will cause imprints on the material.

- Bend excessive material where holes were created (for example around the fingers). You can do this by reheating the material and laying it on a flat surface.
- It is also possible to do it during application onto the patient, but it is more time consuming.

- Stretch the material around small body parts (e.g., fingers) and push it together. It will stick to each other if performed correctly.
- **Do not** attempt to attach large surfaces of the material to each other.

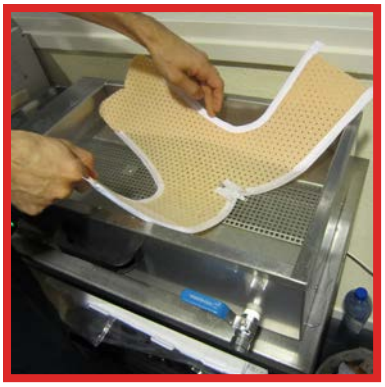
- Use the tip of your finger to lift the material slightly away from the limb around the edges of an orthosis. Make sure that spacing is even around the entire edge.
- **Do not** use your whole finger, this may create too much space and distort the shape of the material around the body part.



11. Quick cooling

- Dip into the bowl of cold water or place under the cold running water.
- Apply a cold pack.
- Wrap low-conforming material with an elastic bandage that has been soaked in ice water.
- Use a cold spray.

12. Reheating and remoulding



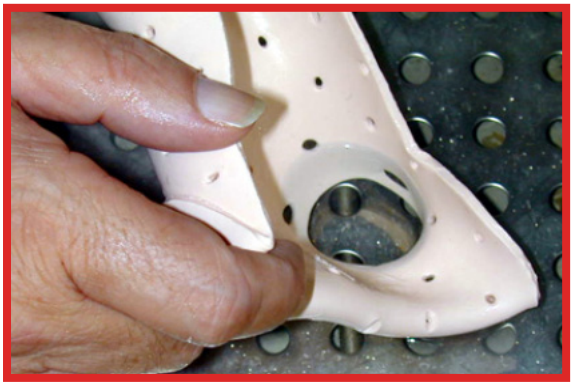
- Use a heat gun.
- Dip the section in the heating pan.
- Put the section in a water bath.

Warning: Do not use a heat gun to remould while the cast is on the patient.

13. Adjustments and trimming

- While the material is still somewhat warm, use 3 - point pressure to shape the material not to press onto the bony prominences.
- Correct the gaping trough by squeezing in the sides of the orthosis.

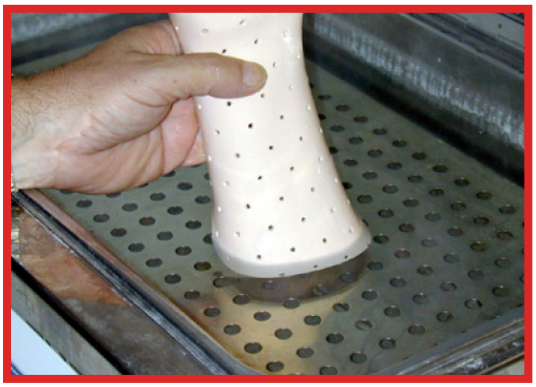
- Mark the trim line (with a fingernail or a pen).
- Trim the lines to ensure freedom of the joints.

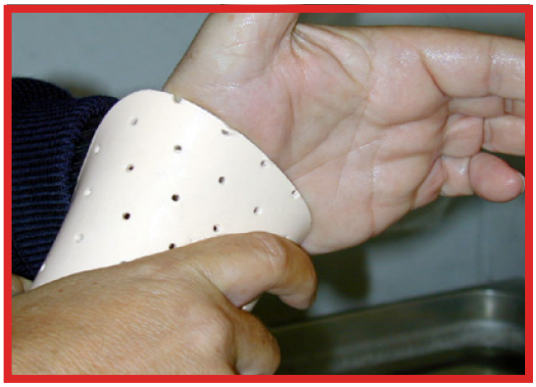


- Spot heat the edges by submersion in hot water.

- Fold the edges.

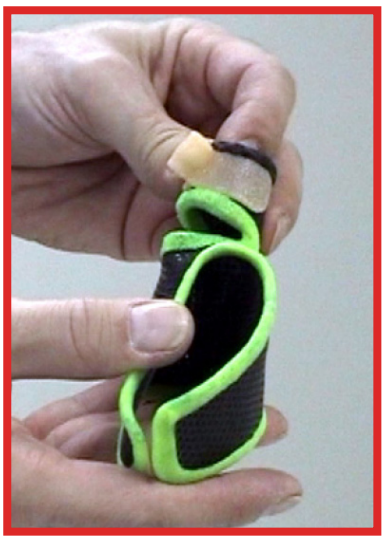
14. Finishing the edges





- Reheat and re-cut the edge with long, smooth strokes to remove any irregularities.
- Reheat and smooth the edges with the hand.

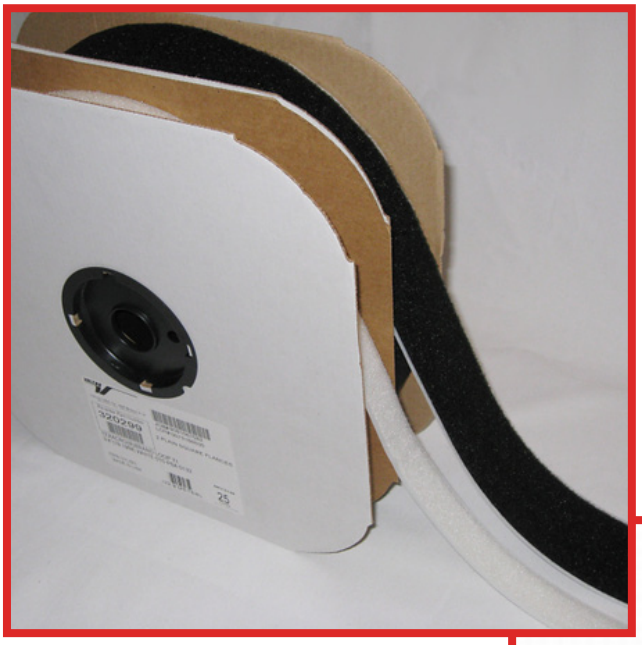
- Reheat the orthosis by placing it into hot water for **2 seconds** and smoothen the surface.

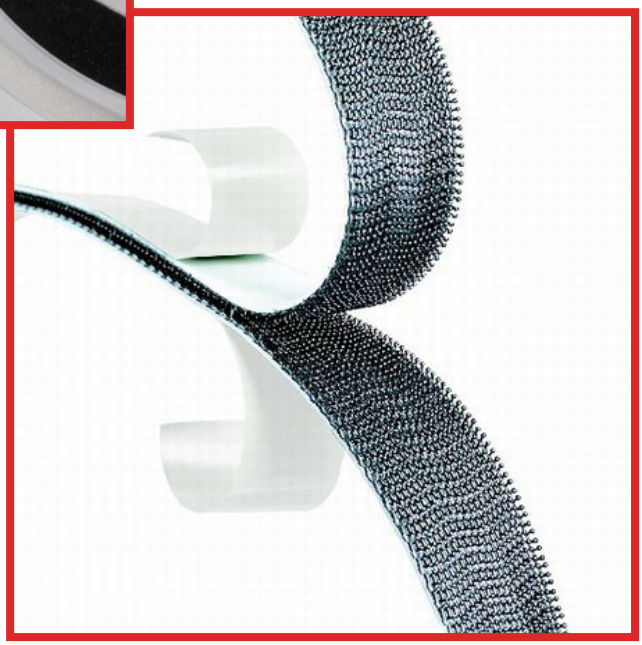


- Grind the edges (after cooling).
- Cover the edges with soft material.

15. Strap attachment

- Determine the optimum location and width of the straps.
- Dry heat the adhesive backing of the hook Velcro® patch with a heat gun.
- Dry heat the attachment site on the orthosis.
- Embed one edge of the patch into preheated material.
- Remove the paper backing from the hook and fold over one edge of the patch.





16. Contact information

T-Tape Company BV

Bosweg 12
4645 RB Putte
The Netherlands
Tel: +31 164 60 29 52
Fax: + 31 164 60 20 53
E-mail: turbocast@planet.nl
Website: www.turbocast.eu