

Technical Note:

The Layering Technique for Heating Sheet Plastics

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INTRODUCTION

Orthotic and prosthetic practitioners have become familiar with different forming procedures using heated sheet plastics, including potential problems with large positive plaster models (specifically adult size knee-ankle-foot models) when using the drape vacuum forming technique. Other problems include ovens with inadequate dimensions and configuration for heating sheet plastics, or multi-level ovens with uneven heating characteristics which cause one sheet to be ready for molding before the other.

A technique for the vacuum forming of knee-ankle-foot positive models in two sections has recently been described.¹ A similar technique is being used in our facility; however, because of our oven design and size, a different method for heating two plastic sheets at the same time is used. This method can be utilized in ovens with one shelf or any oven configuration and shelf size which will hold sheet plastic large enough to cover the average size ankle-foot positive model.[†]

DISCUSSION/PROCEDURE

The heating tray should be prepared by fully covering and affixing a sheet of fluor-glass Teflon[®] sheeting^{††} to the tray. This facilitates the removal of the heated plastic. Our facility uses a gas fired baker's oven with a single heating tray mounted on steel drawer slides attached to the side walls of the oven. The Teflon[®] sheeting is clamped to the heating tray (Figure 1). Plastic pieces for the proximal and distal sections are cut to the appropriate size and the positive plaster model is prepared as stated in the aforementioned article.¹ Either piece may be placed on the Teflon[®] covered heating tray first. A second piece of Teflon[®] sheeting cut to the same size as the heating tray is then placed on top of the first plastic piece. The remaining plastic piece is then placed on top of the second Teflon[®] sheet, forming a layer (Figures 2, 3, and 4).

Depending on the physical location of the oven and the vacuum source, the molding procedure can then be performed by one individual experienced in the drape vacuum forming technique. However, two experienced individuals will almost always ensure a successful procedure. When the top plastic piece is ready for molding, the

[†]We are referring to gas and electric heated air circulating ovens. We have no experience with infrared ovens.

^{††}Readily available from orthotic and prosthetic suppliers.

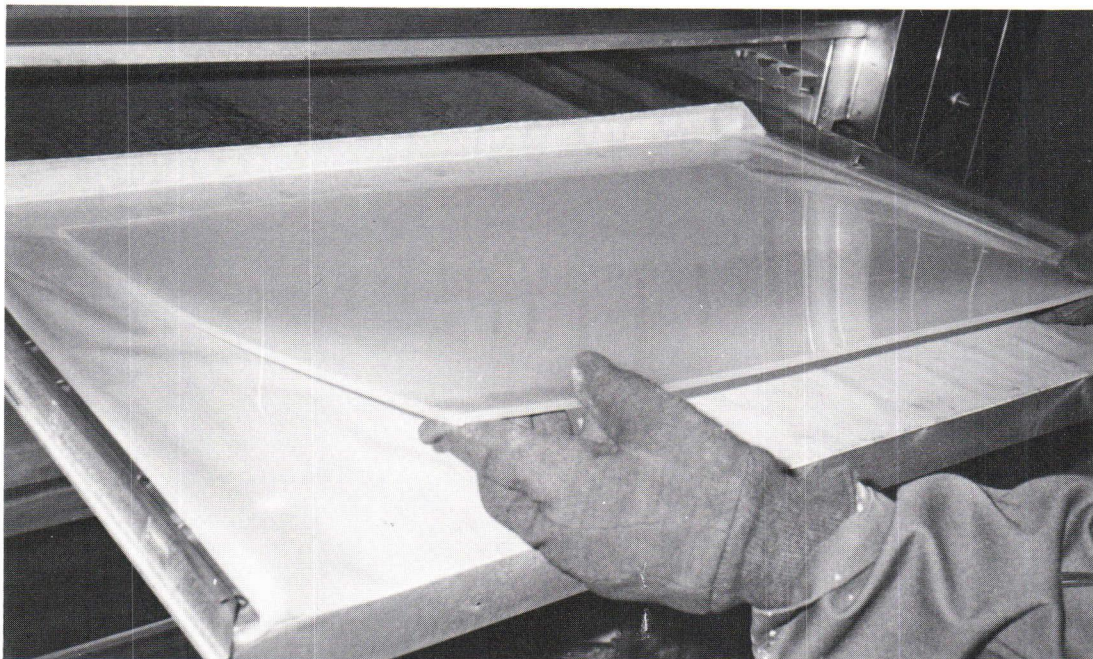


Figure 1. The Teflon[®] sheeting is clamped to the tray.

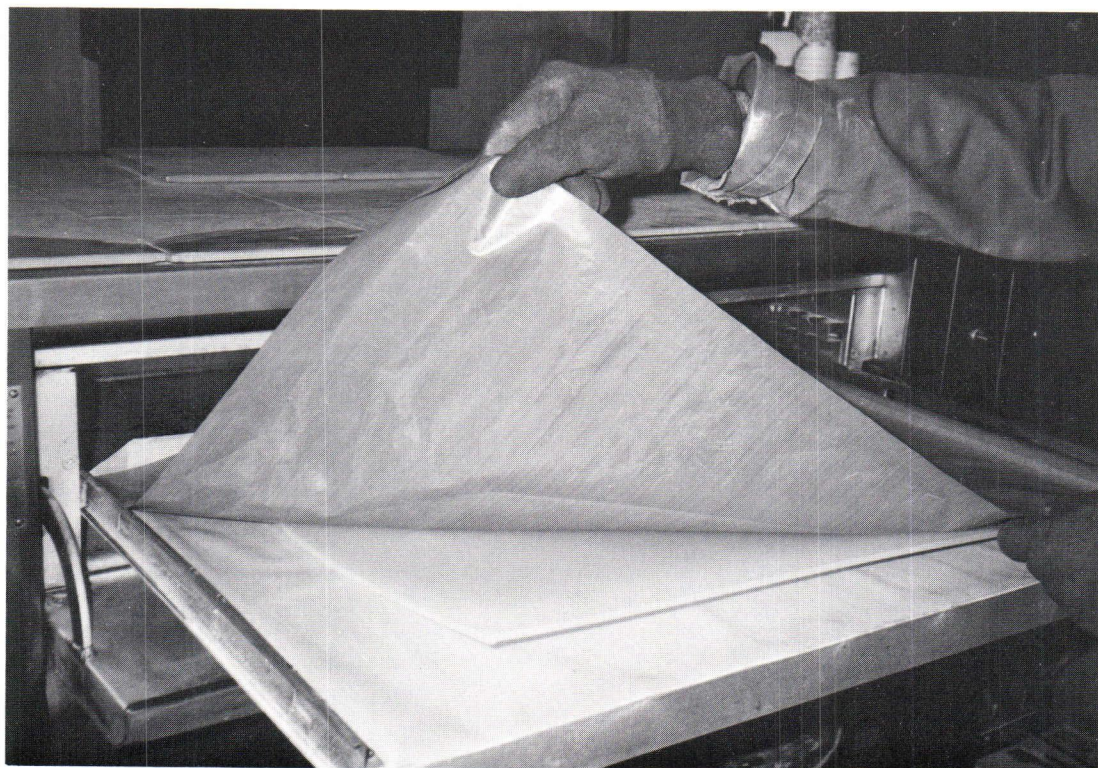


Figure 2. A second Teflon[®] sheet is placed over the plastic.

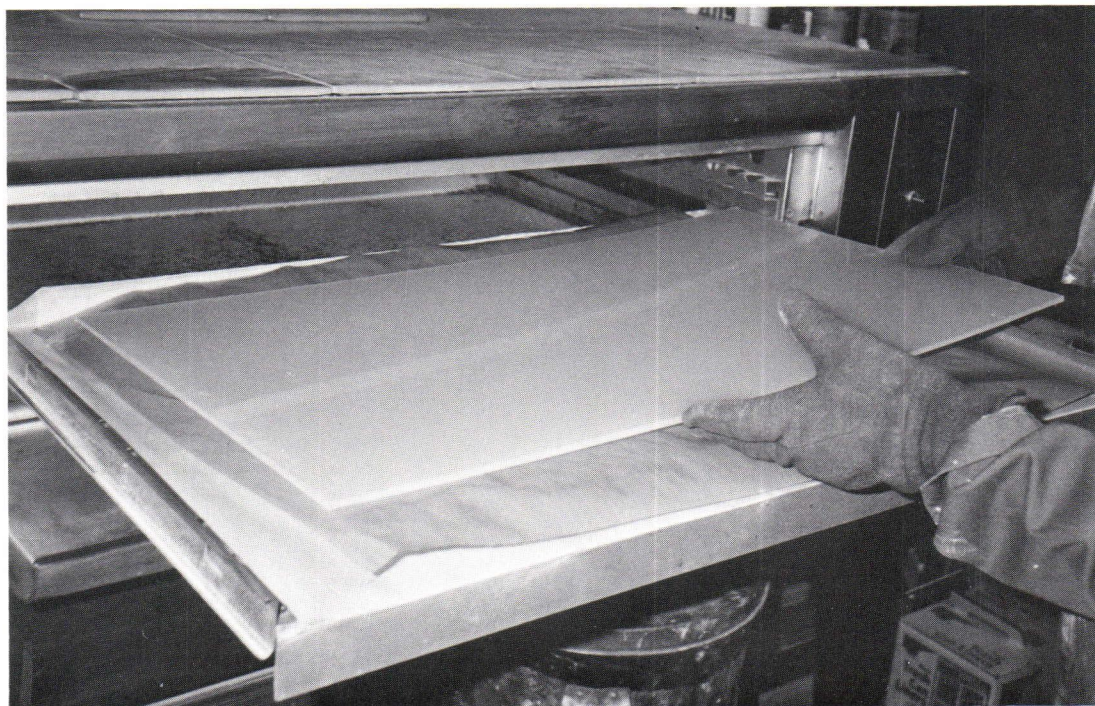


Figure 3. The second sheet of plastic is placed over the Teflon®.



Figure 4. The "sandwiched" plastic sheets are placed in the oven together.

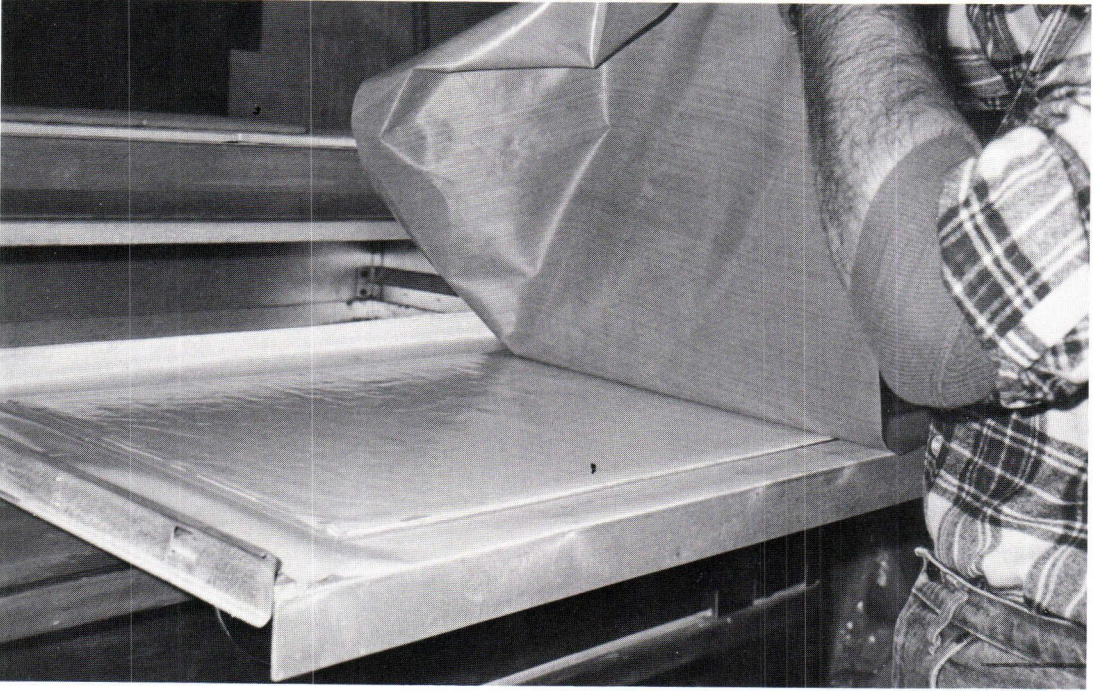


Figure 5. After the first sheet of plastic is applied to the positive model, the second layer of Teflon[®] is removed.



Figure 6. The second sheet of plastic is now ready to apply to the positive model.

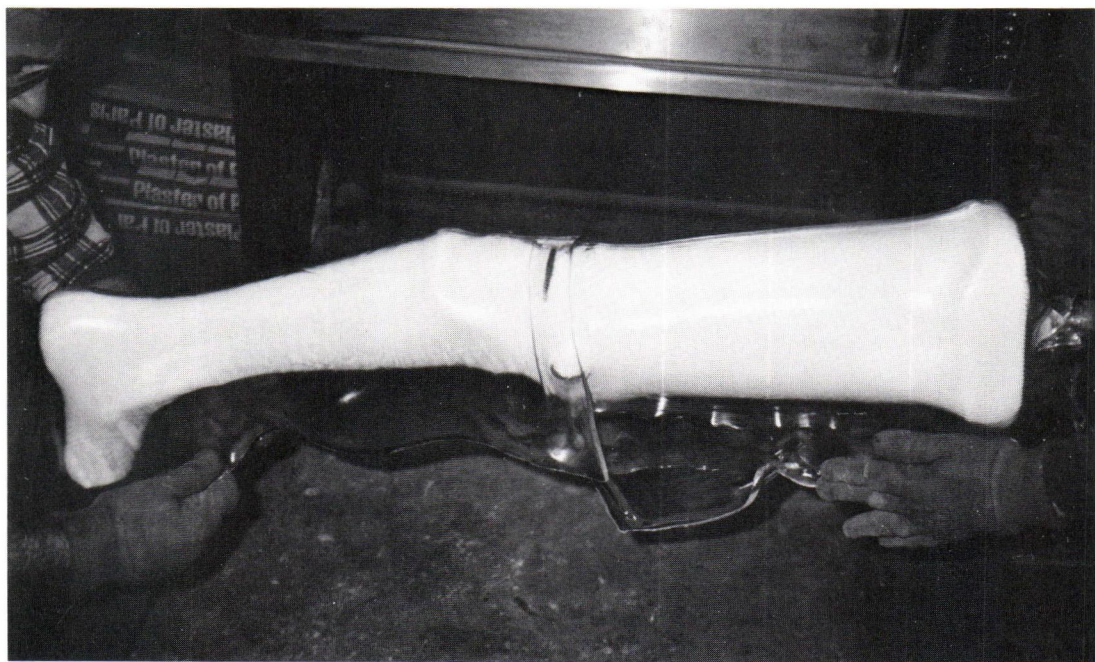


Figure 7. The positive model with both sheets of plastic applied.

bottom piece will also be ready. We have not experienced the timing difficulties of heating two separate plastic sheets at the same time, which can occur in multi-level ovens due to uneven heating. The top plastic piece is removed from the oven and placed in the appropriate position on the positive model. The second Teflon[®] sheet is now peeled off, exposing the second or bottom plastic piece, which is then removed and placed on the model (Figures 5 and 6). The standard drape vacuum forming technique is followed from that point (Figure 7).

ADVANTAGES AND DISADVANTAGES

The advantages of this system include:

- Small ovens without multiple shelves can be used in fabrication.
- Plastic sheets heat simultaneously and uniformly, speeding the vacuum forming process and with less risk of plastic overheating.

A disadvantage of this system is the plastic may take on the texture of the Teflon[®] sheeting. However, it is visible only upon close inspection and has not been a problem cosmetically.

SUMMARY

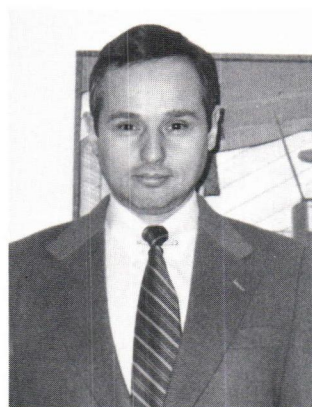
Due to limited oven size and configuration, a layering technique of heating two plastic sheets simultaneously prior to the drape vacuum forming process has been discussed. This technique has been used at our facility for over one year with great success, and can also be adapted for use with multi-level ovens without the timing problems associated with multi-level heating.

REFERENCE

- ¹Showers, D.C., "The 'Overlap' Bisectional Forming Technique in Orthotics," *Orthotics and Prosthetics*, 1986, 39(4), pp. 48-54.

AUTHORS

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