

## Vacuum-formed or milled polypropylene orthoses, and what's the difference?

Most clinicians understand why polypropylene is used to make functional orthoses; however, few have a solid understanding between the different production methods of **vacuum-forming** and **direct-milling**. The orthoses made by these two methods are identical in the resulting shape and function. There is a slight variation in application, appearance and advantages.

### Vacuum-Formed Polypropylene Orthoses

Vacuum-formed poly is most often heated in an oven and is either pressed or vacuumed over a balanced and corrected positive wood mold created from the original negative cast or digital image of the foot. When poly is heated, almost to the melting point, its physical composition is altered making it more flexible when it cools. This additional flexibility has to be compensated for by adding 1mm of thickness when prescribing the thickness of the polypropylene shell. Otherwise, a semi-rigid device becomes a flexible device.



*Left: Heated polypropylene vacuum-formed over wood positives*

### Direct-Milled Polypropylene Orthoses

Producing a direct-milled poly orthoses is a more streamlined process. The digital image of foot is balanced and corrected, and sent directly to a computer-programmed mill that carves the orthoses out of a block of polypropylene. This technique, which does not require heating, produces a more rigid device making it possible to make thinner orthoses with the same flexibility as the thicker vacuum-formed devices.



*Right: Shell is milled directly out of a block of polypropylene based on the corrected "virtual" positive mold*

### Fast Facts:

#### Direct-milled-polypropylene orthoses

- can be prescribed as thin as 2mm
- rearfoot post is milled onto the device
- less expensive due to lower labor and materials costs
- milling lines on surface work well with or without a topcover

#### Vacuum-formed polypropylene orthoses

- more options for rearfoot post material: polypropylene or EVA
- advanced accommodations including plantar fascial grooves & sweet spots
- slightly more flexible for the same thickness
- textured surface works well with or without topcover

Direct-milled Polypropylene Orthoses



Vacuum-formed Polypropylene Orthoses

