Slotting Plastic
to Strap a Brace

By Steve Hill, CO

As is so typical in our industry, there is more than one way of doing most things. Strapping a brace is no different and, in fact, highlights that phenomenon very well.

There are two ways to strap a brace—by using a loop and chafe system, or by slotting plastic. Knowing your options for doing both will help you better help your patient.

Loop and chafe

Most orthotic and some prosthetic devices require straps for their suspension or control. Before the invention of Velcro® we used leather straps with holes punched in them and a buckle system to fasten them, similar to most common belts. The biggest downside to this system was a lack of adjustability, with the distance between each hole being the limiting factor.

Another ancient option that we still sometimes use is string lacing. Nearly all corsets use a lacing system, and it is the preferred method for suspending molded leather PTBs as well as others.

Velcro changed all that and is now the preferred type of strapping system for most applications in O&P. When we apply straps to our various devices we have some options open to us. We can use the "loop & chafe" method, which is by far the easiest and most common.

A strap is attached to one side of the cuff and run through and pulled against a loop and chafe attached at the opposite side. This method is simple and allows the patient extra leverage to tighten up the straps for a snug fit.

At other times we may opt for a second method which does away with the loop and chafe. A slot cut into the plastic is useful when you can't afford the extra space a loop & chafe occupies or when you just don't have the correct size loops lying around. It also looks nice and is very low profile.

Slotting plastic

Now it gets somewhat complicated. There are (essentially) three common ways to slot the plastic. I present these three ways knowing full well that there may be more, but these three are well within my experience and are the ones I choose to discuss.

1. Dremel® tool

The Dremel® tool is one of my favorite tools partly because it's the most versatile power tool in my shop. Dremel makes several attachments that work very well for slotting plastic. One is a side cutting bit, which looks a lot like a drill bit. That works okay, but you can get an uneven cut very easily. Personally, I prefer one of the cutting wheels. There are some that are made of carbon fiber that work particularly well, but there are also others.

I usually drill two holes first, one at each end of the intended slot. Then, working quickly but carefully, I connect the holes with cuts made between the two. You'll want to

work fairly quickly and at a high speed because the friction heat will tend to melt the plastic and make a mess. If you can find some way of holding the plastic section in a vise, do so. Of course that's rarely the case, so another set of paws might come in handy.

Using the Dremel tool with a carbon fiber cutting wheel is my favorite way of cutting slots in plastic.

2. Drill press

Most people simply put the appropriate size drill bit (typically 11/48" to 11/41") into a drill press and use it to side cut the slot. This is one of the easiest ways, to be sure, but not always the best. It's very easy to cut a crooked slot or accidentally skip out of the slot and mar the cuff surface.

Hold the piece firmly and cut slowly is the only advice I can give.

3. Hot razor blade

A technique known as "hot melt cutting" has been used for a long time to cut plastic away from uprights after it has been thermoformed over them. This enables the plastic to be removed from the cast while saving the uprights from the damaging effects of a cast saw.

Using this technique, clamp an old, used razor blade between two small pieces of aluminum bar stock with a vise grip. The bar stock allows you to clamp the razor blade tightly without shattering it. Razor blades are notoriously brittle. You can use an old, dull blade because it's not the sharpness of the blade that's used to cut, it's the heat applied to the blade that's important.

Drill the two holes as in the Dremel tool method to establish the size of the slot. Now heat the razor blade up with a blowtorch. Get it glowing nice and red. Again, as in the first method, connect the holes with slots and remove the plastic left in the middle.

This technique can be a bit messy, sometimes leaving globs of plastic to remove with a sharp, unheated razor blade afterward. The advantage is that it leaves a smooth edge behind it and it also doesn't require you to spend any extra money on tooling.

No matter what method you decide to employ in your lab be sure to wear goggles over your eyes for protection. Work within your own comfort level and, if possible, have someone else around to help keep the plastic cuff stable. The last thing you want is to mess up a perfectly good orthosis during the strapping phase.

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