

Strapping Systems

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Strapping is used to secure an orthosis to a body part. The proper application of straps is crucial to ensure the orthosis serves the intended purpose. Commonly, therapists focus on molding the thermoplastic material to the patient and obtaining the optimal contour; minimizing the importance of strapping as it relates to proper fit. Careless use of straps can ultimately lead to an ineffective orthosis. Similar to thermoplastic materials, numerous types of strapping systems are available. Therapists must challenge themselves to look beyond the traditional hook/loop style for specific orthoses.

First, therapists must appreciate the mechanics of orthotic fabrication. The wider the strap, the better the force distribution. However, straps should not be so wide that they inhibit full motion of unaffected joints. Narrow straps can potentially cause redness and irritation of the underlying soft tissue. When applying straps over bony regions, consider using foam to further distribute the pressure. Be mindful to maximize the mechanical advantage of the orthosis by utilizing the length of the device when fastening the straps. (Image 1)

Hook and loop systems are the most common way to secure an orthosis. Adhesive hook is applied to the thermoplastic material and then a non-adhesive material is fastened to the hook. As a cost-saving measure, consider purchasing 1" adhesive hook. Patients appreciate that this narrow width allows full hook coverage preventing the hook from sticking to clothes and bedding. To save time, keep on hand a supply of pre-cut tabs in the most common lengths.

Consider choosing the type of material to secure to the adhesive hook based on the specific diagnosis and individual patient. Traditional loop is the most economical choice and can be customized by trimming to fit. To minimize ordering, consider keeping 2" strapping in stock and cutting it down as needed. As another cost-saving measure, keep all scraps of loop material for future use. Ordering multiple colors can allow for ultimate customization and aid in compliance! In specific situations, using a specialized strap may be the best choice. For example, when managing a patient with arthritis, soft strapping may be the optimal choice. Be aware that these materials have less "repetitions" than traditional loop, just flip the strap over to double the use! For patients using the orthosis during functional use, it may be beneficial to choose an elasticized loop such as a stretchy Neoprene strap which accommodate muscle contraction/relaxation better than less forgiving traditional loop material. When applying digit orthoses, consider low profile material to minimize bulk between digits such as tape or elasticized wrap. (Image 2)

Helpful adjuncts to strapping include rivets and foam padding. Speedy rivets are useful when there is a small area where adhesive hook may pull off (hole punch and blunt nose pliers required). (Image 3) Rivets can be helpful when managing patients that frequently lose their straps such as the pediatric population. Be sure to cover the underside of the rivet with a liner to prevent irritation from the metal. Strategically inserting foam padding beneath strapping can aid in obtaining optimal joint position. (Image 4) This is especially helpful when immobilizing the hand in an anti-deformity position: wrist extension, metacarpophalangeal, (MCP) joint flexion and interphalangeal (IP) joint extension. Consider placement of foam padding at the strap just proximal to the wrist crease and over the PIP joints.

Patient education regarding the proper application of straps is imperative. Have patients don and doff the orthosis in the clinic to be sure they are confident in proper placement of the straps. The adhesive hook should act as a "road map" for proper placement of loop material. Take a photo with their smart phone so they can refer to that at home! Numbering of the straps may be helpful. Patients should be aware of potential problems associated with improper application such as neurovascular compromise and bony/soft tissue irritation. The strapping should be snug enough to hold the orthosis in place but not so tight it causes tissue irritation. If there is an issue of significant edema, and the potential for "window edema" between the straps is present, perhaps using a circumferential wrap may be beneficial while the edema subsides.

Proper strapping is commonly overshadowed by the focus on thermoplastic selection and the molding process itself. Strapping selection is a crucial step in the orthotic fabrication process and can assist in maximizing the intervention effectiveness and final outcome. There are multiple options available, and we need to use critical thinking to challenge ourselves to come up with the optimal strapping solution.

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