Custom Shoes: Further Considerations

When ordering custom shoes, enhancements can be requested to meet the requirements of patients with unique needs.

By Séamus Kennedy, BEng (Mech), CPed

The implementation of the Therapeutic Shoe Bill (TSB) in 1993 opened up a marketing opportunity for extra-depth shoe manufacturers to provide non-custom shoe solutions for many patients. Shoes with multiple removable inlays, expandable uppers, and generous last designs make it far easier to properly fit and protect the “at-risk” foot. However, not all patients can be accommodated with an off-the-shelf product, so there is still a need for O&P professionals to provide well-fabricated, custom therapeutic shoes.

Many of the custom-molded shoes prescribed and fitted today are suited to particular populations. The typical presentation of a custom-shoe wearer includes some form of deformity due to edema, amputation, Charcot breakdown, or some combination of the three. Often, neuropathy is present, and with it the danger of skin breakdown and ulceration. A significant number of these patients have diabetes as a contributing factor, and many are geriatric.

These patients frequently require unique features and designs to ensure that the custom shoes provide further benefits and full protection. In addition, some custom-shoe wearers do not fit the presentations outlined above. Traumatic amputees, post-polio patients, AFO wearers, and pediatric cases each bring specific requirements. To address some of these needs, enhancements can be requested when ordering custom shoes.

Safety Toe Box

One question that I am frequently asked is, “Can you make a pair of custom-molded shoes with a safety toe box?”

Today, Occupational Safety and Health Administration (OSHA) regulations or specific workplace requirements may stipulate that workers must wear protective shoes. The adoption of these rules, along with the prevalence of diabetes and other debilitating foot conditions, sometimes results in a practitioner seeking a custom-molded shoe with a safety toe box.

The standard safety toe box is made from steel. Steel toe boxes can be bought separately in regular sizes and added over the last of any custom shoe. However, patients who require custom-molded shoes usually have irregularly shaped feet. Although steel toes can be worked (i.e. hammered) to shape and fit, I am reluctant to use them for molded shoes because many patients who need them have some neuropathy. An ill-fitting steel toe box would quickly ulcerate a hammered digit or a prominent bunion.

In order to get a closer fit, I prefer to use a firm thermoplastic. The plaster shoe lasts can be shaped appropriately for the patient’s feet, and then a heated plastic, such as 4mm Suborthol® or Co-poly, can be precisely vacuum-formed for it. Once cooled, the proximal edges can be feathered to eliminate any rough junctions.

Custom-formed thermoplastic toe boxes will hold up to a lot of abuse and ensure a more intimate fit. We have used them for all kinds of industrial workers as well as for farmers and hunters. A well-constructed thermoplastic toe box will fully protect the foot from external hazards and the shoe’s interior.
Sole Stiffeners

There are several indications for sole stiffeners in a shoe. We recommend steel shanks any time the patient has a transmetatarsal or more proximal amputation. The stiffener prevents extreme dorsiflexion of the added filler block into the distal foot during toe-off, when the shoe midsole flexes. Usually toe fillers for single or lesser digits do not require a shank.

Patients with callusing or delicate healing tissue on the plantar forefoot may also benefit from stiffeners. A rigid-soled shoe will not bend and therefore will reduce peak pressure in the forefoot region during third rocker.

Met-head fractures, hallux limitus, or turf toe often require restricted range of motion at the met heads. The insertion of a carbon footplate under a shoe's insole will limit flexion. This is a good alternative to cementing a permanent steel shank into the shoe's midsole because the plate is transferable between shoes, and because it's removable when the condition heals. The thin plates are low bulk and lightweight and can be used in conjunction with custom foot orthotics when necessary. They also have a beneficial energy-return component when the plate springs back into shape at toe-off.

Rocker soles should always be requested when any form of stiffener is employed, otherwise natural gait may be impeded. We find that a chukka-boot height works best, as a stiffened sole lends itself to heel slippage in a low-top. Similarly, stiff-soled shoes can generate the feeling of sliding inside the shoe, so a secure lace closure is preferred to Velcro®.

Insole Materials

Insoles provided under the Medicare TSB program, whether for custom or off-the-shelf shoes, must be (1) multi-density, (2) heat moldable, and (3) have a base layer that meets minimum standards for thickness and durometer. (Author's note: For a fuller outline of the TSB requirements and billing guidelines, visit www.cms.hhs.gov/home/medicare.asp) All fabricators of insoles for the program must also have Pricing Data Analysis and Coding Contractor (PDAC, formerly SADMERC) approval before you can bill either the A-5512 or A-5513 codes.

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