

Introduction to Pedorthic Footwear

What Makes a Shoe a “Pedorthic” Shoe?



Pedorthic Footwear

- There is no “official” definition.
- Several insurance providers simply refer to “depth shoes”
- Medicare’s A5500 PDAC requirements are as good a jumping off point as any.



Requirements for a product to be assigned A5500

For Diabetics only, Fitting (Including Follow-Up), Custom Preparation and Supply of Off-the-Shelf Depth-Inlay Shoe Manufactured to Accommodate Multi-Density Insert(s), Per Shoe, consist of the following:

1. Has a full length, heel-to-toe filler that when removed provides a minimum of 3/16" of additional depth used to accommodate custom-molded or customized inserts; and
2. Is made from leather or other suitable material of equal quality; and
3. Has some form of shoe closure; and
4. Is available in full and half sizes with a minimum of three (3) widths so that the sole is graded to the size and width of the upper portions of the shoe according to the American Standard Last Sizing Schedule or its equivalent. (The American Last Sizing Schedule is the numerical sizing standard used for shoes in the United States.)

Requirement 1

- Has a full length, heel-to-toe filler that when removed provides a minimum of 3/16" of additional depth used to accommodate custom-molded or customized insert
- *Review Criteria:* The three-sixteenths of an inch (3/16") additional depth requirement is to allow for the extra depth needed in the shoe for the placement of a diabetic insert. The source of the extra depth is derived from the American Last Sizing Schedule used for shoes in the United States. A standard depth shoe that would fit the same patient would not be able to accommodate the protective insert, so extra depth is molded into the shoe. Once the insert is placed into the shoe, there should still be adequate (standard) space for the beneficiary's foot. The presence of this additional depth must be proven in the application, or the shoes will not be assigned code A5500. The method of evidence is up to the submitter.

Requirement 2

- Is made from leather or other suitable material of equal quality
- *Review Criteria:* “Suitable material” is considered to be leather or leather-like material with a composition capable of providing adequate protection and support for the beneficiary’s foot. Suitable material must exhibit protective qualities comparable to leather, and also water resistance, durability of wear, and ability to hold its form as a leather equivalent shoe. The final configuration of the leather or leather-like material upper must create a toe box and heel counter to provide protection for the toe and heel areas. These are the most common locations for medical foot issues for the diabetic beneficiary and therefore must provide adequate protection. The applicant must present qualitative and/or quantitative information that the material composition of the shoe meets the equivalency characteristics noted above and provides adequate support.

Requirement 3

- Has some form of shoe closure
- *Review Criteria:* As most individuals being appropriately supplied diabetic shoes lack protective sensation in their feet, adequate forms of closure must be present (such as adjustable fastenings or laces) and the shoe must completely envelope[sic] the foot. Sandals and open toed shoes do not meet requirements for coding as therapeutic shoes for diabetics. If the foot is exposed to the elements, the risk of ulcers is increased, and the exposure may hamper or prevent adequate treatment of the beneficiary's foot. The closure must be functional and allow for tightening and loosening of the opening to accommodate foot swelling during the day and still provide a good fit and support. This combination of an enveloping shoe and functional closure not only ensures a secure fit that prevents intrusion from small objects, but also reduces shear forces that can lead to worsening of medical condition(s).

Requirement 4

- Is available in full and half sizes with a minimum of three (3) widths so that the sole is graded to the size and width of the upper portions of the shoe according to the American Last Sizing Schedule or its equivalent
- *Review Criteria:* Manufacturers must be able to demonstrate that their product(s) can accommodate for a broad range of foot shapes to account for the various foot related issues associated with diabetes. As foot swelling is a common issue in many diabetics, the shoes should be available in wide and standard widths to accommodate for this.

PFA

- The *Pedorthic Footcare Association* states that shoes have two basic purposes: to protect and to perform.
- To determine whether a shoe can do these things well, the following characteristics should be considered:
 - Construction
 - Materials
 - Heel height
 - Shoe shape
 - Foot characteristics
 - Shoe fit



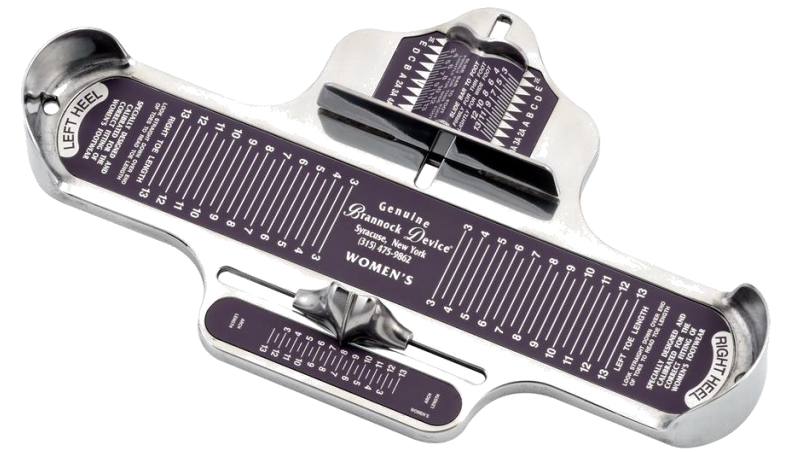
Pedorthic Footwear

- Shoe construction
 - Upper should be durable, breathable and either stretchy or conducive to being stretched and retaining the new shape.
 - Sole materials should be durable, supportive, shock absorbing and able to be (relatively) easily modified.
- Heel height
 - From a biomechanical standpoint, the lower the heel – meaning the smaller difference in height between the heel and the forefoot – the more normal the gait mechanics should be.
- Shoe shape
 - Look for manufacturers who use multiple last designs to build their shoes. The shape of the shoe should fit the shape of the foot. Many foot deformities and painful foot conditions are caused and/or exacerbated by improperly shaped and fitted footwear.



Pedorthic Footwear

- Additional depth
 - The bare minimum for a shoe to be used with a foot orthosis is a removable factory footbed (inlay). Ideally, the shoe will have an additional removable filler (as referenced in the PDAC requirements for A5500). The depth is critical for accommodating both foot deformities and devices like foot orthoses and braces.
- Multiple widths
 - Proper width is just as important as proper length when evaluating shoe fit. Look for manufacturers that offer multiple widths (at least three). Additionally, it needs to be what is known as *true widths*, meaning the sole gets wider in proportion to the widening of the upper when moving up in widths. Many mass market athletic shoe manufacturers claim to offer multiple widths, but the only difference in their “regular” and “wide” widths is the amount of upper material; the sole widths are identical. This means the foot overlaps the edges of the sole.
- Professionally fitted
 - 80% of the Americans are wearing the wrong sized shoe. If the patient is not going to use a shoe purchased from a pedorthic facility, the shoes should at least be fit-checked by a certified pedorthist.



What does the research say?

Pathways to Foot Ulcers

- Pecoraro RE, et al: Pathways to diabetic limb amputation: Basis for prevention. *Diabetes Care*. 1990 May;13(5):513-20.
 - Study defined causal pathways for initial LE amputations in diabetic pts at Seattle VA from 1984-1987.
 - A pivotal antecedent event was clearly identified in 86% of the cases.
 - Pivotal antecedent event was shoe-related repetitive pressure leading to cutaneous ulcer in 36% of all cases.

Do people with diabetic neuropathy fit their shoes incorrectly?

- Harrison SJ, et al: Do patients with diabetes wear shoes of the correct size? Int J Clin Pract. 2007 Nov;61(11):1900-4.
 - Many patients with diabetes (83%) wear shoes that do not fit, particularly, shoes that are too narrow for their foot width.
- McInnes AD, et al: Comparison of shoe-length fit between people with and without diabetic peripheral neuropathy: a case-control study. J Foot Ankle Res. 2012 Apr 16;5(1):9
 - Not really that much worse than the general population. From the diabetic and non-diabetic groups 82% (70/85) and 66% (78/118), respectively wore their shoes either too short or too long.



Perceived role of therapeutic footwear in the prevention of diabetic foot ulcers: A survey of patients with diabetes mellitus in Kaduna State.

- Tagang, et al. in NJBCS; 2016; 13:2 pp78-84.
- **Background:** There is a paucity of literature about the status of therapeutic footwear and their role in prevention of diabetic foot ulcers in Nigeria. The purpose of this study is thus 2-fold. To determine the perceived role of therapeutic footwear in the prevention of foot ulcers among patients with diabetes mellitus, to establish strategies that will encourage the use of therapeutic footwear in the prevention of diabetic foot ulcers.
- **Conclusion:** Majority of the patients are reported to have foot ulcers located on the phalanges and these are related to the wearing of inappropriate footwear. However, they are willing to use therapeutic footwear if recommended by a physician.

Adherence to Wearing Prescription Custom-Made Footwear in Patients With Diabetes at High Risk for Plantar Foot Ulceration

- [Roelof Waaijman](#), MSC,¹ [Renske Keukenkamp](#), MSC,¹ [Mirjam de Haart](#), MD, PHD,¹ [Wojtek P. Polonski](#), MD,² [Frans Nollet](#), MD, PHD,¹ and [Sicco A. Bus](#), PHD^{1,3} [Diabetes Care](#). 2013 Jun; 36(6): 1613–1618.
- OBJECTIVE: Prescription custom-made footwear can only be effective in preventing diabetic foot ulcers if worn by the patient. Particularly, the high prevalence of recurrent foot ulcers focuses the attention on adherence, for which objective data are nonexistent. We objectively assessed adherence in patients with high risk of ulcer recurrence and evaluated what determines adherence.
- RESEARCH DESIGN AND METHODS: In 107 patients with diabetes, neuropathy, a recently healed plantar foot ulcer, and custom-made footwear, footwear use was measured during 7 consecutive days using a shoe-worn, temperature-based monitor. Daily step count was measured simultaneously using an ankle-worn activity monitor. Patients logged time away from home. Adherence was calculated as the percentage of steps that prescription footwear was worn.
- RESULTS: Mean adherence was 71 %. Adherence at home was 61 (+/- 32)%, over 3,959 ± 2,594 steps, and away from home 87 ± 26%, over 2,604 ± 2,507 steps. In 35 patients with low adherence (<60%), adherence at home was 28 ± 24%. Lower BMI, more severe foot deformity, and more appealing footwear were significantly associated with higher adherence.
- CONCLUSIONS: The results show that adherence to wearing custom-made footwear is insufficient, particularly at home where patients exhibit their largest walking activity. This low adherence is a major threat for reulceration.

Conclusion

- Pedorthic footwear describes shoes that:
 - Are the right shape for the patient's foot
 - Are the correct width and length for the patient's foot
 - Accommodate the patient's deformities
 - Have adequate space for the patient to use a foot orthosis comfortably
 - Are durable, supportive, cushioned and breathable
 - Can be modified to better serve the patient's needs
 - Allow the patient to walk as safely and normally as possible



The End