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Senior Minutes

A Better Quality of Life for Seniors, Our Staff and Others

Shoe Wear Recommendations for the Older Adult

Things to Consider and Gift Ideas for your loved ones this Holiday Season!

Clinical practice suggests that many older individuals have great difficulty procuring shoes that are comfortable or shoes that successfully address a clinical problem they are experiencing. The *Journal of the American Geriatrics Society* showed that 58% of healthcare providers either provided intervention or made a referral for foot or footwear problems identified in their patients, with providers including Emergency Medicine physicians, hospital discharge planners, home health agency nurses and primary care physicians. Barriers to effective intervention include patient willingness to comply, financial resources, availability of services, and knowledge on the part of the practitioners.

Information about shoe wear is the purpose of this review and to provide you and healthcare practitioners. The common healthcare issues faced by older adults include poor balance, slipping, risk for falling, shock absorption, knee osteoarthritis, hallux rigidus, and general fit requirements.

Poor Balance

What mostly influences the quality of balance is heel fit. Shoes with 32-mm (1.3 in) heel lift (difference between sole material underneath the heel and forefoot) has more postural sway and a more conservative gait pattern. It also promotes double support time. Older women who wear shoes with elevated heels have a reduction in forward functional reach and have a reduced walking velocity. The forward shift in the center of pressure over the forefoot affected by shoes with elevated heels reduces the ability to center your weight safely in the forward direction.

Older individuals should wear shoes with enough heel lift to accommodate their posterior soft-tissue tightness without using so much heel lift that they incur adverse consequences such as falling. Heel lift should not be too high, nor too low, but just right (much like Goldilocks' preference for porridge).

Stiffness of the sole material can influence balance also. The use of shoes with a softer sole results in increased postural adjustments to improve medial-lateral stability. Abnormally soft soles may produce unstable support surface and can cause balance issues in older individuals. Other features that influence balance are width of the shoe's sole material and height of the upper material (support for the foot and ankle). Older individuals have greater medial-lateral stability when the sole material is wider, which provide a wider base of support to ensure that the person's center of mall is more likely to fall within that increased medial-lateral base of support. High-collar shoes, or shoes that have upper materials extending more superiorly on the foot and ankle provide more stable gait characteristics and greater standing stability.

When considering purchasing footwear for your older loved one, you should avoid shoes with elevated heel hights unless the patient has a severe ankle dorsiflexion limitation of the foot ankle joint; avoiding excessively soft sole material; avoiding rocker-bottom sole designs. You should look for shoes for wider sole material and a more superior collar of the upper materials. Simply wearing shoes as opposed to walking in bare feet will also improve balance.

Slipping

Slipping of course, may lead to a fall. Sufficient friction is required to prevent unwanted slippage. You can test sole materials by pushing vigorously with your thumb or a pen in to the shoe sole material.

Adequate tread groves in the sole material can provide greater coefficients of friction and therefore greater resistance against slipping on floors that are wet. Wider and deeper treads allow greater drainage of the fluid from the shoe/floor interface. It allows greater contact between the shoe sole material and the floor surface.

Older individuals who live in colder climates are often faced with the risk of falling while walking outside on the ground. Shoes with rougher sole surfaces may be protective for individuals who walk on icy surfaces. Also consider Yaktrax Walker (available in stores). It provides elastic netting that is put over shoes or boots before treading on icy outdoor surfaces. It may reduce the risk of falls outdoors during winter but should be warned againsst wearing them indoors on hard surfaces such as tile. It is only dedicated for outdoor use.

Continued on Page 2

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1

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Another way to prevent slippage is walking with smaller step lengths. A reduced step length ensures normal component of the ground reaction force will be larger, thereby effecting greater frictional force that will resist anterior slipping.

In summary, to avoid slippage, avoid very hard sole surfaces and wear shoes with deeper and wider tread grooves and shoes with rougher surfaces on the sole materials.

Shock Absorption

Clinicians often wish to recommend shoes that will provide greater shock absorption at impact with the support surface to reduce demands for muscle-tendon force, as well as loads that are transmitted across joint surfaces, which maybe for the health of the articular cartilage that covers opposing joint surfaces, or for the long-term health and survival of the components for total hip and total knee replacements.

The shoe sole materials should have mid-range stiffness values. Too stiff or not stiff enough shoe sole materials, will deform over a relatively shorter period of time, resulting greater magnitude ground reaction forces. For the athletic-type shoes have incorporated air or gel cells within the sole materials to prolong the time of deformation. Ethylene Vinyl Acetate (EVA) is a foam in the sole materials that moderate stiffness which prolongs the time of deformation and functions as an effective shock-absorbing material through the flow of air and through interconnecting cells within the material. Be warned that with continued use will compromise its effectiveness as a shock absorber as the air cells will collapse and/or the thickness reduced. Thicker sole materials of athletic-type shoes with moderate stiffness values should be replaced regularly followed by prolonged use.

Another issue to consider in shock absorption involves ambient air temperature. You must remember when performing weight bearing exercise to do them indoors if the temperature outside is below 50 degrees Celsius.

Knee Osteoarthritis

The influence of the shoe wear on knee joint loads is tied to the relationship between pronation/supination of the joints within the foot and ankle and frontal plane loading of the knee. Simply wearing shoes that gave some support and resistance to foot pronation will increase varus loading at the knee. Wearing very flexible shoes reduce varus loading at the knee. Laterally-wedged insoles within the shoe have successfully driven foot pronation and reduced varus knee loading for individuals who have varus malalignment and medial compartment osteoarthritis (OA).

Patients with medial compartment OA will benefit from wearing very flexible shoes with laterally-wedged insoles. Patients with lateral compartment OA will benefit from medially-wedged insoles worn in very supportive shoes will promote supination of the foot.

Hallux Rigidus

Another painful condition sometimes experienced by older patients Is called Hallux Rigidus or sometimes called Hallux Limitus. It is characterized by pronounced hypomobility of the metatarsophalangeal (MTP) of the great toe, with very limited extension of the joint. Patients with this condition are recommended to wear rocker-bottom sole, which is combined with a shoe that has stiff sole materials. Specific locations where stiffness is desired in the sole materials is at the toe break, or the forefoot region of the shoe that bends at terminal stance.

General First Recommendations and Fixation

Clinicians may wish to evaluate their patients' shoes for general fit in terms of size. All assessments should be conducted with the patient standing in his/her shoes since the foot elongates and widens and weight bearing. Length of the shoes is assessed using the "rule of thumb." A thumb's width of space (10-20 mm) should be available between the end of the longest toe and the end of the shoe. Width of the shoe is assessed by grasping the upper materials across the region of the metatarsal heads to detect: excessive bunching, indicating that the shoe is too wide; slight bunching indicates the width; or whether the clinician is unable to grasp the upper materials, indicating sufficient width. Appropriate depth of the toe box is assessed by determining if the person can move his/her toes up and down freely and whether there is no uncomfortable pressure being imposed on the dorsal aspect of the toes and toe nails. Finally, many older adults have difficulty being able to tie shoe laces due to lack of strength or dexterity, or the inability to reach the shoe laces with their hands. Potential solutions would be elastic shoe laces that remain tied; long handled shoe horns for placing the foot into the shoe; Velcro closures that are either placed on the shoe by the manufacturer or that can be added by a shoe repair shop; and long-handled grabbing device to pull the Velcro straps tight and secure them in place.

Conclusions

These recommendations for selection of shoe wear construction features will be generally helpful in decreasing the risk for slipping and falls and in improving balance and shock absorption. These recommendations would be helpful for specific musculoskeletal pathologies. Clinicians are encouraged to conduct thorough interviews and physical assessments with their patients prior to making any shoe wear recommendations to determine the appropriate ones for each individual.

Summarized from:

Gross, PT, PhD, FAPTA, Michael T. "Shoe Wear Recommendations for the Older Adult" *Clinical Geriatrics.* May 2010