Shoe lifts for leg length discrepancy

Clinical Policy ID: CCP.1521

Recent review date: 1/2025

Next review date: 5/2026

Policy contains: Leg length discrepancy; leg length inequality; shoe lift.

First Choice VIP Care Plus has developed clinical policies to assist with making coverage determinations. First Choice VIP Care Plus' clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of "medically necessary," and the specific facts of the particular situation are considered, on a case by case basis, by First Choice VIP Care Plus when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. First Choice VIP Care Plus' clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. First Choice VIP Care Plus' clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, First Choice VIP Care Plus will update its clinical policies as necessary. First Choice VIP Care Plus' clinical policies are not guarantees of payment.

Coverage policy

Shoe lifts (internal and external) are clinically proven and, therefore, may be medically necessary for treatment of leg length discrepancy when all of the following criteria are met (American Academy of Orthopaedic Surgeons, 2021; Quinones, undated):

- Appliance is available by prescription only.
- Clinical and radiographic confirmation of leg length discrepancy of 2 to 6 centimeters (cm).
- The member does not desire, or is not appropriate for, surgery. Note: In such cases where a higher lift is required, addition of an ankle-foot orthotic extension up the posterior calf may be medically necessary for stability.

Limitations

No other limitations were identified during the writing of this policy.

Alternative covered services

- Epiphysiodesis.
- Limb shortening.
- Limb lengthening.
- Lower limb prosthesis.

Background

Leg length discrepancy, also called leg length inequality or anisomelia, is a relatively common condition. Clinically significant leg length discrepancy usually appears in childhood. Causes may be congenital, idiopathic, or acquired. Acquired causes may affect the growth plate (e.g., trauma, infection, radiation, or tumor) or occur secondary to fracture of the long bones with malunion or nonunion, hip dysplasia, or hip dislocation. A large majority of cases involve an abnormally sized femur or tibia (American Academy of Orthopaedic Surgeons, 2021).

Only 10% of the population has exactly equal lower leg lengths, with the large majority of the remaining 90% having a discrepancy of less than 1 cm, which is considered insignificant. The degree of discrepancy in clinically significant cases is typically 3.5% to 4% of total leg length, or 4 cm (1.7 inches) in the average adult. Limited evidence suggests even leg length discrepancy of at least 5 millimeters (mm) can lead to chronic hip, knee, and low back problems (Gordon, 2019).

A physical examination for suspected cases will include observation of gait during walking and measurement of the discrepancy when the patient is standing barefoot. In children, leg length discrepancy may be identified during screening for scoliosis (even though discrepancy may not be caused by scoliosis). Gait abnormalities are often observed when the deviation is greater than 1 cm, and greater impact arises as the deviation grows (Khamis, 2017).

A measured block placed under the shorter leg to level the hips may be used to document the discrepancy. Further diagnostic information can be obtained from imaging studies. These include X-rays or scanograms, which are a series of three X-rays and a ruler to measure the length of a leg bone. In some cases, a computerized axial tomography scan of the bone and soft tissue in the legs will be taken. Growing children with leg length discrepancy are monitored over time to assess changes in the discrepancy (American Academy of Orthopaedic Surgeons, 2021).

Treatment for leg length discrepancy depends on many factors, such as the size and cause of the discrepancy, degree of deformity, patient's age, and any underlying neurologic issues. For minor leg length discrepancies, treatments can include periodic surveillance during childhood or wearing a lift fitted to the inside or outside of the shoe. Lifts are not costly and can be removed or adjusted easily. Major discrepancies are usually addressed by surgery to slow or stop the growth of the longer limb (epiphysiodesis), shorten the longer limb, or lengthen the shorter limb, or by prostheses (American Academy of Orthopaedic Surgeons, 2021).

Findings

Guideline

We found no evidence-based guidelines to inform this policy. Three publications offer a consensus of expert opinion to guide provision of shoe lifts for leg length discrepancy. The Pediatric Orthopaedic Society of North America states that surveillance is generally sufficient for discrepancies under 2 cm, and shoe lifts are appropriate for discrepancies from 2 to 6 cm, with surgical interventions used for larger discrepancies (Quinones, undated). The American Academy of Orthopaedic Surgeons (2021) produced a similar document. A review from Germany indicated that shoe lifts may be used if the discrepancy is from 2 to 5 cm, with surgery appropriate for larger discrepancies (Vogt, 2020).

Evidence review

Available evidence consists of largely uncontrolled trials that presents a high degree of uncertainty in findings, particularly in determining the benefit of shoe lifts for patients with mild discrepancies of less than 2 cm.

A systematic review of 10 studies (n = 349), including only one randomized controlled trial examined the effectiveness of shoe lifts used in adults with leg length discrepancy and low back pain, scoliosis, and osteoarthritis. Eighty-eight percent of patients experienced partial or complete pain relief. However, there was a high degree of bias in the included studies. In the nonrandomized studies, the improvement in pain, function/disability, or range of motion attributed to shoe lifts could not be determined with certainty. There were few reported adverse effects. The authors agreed that shoe lifts may be considered when treating adults with leg length discrepancy and musculoskeletal-related pain, but current evidence has not clearly defined the magnitude of the discrepancy (e.g., less than or greater than 2 cm) that would benefit from shoe lift correction (Campbell, 2018).

A systematic review of 23 studies (n = 377 asymptomatic patients) observed that heel lifts of 10 mm decreased duration of swing phase; those at least 5 cm decreased velocity during walking; those of 15 mm decreased maximum ankle dorsiflexion angle; and those of 12 and 18 mm decreased gastrocnemius muscle tendon unit length during running. Few effects were statistically significant (Rabusin, 2019).

Numerous articles on shoe lifts and foot orthoses as a treatment for leg length discrepancy have been published. One study of 300 patients with lower back pain indicated that more than 70% had lower leg discrepancy. Use of underfoot wedge correction or heel rises resulted in reduced discrepancy by an average of 8 mm, and a corresponding reduction in lower back pain (D'Amico, 2012).

A study of 369 children age 5 to 17 years with scoliosis included those with a discrepancy of 0.5 cm (n = 27), 1 cm (n = 329), 1.5 cm (n = 9), and 2 cm (n = 4). An external or internal shoe lift was applied to each. During the first follow-up examination within two weeks, the spine adjusted and the curve corrected in 83.7% (n = 316). In 14.7% (n = 53), the correction was observed later and accompanied by slight low back pain. An average of 11.3 months was needed to equalize the discrepancy. Authors conclude that leg length discrepancy equalization, in minor cases, "equals elimination of scoliosis" (Raczkowski, 2010).

In 2023, we added an observational study of the effects of customized orthotics, including 100% leg length discrepancy heel lift correction, in adults with non-specific low back pain (n = 80). A three-dimensional spine shape reconstruction was used to measure entire body posture. Pain level was assessed using the numerical pain rating scale, and participants were followed for two years. Customized heel-lift orthotics with 100% leg length discrepancy equalization reduced pain symptoms and structural-biomechanical asymmetry in posture in the short- and long-term without contraindications (D'Amico, 2021). No policy changes are warranted.

In 2024, we identified no newly relevant, published literature to add to the policy. No policy changes are warranted.

References

On November 21, 2024, we searched PubMed and the databases of the Cochrane Library, the U.K. National Health Services Centre for Reviews and Dissemination, the Agency for Healthcare Research and Quality, and the Centers for Medicare & Medicaid Services. Search terms were "leg length inequality (MeSH)," "leg length discrepancy," "foot orthoses" (MeSH), "anisomelia," and "shoe lift." We included the best available evidence according to established evidence hierarchies (typically systematic reviews, meta-analyses, and full economic analyses, where available) and professional guidelines based on such evidence and clinical expertise.

American Academy of Orthopaedic Surgeons. Lower limb length discrepancy. http://orthoinfo.aaos.org/topic.cfm?topic=a00259. Last reviewed September 2021.

Campbell TM, Ghaedi BB, Tanjong Ghogomu E, Welch V. Shoe lifts for leg length discrepancy in adults with common painful musculoskeletal conditions: A systematic review of the literature. *Arch Phys Med Rehabil*. 2018;99(5):981-993.e2. Doi: 10.1016/j.apmr.2017.10.027.

D'Amico M, Roncoletta P, Di Felice F, Porto D, Bellomo R, Saggini R. LBP and lower limb discrepancy: 3D evaluation of postural rebalancing via underfoot wedge correction. *Stud Health Technol Inform*. 2012;176:108-112. Doi: 10.3233/978-1-61499-067-3-108.

D'Amico M, Kinel E, Roncoletta P. Leg length discrepancy and nonspecific low back pain: 3-D stereophotogrammetric quantitative posture evaluation confirms positive effects of customized heel-lift orthotics. *Front Bioeng Biotechnol*. 2021;9:743132. Doi: 10.3389/fbioe.2021.743132.

Gordon JE, Davis LE. Leg length discrepancy: The natural history (and what do we really know). *J Pediatr Orthop*. 2019;39(6, Suppl 1):S10-S13. Doi: 10.1097/BPO.0000000000001396.

Khamis S, Carmeli E. Relationship and significance of gait deviations associated with limb length discrepancy: A systematic review. *Gait Posture*. 2017;57:115-123. Doi: 10.1016/j.gaitpost.2017.05.028.

Quinones D, Liu R, Gebhart JJ. Study guide. Leg length discrepancy (LLD). Pediatric Orthopaedic Society of North America. https://posna.org/physician-education/study-guide/leg-length-discrepancy-(lld). Undated.

Rabusin CL, Menz HB, McClelland JA, et al. Effects of heel lifts on lower limb biomechanics and muscle function: A systematic review. *Gait Posture*. 2019;69:224-234. Doi: 10.1016/j.gaitpost.2019.01.023.

Raczkowski JW, Daniszewska B, Zolynski K. Functional scoliosis caused by leg length discrepancy. *Arch Med Sci*. 2010;6(3):393-398. Doi: 10.5114/aoms.2010.14262.

Vogt B, Gosheger G, Wirth T, Horn J, Rodl R. Leg length discrepancy - treatment indications and strategies. *Dtsch Arztebl Int*. 2020;117(24):405-411. Doi: 10.3238/arztebl.2020.0405.

Policy updates

1/2023: initial review date and clinical policy effective date: 2/2023

1/2024: Policy references updated.

1/2025: Policy references updated.