Clinical Policy Title: Treatment of leg length discrepancy

Clinical Policy Number: 14.03.03

Effective Date: January 1, 2016
Initial Review Date: August 19, 2015
Most Recent Review Date: January 11, 2018
Next Review Date: January 2019

Related policies:
None.

ABOUT THIS POLICY: Prestige Health Choice has developed clinical policies to assist with making coverage determinations. Prestige Health Choice’s 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 by Prestige Health Choice 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. Prestige Health Choice’s 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. Prestige Health Choice’s clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, Prestige Health Choice will update its clinical policies as necessary. Prestige Health Choice’s clinical policies are not guarantees of payment.

Coverage policy

Prestige Health Choice considers the use of surgical management of leg length discrepancies to be clinically proven and, therefore, medically necessary when the following criteria are met (The Pediatric Orthopedic Society of North America [POSNA] 2015, American Association of Orthopaedic Surgeons [AAOS] 2017, The Association of Bone and Joint Surgeons 2013):

- Leg length discrepancy of 4 cm or more, or of 4 percent of total leg length.
- Angular or rotational deformity resulting in functional impairment not responding to non-surgical treatment.

Limitations:

Coverage determinations are subject to benefit limitations and exclusions as delineated by the state Medicaid authority. The Florida Medicaid website may be accessed at http://ahca.myflorida.com/Medicaid/.
Prestige Health Choice considers surgical management of leg length discrepancies of less than 4 cm or less than 4 percent of total leg length not to be clinically proven as effective and therefore not medically necessary. Treatment with surgery or with customized orthotics to achieve a desired height is considered cosmetic and not a covered benefit.

**Alternative covered services:**

Treatment with customized orthotics and by an orthopedic surgeon.

**Background**

Leg length discrepancy, or leg length inequality, is estimated to be present in up to a quarter of the general population (The Association of Bone and Joint Surgeons 2013). Clinically significant leg length discrepancy usually appears in childhood. Unequalized leg length discrepancy is associated with posture deformation, gait asymmetry, and low back pain. Radiographically leg length discrepancy causes pelvic obliquity in the frontal plane and lumbar scoliosis with convexity towards the shorter extremity. If left untreated leg length discrepancy can contribute to other serious orthopedic problems, such as stress fractures, degenerative arthritis and discopathy.

Treatment of clinically significant leg length discrepancy varies from conservative measures such as shoe lifts to eliminate minor length discrepancies to open surgical implantation of extendable long-bone prosthetics. The most common treatment for discrepancies in leg length is the use of an orthopedic shoe lift, which can be placed within or added to the exterior of nearly any type of shoe. Shoe lifts are inexpensive and can be removed if they are not effective.

There is substantial literature available on invasive methods of lengthening such as external fixation and pinning (e.g., the Ilizarov device), a method of lengthening often complicated by muscle contracture, joint stiffness, osteomyelitis from pin infection, and prolonged immobility. There are also several fully implantable surgical leg-lengthening devices (e.g., Fitbone®) in use in clinical practice.

Finally, epiphyseal growth blockade, subtrochanteric osteotomy and intramedullary shortening of long bone have been advanced as measures to diminish leg length discrepancy, but timing of these interventions to avoid creating inequality in the still-growing contralateral extremity is difficult in the pediatric age group where this condition is typically found.

**Searches**

Prestige Health Choice searched PubMed and the databases of:
- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality’s National Guideline Clearinghouse and other evidence-based practice centers.
We conducted searches on November 14, 2017. Searched terms were: "leg length discrepancy (MeSH)", and "treatment of leg length discrepancy."

We included:

- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews.**
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

There is a plethora of evidence regarding the degree of leg length discrepancy that is considered clinically significant. The effects of limb length discrepancy vary from patient to patient, depending on the cause and size of the difference. Patients who have differences of 3.5 to 4 percent of total leg length (about 4 cm or 1.67 inches in an average adult) may limp or have other difficulties when walking (American Association of Orthopaedic Surgeons 2017). Some studies show that patients with limb length discrepancies are more likely to experience low back pain and are more susceptible to injury. Other studies do not support this finding.

Some series proclaim near-ubiquity of leg length discrepancy in the general population with inequalities <2 cm likely inconsequential to ambulatory function (The Association of Bone and Joint Surgeons 2013). The Pediatric Orthopedics Society of North American (POSNA) recently concluded that LLD ≥2 cm is a significant impairment to gait and well-being (POSNA 2015). Others emphasize the simplicity of leg length discrepancy treatment and its substantial success rates at eliminating the discomfort of scoliosis (Raczkowski 2010) as justification for seeking and treating this condition vigorously.

Common methods of detecting leg length discrepancy include direct measure (e.g., by tape), indirect radiologic evaluation (e.g., assessment of pelvic leveling by drawing a line between iliac crests on anterior-posterior view of the pelvis), and computerized tomographic (CT) scanogram of the lower extremities in lateral view (Sabharwal 2008). There are potential sources of error with tape measurements related to differences in leg circumference, angular deformities, joint contractures and difficulty in accurately palpating bony prominences. Radiographic assessment of leg length discrepancy, first garnering recommendation nearly a quarter of a century ago remains the gold standard for accurately and reproducibly establishing the magnitude and results of treatment for leg length inequality.
Krieg (2008) published a clinical trial of eight adolescent patients who underwent leg lengthening with a motorized intramedullary lengthening device. The study focused on leg length achieved, time of rehabilitation, and rate of complications. The authors concluded that difficulties commonly associated with external fixators can be reduced with this method, and that short time of hospitalization and rehabilitation make it a promising procedure for limb lengthening.

The POSNA (2015) found that percutaneous epiphysodesis is most often performed to equalize or reduce leg length discrepancy. The POSNA noted that angular deformity can complicate an imperfectly performed epiphysodesis. Several techniques from open subtrochanteric osteotomy to closed intramedullary shortening have also been described. Unfortunately, only up to 10 percent of the length of a bone can be acutely shortened without unacceptable muscle weakness following the procedure.

Policy updates:

There is moderate quality evidence from a systematic review (Jauregui 2016) of low intensity pulsed ultrasound or pulsed electromagnetic fields effects on regenerative bone growth that the treatment time in limb lengthening is reduced when these modalities are part of the post-operative rehabilitative program.

The effects of limb length discrepancy vary from patient to patient, depending on the cause and size of the difference (American Academy of Orthopaedic Surgeons 2017). Patients who have differences of 3.5 to 4 percent of total leg length (about 4 cm or 1.67 inches in an average adult) may limp or have other difficulties when walking. Because these differences require the patient to exert more effort to walk, he or she may tire easily. Some studies show that patients with limb length discrepancies are more likely to experience low back pain and are more susceptible to injury. Other studies do not support this finding, however.

Summary of clinical evidence:

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<th>Citation</th>
<th>Content, Methods, Recommendations</th>
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| American Association of Orthopaedic Surgeons (2017) | **Key points:**  
  - The effects of limb length discrepancy vary from patient to patient, depending on the cause and size of the difference.  
  - Patients who have differences of 3-1/2 to 4 percent of total leg length (about 4 cm or 1-2/3 inches in an average adult) may limp or have other difficulties when walking.  
  - Because these differences require the patient to exert more effort to walk, he or she may tire easily.  
  - Some studies show that patients with limb length discrepancies are more likely to experience low back pain and are more susceptible to injury.  
  - Other studies do not support this finding, however. |
| Jauregui (2016) | **Key points:**  
  - Systematic review of low intensity pulsed ultrasound or pulsed electromagnetic fields effects on regenerative bone growth and whether they affect the treatment time in limb lengthening.  
  - Differences in bone healing index with and without the use of regenerate bone stimulation were the primary outcome measures. |
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| A total of 7 studies inclusive of a cohort of 153 patients found the mean healing index was 11.7 days/cm faster when using bone stimulation than in the comparison cohorts (33.7 vs 45.4 day, standardized mean difference of 1.16; p = 0.003).<br>The authors concluded that low intensity pulsed ultrasound or pulsed electromagnetic fields both decreased the time for bone healing (healing index in days/cm) of the newly formed regenerate bone in the cohort of patients that underwent limb lengthening. |<br><br>POSNA (2015)  <br>Leg Length Discrepancy 2-5 cms  <br>**Key points:**<br>- Significant leg length discrepancy (≥2cm) has an untoward effect on gait and is not tolerated well by patients.  <br>- Percutaneous epiphysodesis is most often performed, there are a number of current publications on the technique.  <br>- Angular deformity can follow an imperfectly performed epiphysodesis.  <br>- Bone shortening procedures can equalize or reduce leg length discrepancy.  <br>- Several techniques from open subtrochanteric osteotomy to closed intramedullary shortening have been described.  <br>- Only up to 10% of the length of a bone can be acutely shortened without unacceptable muscle weakness following.  <br>  
Weber (2014)  <br>Fluoroscopy and imageless navigation enable an equivalent reconstruction of leg length and global and femoral offset in THA  <br>**Key points:**<br>- A clinical trial of leg length discrepancy in 125 patients randomized to either navigation-guided or fluoroscopy-controlled total hip arthroplasty.  <br>- Analyzing the relative accuracy of leg length restoration resulted in a mean difference of 0.2 mm (95% CI, -1.0 to +1.4 mm; p = 0.729).  <br>- The authors concluded that Intraoperative fluoroscopy and imageless navigation seem equivalent in accuracy and precision to reconstruct leg length and global and femoral offset during total hip arthroplasty.  <br>  
The Association of Bone and Joint Surgeons (2013)  <br>Limb Length Discrepancy.  <br>**Key points:**<br>- Simple population studies show that up to a quarter of the population have a leg length discrepancy of at least 1cm.  <br>- Perhaps unsurprisingly, the chiropractic literature includes claims of leg length discrepancy in 90% of the population; however, these were not necessarily trivial differences as the mean difference was over 5mm  <br>- Gait studies consistently show that a discrepancy less than 2cm does not cause gait asymmetry.  <br>- For most people, anatomical leg-length inequality does not appear to be clinically significant until the magnitude reaches approximately 2cm  <br>- There is no evidence for increased incidence of hip or knee arthrosis for leg length discrepancy of 2cm or less.  <br>- For larger amounts of discrepancy, clinical judgment still must be weighed on an individual basis, as individual variation among patients with leg length discrepancy confounds any precise classification of functional disability.  <br>  
Raczkowski (2010)  <br>Functional scoliosis caused by leg length discrepancy  <br>**Key points:**<br>- A clinical trial of 369 children aged 5 to 17 years (209 girls, 160 boys) with leg length discrepancy-related scoliosis.  <br>- Leg length discrepancy of 0.5 cm was observed in 27, 1 cm in 329, 1.5 cm in 9 and 2 cm in 4 children.  <br>- During the first follow-up examination, within 2 weeks, the adjustment of the spine to new static conditions was noted and correction of the curve occurred in 316 examined children (83.7%).  <br>- In 53 children (14.7%) the correction was observed later and was accompanied by slight low back pain. |

Key points:
- A systematic review of 42 articles dealing with various assessment tools for measuring leg length discrepancy.
- While using a tape measure is an easy, safe, and noninvasive means of assessing leg length discrepancy, it is less reliable when compared to radiographic techniques such as a CT scanogram.
- A scanogram is one of the most commonly used methods for assessing leg length discrepancy and has excellent reliability and minimal, if any, magnification error.
- Despite a 5% magnification “error” in the measurement of the entire length of the lower extremity, there is minimal effect on assessment of leg length discrepancy.

References

Professional society guidelines/other:


Peer-reviewed references:


**CMS National Coverage Determinations (NCDs):**

No NCDs identified as of the writing of this policy.

**Local Coverage Determinations (LCDs):**


**Commonly submitted codes**

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

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<th>CPT Code</th>
<th>Description</th>
<th>Comment</th>
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<tbody>
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<td>20690</td>
<td>Application of a uniplane (pins or wires in one plane), unilateral, external fixation system</td>
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<tr>
<td>20692</td>
<td>Application of a multiplane (pins or wires in more than one plane), unilateral, external fixation system (e.g., Ilizarov, Monticelli type)</td>
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<tr>
<td>20696</td>
<td>Application of multiplane (pins or wires in more than one plane), unilateral, external fixation with stereotactic computer-assisted adjustment (e.g., spatial frame), including imaging; initial and subsequent alignment(s), assessment(s), and computation(s) of adjustment schedule(s)</td>
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<td>27465</td>
<td>Osteoplasty, femur; shortening (excluding 64876)</td>
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<th>ICD 10 Code</th>
<th>Description</th>
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<td>M21.951-M21.959</td>
<td>Unspecified acquired deformity of thigh</td>
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<tr>
<td>M21.961-M21.969</td>
<td>Unspecified acquired deformity of lower leg</td>
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<td>M21.751-M21.759</td>
<td>Unequal limb length (acquired), femur</td>
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<td>M21.761-M21.769</td>
<td>Unequal limb length (acquired), tibia and fibula</td>
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<td>Q72.811-Q72.819</td>
<td>Congenital shortening of lower limb</td>
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<td>HCPCS Level II Code</td>
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