CLINICAL APPROPRIATENESS GUIDELINES

MUSCULOSKELETAL PROGRAM

Appropriate Use Criteria: Small Joint Surgery

EFFECTIVE NOVEMBER 1, 2020

Proprietary

Approval and implementation dates for specific health plans may vary. Please consult the applicable health plan for more details.

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AIM SpecialtyHealth®
8600 West Bryn Mawr Avenue
South Tower – Suite 800 Chicago, IL 60631
www.aimspecialtyhealth.com

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Description and Application of the Guidelines

The AIM Clinical Appropriateness Guidelines (hereinafter "the AIM Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based criteria for medical necessity determinations where possible. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of health care
- To promote the most efficient and cost-effective use of services

The AIM guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up-to-date clinical principles and best practices. Relevant citations are included in the References section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of the AIM Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria, and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. Applicable federal and state coverage mandates take precedence over these clinical guidelines. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of the AIM Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

General Clinical Guideline

Clinical Appropriateness Framework

Critical to any finding of clinical appropriateness under the guidelines for a specific diagnostic or therapeutic intervention are the following elements:

- Prior to any intervention, it is essential that the clinician confirm the diagnosis or establish its pretest likelihood based on a complete evaluation of the patient. This includes a history and physical examination and, where applicable, a review of relevant laboratory studies, diagnostic testing, and response to prior therapeutic intervention.
- The anticipated benefit of the recommended intervention should outweigh any potential harms that may result (net benefit).
- Current literature and/or standards of medical practice should support that the recommended intervention offers the greatest net benefit among competing alternatives.
- Based on the clinical evaluation, current literature, and standards of medical practice, there exists a reasonable likelihood that the intervention will change management and/or lead to an improved outcome for the patient.

If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

Simultaneous Ordering of Multiple Diagnostic or Therapeutic Interventions

Requests for multiple diagnostic or therapeutic interventions at the same time will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all interventions simultaneously. This is based on the fact that appropriateness of additional intervention is often dependent on the outcome of the initial intervention.

Additionally, either of the following may apply:

- Current literature and/or standards of medical practice support that one of the requested diagnostic or therapeutic interventions is more appropriate in the clinical situation presented; or
- One of the diagnostic or therapeutic interventions requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice.

Repeat Diagnostic Intervention

In general, repeated testing of the same anatomic location for the same indication should be limited to evaluation following an intervention, or when there is a change in clinical status such that additional testing is required to determine next steps in management. At times, it may be necessary to repeat a test using different techniques or protocols to clarify a finding or result of the original study.

Repeated testing for the same indication using the same or similar technology may be subject to additional review or require peer-to-peer conversation in the following scenarios:

- Repeated diagnostic testing at the same facility due to technical issues
- Repeated diagnostic testing requested at a different facility due to provider preference or quality concerns
- Repeated diagnostic testing of the same anatomic area based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated diagnostic testing of the same anatomic area by different providers for the same member over a short period of time

Repeat Therapeutic Intervention

In general, repeated therapeutic intervention in the same anatomic area is considered appropriate when the prior intervention proved effective or beneficial and the expected duration of relief has lapsed. A repeat intervention requested prior to the expected duration of relief is not appropriate unless it can be confirmed that the prior intervention was never administered.

Small Joint Surgery of the Foot and Ankle

General Requirements and Documentation

The following general requirements apply to all indications except where they differ from the specific requirements. The specific requirements take precedence over any stated general requirement.

These guidelines address foot and ankle procedures when performed on an **elective, non-emergent** basis and not as part of the care of an acute fracture.

Documentation supporting medical necessity should be submitted at the time of the request and must include the following components:

Clinical notes describing symptom duration and severity, specific functional limitations related to symptoms, and type and duration of all therapeutic measures provided. If conservative management is not appropriate, the reason must be clearly documented.

Conservative management offered by the provider or other health professionals for this condition(s) should include footwear modification and/or padding/accommodative devices (e.g., foot orthosis) AND at least one of the following complementary strategies to reduce inflammation, alleviate pain, and improve function:

- Activity modification
- Prescription strength anti-inflammatory medications and analgesics
- Corticosteroid injection(s)
- Debridement of associated hyperkeratotic lesions such as corns or calluses

Documentation of compliance with a plan of therapy that includes elements from these areas is required where conservative management is appropriate.

If conservative management is not appropriate, the medical record must clearly document why such an approach is not reasonable.

Reporting of symptom severity. Severity of pain and its impact on function is a key factor in determining the need for intervention. For the purposes of this guideline, significant pain and functional impairment refers to pain ≥ 4 on the VAS scale associated with difficulty performing at least 2 impacted daily activities such as walking and wearing reasonable shoes.

Reports of imaging studies. Radiographic imaging must include weight bearing anterior-posterior and lateral views of the affected foot.

The provider shall submit a detailed and specific imaging report that correlates with clinical findings of the requested procedure. In the absence of the detailed report, the provider will be required to submit a report from an independent radiologist. The results of all imaging studies should correlate with the clinical findings in support of the requested procedure.

Imaging reports should be thorough and describe the presence or absence of subchondral cysts, subchondral sclerosis, periarticular osteophytes, joint subluxation, or avascular necrosis. The degree of joint space narrowing should also be noted. When appropriate, the key angular deformity indices should be documented.

Tobacco cessation. Adherence to a tobacco cessation program resulting in abstinence from tobacco for at least 6 weeks prior to surgery is recommended.

Diabetes. It is recommended that a patient with history of diabetes maintain a hemoglobin A1C of 8% or less prior to any joint replacement surgery.

Body Mass Index (BMI). It is recommended that any patient with a BMI equal to or greater than 40 attempt weight reduction prior to surgery.

Hallux Rigidus Surgery

Description and Scope

This guideline addresses surgery for hallux rigidus when performed as an **elective, non-emergent** procedure.

Hallux rigidus is a painful arthritis of the first metatarsophalangeal joint, which can cause stiffness and progressive loss of motion. It is the most common arthritic condition of the foot. The first metatarsophalangeal joint develops progressive degenerative changes resulting in pain, inflammation, and limited motion. The condition is more prevalent in females than males and has an average age of onset of about 50 years. Over 95% of patients have it bilaterally and two thirds have a positive family history.

A variety of scales have been used to grade the severity of hallux rigidus, although the scales proposed by Hattrup and Johnson and Coughlin and Shurmes are most common. For the purposes of interpretation of this guideline, either scale can be used (see **Table 1**) to determine whether hallux rigidus is mild, moderate or severe. Radiographic confirmation of hallux rigidus must include weight bearing anterior-posterior (ap) and lateral view of the affected foot.

Table 1. Grading Scales for Hallux Rigidus

Radiographic	Clinical	Qualitative	Hattrup and Johnson	Coughlin and Shurnes
No radiographic evidence for osteoarthritis	No pain +/- mild stiffness		-	0
Mild-to-moderate osteophyte formation with no joint space involvement	Mild pain maximal with flexion, mild stiffness	Mild	I	1
Moderate osteophyte formation and joint space narrowing; subchondral sclerosis	Moderate-to-severe pain constant at the extremes of motion, moderate-to-severe stiffness	Moderate	II	2
Marked osteophyte formation and loss of the joint space, cystic changes with or without subchondral sclerosis	Nearly constant pain (3), pain throughout the range of motion (including midrange) (4)	Severe	III	3 or 4

Hattrup SJ, Johnson KA. Subjective results of hallux rigidus following treatment with cheilectomy. Clin Orthop Relat Res. 1988(226):182-91.

Coughlin MJ, Shurnas PS. Hallux rigidus. Grading and long-term results of operative treatment. J Bone Joint Surg Am. 2003;85(11):2072-88.

After non surgical intervention, a variety of surgical interventions are available to treat hallux rigidus. Cheilectomy involves removal of excess osteophytes and is done to alleviate osseous impaction of the proximal phalanx and metatarsal head through debridement of the articulating joints. Arthrodesis is the most common treatment for patients with advanced hallux rigidus but carries additional risks including the potential for loss of foot function and joint motion, diminished gait efficiency, failure of fixation, nonunion, and transfer metatarsalgia. Alternatives include resection arthroplasty. More recently, implant arthroplasty of the first metatarsophalangeal joint has been proposed as an alternative to arthrodesis for more advanced hallus rigidus as a way of restoring joint motion.

Clinical Indications

Surgery for Hallux Rigidus

Surgery for hallux rigidus (including cheilectomy or osteotomy) may be considered medically necessary in skeletally mature patients when ALL of the following requirements are met:

- At least mild hallux rigidus (first metatarsophalangeal osteophytes with or without joint space narrowing) confirmed by radiography
- Limited and/or painful range of motion first metarsophalangeal joint
- At least 6 months of symptoms
- Significant pain and functional impairment of the first metatarsophalangeal joint that persists after at least 3 months of conservative management
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)

First Metatarsophalangeal Joint Arthrodesis

First metatarsophalangeal joint arthrodesis may be considered medically necessary in skeletally mature patients when ALL of the following requirements are met:

- At least 6 months of symptoms
- Limited and/or painful range of motion first metarsophalangeal joint
- Significant pain and functional impairment of the first metatarsophalangeal joint that persists after failed prior first metatarsophalangeal surgery or after at least 3 months of conservative management
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)
- Presence of ONE of the following:
    - Severe hallux rigidus* confirmed by radiography
    - Failed prior hallux valgus/rigidus surgery
    - Moderate hallux rigidus confirmed by radiography with excessive (hyper) mobility of the first metatarsophalangeal joint

*Resection arthroplasty is an alternative to arthrodesis

Contraindications

(All hallux rigidus procedures)

- Active infection of the joint
- Active systemic bacteremia
- Active skin infection
- Inadequate bone stock for osteotomy or arthrodesis
- Poor wound healing
- Peripheral vascular disease with non-healing ulcerative wounds

Exclusions

Indications other than those addressed in this guideline are considered **not medically necessary** including, but not limited to the following:

- Asymptomatic hallux rigidus

- Surgical intervention solely for the purposes of improved cosmesis
- Implant arthroplasty
- Percutaneous osteotomy

Selected References

1. Brewster M. Does total joint replacement or arthrodesis of the first metatarsophalangeal joint yield better functional results? A systematic review of the literature. J Foot Ankle Surg. 2010;49(6):546-52.
2. Coughlin MJ, Shurnas PS. Hallux rigidus. Grading and long-term results of operative treatment. The Journal of Bone and Joint Surgery American volume. 2003;85(11):2072-88.
3. Gibson JN, Thomson CE. Arthrodesis or total replacement arthroplasty for hallux rigidus: a randomized controlled trial. Foot Ankle Int. 2005;26(9):680-90.
4. Glazebrook M, Blundell CM, O'Dowd D, et al. Midterm Outcomes of a Synthetic Cartilage Implant for the First Metatarsophalangeal Joint in Advanced Hallux Rigidus. Foot Ankle Int. 2019;40(4):374-83.
5. Glazebrook M, Younger ASE, Daniels TR, et al. Treatment of first metatarsophalangeal joint arthritis using hemiarthroplasty with a synthetic cartilage implant or arthrodesis: A comparison of operative and recovery time. J Foot Ankle Surg. 2018;24(5):440-7.
6. Goldberg A, Singh D, Glazebrook M, et al. Association Between Patient Factors and Outcome of Synthetic Cartilage Implant Hemiarthroplasty vs First Metatarsophalangeal Joint Arthrodesis in Advanced Hallux Rigidus. Foot Ankle Int. 2017;38(11):1199-206.
7. Hattrup SJ, Johnson KA. Subjective results of hallux rigidus following treatment with cheilectomy. Clinical Orthopaedics and Related Research. 1988(226):182-91.
8. Kilmartin TE. Phalangeal osteotomy versus first metatarsal decompression osteotomy for the surgical treatment of hallux rigidus: a prospective study of age-matched and condition-matched patients. J Foot Ankle Surg. 2005;44(1):2-12.
9. Maffulli N, Papalia R, Palumbo A, et al. Quantitative review of operative management of hallux rigidus. Br Med Bull. 2011;98:75-98.
10. Mirmiran R, Bush T, Cerra MM, et al. Joint Clinical Consensus Statement of the American College of Foot and Ankle Surgeons(R) and the American Association of Nurse Practitioners(R): Etiology, Diagnosis, and Treatment Consensus for Gouty Arthritis of the Foot and Ankle. J Foot Ankle Surg. 2018;57(6):1207-17.
11. Park YH, Jung JH, Kang SH, et al. Implant Arthroplasty versus Arthrodesis for the Treatment of Advanced Hallux Rigidus: A Meta-analysis of Comparative Studies. J Foot Ankle Surg. 2019;58(1):137-43.
12. Patel HA, Kalra R, Johnson JL, et al. Is interposition arthroplasty a viable option for treatment of moderate to severe hallux rigidus? - A systematic review and meta-analysis. J Foot Ankle Surg. 2019;25(5):571-9.
13. Roukis TS. Clinical outcomes after isolated periarticular osteotomies of the first metatarsal for hallux rigidus: a systematic review. J Foot Ankle Surg. 2010;49(6):553-60.
14. Roukis TS. Outcomes after cheilectomy with phalangeal dorsiflexory osteotomy for hallux rigidus: a systematic review. J Foot Ankle Surg. 2010;49(5):479-87.
15. So E, Wilson MD, Chu AK, et al. Incidence of Nonunion of the Hallux Interphalangeal Joint Arthrodesis: A Systematic Review. J Foot Ankle Surg. 2018;57(4):776-80.
16. Stevens J, de Bot R, Hermus JPS, et al. Clinical Outcome Following Total Joint Replacement and Arthrodesis for Hallux Rigidus: A Systematic Review. JBJS rev. 2017;5(11):e2.
17. Stone OD, Ray R, Thomson CE, et al. Long-Term Follow-up of Arthrodesis vs Total Joint Arthroplasty for Hallux Rigidus. Foot Ankle Int. 2017;38(4):375-80.

Hallux Valgus and Bunionette Surgery

Description and Scope

This guideline addresses surgery for hallux valgus when performed as an **elective, non-emergent** procedure.

Hallux valgus is a common deformity of the first ray (great toe) characterized by a lateral deviation of the proximal phalanx at the level of the metatarsal joint. It is frequently associated with a concomitant medial (varus) deviation of the first metatarsal. The result is a bony prominence or “bump” on the medial side of the first metarsophalangeal joint. This is often referred to as a “bunion” and may be associated with soft tissue swelling and pain. In addition, the articular surface of the first metatarsal may have a valgus (lateral) inclination also contributing to the deformity. As the deformity progresses the sesamoid complex will shift laterally aided by the deforming force of the adductor tendon and the lateral capsule tightens while the medial side attenuates. When conservative management fails, the surgical correction of bony and/or soft tissue hallux valgus is often performed, and over 100 different surgical techniques have been described in the literature. Surgical procedures for hallux valgus include simple bunionectomy, various soft tissue procedures, metatarsal and phalangeal osteotomies, resection arthroplasty and metatarsophalangeal arthrodesis.

Bunionette deformity, also known as Tailor’s bunion, involves the fifth metatarsal head with a painful lateral bony prominence. It is often associated with constrictive footwear causing pain, inflammation, keratosis, and ulceration. When conservative management fails, surgical methods include condylar excision, proximal or distal osteotomies.

For arthrodesis indications, please see the criteria for hallux rigidus.

Clinical Indications

Hallux Valgus or Bunionette Surgery

Hallux valgus or bunionette surgery may be considered medically necessary when ALL of the following requirements are met:

- Skeletally mature patients (for bony procedures only)
- At least 6 months of symptoms
- Significant pain and functional limitation of the first or fifth metatarsophalangeal joint that persists after at least 3 months of conservative management or nonhealing ulcer at the site of the bunion, the sole of the foot or the second toe
- Radiographic confirmation of a hallux valgus angle (HVA) or metatarsophalangeal angle greater than 15 degrees or an intermetatarsal angle greater than 9 degrees
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)

Contraindications

(All hallux valgus procedures)

- Active infection of the joint
- Active systemic bacteremia
- Active skin infection
- Inadequate bone stock for osteotomy or arthrodesis
- Poor wound healing
- Peripheral vascular disease with non-healing ulcerative wounds

Exclusions

Indications other than those addressed in this guideline are considered **not medically necessary** including, but not limited to the following:

- Asymptomatic hallux valgus or bunionette deformity
- Surgical intervention solely for the purposes of improved cosmesis
- Implant arthroplasty

Note: Requests for bilateral bunionectomy done at the same time may require additional medical necessity review and may not be authorized.

Selected References

1. American College of Occupational and Environmental Medicine (ACOEM). Ankle and Foot Disorders. 2015.
2. Barg A, Harmer JR, Presson AP, et al. Unfavorable Outcomes Following Surgical Treatment of Hallux Valgus Deformity: A Systematic Literature Review. Journal of Bone & Joint Surgery - American Volume. 2018;100(18):1563-73.
3. Bia A, Guerra-Pinto F, Pereira BS, et al. Percutaneous Osteotomies in Hallux Valgus: A Systematic Review. J Foot Ankle Surg. 2018;57(1):123-30.
4. Biz C, Fosser M, Dalmau-Pastor M, et al. Functional and radiographic outcomes of hallux valgus correction by mini-invasive surgery with Reverdin-Isham and Akin percutaneous osteotomies: a longitudinal prospective study with a 48-month follow-up. Journal of Orthopaedic Surgery. 2016;11(1):157.
5. Buciuto R. Prospective randomized study of chevron osteotomy versus Mitchell's osteotomy in hallux valgus. Foot Ankle Int. 2014;35(12):1268-76.
6. Caravelli S, Mosca M, Massimi S, et al. Percutaneous treatment of hallux valgus: What's the evidence? A systematic review. Musculoskelet Surg. 2018;102(2):111-7.
7. Deenik A, van Mameren H, de Visser E, et al. Equivalent correction in scarf and chevron osteotomy in moderate and severe hallux valgus: a randomized controlled trial. Foot Ankle Int. 2008;29(12):1209-15.
8. Deenik AR, Pilot P, Brandt SE, et al. Scarf versus chevron osteotomy in hallux valgus: a randomized controlled trial in 96 patients. Foot Ankle Int. 2007;28(5):537-41.
9. Di Giorgio L, Sodano L, Touloupakis G, et al. Reverdin-Isham osteotomy versus Endolog system for correction of moderate hallux valgus deformity: a Randomized Controlled Trial. Clin Ter. 2016;167(6):e150-e4.
10. Elshazly O, Abdel Rahman AF, Fahmy H, et al. Scarf versus long chevron osteotomies for the treatment of hallux valgus: A prospective randomized controlled study. J Foot Ankle Surg. 2019;25(4):469-77.
11. Ferrari J. Bunions. Clin Evid (Online). 2009;11:11.
12. Glazebrook M, Copithorne P, Boyd G, et al. Proximal opening wedge osteotomy with wedge-plate fixation compared with proximal chevron osteotomy for the treatment of hallux valgus: a prospective, randomized study. The Journal of bone and joint surgery American volume. 2014;96(19):1585-92.
13. Harb Z, Kokkinakis M, Ismail H, et al. Adolescent hallux valgus: a systematic review of outcomes following surgery. J. 2015;9(2):105-12.
14. Jeuken RM, Schotanus MG, Kort NP, et al. Long-term Follow-up of a Randomized Controlled Trial Comparing Scarf to Chevron Osteotomy in Hallux Valgus Correction. Foot Ankle Int. 2016;37(7):687-95.
15. Kaufmann G, Dammerer D, Heyenbrock F, et al. Minimally invasive versus open chevron osteotomy for hallux valgus correction: a randomized controlled trial. Int Orthop. 2019;43(2):343-50.
16. Klugarova J, Hood V, Bath-Hextall F, et al. Effectiveness of surgery for adults with hallux valgus deformity: a systematic review. JBI Database System Rev Implement Rep. 2017;15(6):1671-710.
17. Lee KB, Cho NY, Park HW, et al. A comparison of proximal and distal Chevron osteotomy, both with lateral soft-tissue release, for moderate to severe hallux valgus in patients undergoing simultaneous bilateral correction: a prospective randomised controlled trial. Bone Joint J. 2015;97-B(2):202-7.
18. Lee M, Walsh J, Smith MM, et al. Hallux Valgus Correction Comparing Percutaneous Chevron/Akin (PECA) and Open Scarf/Akin Osteotomies. Foot Ankle Int. 2017;38(8):838-46.
19. Ma Q, Liang X, Lu J. Chevron osteotomy versus scarf osteotomy for hallux valgus correction: A meta-analysis. J Foot Ankle Surg. 2019;25(6):755-60.
20. Maffulli N, Longo UG, Marinozzi A, et al. Hallux valgus: effectiveness and safety of minimally invasive surgery. A systematic review. Br Med Bull. 2011;97:149-67.
21. Mahadevan D, Lines S, Hepple S, et al. Extended plantar limb (modified) chevron osteotomy versus scarf osteotomy for hallux valgus correction: A randomised controlled trial. J Foot Ankle Surg. 2016;22(2):109-13.

22. Malagelada F, Sahirad C, Dalmau-Pastor M, et al. Minimally invasive surgery for hallux valgus: a systematic review of current surgical techniques. Int Orthop. 2019;43(3):625-37.
23. Martijn HA, Sierevelt IN, Wassink S, et al. Fifth Metatarsal Osteotomies for Treatment of Bunionette Deformity: A Meta-Analysis of Angle Correction and Clinical Condition. J Foot Ankle Surg. 2018;57(1):140-8.
24. Mirmiran R, Bush T, Cerra MM, et al. Joint Clinical Consensus Statement of the American College of Foot and Ankle Surgeons(R) and the American Association of Nurse Practitioners(R): Etiology, Diagnosis, and Treatment Consensus for Gouty Arthritis of the Foot and Ankle. J Foot Ankle Surg. 2018;57(6):1207-17.
25. Park HW, Lee KB, Chung JY, et al. Comparison of outcomes between proximal and distal chevron osteotomy, both with supplementary lateral soft-tissue release, for severe hallux valgus deformity: A prospective randomised controlled trial. Bone Joint J. 2013;95-b(4):510-6.
26. Pentikainen IT, Ojala R, Ohtonen P, et al. Radiographic analysis of the impact of internal fixation and dressing choice of distal chevron osteotomy: randomized control trial. Foot Ankle Int. 2012;33(5):420-3.
27. Radwan YA, Mansour AM. Percutaneous distal metatarsal osteotomy versus distal chevron osteotomy for correction of mild-to-moderate hallux valgus deformity. Arch Orthop Trauma Surg. 2012;132(11):1539-46.
28. Resch S, Stenstrom A, Reynisson K, et al. Chevron osteotomy for hallux valgus not improved by additional adductor tenotomy. A prospective, randomized study of 84 patients. Acta Orthop Scand. 1994;65(5):541-4.
29. Roukis TS. Percutaneous and minimum incision metatarsal osteotomies: a systematic review. J Foot Ankle Surg. 2009;48(3):380-7.
30. Sahin N, Cansabuncu G, Cevik N, et al. A randomized comparison of the proximal crescentic osteotomy and rotational scarf osteotomy in the treatment of hallux valgus. Acta Orthop Traumatol Turc. 2018;52(4):261-6.
31. Saro C, Andren B, Wildemyr Z, et al. Outcome after distal metatarsal osteotomy for hallux valgus: a prospective randomized controlled trial of two methods. Foot Ankle Int. 2007;28(7):778-87.
32. Shimozono Y, Hurley ET, Brown AJ, et al. Sesamoidectomy for Hallux Sesamoid Disorders: A Systematic Review. J Foot Ankle Surg. 2018;57(6):1186-90.
33. Torkki M, Malmivaara A, Seitsalo S, et al. Surgery vs orthosis vs watchful waiting for hallux valgus: a randomized controlled trial. Jama. 2001;285(19):2474-80.
34. Waizy H, Panahi B, Dohle J, et al. The Current S2e Guideline for Hallux valgus - Evidence-based Guideline Development Using Meta-analysis. Zeitschrift fur Orthopadie und Unfallchirurgie. 2019;157(1):75-82.
35. Yammine K, Assi C. A meta-analysis of comparative clinical studies of isolated osteotomy versus osteotomy with lateral soft tissue release in treating hallux valgus. J Foot Ankle Surg. 2019;25(5):684-90.

Lesser Toe Deformities

Description and Scope

This guideline addresses surgery for lesser toe deformities when performed as an **elective, non-emergent** procedure and not as part of the care of an acute fracture.

Deformities of the lesser (two through five) toes are generally known as hammer toe, claw toe, and mallet toe.

Hammer toe is characterized by flexion deformity of the proximal interphalangeal joint of one or more of the lesser four toes. In severe or chronic conditions, it may be associated with either flexion or extension of the distal interphalangeal or hyperextension of the metatarsophalangeal joint joint. The most commonly affected toe is the second, although multiple toes can be involved. Hammer toes are considered flexible if passively correctable or rigid if not correctable to the neutral position.

Mallet toe is characterized by flexion deformity at the distal interphalangeal joint only.

Claw toe deformity is characterized by flexion deformities of the proximal interphalangeal and distal interphalangeal joints as well as hyperextension at the metatarsophalangeal joint.

The main bony procedures used in the treatment of second hammertoe are excisional arthroplasty and arthrodesis of the proximal interphalangeal joint. Arthrodesis of the proximal interphalangeal joint represents the standard treatment for rigid and structured deformities not suited for manual correction. This procedure is performed by removing the articular surfaces of the proximal and intermediate phalanges. Although many systems such as cannulated screws or absorbable pins have been designed for the fixation of the arthrodesis, the K-wire is the most utilized traditional method. Surgical management of lesser toe deformity may also include soft-tissue release, tendon transfer, joint resection, joint fusion, metatarsal shortening, or a combination of procedures.

Clinical Indications

Lesser Toe Deformity Surgery

Lesser toe deformity surgery may be considered medically necessary in skeletally mature patients when ALL of the following criteria are met:

- At least 6 months of symptoms
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)
- Significant pain and functional impairment that persists after at least 3 months of conservative therapy or non-healing ulcer attributed to the lesser toe deformity
- Radiographic confirmation of a hammer toe, claw toe, or mallet toe

Contraindications

(All lesser toe deformity procedures)

- Active infection of the joint
- Active systemic bacteremia
- Active skin infection
- Inadequate bone stock for osteotomy or arthrodesis
- Poor wound healing
- Peripheral vascular disease with non-healing ulcerative wounds

Exclusions

Indications other than those addressed in this guideline are considered **not medically necessary** including, but not limited to the following:

- Asymptomatic lesser toe deformities
- Surgical intervention solely for the purposes of improved cosmesis
- Implant arthroplasty
- Intramedullary fixation devices other than wire fixation

Selected References

1. Albright RH, Hassan M, Randich J, et al. Risk Factors for Failure in Hammertoe Surgery. Foot Ankle Int. 2020:1071100720904931.
2. Angirasa AK, Barrett MJ, Silvester D. SmartToe R implant compared with Kirschner wire fixation for hammer digit corrective surgery: a review of 28 patients. J Foot Ankle Surg. 2012;51(6):711-3.
3. Atinga M, Dodd L, Foote J, et al. Prospective review of medium term outcomes following interpositional arthroplasty for hammer toe deformity correction. J Foot Ankle Surg. 2011;17(4):256-8.
4. Averous C, Leider F, Rocher H, et al. Interphalangeal Arthrodesis of the Toe With a New Radiolucent Intramedullary Implant (Toegrip). Foot ankle spec. 2015;8(6):520-4.
5. Basile A, Albo F, Via AG. Intramedullary Fixation System for the Treatment of Hammertoe Deformity. J Foot Ankle Surg. 2015;54(5):910-6.
6. Boffeli TJ, Thompson JC, Tabatt JA. Two-Pin Fixation of Proximal Interphalangeal Joint Fusion for Hammertoe Correction. J Foot Ankle Surg. 2016;55(3):480-7.
7. Catena F, Doty JF, Jastifer J, et al. Prospective study of hammertoe correction with an intramedullary implant. Foot Ankle Int. 2014;35(4):319-25.
8. Ceccarini P, Rinonapoli G, Sebastiani E, et al. Clinical Comparison Between Shortening Osteotomy of the Proximal Phalanx Neck and Arthrodesis in Hammer Toe Surgery at Mid-TermFollow-Up. J Foot Ankle Surg. 2019;58(2):221-5.
9. Coillard JY, Petri GJ, van Damme G, et al. Stabilization of proximal interphalangeal joint in lesser toe deformities with an angulated intramedullary implant. Foot Ankle Int. 2014;35(4):401-7.
10. Cook JJ, Johnson LJ, Cook EA. Anatomic Reconstruction Versus Traditional Rebalancing in Lesser Metatarsophalangeal Joint Reconstruction. J Foot Ankle Surg. 2018;57(3):509-13.
11. Coughlin MJ, Dorris J, Polk E. Operative repair of the fixed hammertoe deformity. Foot Ankle Int. 2000;21(2):94-104.
12. Ellington JK, Anderson RB, Davis WH, et al. Radiographic analysis of proximal interphalangeal joint arthrodesis with an intramedullary fusion device for lesser toe deformities. Foot Ankle Int. 2010;31(5):372-6.
13. Fazal MA, James L, Williams RL. StayFuse for proximal interphalangeal joint fusion. Foot Ankle Int. 2013;34(9):1274-8.
14. Ferrier M, Mattei JC, Desmarchelier R, et al. Radiographic and Clinical Comparison of Proximal Interphalangeal Joint Arthrodesis Between a Static and Dynamic Implant. J Foot Ankle Surg. 2019;58(4):657-62.
15. Frey S, Helix-Giordanino M, Piclet-Legre B. Percutaneous correction of second toe proximal deformity: Proximal interphalangeal release, flexor digitorum brevis tenotomy and proximal phalanx osteotomy. Orthop Traumatol Surg Res. 2015;101(6):753-8.
16. Gilheany M, Baarini O, Samaras D. Minimally invasive surgery for pedal digital deformity: an audit of complications using national benchmark indicators. Journal of Foot & Ankle Research. 2015;8:17.
17. Guelfi M, Pantalone A, Cambiaso Daniel J, et al. Arthrodesis of proximal inter-phalangeal joint for hammertoe: intramedullary device options. Journal of Orthopaedics & Traumatology. 2015;16(4):269-73.
18. Harmer JL, Wilkinson A, Maher AJ. A Midterm Review of Lesser Toe Arthrodesis With an Intramedullary Implant. Foot ankle spec. 2017;10(5):458-64.
19. Jay RM, Malay DS, Landsman AS, et al. Dual-Component Intramedullary Implant Versus Kirschner Wire for Proximal Interphalangeal Joint Fusion: A Randomized Controlled Clinical Trial. J Foot Ankle Surg. 2016;55(4):697-708.
20. Joseph R, Schroeder K, Greenberg M. A retrospective analysis of lesser metatarsophalangeal joint fusion as a treatment option for hammertoe pathology associated with metatarsophalangeal joint instability. J Foot Ankle Surg. 2012;51(1):57-62.
21. Khan F, Kimura S, Ahmad T, et al. Use of Smart Toe© implant for small toe arthrodesis: A smart concept? Foot and Ankle Surgery. 2015;21(2):108-12.
22. Klammer G, Baumann G, Moor BK, et al. Early complications and recurrence rates after Kirschner wire transfixion in lesser toe surgery: a prospective randomized study. Foot Ankle Int. 2012;33(2):105-12.

23. Kominsky SJ, Bermudez R, Bannerjee A. Using a bone allograft to fixate proximal interphalangeal joint arthrodesis. Foot ankle spec. 2013;6(2):132-6.
24. Konkel KF, Sover ER, Menger AG, et al. Hammer toe correction using an absorbable pin. Foot Ankle Int. 2011;32(10):973-8.
25. Kramer WC, Parman M, Marks RM. Hammertoe correction with k-wire fixation. Foot Ankle Int. 2015;36(5):494-502.
26. Lamm BM, Ribeiro CE, Vlahovic TC, et al. Lesser proximal interphalangeal joint arthrodesis: a retrospective analysis of the peg-in-hole and end-to-end procedures. J Am Podiatr Med Assoc. 2001;91(7):331-6.
27. Matthews AH, Jagodzinski NA, Westwood M, et al. Effectiveness of the Cobb-Stainsby excision arthroplasty. J Foot Ankle Surg. 2018;24(1):49-53.
28. McKenzie JC, Rogero RG, Khawam S, et al. Incidence and Risk Factors for Pin Site Infection of Exposed Kirschner Wires Following Elective Forefoot Surgery. Foot Ankle Int. 2019;40(10):1154-9.
29. Mueller CM, Boden SA, Boden AL, et al. Complication Rates and Short-Term Outcomes After Operative Hammertoe Correction in Older Patients. Foot Ankle Int. 2018;39(6):681-8.
30. Obrador C, Losa-Iglesias M, Becerro-de-Bengoa-Vallejo R, et al. Comparative Study of Intramedullary Hammertoe Fixation. Foot Ankle Int. 2018;39(4):415-25.
31. O'Kane C, Kilmartin T. Review of proximal interphalangeal joint excisional arthroplasty for the correction of second hammer toe deformity in 100 cases. Foot Ankle Int. 2005;26(4):320-5.
32. Payo-Ollero J, Casajus-Ortega A, Llombart-Blanco R, et al. The efficacy of an intramedullary nitinol implant in the correction of claw toe or hammertoe deformities. Arch Orthop Trauma Surg. 2019;139(12):1681-90.
33. Peck CN, Macleod A, Barrie J. Lesser metatarsophalangeal instability: presentation, management, and outcomes. Foot Ankle Int.33(7):565-70.
34. Richman SH, Siqueira MB, McCullough KA, et al. Correction of Hammertoe Deformity With Novel Intramedullary PIP Fusion Device Versus K-Wire Fixation. Foot Ankle Int. 2017;38(2):174-80.
35. Roukis TS. A 1-piece shape-metal nitinol intramedullary internal fixation device for arthrodesis of the proximal interphalangeal joint in neuropathic patients with diabetes. Foot ankle spec. 2009;2(3):130-4.
36. Sandhu JS, DeCarbo WT, Hofbauer MH. Digital arthrodesis with a one-piece memory nitinol intramedullary fixation device: a retrospective review. Foot ankle spec. 2013;6(5):364-6.
37. Scholl A, McCarty J, Scholl D, et al. Smart toe R implant versus buried Kirschner wire for proximal interphalangeal joint arthrodesis: a comparative study. J Foot Ankle Surg. 2013;52(5):580-3.
38. Schrier JC, Keijsers NL, Matricali GA, et al. Lesser Toe PIP Joint Resection Versus PIP Joint Fusion: A Randomized Clinical Trial. Foot Ankle Int. 2016;37(6):569-75.
39. Scott RT, Hyer CF, Berlet GC. The PROTOE intramedullary hammertoe device: an alternative to Kirschner wires. Foot ankle spec. 2013;6(3):214-6.
40. Sperati G. Metatarsophalangeal joint arthroplasty with implantation of Osteomed Interflex IPG system: our experience. Acta Biomed Ateneo Parmense. 2014;85 Suppl 2:118-20.
41. Sung W, Weil L, Jr., Weil LS, Sr. Retrospective comparative study of operative repair of hammertoe deformity. Foot ankle spec. 2014;7(3):185-92.
42. Wendelstein JA, Goger P, Bock P, et al. Bioabsorbable Fixation Screw for Proximal Interphalangeal Arthrodesis of Lesser Toe Deformities. Foot Ankle Int. 2017;38(9):1020-5.
43. Yassin M, Garti A, Heller E, et al. Hammertoe Correction With K-Wire Fixation Compared With Percutaneous Correction. Foot ankle spec. 2017;10.

Ankle Arthritis

Description and Scope

This guideline addresses surgery for ankle osteoarthritis when performed as an **elective, non-emergent** procedure and not as part of the care of an acute fracture.

Ankle osteoarthritis presents in approximately 1% of the world's adult population. The primary cause of ankle osteoarthritis is trauma associated with pain, dysfunction, and impaired mobility. Other causes include rheumatic diseases, gout, hemochromatosis, avascular necrosis, hemophilia, and postinfectious conditions. In the early stages, conservative management may decrease pain and preserve function. Ankle arthrodesis or total ankle arthroplasty may be indicated for advanced cases. Ankle arthrodesis was considered the gold standard treatment in patients with end-stage ankle osteoarthritis until the 1970s, when the first total ankle arthroplasty procedures were described. Although gait efficiency is decreased with ankle arthrodesis, most surgeons still consider it as the procedure of choice to alleviate pain in patients with end-stage ankle osteoarthritis.

Ankle arthrodesis is regarded as a reliable treatment for end-stage ankle arthritis because it yields good results with a low complication rate. A commonly reported risk of ankle arthrodesis is adjacent-joint degeneration that occurs more frequently in those with arthritis of the ipsilateral hindfoot and midfoot.

Total ankle arthroplasty was first performed in 1970 as an alternative treatment option to the gold standard at the time of ankle arthrodesis for end-stage ankle degenerative joint disease. Initially, total ankle arthroplasty had high rates of subsidence, loosening, and revision. However, with the advances in implant design such as uncemented implants as well as fixed and mobile-bearing surfaces, total ankle arthroplasty has resulted in improved outcomes.

Clinical Indications

Ankle Arthrodesis

Ankle arthrodesis may be considered medically necessary in skeletally mature patients when ALL of the following criteria are met:

- Radiographic confirmation of advanced/end-stage arthritis of the tibiotalar joint
- Significant pain and functional impairment due to arthritis of the ankle that persists after at least 6 months of conservative management
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)

Total Ankle Arthroplasty

Total ankle arthroplasty may be considered medically necessary in skeletally mature patients when ALL of the following criteria are met:

- Radiographic confirmation of advanced/end-stage arthritis of the tibiotalar joint
- Significant pain and functional impairment due to arthritis of the ankle that persists after at least 6 months of conservative management
- Documentation of adequate lower extremity vascular perfusion (e.g., strong, palpable pedal pulses)
- Device is FDA approved
- At least ONE of the following is present:
    - Moderate-to-severe adjacent joint (subtalar or midfoot) arthritis
    - Inflammatory arthritis

Contraindications

- Active infection of the joint
- Active systemic bacteremia
- Charcot neuropathy
- Active skin infection
- Inadequate bone stock
- Severe anatomic deformity in adjacent ankle structures, including hindfoot, forefoot and knee joint
- Severe ankle deformity (e.g., severe varus or valgus deformity) that would not normally be eligible for ankle arthroplasty
- Prior surgery or injury that has adversely affected ankle bone quality
- Extensive avascular necrosis of the talar dome
- Malalignment (e.g., varus or valgus deformity greater than 15 degrees) not correctable by surgery
- Peripheral vascular disease
- Absence of the medial or lateral malleolus or both
- Significant mal-alignment of the knee joint
- Severe osteoporosis, osteopenia or other conditions resulting in poor bone quality, as this may result in inadequate bony fixation
- High demand sports activities (e.g., contact sports, jumping)
- Immunosuppressive therapy
- Insufficient ligament support that cannot be repaired with soft tissue stabilization
- Insufficient musculature such that proper component positioning or alignment is not possible
- Neurologic impairment with dynamic muscular imbalance across the ankle joint
- Prior fusion of the ankle
- Prior revision of a total ankle replacement
- Peripheral neuropathy (may lead to Charcot joint of the affected ankle)
- Psychiatric problems that hinder adequate cooperation during perioperative period

Exclusions

Indications other than those addressed in this guideline are considered **not medically necessary** including, but not limited to the following:

- Asymptomatic ankle osteoarthritis
- Surgical intervention solely for the purposes of improved cosmesis
- Non-FDA approved total ankle replacement devices

Selected References

1. Bai LB, Lee KB, Song EK, et al. Total ankle arthroplasty outcome comparison for post-traumatic and primary osteoarthritis. Foot Ankle Int. 2010;31(12):1048-56.
2. Barg A, Morris SC, Schneider SW, et al. Surgical procedures in patients with haemophilic arthropathy of the ankle. Haemophilia. 2016;22(3):e156-76.
3. Bonnin M, Gaudot F, Laurent JR, et al. The Salto total ankle arthroplasty: survivorship and analysis of failures at 7 to 11 years. Clinical orthopaedics and related research. 2011;469(1):225-36.

4. Braito M, Dammerer D, Kaufmann G, et al. Are our expectations bigger than the results we achieve? a comparative study analysing potential advantages of ankle arthroplasty over arthrodesis. Int Orthop. 2014;38(8):1647-53.
5. Brunner S, Barg A, Knupp M, et al. The Scandinavian total ankle replacement: long-term, eleven to fifteen-year, survivorship analysis of the prosthesis in seventy-two consecutive patients. The Journal of bone and joint surgery American volume. 2013;95(8):711-8.
6. Choi WJ, Lee JS, Lee M, et al. The impact of diabetes on the short- to mid-term outcome of total ankle replacement. Bone Joint J. 2014;96-b(12):1674-80.
7. Clough TM, Alvi F, Majeed H. Total ankle arthroplasty: what are the risks?: a guide to surgical consent and a review of the literature. Bone Joint J. 2018;100-B(10):1352-8.
8. Coetzee JC, McGaver RS, Seiffert KJ, et al. Management of Ankle Arthritis After Severe Ankle Trauma. J Orthop Trauma. 2020;34 Suppl 1:S26-S31.
9. Colorado Division of Workers' Compensation, Lower Extremity Injury Medical Treatment Guidelines, (2016), Colorado Division of Workers' Compensation, 216.
10. Cottom JM, Douthett SM, McConnell KK, et al. The Effect of Tobacco Use on Incision Healing in Total Ankle Arthroplasty: A Review of 114 Patients. Foot ankle spec. 2019:1938640019826675.
11. Daniels TR, Mayich DJ, Penner MJ. Intermediate to Long-Term Outcomes of Total Ankle Replacement with the Scandinavian Total Ankle Replacement (STAR). The Journal of bone and joint surgery American volume. 2015;97(11):895-903.
12. de Keijzer DR, Joling BSH, Sierevelt IN, et al. Influence of Preoperative Tibiotalar Alignment in the Coronal Plane on the Survival of Total Ankle Replacement: A Systematic Review. Foot Ankle Int. 2019:1071100719886817.
13. Di Iorio A, Viste A, Fessy MH, et al. The AES total ankle arthroplasty analysis of failures and survivorship at ten years. Int Orthop. 2017;41(12):2525-33.
14. Esparragoza L, Vidal C, Vaquero J. Comparative study of the quality of life between arthrodesis and total arthroplasty substitution of the ankle. J Foot Ankle Surg. 2011;50(4):383-7.
15. Giannini S, Romagnoli M, Barbadoro P, et al. Results at a minimum follow-up of 5 years of a ligaments-compatible total ankle replacement design. Foot and ankle surgery : official journal of the European Society of Foot and Ankle Surgeons. 2017;23(2):116-21.
16. Gross C, Erickson BJ, Adams SB, et al. Ankle arthrodesis after failed total ankle replacement: a systematic review of the literature. Foot ankle spec. 2015;8(2):143-51.
17. Gross CE, Lampley A, Green CL, et al. The Effect of Obesity on Functional Outcomes and Complications in Total Ankle Arthroplasty. Foot Ankle Int. 2016;37(2):137-41.
18. Hahn ME, Wright ES, Segal AD, et al. Comparative gait analysis of ankle arthrodesis and arthroplasty: initial findings of a prospective study. Foot Ankle Int. 2012;33(4):282-9.
19. Honnenahalli Chandrappa M, Hajibandeh S, Hajibandeh S. Ankle arthrodesis-Open versus arthroscopic: A systematic review and meta-analysis. Journal of Clinical Orthopaedics & Trauma. 2017;8(Suppl 2):S71-S7.
20. Jastifer J, Coughlin MJ, Hirose C. Performance of total ankle arthroplasty and ankle arthrodesis on uneven surfaces, stairs, and inclines: a prospective study. Foot Ankle Int. 2015;36(1):11-7.
21. Joo SD, Lee KB. Comparison of the outcome of total ankle arthroplasty for osteoarthritis with moderate and severe varus malalignment and that with neutral alignment. Bone Joint J. 2017;99-b(10):1335-42.
22. Kerkhoff YR, Kosse NM, Metsaars WP, et al. Long-term Functional and Radiographic Outcome of a Mobile Bearing Ankle Prosthesis. Foot Ankle Int. 2016;37(12):1292-302.
23. Kessler B, Sendi P, Graber P, et al. Risk factors for periprosthetic ankle joint infection: a case-control study. The Journal of bone and joint surgery American volume. 2012;94(20):1871-6.
24. Kim HJ, Suh DH, Yang JH, et al. Total ankle arthroplasty versus ankle arthrodesis for the treatment of end-stage ankle arthritis: a meta-analysis of comparative studies. Int Orthop. 2017;41(1):101-9.
25. Kim JH, Patel S. Is It Worth Discriminating Against Patients Who Smoke? A Systematic Literature Review on the Effects of Tobacco Use in Foot and Ankle Surgery. J Foot Ankle Surg. 2017;56(3):594-9.
26. Kofoed H, Stürup J. Comparison of ankle arthroplasty and arthrodesis. A prospective series with long-term follow-up. The Foot. 1994;4(1):6-9.
27. Krause FG, Windolf M, Bora B, et al. Impact of complications in total ankle replacement and ankle arthrodesis analyzed with a validated outcome measurement. The Journal of bone and joint surgery American volume. 2011;93(9):830-9.
28. Lee GW, Wang SH, Lee KB. Comparison of Intermediate to Long-Term Outcomes of Total Ankle Arthroplasty in Ankles with Preoperative Varus, Valgus, and Neutral Alignment. The Journal of bone and joint surgery American volume. 2018;100(10):835-42.
29. Ling JS, Smyth NA, Fraser EJ, et al. Investigating the Relationship Between Ankle Arthrodesis and Adjacent-Joint Arthritis in the Hindfoot. A Systematic Review. Journal of Bone & Joint Surgery - American Volume. 2015;97(9):e43.

30. Maffulli N, Longo UG, Locher J, et al. Outcome of ankle arthrodesis and ankle prosthesis: a review of the current status. Br Med Bull. 2017;124(1):91-112.
31. Mann JA, Mann RA, Horton E. STAR ankle: long-term results. Foot Ankle Int. 2011;32(5):S473-84.
32. Moore KR, Howell MA, Saltrick KR, et al. Risk Factors Associated With Nonunion After Elective Foot and Ankle Reconstruction: A Case-Control Study. J Foot Ankle Surg. 2017;56(3):457-62.
33. Norvell DC, Shofer JB, Hansen ST, et al. Frequency and Impact of Adverse Events in Patients Undergoing Surgery for End-Stage Ankle Arthritis. Foot Ankle Int. 2018;39(9):1028-38.
34. Onggo JR, Nambiar M, Phan K, et al. Outcome after total ankle arthroplasty with a minimum of five years follow-up: A systematic review and meta-analysis. J Foot Ankle Surg. 2019;25:25.
35. Park JH, Kim HJ, Suh DH, et al. Arthroscopic Versus Open Ankle Arthrodesis: A Systematic Review. Arthroscopy. 2018;34(3):988-97.
36. Pedowitz DI, Kane JM, Smith GM, et al. Total ankle arthroplasty versus ankle arthrodesis: a comparative analysis of arc of movement and functional outcomes. Bone Joint J. 2016;98-b(5):634-40.
37. Piriou P, Culpan P, Mullins M, et al. Ankle replacement versus arthrodesis: a comparative gait analysis study. Foot Ankle Int. 2008;29(1):3-9.
38. Queen RM, Adams SB, Jr., Viens NA, et al. Differences in outcomes following total ankle replacement in patients with neutral alignment compared with tibiotalar joint malalignment. The Journal of bone and joint surgery American volume. 2013;95(21):1927-34.
39. Rodriguez-Merchan EC. Total ankle replacement or ankle fusion in painful advanced hemophilic arthropathy of the ankle. Expert Rev Hematol. 2015;8(6):727-31.
40. Rouhani H, Favre J, Aminian K, et al. Multi-segment foot kinematics after total ankle replacement and ankle arthrodesis during relatively long-distance gait. Gait Posture. 2012;36(3):561-6.
41. Saltzman CL, Kadoko RG, Suh JS. Treatment of isolated ankle osteoarthritis with arthrodesis or the total ankle replacement: a comparison of early outcomes. Clinics in orthopedic surgery. 2010;2(1):1-7.
42. Saltzman CL, Mann RA, Ahrens JE, et al. Prospective controlled trial of STAR total ankle replacement versus ankle fusion: initial results. Foot Ankle Int. 2009;30(7):579-96.
43. Sansosti LE, Van JC, Meyr AJ. Effect of Obesity on Total Ankle Arthroplasty: A Systematic Review of Postoperative Complications Requiring Surgical Revision. J Foot Ankle Surg. 2018;57(2):353-6.
44. Schuh R, Hofstaetter J, Krismer M, et al. Total ankle arthroplasty versus ankle arthrodesis. Comparison of sports, recreational activities and functional outcome. Int Orthop. 2012;36(6):1207-14.
45. Schweitzer KM, Adams SB, Viens NA, et al. Early prospective clinical results of a modern fixed-bearing total ankle arthroplasty. The Journal of bone and joint surgery American volume. 2013;95(11):1002-11.
46. Singer S, Klejman S, Pinsker E, et al. Ankle arthroplasty and ankle arthrodesis: gait analysis compared with normal controls. The Journal of bone and joint surgery American volume. 2013;95(24):e191(1-10).
47. Slobogean GP, Younger A, Apostle KL, et al. Preference-based quality of life of end-stage ankle arthritis treated with arthroplasty or arthrodesis. Foot Ankle Int. 2010;31(7):563-6.
48. Smyth NA, Kennedy JG, Parvizi J, et al. Risk factors for periprosthetic joint infection following total ankle replacement. J Foot Ankle Surg. 2019;07:07.
49. Stewart MG, Green CL, Adams SB, Jr., et al. Midterm Results of the Salto Talaris Total Ankle Arthroplasty. Foot Ankle Int. 2017;38(11):1215-21.
50. Sung KS, Ahn J, Lee KH, et al. Short-term results of total ankle arthroplasty for end-stage ankle arthritis with severe varus deformity. Foot Ankle Int. 2014;35(3):225-31.
51. Trajkovski T, Pinsker E, Cadden A, et al. Outcomes of ankle arthroplasty with preoperative coronal-plane varus deformity of 10 degrees or greater. The Journal of bone and joint surgery American volume. 2013;95(15):1382-8.
52. Trincat S, Kouyoumdjian P, Asencio G. Total ankle arthroplasty and coronal plane deformities. Orthop Traumatol Surg Res. 2012;98(1):75-84.
53. Zhao D, Huang D, Zhang G, et al. Positive and negative factors for the treatment outcomes following total ankle arthroplasty? A systematic review. J Foot Ankle Surg. 2020;26(1):1-13.

Codes

The following code list is not meant to be all-inclusive. Authorization requirements will vary by health plan. Please consult the applicable health plan for guidance on specific procedure codes.

Specific CPT codes for services should be used when available. Nonspecific or not otherwise classified codes may be subject to additional documentation requirements and review.

CPT/HCPCS

27702 .....Arthroplasty, ankle; with implant (total ankle)

27703 .....Arthroplasty, ankle; revision, total ankle

27704 .....Removal of ankle implant

27870 .....Arthrodesis, ankle, open

28110 .....Ostectomy, partial excision, fifth metatarsal head (bunionette) (separate procedure)

28285 .....Correction, hammertoe (eg, interphalangeal fusion, partial or total phalangectomy)

28286 .....Correction, cock-up fifth toe, with plastic skin closure (eg, Ruiz-Mora type procedure)

28289 .....Hallux rigidus correction with cheilectomy, debridement and capsular release of the first metatarsophalangeal joint; without implant

28291 .....Hallux rigidus correction with cheilectomy, debridement and capsular release of the first metatarsophalangeal joint; with implant

28292 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with resection of proximal phalanx base, when performed, any method

28295 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with proximal metatarsal osteotomy, any method

28296 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with distal metatarsal osteotomy, any method

28297 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with first metatarsal and medial cuneiform joint arthrodesis, any method

28298 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with proximal phalanx osteotomy, any method

28299 .....Correction, hallux valgus (bunionectomy), with sesamoidectomy, when performed; with double osteotomy, any method

28306 .....Osteotomy, with or without lengthening, shortening or angular correction, metatarsal; first metatarsal

28307 .....Osteotomy, with or without lengthening, shortening or angular correction, metatarsal; first metatarsal with autograft (other than first toe)

28308 .....Osteotomy, with or without lengthening, shortening or angular correction, metatarsal; other than first metatarsal, each

28310 .....Osteotomy, shortening, angular or rotational correction; proximal phalanx, first toe (separate procedure)

28312 .....Osteotomy, shortening, angular or rotational correction; other phalanges, any toe

28315 .....Sesamoidectomy, first toe (separate procedure)

28750 .....Arthrodesis, great toe; metatarsophalangeal joint

History

Status	Review Date	Effective Date	Action
Created	05/11/2020	11/01/2020	Original effective date. Independent Multispecialty Physician Panel (IMPP) review.