

# 15.

## Bölüm

# METATARS KIRIKLARI

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### GİRİŞ

Metatars kırıkları, erişkinlerde ayak parmak kırıklarından sonra en sık görülen ön ayak yaralanmalarıdır. Hastalar genellikle travma sonrası ağrı ve yürümede güçlük şikayeti ile başvururlar. Tanı genellikle üç yönlü ayak grafisi ile konur. Ancak tarsometatarsal eklem yaralanmalarının ayırıcı tanısı için bilgisayarlı tomografi gerekli olabileceği gibi stres kırıklarının tanısında da manyetik rezonans görüntüleme ve sintigrafi gerekli olabilir. Genellikle düşük enerjili travma sonrası meydana gelen metatars kırıkları, sıklıkla ayrışmamış kırıklar olup çoğu konservatif yöntemlerle tedavi edilir ve nadiren cerrahi tedavi gerektirir. Ancak bu kırıkların tanı ve tedavisi uygun bir şekilde yapılmadığında ön ayak deformitesine ve kronik ayak ağrısına yol açabilirler. Tedavinin amacı; metatarsları kırık öncesi ayak anatomisine uygun hale getirerek, ön ayağın uzunlamasına ve enlemesine kemerlerini korumak ve ağrısız yük taşıyan bir ayak elde etmektir. Böylelikle post-travmatik dejeneratif değişiklikler, metatarsalji ve kronik ayak deformiteleri önlenmiş olur. Bu bölümün temel amacı, ayak yaralanmalarının önemli bir bölümünü oluşturan metatars kırıklarının güncel tanı ve tedavi yaklaşımını özetlemektir.

### EPİDEMİYOLOJİ

Metatars kırıkları, erişkinlerde sık görülen ayak yaralanmaları olup tüm ayak kırıklarının yaklaşık %35'ini ve tüm iskelet sistemi yaralanmalarının yaklaşık %5'ini oluşturur (1,2). Genellikle 20-50 yaş arasında rastlanır. İleri yaş, osteoporotik kadınlarda ve kronik diyabet hastalarında bu kırıklara daha

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### Zone 3 kırıkları:

Yer değiştirmemiş ya da çok az yer değiştirmiş kırıklar konservatif yöntemlerle tedavi edilir. >3-4 mm yer değiştirme ve >10° plantar ya da dorsal açılanma varlığında kapalı redüksiyon ve alçılama önerilir. Redüksiyon kapalı olarak başaramadığında veya redüksiyonun devamı sağlanamadığında açık redüksiyon internal fiksasyon uygulanır. Fiksasyon için K-telleri, mini vidalar ya da plak ve mini vidalar kullanılır.

### KAYNAKLAR

1. Boutefnouchet T, Budair B, Backshayesh P, et al. Metatarsal fractures: a review and current concepts. *Trauma*. 2014;16(3):147-163.
2. Hatch RL, Alsobrook JA, Clugston JR. Diagnosis and management of metatarsal fractures. *Am Fam Physician*. 2007;76(6):817-826.
3. Cakir H, Van Vliet-Koppert ST, Van Lieshout EM, et al. Demographics and outcome of metatarsal fractures. *Arch Orthop Trauma Surg*. 2011;131(2):241-245.
4. Moore N. Metatarsal fracture management. *Orthop Trauma*. 2018;32(6):428-436.
5. Sarpong NO, Swindell HW, Trupia EP, et al. Metatarsal fractures. *Foot Ankle Orthop* 2018;3:3. Doi: 10.1177/2473011418775094
6. Petrisor BA, Ekrol I, Court-Brown C. The epidemiology of metatarsal fractures. *Foot Ankle Int*. 2006;27(3):172-174.
7. Buddecke DE, Polk MA, Barp EA. Metatarsal fractures. *Clin Podiatr Med Surg* 2010;27(4):601-624.
8. Urteaga AJ, Lynch M. Fractures of the central metatarsals. *Clin Podiatr Med Surg*.1995;12(4):759-772.
9. Smith JW, Arnoczky SP, Hersh A. The intraosseous blood supply of the fifth metatarsal: implications for proximal fracture healing. *Foot Ankle*. 1992;13(3):143-152.
10. Zwitter EW, Breederveld RS. Fractures of the fifth metatarsal; diagnosis and treatment. *Injury*. 2010;41(6):555-562.
11. Rammelt S, Heineck J, Zwipp H. Metatarsal fractures. *Injury*. 2004;35 Suppl 2:SB77-86. Doi: 10.1016/j.injury.2004.07.016.
12. Patel DS, Roth M, Kapil N. Stress fractures: diagnosis, treatment, and prevention. *Am Fam Physician*. 2011;83(1):39-46.
13. Richli WR, Rosenthal DI. Avulsion fracture of the fifth metatarsal: experimental study of pathomechanics. *AJR Am J Roentgenol*. 1984;143(4):889-891.
14. Theodorou DJ, Theodorou SJ, Kakitsubata Y, et al. Fractures of proximal portion of fifth metatarsal bone: anatomic and imaging evidence of a pathogenesis of avulsion of the plantar aponeurosis and the short peroneal muscle tendon. *Radiology*. 2003;226(3):857-865.
15. Zwipp H, Baumgart F, Cronier P, et al. Integral classification of injuries (ICI) to the bones, joints, and ligaments application to injuries of the foot. *Injury* 2004;35: SB3-SB9. Doi: 10.1016/j.injury.2004.07.008
16. Dameron TB. Fractures and anatomic variations of the proximal portion of the fifth metatarsal. *J Bone Joint Surg (Am)*. 1975;57(6):788-792.
17. Quill GEJ. Fractures of the proximal fifth metatarsal. *Orthop Clin North Am*. 1995;26(2):353-361.
18. Jones R. Fracture of the base of the fifth metatarsal bone by indirect violence. *Ann Surg*. 1902;35(6):697-700.
19. Stewart I. Jones's fracture: fracture of base of fifth metatarsal. *Clin Orthop*. 1960;16:190-198.

20. Lawrence SJ, Botte MJ. Jones' fractures and related fractures of the proximal fifth metatarsal. *Foot Ankle*. 1993;14(6):358-365.
21. Torg JS. Fractures of the base of the fifth metatarsal distal to the tuberosity. *Orthopedics*. 1990; 13(7):731-737.
22. Shereff MJ. Fractures of the forefoot. *Instr Course Lect* 1990;39:133-140.
23. Lee DK, Mulder GD, Schwartz AK. Hallux, sesamoid and first metatarsal injuries. *Clin Podiatr Med Surg*. 2011;28(1):43-56.
24. Shereff MJ. Complex fractures of the metatarsals. *Orthopaedics*. 1990;13(8):875-882.
25. Zwipp H, Rammelt S. Posttraumatic deformity correction at the foot. *Zentralbl Chir*. 2003; 128(3):218-226.
26. Rammelt S, Schneiders W, Schikore H, et al. Primary open reduction and fixation compared with delayed corrective arthrodesis in the treatment of tarsometatarsal (Lisfranc) fracture dislocation. *J Bone Joint Surg (Br)*. 2008;90(11):1499-1506.
27. Zermatten P, Crevoisier X. Avulsion fracture of the peroneus longus tendon insertion at the base of the first metatarsal: report of a case. *Foot Ankle Surg*. 2011;17(1):10-12.
28. Sánchez Alepuz E, Vicent Carsi V, Alcántara P, et al. Fractures of the central metatarsal. *Foot Ankle Int*. 1996;17(4):200-203.
29. Samaila EM, Ditta A, Negri S, et al. Central metatarsal fractures: a review and current concepts. *Acta Biomed*. 2020;30;91(4-5):36-46
30. Baumfeld D, Macedo BD, Nery C, et al. Anterograde percutaneous treatment of lesser metatarsal fractures: technical description and clinical results. *Rev Bras Ortop*. 2015; 4;47(6):760-764.
31. Kim HN, Park YW. Reduction and fixation of metatarsal neck fractures using closed antegrade intramedullary nailing: technique tip. *Foot Ankle Int*. 2011;32(11):1098-1100.
32. Kim HN, Park YJ, Kim GL, et al. Closed antegrade intramedullary pinning for reduction and fixation of metatarsal fractures. *J Foot Ankle Surg*. 2012;51(4):445-449.
33. Zarei M, Bagheri N, Nili A, et al. Closed antegrade/retrograde intramedullary fixation of central metatarsal fractures: surgical technique and clinical outcomes. *Injury*. 2020;51(4):1125-1129. Doi: 10.1016/j.injury.2020.03.001.
34. Donahue MP, Manoli A 2nd. Technical tip: transverse percutaneous pinning of metatarsal neck fractures. *Foot Ankle Int*. 2004;25(6):438-439.
35. Ozer H, Ozgur A. The transverse dorsal approach to displaced multi-metatarsal fractures. *J Foot Ankle Surg*. 2006;45(3):190-191.
36. Mert M, Unkar EA, Ozluk AV, et al. Multiple simultaneous metatarsal stress fractures in the same foot. *J Am Podiatr Med Assoc*. 2015;105(2):177-180.
37. Chuckpaiwong B, Cook C, Pietrobon R, et al. Second metatarsal stress fracture in sport: comparative risk factors between proximal and non-proximal locations. *Br J Sports Med*. 2007;41(8):510-514.
38. Chuckpaiwong B, Cook C, Nunley JA. Stress fractures of the second metatarsal base occur in nondancers. *Clin Ortop Relat Res*. 2007;461:197-202. Doi: 10.1097/BLO.0b013e3180598ff2.
39. Korpelainen R, Orava S, Karpakka J, et al. Risk factors for recurrent stress fractures in athletes. *Am J Sports Med*. 2001;29(3):304-310.
40. Gehrmann RM., Renard RL. Current concepts review: Stress fractures of the foot. *Foot Ankle Int*. 2006;27(9):750-757.
41. Aronow MS, Diaz-Doran V, Sullivan RJ, et al. The effect of triceps surae contracture force on plantar foot pressure distribution. *Foot Ankle Int* 2006;27(1):43-52.
42. Ringham R, Klump K, Kaye W, et al. Eating disorder symptomatology among ballet dancers. *Int J Eat Disord*. 2006;39(6):503-508.
43. Cassebaum WH. Lisfranc fracture-dislocations. *Clin Orthop Relat Res* 1963;30(30):116-129.
44. Moracia-Ochagavía I, Rodríguez-Merchán EC. Lisfranc fracture-dislocations: current ma-

- agement. *EFORT Open Rev.* 2019;2;4(7):430-444.
45. Desmond EA, Chou LB. Current concepts review: Lisfranc injuries. *Foot Ankle Int* 2006;27(8):653-660.
  46. Benirschke SK, Meinberg E, Anderson SA, et al. Fractures and dislocations of the midfoot: Lisfranc and Chopart injuries. *J Bone Joint Surg (Am)*. 2012;94(14):1325-1337.
  47. DeOrio M, Erickson M, Usuelli FG, et al. Lisfranc injuries in sport. *Foot Ankle Clin*. 2009;14(2):169-186.
  48. Yu-Kai Y, Shiu-Bii L. Anatomic parameters of the Lisfranc joint complex in a radiographic and cadaveric comparison. *J Foot Ankle Surg*. 2015;54(5):883-887.
  49. Nunley JA, Vertullo CJ. Classification, investigation, and management of midfoot sprains: lisfranc injuries in the athlete. *Am J Sports Med*. 2002;30(6):871-878.
  50. Myerson MS, Fisher RT, Burgess AR, et al. Fracture dislocations of the tarsometatarsal joints: End results correlated with pathology and treatment. *Foot Ankle*. 1986;6(5):225-242.
  51. Stavlas P, Roberts CS, Xypnitos FN, et al. The role of reduction and internal fixation of Lisfranc fracture-dislocations: a systematic review of the literature. *Int Orthop* 2010;34(8):1083-1091.
  52. Shapiro MS, Wascher DC, Finerman GA. Rupture of Lisfranc's ligament in athletes. *Am J Sports Med*. 1994;22(5):687-691.
  53. Meyer SA, Callaghan JJ, Albright JP, et al. Midfoot sprains in collegiate football players. *Am J Sports Med*. 1994;22(3):392-401.
  54. Faciszewski T, Burks RT, Manaster BJ. Subtle injuries of the Lisfranc joint. *J Bone Joint Surg Am (Am)*. 1990;72(10):1519-1522.
  55. Crates JM, Barber FA, Sanders EJ. Subtle Lisfranc subluxation: results of operative and nonoperative treatment. *J Foot Ankle Surg*. 2015;54(3):350-355.
  56. Kuo RS, Tejwani NC, Digiovanni CW, et al. Outcome after open reduction and internal fixation of Lisfranc joint injuries. *J Bone Joint Surg (Am)* 2000;82(11):1609-1618.
  57. Ly TV, Coetzee JC. Treatment of primarily ligamentous Lisfranc joint injuries: primary arthrodesis compared with open reduction and internal fixation. A prospective, randomized study. *J Bone Joint Surg (Am)*. 2006;88(3):514-520.
  58. Mulier T, Reynders P, Dereymaeker G, et al. Severe Lisfrancs injuries: primary arthrodesis or ORIF? *Foot Ankle Int*. 2002;23(10):902-905.
  59. Henning JA, Jones CB, Sietsema DL, et al. Open reduction internal fixation versus primary arthrodesis for lisfranc injuries: a prospective randomized study. *Foot Ankle Int*. 2009;30(10):913-922.
  60. Smith N, Stone C, Furey A. Does open reduction and internal fixation versus primary arthrodesis improve patient outcomes for Lisfranc trauma? A systematic review and meta-analysis. *Clin Orthop Relat Res*. 2015;474(6):1445-1452.
  61. Cochran G, Renninger C, Tompane T, et al. Primary arthrodesis versus open reduction and internal fixation for low-energy Lisfranc injuries in a young athletic population. *Foot Ankle Int*. 2017;38(9):957-963.
  62. Ponkilainen VT, Mattila VM, Laine HJ, et al. Nonoperative, open reduction and internal fixation or primary arthrodesis in the treatment of Lisfranc injuries: a prospective, randomized, multicenter trial - study protocol. *BMC Musculoskelet Disord*. 2018;19(1):301.
  63. Lau S, Howells N, Millar M, et al. Plates, screws, or combination? Radiologic outcomes after Lisfranc fracture dislocation. *J Foot Ankle Surg*. 2016;55(4):799-802.
  64. Llopis E, Carrascoso J, Iriarte I, et al. Lisfranc Injury Imaging and Surgical Management. *Semin Musculoskelet Radiol*. 2016;20(2):139-153.
  65. Clements JR, Schopf R. Advances in forefoot trauma. *Clin Podiatr Med Surg*. 2013;30(3):435-444.
  66. O'Malley M, DeSandis B, Allen A, et al. Operative treatment of fifthmetatarsal jones fractures (zone II and III) in the NBA. *Foot Ankle Int*. 2016;37(5):488-500.

67. O'Malley MJ, Hamilton WG, Muniak J. Fractures of the distal shaft of the fifth metatarsal. *Am J Sports Med.* 1996;24(2):240-243.
68. Egol K, Walsh M, Rosenblatt K, et al. Avulsion fractures of the fifth metatarsal base: a prospective outcome study. *Foot Ankle Int* 2007;28(5):581-583.
69. Shahid MK, Punwar S, Boulind C, et al. Aircast walking boot and below-knee walking cast for avulsion fractures of the base of the fifth metatarsal: a comparative cohort study. *Foot Ankle Int.* 2013;34(1):75-79.
70. Smith TO, Clark A, Hing CB. Interventions for treating proximal fifth metatarsal fractures in adults: a meta-analysis of the current evidence-base. *Foot Ankle Surg.* 2011;17(4):300-307.
71. Konkel KF, Menger AG, Retzlaff SA. Nonoperative treatment of fifth metatarsal fractures in an orthopaedic suburban private multispeciality practice. *Foot Ankle Int.* 2005;26(9):704-707.
72. Hussain ZS, DeFonzo DJ. Relative stability of tension band versus two-cortex screw fixation for treating fifth metatarsal base avulsion fractures. *J Foot Ankle Surg.* 2000;39(2):89-95.
73. Mologne TS, Lundeen JM, Clapper MF, et al. Early screw fixation versus casting in the treatment of acute Jones fractures. *Am J Sports Med.* 2005;33(7):970-975.
74. Portland G, Kelikian A, Kodros S. Acute surgical management of Jones' fractures. *Foot Ankle Int.* 2003;24(11):829-833.
75. Porter DA, Duncan M, Meyer SJF. Fifth metatarsal Jones fracture fixation with a 4.5-mm cannulated stainless steel screw in the competitive and recreational athlete: a clinical and radiographic evaluation. *Am J Sports Med.* 2005;33(5):726-733.
76. Raikin SM, Slenker N, Ratigan B. The association of a varus hindfoot and fracture of the fifth metatarsal metaphysealdiaphyseal junction: the Jones fracture. *Am J Sports Med.* 2008;36(7):1367-1372