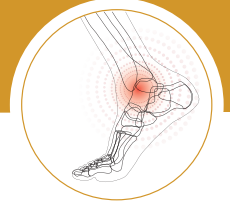


BÖLÜM 5.3



Posterior Malleol Kırıkları

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GİRİŞ

“Posterior malleol” tanımlaması ilk olarak 1911 yılında Destot tarafından yapılmıştır (1). Posterior malleol (PM) kırıkları, tüm ayak bilek kırıklarının %7 ila 44’ünü oluşturmaktadır (2,3). Genellikle oluş nedeni rotasyonel ayak bilek travmalarıdır. Hem supinasyon hem de pronasyon tipi yaralanmalarda görülebilir bu nedenle genellikle trimalleolar kırıklara eşlik etmektedirler (4). Ancak %1 oranında plantar fleksiyonda ve aksiyel yüklenme ile oluşan travmalar sonrasında izole olarak da görülebilmektedirler (5).

PM kırıkları ile ilgili giderek artan sayıda çalışmaya rağmen, en iyi tedavi konusunda hala bir fikir birliği yoktur (6-9). Bununla birlikte, son zamanlarda bilgisayarlı tomografi (BT) görüntülemenin daha sık kullanılmasıyla, ayak bileği kırığı paternleri daha iyi anlaşılmıştır. Bunun sonucu olarak tedavide daha çok bireyselleştirilmiş yaklaşımlar kullanılmaya başlamıştır (10-13).

Posterior inferior tibiofibular bağ (PITFL), superior oblik ve inferior transvers parçalardan oluşur (6). Tibiofibular sindesmozun toplam gücünün %42’sini sağlar (14). PM kırıklarında bu sindesmos eklemi bozulmaktadır. Bu nedenle ayak bileğinin fizyolojik hareketi bozularak dejenerasyon için risk faktörü oluşturmaktadır. Ayak bilek kırıklarında PM komponentinin bulunması prognozu kötü yönde etkilediği ortaya konulmuştur (2,15-17).

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mm'den fazla deplasmanı olan PM kırıklarında kötü klinik sonuçlar gösterilmiştir (47,55).

Distal tibia kırıklarında posterior pilona uzanan kırık mevcut ve intramedüller çivi planlaması yapılıyorsa öncelikle PM tespiti yapılmalıdır (56). Ayrıca intramedüller çivi yapılacak hastada PM kırığı pilondan 31 mm proksimale uzanıyorsa deplasman olasılığının fazla olduğu gösterilmiştir (57).

SONUÇ

Çok sayıda klinik çalışmaya rağmen, çoğunlukla retrospektif tasarımları, kırık anatomisini ve redüksiyonu sadece radyografi kullanarak değerlendirmeleri ve tek tip tedavi eksikliği nedeniyle kanıtlar sınırlıdır. Bu nedenle, PM kırıkları tanı ve tedavisinde kanıta dayalı rehberler sunmak günümüzdeki verilerle zor görünmektedir. Güncel yaklaşımda BT ve 3B-BT ile değerlendirmenin, tanı ve tedavi planlamasında önerilmektedir. PM kırıklarının ayak bileği sindesmos stabilitesinde önemli olduğu ve anatomik redüksiyon ile eklem restorasyonu sağlanan hastalarda daha iyi klinik sonuçlar sağladığı unutulmamalıdır.

KAYNAKLAR

1. E-A-J. D. Traumatisme du pied et rayons X: malléoles, astragale, calcaneum, avant-pied. Paris: Masson et Cie. 1911.
2. Jaskulka RA, Ittner G, Schedl R. Fractures of the posterior tibial margin: their role in the prognosis of malleolar fractures. *J Trauma*. 1989;29(11):1565-70.
3. Court-Brown CM, McBirnie J, Wilson G. Adult ankle fractures--an increasing problem? *Acta Orthop Scand*. 1998;69(1):43-7.
4. Lauge-Hansen N. Fractures of the ankle. II. Combined experimental-surgical and experimental-roentgenologic investigations. *Arch Surg*. 1920;60(5):957-85.
5. Boggs LR. Isolated posterior malleolar fractures. *Am J Emerg Med*. 1986;4(4):334-6.
6. Bartoniček J, Rammelt S, Tuček M, et al. Posterior malleolar fractures of the ankle. *Eur J Trauma Emerg Surg*. 2015;41(6):587-600.
7. Heim D, Niederhauser K, Simbrey N. The Volkmann dogma: a retrospective, long-term, single-center study. *Eur J Trauma Emerg Surg*. 2010;36(6):515-9.
8. Solan MC, Sakellariou A. Posterior malleolus fractures: worth fixing. *Bone Joint J*. 2017;99-B(11):1413-9.
9. White TO. In defence of the posterior malleolus. *Bone Joint J*. 2018;100-B(5):566-9.
10. Haraguchi N, Haruyama H, Toga H, Kato F. Pathoanatomy of posterior malleolar fractures of the ankle. *J Bone Joint Surg Am*. 2006;88(5):1085-92.
11. Bartoniček J, Rammelt S, Kostlivý K, et al. Anatomy and classification of the posterior tibial fragment in ankle fractures. *Arch Orthop Trauma Surg*. 2015;135(4):505-16.
12. Bartoniček J, Rammelt S, Tuček M. Posterior Malleolar Fractures: Changing Concepts and Recent Developments. *Foot Ankle Clin*. 2017;22(1):125-45.
13. Rammelt S, Boszczyk A. Computed Tomography in the Diagnosis and Treatment of Ankle Fractures: A Critical Analysis Review. *JBJS Rev*. 2018;6(12):E7.

14. Ogilvie-Harris DJ, Reed SC, Hedman TP. Disruption of the ankle syndesmosis: biomechanical study of the ligamentous restraints. *Arthroscopy*. 1994;10(5):558–60.
15. H C Leeds MGE. Instability of the distal tibiofibular syndesmosis after bimalleolar and trimalleolar ankle fractures. *J Bone Joint Surg Am* . 1984;66(4):490-503.
16. Tejwani NC, Pahk B, Egol KA. Effect of posterior malleolus fracture on outcome after unstable ankle fracture. *J Trauma*. 2010;69(3):666–9.
17. Zenker H, Nerlich M. Prognostic aspects in operated ankle fractures. *Arch Orthop Trauma Surg*. 1982;100(4):237–41.
18. Irwin TA, Lien J, Kadakia AR. Posterior malleolus fracture. *J Am Acad Orthop Surg*. 2013;21(1):32–40.
19. Müller ME, Koch P, Nazarian S, et al. The Comprehensive Classification of Fractures of Long Bones. *Compr Classif Fract Long Bones*. 1990.
20. Heim U. Indications and technic for the stabilization of the posterior Volkmann's triangle in malleolar fractures. *Unfallchirurg*. 1982;85(9):388-94.
21. Müller ME, Allgöwer M, Schneider R, et al. Manual of internal fixation. *Man Intern Fixat*. 1991.
22. Rammelt S ZH. Ankle fractures. In: Bentley G, editor. *European Instructional Course Lectures*. Vol 12. Springer. 2012. p. 205–19.
23. Rammelt S, Zwipp H, Mittlmeier T. Operative treatment of pronation fracture--dislocations of the ankle. *Oper Orthop Traumatol*. 2013;25(3):273–93.
24. Lidder S, Masterson S, Dreu M, et al. The risk of injury to the peroneal artery in the posterolateral approach to the distal tibia: a cadaver study. *J Orthop Trauma*. 2014;28(9):534–7.
25. De Vries JS, Wijgman AJ, Sierevelt IN, et al. Long-term results of ankle fractures with a posterior malleolar fragment. *J Foot Ankle Surg*. 2005;44(3):211–7.
26. Li, Yong-duo, Shu-mao Liu, Jin-sheng Jia JZ. Choice of internal fixation methods for posterior malleolus fracture in both biomechanics and clinical application. *Beijing Da Xue Xue Bao Yi Xue Ban*. p. 18;43(5):718-23.
27. Hartwich K, Lorente Gomez A, Pyrc J, et al. Biomechanical Analysis of Stability of Posterior Antigliding Plating in Osteoporotic Pronation Abduction Ankle Fracture Model With Posterior Tibial Fragment. *Foot ankle Int*. 2017;38(1):58–65.
28. Wang X, Yin J, Zhang C, et al. Biomechanical Study of Screw Fixation and Plate Fixation of a Posterior Malleolar Fracture in a Simulation of the Normal Gait Cycle. *Foot ankle Int*. 2017;38(10):1132–8.
29. Rammelt S. Management of ankle fractures in the elderly. *EFORT open Rev*. 2017;1(5):239–46.
30. Weber M. Trimalleolar fractures with impaction of the posteromedial tibial plafond: implications for talar stability. *Foot ankle Int*. 2004;25(10):716–27.
31. Klammer G, Kadakia AR, Joos DA, et al. Posterior pilon fractures: a retrospective case series and proposed classification system. *Foot ankle Int*. 2013;34(2):189–99.
32. Bois AJ, Dust W. Posterior fracture dislocation of the ankle: technique and clinical experience using a posteromedial surgical approach. *J Orthop Trauma*. 2008;22(9):629–36.
33. Assal M, Dalmau-Pastor M, Ray A, Stern R. How to Get to the Distal Posterior Tibial Malleolus? A Cadaveric Anatomic Study Defining the Access Corridors Through 3 Different Approaches. *J Orthop Trauma*. 2017;31(4):e127–9.
34. Hoekstra H, Rosseels W, Rammelt S, et al. Direct fixation of fractures of the posterior pilon via a posteromedial approach. *Injury*. 2017;48(6):1269–74.
35. Rammelt S, Obruba P. An update on the evaluation and treatment of syndesmotic injuries. *Eur J Trauma Emerg Surg*. 2015;41(6):601–14.
36. Baumbach SF, Herterich V, Damblemont A, et al. Open reduction and internal fixation of the posterior malleolus fragment frequently restores syndesmotic stability. *Injury*. 2019;50(2):564–70.

37. Miller MA, McDonald TC, Graves ML, et al. Stability of the Syndesmosis After Posterior Malleolar Fracture Fixation. *Foot ankle Int.* 2018;39(1):99–104.
38. Li M, Collier RC, Hill BW, et al. Comparing Different Surgical Techniques for Addressing the Posterior Malleolus in Supination External Rotation Ankle Fractures and the Need for Syndesmotic Screw Fixation. *J Foot Ankle Surg.* 2017;56(4):730–4.
39. Egol KA, Pahk B, Walsh M, et al. Outcome after unstable ankle fracture: effect of syndesmotic stabilization. *J Orthop Trauma.* 2010;24(1):7–11.
40. Veltman ES, Halma JJ, de Gast A. Longterm outcome of 886 posterior malleolar fractures: A systematic review of the literature. *Foot Ankle Surg.* 2016;22(2):73–7.
41. Shi HF, Xiong J, Chen YX, et al. Comparison of the direct and indirect reduction techniques during the surgical management of posterior malleolar fractures. *BMC Musculoskelet Disord.* 2017;18(1).
42. Zhong S, Shen L, Zhao JG, et al. Comparison of Posteromedial Versus Posterolateral Approach for Posterior Malleolus Fixation in Trimalleolar Ankle Fractures. *Orthop Surg.* 2017;9(1):69–76.
43. Verhage SM, Boot F, Schipper IB, et al. Open reduction and internal fixation of posterior malleolar fractures using the posterolateral approach. *Bone Joint J.* 2016;98-B(6):812–7.
44. Vidović D, Elabjer E, Muškardin IVA, et al. Posterior fragment in ankle fractures: antero-posterior vs posteroanterior fixation. *Injury.* 2017;48 Suppl 5:S65–9.
45. Kim MB, Lee YH, Kim JH, et al. Lateral transmalleolar approach and miniscrews fixation for displaced posterolateral fragments of posterior malleolus fractures in adults: a consecutive study. *J Orthop Trauma.* 2015;29(2):105–9.
46. Choi JY, Kim JH, Ko HT, et al. Single Oblique Posterolateral Approach for Open Reduction and Internal Fixation of Posterior Malleolar Fractures With an Associated Lateral Malleolar Fracture. *J Foot Ankle Surg.* 2015;54(4):559–64.
47. Van Hooff CCD, Verhage SM, Hoogendoorn JM. Influence of fragment size and postoperative joint congruency on long-term outcome of posterior malleolar fractures. *Foot ankle Int.* 2015;36(6):673–8.
48. Little MMT, Berkes MB, Schottel PC, et al. Anatomic Fixation of Supination External Rotation Type IV Equivalent Ankle Fractures. *J Orthop Trauma.* 2015;29(5):250–5.
49. Odak S, Ahluwalia R, Unnikrishnan P, et al. Management of Posterior Malleolar Fractures: A Systematic Review. *J Foot Ankle Surg.* 2016;55(1):140–5.
50. Miller AN, Carroll EA, Parker RJ, et al. Posterior malleolar stabilization of syndesmotic injuries is equivalent to screw fixation. *Clin Orthop Relat Res.* 2010;468(4):1129–35.
51. Xu HL, Li X, Zhang DY, et al. A retrospective study of posterior malleolus fractures. *Int Orthop.* 2012;36(9):1929.
52. Kang C, Hwang DS, Lee JK, et al. Screw Fixation of the Posterior Malleolus Fragment in Ankle Fracture. *Foot ankle Int.* 2019;40(11):1288–94.
53. Berkes MB, Little MTM, Lazaro LE, et al. Articular congruity is associated with short-term clinical outcomes of operatively treated SER IV ankle fractures. *J Bone Joint Surg Am.* 2013;95(19):1769–75.
54. Verhage SM, Krijnen P, Schipper IB, et al. Persistent postoperative step-off of the posterior malleolus leads to higher incidence of post-traumatic osteoarthritis in trimalleolar fractures. *Arch Orthop Trauma Surg.* 2019 Mar 12;139(3):323–9.
55. Langenhuijsen JF, Heetveld MJ, Uitee JM, et al. Results of ankle fractures with involvement of the posterior tibial margin. *J Trauma.* 2002 [cited 2022 Oct 25];53(1):55–60.
56. Kempegowda H, Maniar HH, Richard R, et al. Posterior Malleolar Fractures Associated With Tibial Shaft Fractures and Sequence of Fixation. *J Orthop Trauma.* 2016;30(10):568–71.
57. Zhang Y, Qin X, Song L, et al. The risk of violating the posterior malleolar fracture when nailing the ipsilateral concomitant spiral distal tibial fracture. *BMC Musculoskelet Disord.* 2018;19(1):1–9.