

Yavuz Selim KARA¹

GİRİŞ

Tarsometatarsal eklem yaralanmaları, Napolyon dönemi cerrahlarından biri olan Lisfranc'ın bu seviyeden yaptığı amputasyonlar nedeniyle Lisfranc yaralanmaları olarak adlandırılmıştır (1). Lisfranc yaralanmaları, orta ayak yapılarının ilişkilerinin tamamen bozulduğu ciddi yaralanmalardan burkulmalara kadar geniş bir çeşitlilik göstermektedir. Erkeklerde görülme sıklığı kadınlara göre 2-4 kat daha fazla olup genellikle 30'lu yaşların ortalarında görülmektedir (2-6). Zamanında tanı konulmaması durumunda ciddi fonksiyonel sorun oluşturmaları erken tanının önemini arttırmaktadır. Tedavi hedefleri stabil, anatomik dizilimi uygun bir ayak elde etmektir.

TARİHÇE

Tarsometatarsal eklem yaralanmaları ile ilgili ilk tedavi prensipleri ve sınıflamalar 1909 yılında Quenu ve Kuss tarafından tanımlanmıştır (7). 1951 yılında Gissane tarafından yapılmış bir çalışmada tedavide gecikmenin amputasyonla sonuçlanabileceği belirtilmiş olup yaralanmanın önemine değinilmiştir (8).

1950 yılında ilk kez Del Sel (9) ve Collett (10) tarafından eklemin anatomik redüksiyonunun ve diziliminin sağlanmasının iyi fonksiyonel sonuç için temel olduğu bildirilmesine rağmen bu görüş 1970'lerin ilk yıllarına kadar kabul görmemiştir. 1970 yılında Wilson ve Wilppula'nın (11,12), 1982 yılında ise Hardcastle'ın (4) yaptığı çalışmalar ile yaralanma derecesi ne olursa

¹ Uzm. Dr. Yavuz Selim KARA, Erzurum Oltu Devlet Hastanesi, Ortopedi ve Travmatoloji Bölümü
desolator457@yahoo.com

visi için artrodez uygulanmaktadır. Bohay ve ark.'nın yaptığı bir çalışmada ise gecikmiş Lisfranc yaralanmalarında halluks valgus deformitesinin görülebileceği belirtilmiştir. Özellikle kronik yaralanma sonrası 1. ve 2. metatars bazis arası diastazın artmasının intermetatarsal açıda artmaya, bunun da halluks valgus deformitesi gelişmesine neden olduğu belirtilmiştir (92).

Sonuç

Lisfranc yaralanmaları orta ayağın fonksiyonlarını ciddi anlamda bozabilecek yaralanmalardır. Nadir görülmesine rağmen düşük enerjili travmalarda da görülebileceği akılda tutulmalıdır. Tanıda gecikmenin ciddi fonksiyon kaybına yol açtığı, komplikasyon riskini arttırdığı bu yaralanmalarda erken tanı çok önemlidir.

KAYNAKLAR

1. J L. Nouvelle Methode Opératoire Pour l'amputation Partielle Du Pied Par Son Articulation Tarso-Metatarsienne. Paris, Gabon; 1815.
2. Arntz CT, Veith RG, Hansen ST. Fractures and fracture-dislocations of the tarsometatarsal joint. J Bone Jt Surg - Ser A. 1988. doi:10.2106/00004623-198870020-00003
3. Goossens M, De Stoop N. Lisfranc's fracture-dislocations: Etiology, radiology, and results of treatment. A review of 20 cases. Clin Orthop Relat Res. 1983. doi:10.1097/00003086-198306000-00020
4. Hardcastle PH, Reschauer R, Kutscha-Lissberg E, et al.. Injuries to the tarsometatarsal joint. Incidence, classification and treatment. J Bone Jt Surg - Ser B. 1982. doi:10.1302/0301-620x.64b3.7096403
5. Myerson MS, Fisher RT, Burgess AR, et al. Fracture dislocations of the tarsometatarsal joints: End results correlated with pathology and treatment. Foot Ankle. 1986. doi:10.1177/107110078600600504
6. Blanco RP, Merchán CR, Sevillano RC, et al. Tarsometatarsal fractures and dislocations. J Orthop Trauma. 1988. doi:10.1097/00005131-198802030-00003
7. Quenu E KG. Étude sur les luxations du metatars, Rev Chir Paris 39. In ; 1909.
8. Gissane w. A dangerous type of fracture of the foot. J Bone Joint Surg Br. 1951. doi:10.1302/0301-620x.33b4.535
9. Del Sel JM. The surgical treatment of tarso-metatarsal fracture-dislocations. J Bone Joint Surg Br. 1955. doi:10.1302/0301-620x.37b2.203
10. Collett HS, Hood TK AR. Tarsometatarsal Fracture-Dislocations,; 1958.
11. Wilppula E. Tarsometatarsal fracture-dislocation: late results in 26 patients, Acta Orthop Scand. Acta Chir Scand. 1973;(44):335-345.
12. Wilson DW. Injuries of the tarso-metatarsal joints. Etiology, classification and results of treatment. J Bone Joint Surg Br. 1972. doi:10.1302/0301-620x.54b4.677
13. Bassett FH. Dislocations of the tarsometatarsal joints. South Med J. 1964. doi:10.1097/00007611-196411000-00008
14. Cain PR, Seligson D. Lisfranc's fracture-dislocation with intercuneiform dislocation: presentation of two cases and a plan for treatment. Foot Ankle. 1981. doi:10.1177/107110078100200307
15. Peicha G, Labovitz J, Seibert FJ, et al. The anatomy of the joint as a risk factor for Lisfranc dislocation and fracture-dislocation: An anatomical and radiological case control study.

- J Bone Jt Surg. 2002. doi:10.1302/0301-620x.84b7.12587
16. Mark J. Berkowitz RWS. Dislocations of the Foot. In: Michael J. Coughlin, Charles Saltzman RB, Anderson, eds. *Mann's Surgery of the Foot and Ankle*. 9th ed. Philadelphia: Mosby; 2014:1928-1950.
 17. Jones RL. The human foot. An experimental study of its mechanics, and the role of its muscles and ligaments in the support of the arch. *Am J Anat*. 1941;68(1):1-39. doi:10.1002/aja.1000680102
 18. Kaar S, Femino J, Morag Y. Lisfranc Joint Displacement Following Sequential Ligament Sectioning. *J Bone Jt Surgery-American Vol*. 2007. doi:10.2106/JBJS.F.00958
 19. Panchbhavi VK, Andersen CR, Vallurupalli S, et al..A minimally disruptive model and three-dimensional evaluation of lisfranc joint diastasis. *J Bone Jt Surg - Ser A*. 2008. doi:10.2106/JBJS.G.01420
 20. Jeffreys TE. Lisfranc's fracture-dislocation: A clinical and experimental study of tarso-metatarsal dislocations and fracture-dislocations. *J Bone Joint Surg Br*. 1963.
 21. Anderson LD: Injuries of the forefoot, *Clin Orthop Relat Res* 122:18–27, 1977.
 22. Bohay DR, Manoli A. Occult fractures following subtalar joint injuries. *Foot Ankle Int*. 1996. doi:10.1177/107110079601700309
 23. Heck BE, Ebraheim NA, Jackson WT. Anatomical Considerations of Irreducible Medial Subtalar Dislocation. *Foot Ankle Int*. 1996;17(2):103-106. doi:10.1177/107110079601700208
 24. Debenedetti MJ, Evanski PM, Waugh TR. The Unreducible Lisfranc Fracture. *Clin Orthop Relat Res*. 1978;NA;(136):238??240. doi:10.1097/00003086-197810000-00034
 25. Denton JR. A Complex Lisfranc Fracture-dislocation. *J Trauma Inj Infect Crit Care*. 1980;20(6):526-529. doi:10.1097/00005373-198006000-00017
 26. Schenck RC, Heckman JD. Fractures and Dislocations of the Forefoot: Operative and Nonoperative Treatment. *J Am Acad Orthop Surg*. 1995. doi:10.5435/00124635-199503000-00002
 27. Yamamoto H, Furuya K, Muneta T, et al. Neglected Lisfranc's joint dislocation. *J Orthop Trauma*. 1992.
 28. Levine BP, Stoppacher R, Kristiansen TK. Plantar lateral dislocation of the medial cuneiform: A case report. *Foot Ankle Int*. 1998. doi:10.1177/107110079801900213
 29. Lewis AG, DeLee JC. Type-I complex dislocation of the first metatarsophalangeal joint - Open reduction through a dorsal approach: A case report. *J Bone Jt Surg - Ser A*. 1984. doi:10.2106/00004623-198466070-00026
 30. Cassebaum WH: Lisfranc fracture-dislocations, *Clin Orthop Relat Res* 30:116–129, 1963.
 31. Jeffreys TE: Lisfranc's fracture-dislocation, *J Bone Joint Surg Br* 45:546–551, 1963.
 32. Jeffreys TE: Lisfranc's fracture-dislocation, *J Bone Joint Surg Br* 45:546–551, 1963.
 33. Wilson DW: Injuries of the tarsometatarsal joints. Etiology, classification and results of treatment, *J Bone Joint Surg Br* 54: 677–686, 1972
 34. Myerson M. The diagnosis and treatment of injuries to the lisfranc joint complex. *Orthop Clin North Am*. 1989.
 35. Adelaar RS. The treatment of tarsometatarsal fracture-dislocation. *Instr Course Lect*. 1990. doi:10.12671/jksf.1996.9.1.205
 36. Micheli LJ, Sohn RS, Solomon R. Stress fractures of the second metatarsal involving Lisfranc's joint in ballet dancers. A new overuse injury of the foot. *J Bone Jt Surg - Ser A*. 1985. doi:10.2106/00004623-198567090-00011
 37. O'Donoghue DH. Treatment of injuries to athletes. *Northwest Med*. 1958. doi:10.1136/bjism.5.4.240
 38. O'Malley MJ, Hamilton WG, Munyak J, et al. Stress fractures at the base of the second metatarsal in ballet dancers. *Foot Ankle Int*. 1996. doi:10.1177/107110079601700206
 39. Charcot JM: Sur quelques arthropathies qui paraissent dépendre d'une lésion du cerveau ou de la moelle épinière, *Arch Physiol* 1:161, 1868.
 40. Giesecke SB, Dalinka MK, Kyle GC. Lisfranc's fracture-dislocation: A manifestation of

- peripheral neuropathy. *Am J Roentgenol.* 1978. doi:10.2214/ajr.131.1.139
41. Hennessy O. Case report 264. *Skeletal Radiol.* 1984;11(2):155-157. doi:10.1007/BF00348808
 42. Holmes GB, Hill N. Fractures and Dislocations of the Foot and Ankle in Diabetics Associated with Charcot Joint Changes. *Foot Ankle Int.* 1994. doi:10.1177/107110079401500405
 43. Heckman JD: Fractures and dislocations of the foot. In Rockwood CA, Green DP, Bucholz R, Heckman JD, editors: *Fractures in adults*, ed 4, Philadelphia, 1996, Lippincott-Raven, pp 2287.
 44. Foster SC, Foster RR: Lisfranc's tarsometatarsal fracturedislocation, *Radiology* 120:79–83, 1976
 45. Berg JH, Silveri CP, Harris M. Variant of the Lisfranc Fracture-Dislocation: A Case Report and Review of the Literature. *J Orthop Trauma.* 1998. doi:10.1097/00005131-199806000-00015
 46. Stødle AH, Hvaal KH, Enger M, et al. Lisfranc injuries: Incidence, mechanisms of injury and predictors of instability. *Foot Ankle Surg.* 2020;26(5):535-540. doi:10.1016/j.fas.2019.06.002
 47. Seo D-K, Lee H-S, Lee KW, et al. Nonweightbearing Radiographs in Patients With a Subtle Lisfranc Injury. *Foot Ankle Int.* 2017;38(10):1120-1125. doi:10.1177/1071100717717220
 48. Johnson GF. Pediatric Lisfranc injury: "Bunk bed" fracture. *Am J Roentgenol.* 1981. doi:10.2214/ajr.137.5.1041
 49. Preidler KW, Peicha G, Lajtai G, et al. Conventional radiography, CT, and MR imaging in patients with hyperflexion injuries of the foot: Diagnostic accuracy in the detection of bony and ligamentous changes. *Am J Roentgenol.* 1999. doi:10.2214/ajr.173.6.10584818
 50. Philbin T, Rosenberg G, Sfera JJ. Complications of missed or untreated Lisfranc injuries. *Foot Ankle Clin.* 2003. doi:10.1016/S1083-7515(03)00003-2
 51. Kaplan JD, Karlin JM, Scurran BL, et al. Lisfranc's fracture-dislocation. A review of the literature and case reports. *J Am Podiatr Med Assoc.* 1991. doi:10.7547/87507315-81-10-531
 52. Llopis E, Carrascoso J, Iriarte I, et al. Lisfranc Injury Imaging and Surgical Management. *Semin Musculoskelet Radiol.* 2016. doi:10.1055/s-0036-1581119
 53. Kitsukawa K, Hirano T, Niki H, et al. MR Imaging Evaluation of the Lisfranc Ligament in Cadaveric Feet and Patients with Acute to Chronic Lisfranc Injury. *Foot Ankle Int.* 2015. doi:10.1177/1071100715596746
 54. Seybold JD, Coetzee JC. Lisfranc Injuries: When to Observe, Fix, or Fuse. *Clin Sports Med.* 2015. doi:10.1016/j.csm.2015.06.006
 55. Desmond EA, Chou LB. Current concepts review: Lisfranc injuries. *Foot Ankle Int.* 2006. doi:10.1177/107110070602700819
 56. Keiserman LS, Cassandra J, Amis JA. The piano key test: A clinical sign for the identification of subtle tarsometatarsal pathology. *Foot Ankle Int.* 2003. doi:10.1177/107110070302400511
 57. Ross G, Cronin R, Hauzenblas J, et al. Plantar Ecchymosis Sign: A Clinical Aid to Diagnosis of Occult Lisfranc Tarsometatarsal Injuries. *J Orthop Trauma.* 1996. doi:10.1097/00005131-199602000-00008
 58. Curtis MJ, Myerson M, Szura B. Tarsometatarsal joint injuries in the athlete. *Am J Sports Med.* 1993. doi:10.1177/036354659302100403
 59. Chiodo CP, Myerson MS. Developments and advances in the diagnosis and treatment of injuries to the tarsometatarsal joint. *Orthop Clin North Am.* 2001. doi:10.1016/S0030-5898(05)70190-5
 60. Komenda GA, Myerson MS, Biddinger KR. Results of arthrodesis of the tarsometatarsal joints after traumatic injury. *J Bone Jt Surg - Ser A.* 1996. doi:10.2106/00004623-199611000-00005

61. Myerson MS, Cerrato RA. Current management of tarsometatarsal injuries in the athlete. In: *Journal of Bone and Joint Surgery - Series A.* ; 2008.
62. Nunley JA, Vertullo CJ. Classification, Investigation, and Management of Midfoot Sprains. *Am J Sports Med.* 2002;30(6):871-878. doi:10.1177/03635465020300061901
63. Watson TS, Shurnas PS, Denker J. Treatment of Lisfranc Joint Injury: Current Concepts. *Am Acad Orthop Surg.* 2010;18(12):718-728. doi:10.5435/00124635-201012000-00002
64. Ebraheim NA, Yang H, Lu J, Biyani A. Computer evaluation of second tarsometatarsal joint dislocation. *Foot Ankle Int.* 1996. doi:10.1177/107110079601701107
65. Kuo R, Tejwani N, DiGiovanni C, et al. Outcome After Open Reduction and Internal Fixation of Lisfranc Joint Injuries * despite such surgical management . *Methods. J Bone Jt Surg.* 2000.
66. Resch S, Stenström A. The Treatment of Tarsometatarsal Injuries. *Foot Ankle.* 1990;11(3):117-123. doi:10.1177/107110079001100301
67. Myerson MS. The diagnosis and treatment of injury to the tarsometatarsal joint complex. *J Bone Joint Sur Br.* 1999;81(5):756-763.
68. Kirzner N, Zotov P, Goldbloom D, et al. Dorsal bridge plating or transarticular screws for Lisfranc fracture dislocations. *Bone Joint J.* 2018;100-B(4):468-474. doi:10.1302/0301-620X.100B4.BJJ-2017-0899.R2
69. Marks RM, Parks BG, et al. Midfoot fusion technique for neuroarthropathic feet: Biomechanical analysis and rationale. *Foot Ankle Int.* 1998. doi:10.1177/107110079801900801
70. Hu SJ, Chang SM, Li XH, et al. Outcome comparison of Lisfranc injuries treated through dorsal plate fixation versus screw fixation. *Acta Ortop Bras.* 2014. doi:10.1590/1413-78522014220600576
71. Ho NC, Sangiorgio SN, Cassinelli S, et al. Biomechanical comparison of fixation stability using a Lisfranc plate versus transarticular screws. *Foot Ankle Surg.* 2019. doi:10.1016/j.fas.2017.08.004
72. Bansal A, Carlson DA, Owen JR, et al. Ligamentous Lisfranc Injury: A Biomechanical Comparison of Dorsal Plate Fixation and Transarticular Screws. *J Orthop Trauma.* 2019. doi:10.1097/BOT.0000000000001466
73. Boksh K, Sharma A, Grindlay D, et al. Dorsal bridge plating versus. Transarticular screw fixation for lisfranc injuries: A systematic review and meta-analysis. *J Clin Orthop Trauma.* 2020. doi:10.1016/j.jcot.2020.03.019
74. Coetsee JC. Making Sense of Lisfranc Injuries. *Foot Ankle Clin.* 2008. doi:10.1016/j.fcl.2008.07.001
75. Ly TV, Coetsee JC. Treatment of primarily ligamentous Lisfranc joint injuries: Primary arthrodesis compared with open reduction and internal fixation a prospective, randomized study. *J Bone Jt Surg - Ser A.* 2006. doi:10.2106/JBJS.E.00228
76. 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.* 2016. doi:10.1007/s11999-015-4366-y
77. Buda M, Kink S, Stavenuiter R, et al. Reoperation Rate Differences Between Open Reduction Internal Fixation and Primary Arthrodesis of Lisfranc Injuries. *Foot Ankle Int.* 2018. doi:10.1177/1071100718774005
78. Sripanich Y, Weinberg MW, Krähenbühl N, et al. Surgical outcome of chronic Lisfranc injury without secondary degenerative arthritis: A systematic literature review. *Injury.* 2020. doi:10.1016/j.injury.2020.04.005
79. Miyamoto W, Takao M, Innami K, et al. Ligament reconstruction with single bone tunnel technique for chronic symptomatic subtle injury of the Lisfranc joint in athletes. *Arch Orthop Trauma Surg.* 2015. doi:10.1007/s00402-015-2250-6
80. Nery C, Raduan F, Baumfeld D. Joint-sparing Corrections in Malunited Lisfranc Joint Injuries. *Foot Ankle Clin.* 2016. doi:10.1016/j.fcl.2015.09.007

81. Zwipp H, Rammelt S. Anatomical reconstruction of chronically instable Lisfranc's ligaments. *Unfallchirurg*. 2014. doi:10.1007/s00113-014-2600-9
82. De los Santos-Real R, Canillas F, Varas-Navas J, et al. Lisfranc Joint Ligament Complex Reconstruction: A Promising Solution for Missed, Delayed, or Chronic Lisfranc Injury Without Arthritis. *J Foot Ankle Surg*. 2017. doi:10.1053/j.jfas.2017.06.025
83. Myerson MS. Management of compartment syndromes of the foot. *Clin Orthop Relat Res*. 1991. doi:10.1097/00003086-199110000-00033
84. Brunet JA, Wiley JJ. The late results of tarsometatarsal joint injuries. *J Bone Jt Surg - Ser B*. 1987. doi:10.1302/0301-620x.69b3.3108261
85. Johnson JE, Johnson KA. Dowel arthrodesis for degenerative arthritis of the tarsometatarsal (Lisfranc) joints. *Foot Ankle*. 1986. doi:10.1177/107110078600600505
86. Sangeorzan BJ, Verth RG, Hansen ST. Salvage of Lisfranc's Tarsometatarsal Joint by Arthrodesis. *Foot Ankle Int*. 1990. doi:10.1177/107110079001000401
87. Ferris LR, Vargo R, Alexander IJ. Late reconstruction of the midfoot and tarsometatarsal region after trauma. *Orthop Clin North Am*. 1995.
88. Jungbluth P, Wild M, Thelen S, et al. Funktionelle und subjektive Ergebnisse nach subtalaren Luxationen. *Unfallchirurg*. 2009. doi:10.1007/s00113-009-1568-3
89. Nadaud JP, Parks BG, Schon LC. Plantar and calcaneocuboid joint pressure after isolated medial column fusion versus medial and lateral column fusion: A biomechanical study. *Foot Ankle Int*. 2011. doi:10.3113/FAI.2011.1069
90. Compson JP. An irreducible medial cuneiform fracture-dislocation. *Injury*. 1992. doi:10.1016/0020-1383(92)90081-3
91. Faciszewski T, Burks RT, Manaster BJ. Subtle injuries of the Lisfranc joint. *J Bone Jt Surg - Ser A*. 1990.
92. Bohay DR, Johnson KD, Manoli A. The traumatic bunion. *Foot Ankle Int*. 1996. doi:10.1177/107110079601700705