A Rare Injury in Collegiate Athletics—The Lisfranc Fracture–Dislocation

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A rare injury in collegiate athletics is the Lisfranc fracture–dislocation of the foot. This case study will give team physicians and athletic trainers an idea of what to look for in this type of injury. It will be shown how an 18-year-old college football player received the injury, how it was evaluated by the sports medicine staff, and how it was surgically treated by the team physician. Finally, the athlete’s rehabilitation will be summarized and the time frame during which full activities were started again will be outlined. This case study will give sports medicine specialists a better understanding of the Lisfranc topic and how to deal with it.

The Lisfranc fracture–dislocation is an injury rarely seen in athletics. But when it occurs, it is extremely important that the athletic trainer and physician recognize it immediately. The injury itself occurs in the midfoot. A direct or indirect force that causes midfoot eversion produces this type of injury. The metatarsals are the bones most involved with the Lisfranc injury. The cuneiforms and the cuboid are the secondary bones involved (5). Pain and swelling to the area involved should be carefully evaluated by the athletic trainer and physician. Immobilization should occur with transport to a hospital if necessary. Usual treatment includes surgery to the injured area with an extended rehabilitation period (1).

This report was written in hopes that other sports medicine personnel will gain some understanding of how to diagnose and treat this injury. Since the Lisfranc injury is very rare in athletics, it is important that it be diagnosed and treated early, so chronic disabilities do not occur.

History

On August 31, 1992, an 18-year-old Carnegie Mellon University football player was practicing with the team on the grass intramural field. It was in the late...
afternoon and practice was about halfway over. During a certain play of the drill the player, a tight end, got his left foot caught in a hole in the field. As the opposing defensive player came up to block him, he put all his weight on the left side of his body. His left foot was planted in the hole and his forefoot was hyperextended. As more weight was forced on top of him, his left foot rotated and snapped (Figure 1). The play ended immediately with the player lying on the ground in a lot of pain.

Evaluation

The injured athlete was calmed down and stabilized on his back. He said he felt a sharp pain in his midfoot—up to his toes. The athlete said he felt a “pop” in the middle of his foot when the injury occurred. On initial evaluation, half of his left shoe had to be cut off in order to carefully slide his foot out. Moderate swelling was present in the midfoot to forefoot area. When the injured area was palpated, most of the pain and discomfort were found to be between the first and third metatarsals. There was no definite evidence of a fracture or dislocation.
at that time. There was no severe deformity to the area. The pain was moderate and the injured area was swelling very quickly. The foot and lower leg were immobilized and the athlete was carried to the training room from the practice field. His foot, still immobilized, was elevated on a treatment table and ice was placed around it.

The team physician came into the training room almost immediately after ice was placed on the athlete. He did an initial evaluation and felt there could be a fracture of one of the bones in the midfoot. The physician then placed a temporary posterior splint on the athlete’s foot and lower leg. An X ray and further evaluation were to be done early the next morning in his office. The athlete was placed on crutches and transported to his dormitory room.

**Treatment**

The athlete was taken to the team physician’s office the next morning. He was X-rayed and reevaluated. His pain and discomfort were about the same as the previous night. The physician’s examination revealed that he had suffered a Lisfranc fracture–dislocation of the first and second metatarsals. At that time it was decided to do a surgical repair on the injury that afternoon (Figure 2).

With surgery, it was discovered that the first metatarsal base was subluxated 40–50%. There was also a small fracture in the first metatarsal. The second metatarsal was fractured, but nondisplaced. The medial joint ligaments of the second metatarsal were disrupted superiorly. With the first and second metatarsals reduced and holding nicely, a K-wire was inserted percutaneously through the base of the first metatarsal of the lateral corner of the cuneiform into the second metatarsal into the cuneiform. A second K-wire was inserted transversely through the first and second metatarsal bases into one cortex of the third metatarsal. X rays (fluoroscopy) showed this to be in excellent position. The athlete was placed into a short leg cast with the foot placed in a neutral position. The pins were left protruding and were bent over, and Vaseline gauze was placed around them (3).

The athlete was seen 2 weeks postsurgery for cast change and evaluation. X rays showed pin and bone placement still to be excellent (Figure 3). Six weeks postsurgery, the cast and pins were removed from the foot. X rays taken at this time showed almost complete healing of the area.

**Rehabilitation**

Rehabilitation for the injury started 1 week after the surgery; the athlete was given isometric calf exercises to do while he was in the cast. He performed these exercises 1–2 times a day on his own. It was opted not to use electrical stimulation on the calf muscles until the cast was taken off. The athlete was allowed to do light resistance work on his hamstrings, quadriceps, and hips. This phase of rehabilitation lasted 6 weeks.

Six weeks postoperation, the cast was removed. Active and passive range of motion exercises, without any resistance, were started on the athlete’s foot and ankle. Muscle stimulation was started on the calf muscles, which would help strengthen those muscles. The athlete was partial weight bearing at this time, for a period of 1 week.
Eight weeks postoperation, and 2 weeks after the cast was taken off, the athlete started more aggressive rehabilitation. Range of motion exercises with resistance were instituted. When it was seen that the foot and ankle could handle light resistance through normal range, the athlete was placed on a heavier resistance program. A slant board was used for stretching of the lower leg muscles. A BAPS board was used with varying weights and movements. Different resistances of theraband were used to increase range of motion and strength. Other exercises such as toe raises, heel cord, and towel curls were incorporated with the rehab program to add endurance. At the end of each exercise program the athlete either rode the stationary bike or swam in the gymnasium pool for 15 to 20 min.

The final phase of the organized rehabilitation program was started at 12 weeks postoperation. This phase started with the athlete jogging straight lines
(50 yd). He then progressed to running circles and figure eights, and then sprinting. By the end of the program he was able to sprint and turn, and then backpedal without pain. During this phase he was still working out in the swimming pool and the weight room, trying to gain more strength and endurance (4).

At about 4 months postoperation the athlete was given clearance by the team physician to do any activity on his own, as long as he had no pain. He was instructed to stay away from contact sports and to do everything on smooth surfaces. He was also fitted with a special arch support, to be used in all of his shoes. This would give the foot more comfort and support with activity. He was expected to be given medical clearance to play football in 1993.

**Conclusion**

The Lisfranc fracture–dislocation can be caused by either a direct or an indirect force on the foot. The area injured is in the midfoot region and includes the 5
metatarsals, 3 cuneiforms, and cuboid. The ligaments in this area also can be involved and often become unstable. The injury suffered by our athlete was caused by an indirect force. His foot was stuck in a hole in the field, and an opposing player was placing a force from the front and top. The forefoot was twisted and hyperextended from the force, causing injury to the midfoot region.

The injury was detected mainly by X rays taken the next day, but in most cases there is more of a gross deformity evident. Athletic trainers should always observe for deformity of bony areas, swelling, and discoloration. The dorsalis pedis pulse should also be checked during the evaluation. In severe cases, the dorsalis pedis artery could be severed from the displacement of bones caused by the injury (2).

Finally, it is important for athletic trainers and physicians to check the shoes their athletes are wearing and the type of surface they are playing on. This type of foot injury can be controlled by playing on a smooth, regular surface and wearing supportive shoes.

References