

# DEMOGRAPHIC ANALYSIS OF PODIATRIC EMERGENCY ROOM VISITS: A Preliminary Report

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## INTRODUCTION

The Podiatry Department at Northlake Regional Medical Center in Tucker, Georgia is fortunate to treat nearly all of the patients admitted to the emergency room with lower extremity trauma. The hospital is a 120-bed general care facility, located in a suburb of Atlanta, GA. The eight-bed emergency room is a Level II facility, and is staffed by full time M.D. and D.O. physicians trained in emergency medicine. The emergency room, which draws patients from a three county area, logs over 13,000 annual visits. Of this population, approximately 1,000 patients are treated annually for podiatric related injuries. The figures presented within this paper represent a preliminary study of 750 podiatric-related emergency room visits. The most frequent mechanisms of injury have been included and will be discussed. The patient population in this study has been broken down and categorized into twelve major groups based on the most common injury patterns observed. (Table 1)

## LATERAL ANKLE SOFT TISSUE INJURY

Lateral ankle soft tissue injuries account for nearly one-third of all podiatric emergency room visits. Eighty-four percent of these injuries involved the lateral ankle ligaments, 12% were identified as involving the extensor digitorum brevis musculotendinous complex, 2% involved the peroneal

tendons, and 2% involved the calcaneocuboid and cuboid-metatarsal ligaments. Multiple injuries involving more than one of these structures were observed in 31% of the injuries.

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**Table 1**

### COMMON INJURY PATTERNS

(750 Cases During A One-Year Period)

<u>INJURY</u>	<u>PERCENTAGE</u>
Lateral Ankle Soft Tissue Injury	31.1%
Fracture / Dislocation	28.6%
Contusion	8.3%
Dermatologic / Infection	6.1%
Laceration / Abrasion	5.8%
Puncture	5.7%
Postoperative Complication	4.8%
Miscellaneous	3.0%
Achilles Tendon Injury	2.1%
Medial Ankle Soft Tissue Injury	2.0%
Lisfranc / Midfoot Strain	1.5%
Heel Pain	1.0%
Total	100.0%

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The most common cause of injury in this patient population involved sporting activities (34% overall) such as basketball (16%), baseball/softball (5%), football (3%), soccer (2%), tennis (2%), and running (2%). Twists and slips accounted for 21% of lateral ankle injuries, missed footing on stairs and steps (15%), falls (12%), stepping off a curb or in a hole (5%), and motor vehicle accidents (2%).

## FRACTURE / DISLOCATION

Fractures and fracture/dislocations accounted for 30% of all podiatric emergency room visits, and have been subdivided based on the anatomic location. (Table 2)

**Table 2**

### LOCATION OF FRACTURES AND DISLOCATIONS

Ankle	30%
Metatarsal (5th)	19%
Hallux	11%
Calcaneus	10%
Lesser Digit (2-5)	9%
Pediatric	7%
Metatarsal (1-4)	4%
Talus	3%
Navicular/Cuboid	3%
Lisfranc	3%
Subtalar	1%
Total	100%

#### Ankle Fracture/Dislocation

Ankle fractures accounted for 9% of podiatric emergency room visits, and 30% of fractures. The most frequent mechanism of injury was supination-external rotation (SER=56%), followed by supination-adduction (SADD=21%), pronation abduction (PABD=10%), pronation-external rotation (PER=5%), pilon fractures (4%), and isolated fibula fractures (4%). Eleven percent of these patients incurred fracture/dislocations requiring immediate closed reduction under sedation, while 16% were taken to surgery for immediate open reduction with internal fixation.

Isolated twists and falls were the most frequent cause of ankle fractures (41%), followed by combined sporting injuries (21%), falls from stairs or a step (10%), motor vehicle accidents (8%), falls on an incline hill (5%), and falls from a rooftop or tree (5%).

#### Fifth Metatarsal Fractures

Fifth metatarsal fractures accounted for 6% of podiatric emergency room visits, 19% of fractures, and 82% of metatarsal fractures. Transverse base avulsion fractures were most frequently observed (51%), followed by diaphyseal fractures (27%), intra-articular base fractures (19%), proximal metaphyseal-diaphyseal (Jones's) fractures (7%), and distal head fractures (5%).

Falls and trips were identified as the most frequent cause of fifth metatarsal fractures (44%), followed by injuries incurred while descending a step or stairs (29%), stepping in a hole or off a curb (12%), running injuries (7%), and softball/baseball injuries (7%).

#### Hallux Fractures

Fractures of the hallux represented 3% of podiatric emergency visits, 11% of fractures, and 53% of digital fractures. The distal phalanx was implicated 52% of the time, the proximal phalanx 39% of the time, and combined fractures of both the proximal and distal phalanges accounted for 9% of all hallux fractures. Associated dislocations of the interphalangeal joint were present in 9% of these injuries, and 39% were considered open fractures, due to traumatic injuries of the nailbed.

Crush injuries accounted for 31% of hallux fractures, followed by lawn mower injuries (18%), motor vehicle injuries (14%), falls from steps or a ladder (14%), stubbing of the hallux (14%), and kicking injuries (9%).

#### Calcaneal Fractures

Fractures of the calcaneus accounted for 3% of podiatric emergency room visits and 10% of fractures. Fractures through the body of the calcaneus represented 51% of calcaneal fractures, while anterior beak and chip avulsion fractures accounted for 49% of these injuries.

Falls from heights ranging from 4-20 feet accounted for 45% of calcaneal fractures, followed by tripping and falling (30%), falls from stairs or a step (20%), and motor vehicle injuries (5%).

### **Lesser Digit Fractures**

Lesser digit (2-5) fractures accounted for 3% of podiatric emergency visits, 9% of fractures, and 47% of digital fractures. The 5th proximal phalanx was implicated in 33% of lesser digit fractures, followed by the 2nd proximal phalanx (17%). The 2nd middle and distal phalanx, 3rd middle and distal phalanx, and 5th middle phalanx, each accounted for 6% of lesser digit fractures.

Stubbing of a digit was the most common cause of lesser digit fractures (54%), followed by crush injuries and kicking injuries (15% each), and sporting and escalator injuries (8% each).

### **Pediatric Fractures**

Pediatric Salter Harris type fractures accounted for 2% of podiatric emergency visits, and 7% of fractures. The ankle was implicated in 75% of pediatric fractures, while the calcaneus, lesser metatarsals, 5th metatarsal base, and hallux proximal and distal phalanges each accounted for 5% of pediatric Salter Harris fractures. Of the pediatric ankle fractures, 50% involved the fibula, 40% the tibia, and 10% were triplane ankle fractures.

Sporting injuries were implicated in 46% of pediatric fractures, followed by falls (22%). Skateboarding and rollerskating, falls from stairs or a step, and bicycle injuries each accounted for 8% of pediatric fractures.

### **Metatarsal 1-4 Fractures**

Fractures of metatarsals 1-4 accounted for 1% of podiatric emergency visits, 4% of fractures, and 18% of metatarsal fractures. The third and fourth metatarsals were equal in frequency of injury (30%), followed by the second metatarsal (26%), and finally the first metatarsal (9%). Multiple fractures of adjacent metatarsals were common, as the average patient presented with 2.6 fractures.

The most common cause of injury was falls (66%), of which half occurred while falling from a step or flight of stairs. Forklift and other crush injuries accounted for 22% of these fractures, and 12% involved kicking injuries.

### **Talar Fractures**

Fractures of the talus accounted for 1% of podiatric emergency visits, and 3% of fractures. The posterior process was implicated in 71% of talus fractures (Shepherd fracture), while the lateral

talar process was involved in 29% of these injuries.

Sporting injuries were the most frequent cause of talar fractures (42%), followed by motor vehicle injuries (29%). Other causes included falls, and one injury occurred during an epileptic seizure.

### **Navicular/Cuboid Fractures**

Fractures of the navicular and cuboid bones accounted for 1% of podiatric emergency visits, and 3% of fractures. Navicular fractures were twice as common as cuboid fractures. Avulsion of the navicular tuberosity and fractures through the body of the navicular were equally as common, while the cuboid fractures were all avulsion chip fractures.

### **Lisfranc Fracture/Dislocation**

Fractures and fracture/dislocations of the Lisfranc joint represented 1% of podiatric emergency room visits, 3% of fractures/dislocations, and 35% of all Lisfranc injuries. These produced a variety of injury patterns involving the bases of metatarsals 1-4, from simple dislocations to fracture/dislocations.

The most frequent causes of Lisfranc trauma were motor vehicle accidents and direct blunt trauma from dropped heavy objects (equal ratios).

### **Subtalar Dislocation**

Dislocations of the subtalar and midtarsal joints accounted for less than one percent of podiatric emergency visits, and 1% of fracture/dislocations. Two-thirds of these patients had isolated subtalar dislocations, while one-third had isolated midtarsal dislocations. There were no associated fractures identified in these patients.

The two most frequent causes identified were softball and motor vehicle injuries, with softball injuries being twice as common.

## **CONTUSIONS**

Soft tissue contusions accounted for 8.3% of podiatric emergency room visits. The forefoot was involved in 33% of these injuries, followed by the ankle and leg (30%), digits (22%), and rearfoot (14%).

Objects dropped on the foot represented 32% of these injuries, followed by combined

sporting injuries (14%), falls (11%, more than half from stairs and ladders), forklift injuries (6%), and motor vehicle and bicycle injuries (5% each).

## DERMATOLOGIC

Dermatologic conditions were implicated in 6.1% of podiatric emergency visits. This category specifically details non-traumatic infectious causes. (Table 3)

**Table 3**

### NON-TRAUMATIC INFECTIOUS CAUSES OF EMERGENCY ROOM VISITS

Cellulitis / Ulcer	28%
Paronychia	24%
Diabetic Infection	20%
Insect Bites	15%
Tinea Pedis	11%
Misc.	2%
Total	100%

#### Cellulitis/Ulcer

Cellulitis and cellutic ulcerations accounted for 2% of podiatric emergency visits, and 28% of infections. Ischemic ulcers were present in 20% of these patients, and 31% were admitted to the hospital for intravenous antibiotic administration.

#### Paronychia

Infected ingrown toenails accounted for less than 2% of podiatric emergency visits, and 24% of infections. The hallux was implicated in all cases, and the lateral nail boarder was most frequently involved (64%). Nine percent of these patients presented with a bilateral condition. All patients were treated by partial nail avulsion under local anesthesia.

#### Diabetic Foot Infection

Diabetic foot infections accounted for 1% of podiatric emergency room visits, and 20% of infections. Slightly less than one-half (44%) of these patients were admitted for intravenous antibiotic administration, and/or surgical drainage of the infection.

#### Insect Bites

Insect bites accounted for 1% of podiatric emergency visits, and 7% of this category. Most of these patients either suspected or verified that the cause of inflammation or infection was through an insect bite, and cellulitis accompanied the injury in more than one-half (57%) of these injuries. Fire ant and spider bites were the most commonly identified animals, and all cases of this type presented between the months of July and September.

#### Tinea Pedis

Acute tinea pedis accounted for less than 1% of podiatric emergency visits, and 5% of infections. Acute vesicular tinea was identified in 40% of these patients.

#### Miscellaneous Dermatology

One patient in this study (2% of dermatologic) presented with multiple symmetrical maculopapular lesions of both upper and lower extremities, and was identified as having a drug eruption secondary to chronic laxative use (phenolphthalein).

## LACERATION/ABRASION

Lacerations and abrasions accounted for 5.8% of podiatric emergency visits. There was a distinct bimodal distribution of patient age in this category, with pediatric visits (ages 1-15) representing nearly one-half (44%) of all cases. The most commonly implicated causes of lacerations were glass and pottery (37%), followed by sharp metal (17%), knife or axe (7%), and falls (7%). Miscellaneous causes also included injury from a forklift, lawn mower, escalator, and motor vehicle injuries.

## PUNCTURE WOUNDS

Puncture wounds accounted for 5.7% of podiatric emergency visits. The most frequently identified cause of puncture wounds was from a nail or screw (34%), glass (20%), needle (15%), and splinter or toothpick (15%). These wounds were complicated by cellulitis in 15% of the cases, and one-third of these patients were admitted for intravenous antibiotic administration. Other causes included punctures from a fishhook, clam shell, pine cone, pitchfork, hairbrush, and projec-

tiles such as a gunshot wound and impaled metal from a lawn mower injury.

### **POSTOPERATIVE COMPLICATIONS**

Postoperative complications accounted for 4.8% of podiatric emergency room visits. Pain was the most frequent presentation (39%), followed by surgical infection/wound dehiscence (19%), routine dressing change (19%), injury to the surgical site (11%), and tight cast or dressing (6%).

### **MISCELLANEOUS**

Miscellaneous visits which did not fall into one of the previous categories accounted for 3% of podiatric emergency room visits. Pain was the common presenting symptom, and the diagnoses included diffuse metatarsalgia, sesamoiditis, metatarsophalangeal joint capsulitis, ankle and midfoot osteoarthritis, reflex sympathetic dystrophy, diabetic charcot arthropathy, Freiberg's infraction of the second metatarsal, and tarsal coalitions (calcaneo-navicular bar and talo-calcaneal bridge).

### **ACHILLES TENDON**

Injury to the Achilles tendon accounted for 2.1% of podiatric emergency visits. Rupture of the Achilles tendon was diagnosed in 38% of the patients in this category, with the remaining patients suffering from Achilles tendinitis or gastrosoleal strain. Sporting activities were responsible for 82% of these injuries, with basketball being the most frequently identified sport (50%). In the case of Achilles tendon rupture, all patients were males between the age of 29 and 36 years, and the common cause of injury was playing basketball.

### **MEDIAL ANKLE SOFT TISSUE INJURY**

Soft tissue injuries of the medial ankle and arch accounted for 2% of podiatric emergency room visits. The posterior tibial tendon insertion was identified as the most frequent site of injury (60%). Strain of the tendon's insertion was found in 27% of these injuries, while an equal number of these patients (27%) had an associated os tibiale externum on radiographic examination. Rupture of the tibialis posterior tendon was found in

7% of these patients.

The most frequently identified injury pattern was twisting of the foot (33%), followed by sporting injuries (27%), and stepping in a hole or off a curb (20%). Miscellaneous injuries (20%) included falls from a ladder and motor vehicle injuries.

### **LISFRANC SOFT TISSUE INJURY**

Soft tissue injury of Lisfranc's joint accounted for 1.5% of podiatric emergency visits, and 65% of all Lisfranc injuries. Sporting injuries accounted for 27% of these injuries, followed by twists of the foot and motor vehicle injuries (18% each).

### **HEEL PAIN**

One percent of podiatric emergency visits were from patients complaining of heel pain. The presenting symptoms were consistent with that of heel spur syndrome, and 38% of these patients related the onset of pain with a recent increase in activity, such as walking. Another 25% of these patients related their symptoms to sporting activities, such as football and basketball.

### **ACTIVITY BREAKDOWN**

The identifiable causes of injury, as a combined log for all categories, can be broken down into 4 major categories, falls, sports, twists, and miscellaneous. Table 4 gives a specific breakdown of the identifiable causes of injury.

### **SUMMARY**

A considerable number of the patients who are treated in emergency rooms present with podiatric related injuries. Patients often present to the emergency room with chronic conditions that would be more appropriately managed as an outpatient. However, there is a significant amount of podiatric trauma which warrants the immediate attention of a trained surgical specialist.

In studying the types of foot-related injuries and their causes, it is necessary to identify the types of activities which lead to injury. It is obvious that many work-related crush injuries could be prevented with proper protective footwear, as could lacerations, punctures, and lawn mower injuries. In addition, falls from a height, step, or stairs, and twisting injuries cause the majority of

non-sports related foot injuries. Thus, an effort to educate the public in safety measures, specifically aimed at prevention, would reduce the incidence of foot related injuries.

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**Table 4**

**IDENTIFIABLE CAUSES OF INJURY**

FALLS

Generic	19%
Stairs/Step	13%
Ladder/Height	2%
Hill/Incline	1%
<b>Total number of falls</b>	<b>35.0%</b>

SPORTS

Basketball	10%
Baseball/Softball	4%
Football	3%
Soccer	3%
Running/Walking	3%
Skating	2%
Karate	2%
Tennis/Racquetball	2%
Dance/Cheerleading	1%
Wrestling	1%
Misc.	1%
Volleyball	.5%
<b>Total number of sports injuries</b>	<b>32.5%</b>

TWIST

Generic	11%
Hole/Curb	4%
<b>Total number of twist injuries</b>	<b>15.0%</b>

OTHER

Crush	6%
Motor Vehicle	5%
Stub	2%
Bicycle	1%
Forklift	1%
Lawn mower	1%
Escalator	1%
Seizures	.5%
<b>Total number of other injuries</b>	<b>17.5%</b>

**Total 100.0%**

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