

Fact\$, figure\$ and fracture\$

Cost of Lower Extremity Fractures Research Note Preview

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CIREN Data – Lower Extremity Fracture Type

(2,472 total fractures)

◆ Pelvic	26%
◆ Femur	19%
◆ Tibia/Fibula	17%
◆ Ankle/Hindfoot	16%
◆ Tarsal/Metatarsal	6%
◆ Patella	3%

Most Common Injury Source

Rank	Pelvic	Tib/fib	Femur	Ankle/ Hind foot	Tarsal/ Metatarsal	Patella
1	Left side interior surface	Floor/ toe pan	Knee bolster	Floor / toe pan	Floor/ toe pan	Knee bolster
2	Knee Bolster	Knee Bolster	Left instrument Panel	Foot controls	Foot controls	Left instrument Panel
3	Left side hardware or armrest	Left instrument panel	Unknown injury source	Unknown injury source	Unknown injury source	Unknown injury source
4	Unknown injury source	Unknown injury source	Glove comp. Door	Non-contact injury source	Other interior object	Steering column
5	Right side interior surface	Foot controls	Right instrument panel	Right side interior surface	Center console first row	Glove comp. door

Four comparison groups

- Single lower extremity – one lower extremity injury, all other body region with maximum severity (MAIS) equals to zero or one
- Multiple lower extremity – two or more lower extremity injuries, all other body regions with MAIS zero or one
- Lower extremity and other injuries – at least one lower extremity injury, and at least one MAIS 2+ in any other body region
- No lower extremity injury – MAIS 2+ in another body region

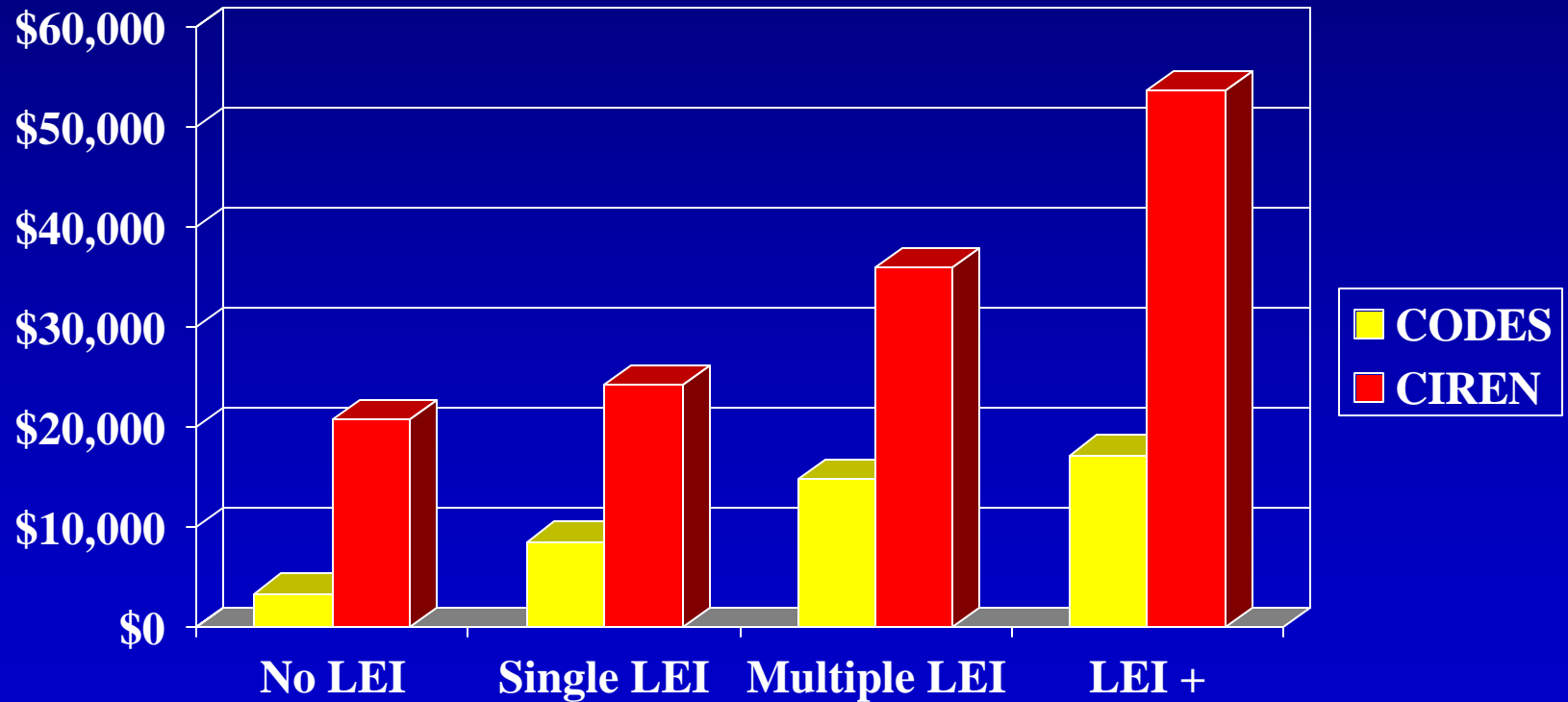
CIREN

Lower Extremity Group	Frequency	Percent
Single	88	5.0
Multiple	134	7.7
With Other injury	756	43.7
No	763	43.6
Total	1,750	100.0

CODES (Hospital discharge)

Lower Extremity Group	Frequency	Percent
Single	737	7.4
Multiple	248	2.5
With Other injury	1,133	11.4
No	7,809	78.7
Total	9,927	100.0

Acute care charges



Acute care costs for isolated injuries

Fracture	Median Cost
Acetabulum	\$20,723
Femur head	\$14,712
Femur shaft	\$12,623
Tibia shaft	\$ 9,093
Bi/Tri-malleolar	\$ 7,541
Calcaneus	\$ 4,956
Talus	\$ 7,848

Talus Fracture

(extra-articular)

ICD-9

AIS

OTA



This figure compares the level of detail involved in using ICD-9, AIS and OTA codes. Where a fracture has 2 possible ICD-9 codes and 1 possible AIS code, it has 26 possible OTA codes. The OTA coding system is the most specific tool we used for this research project.

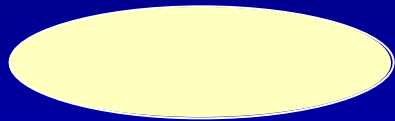
Talus Fracture

(partial articular)

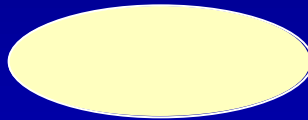
ICD-9

AIS

OTA



825.31 open

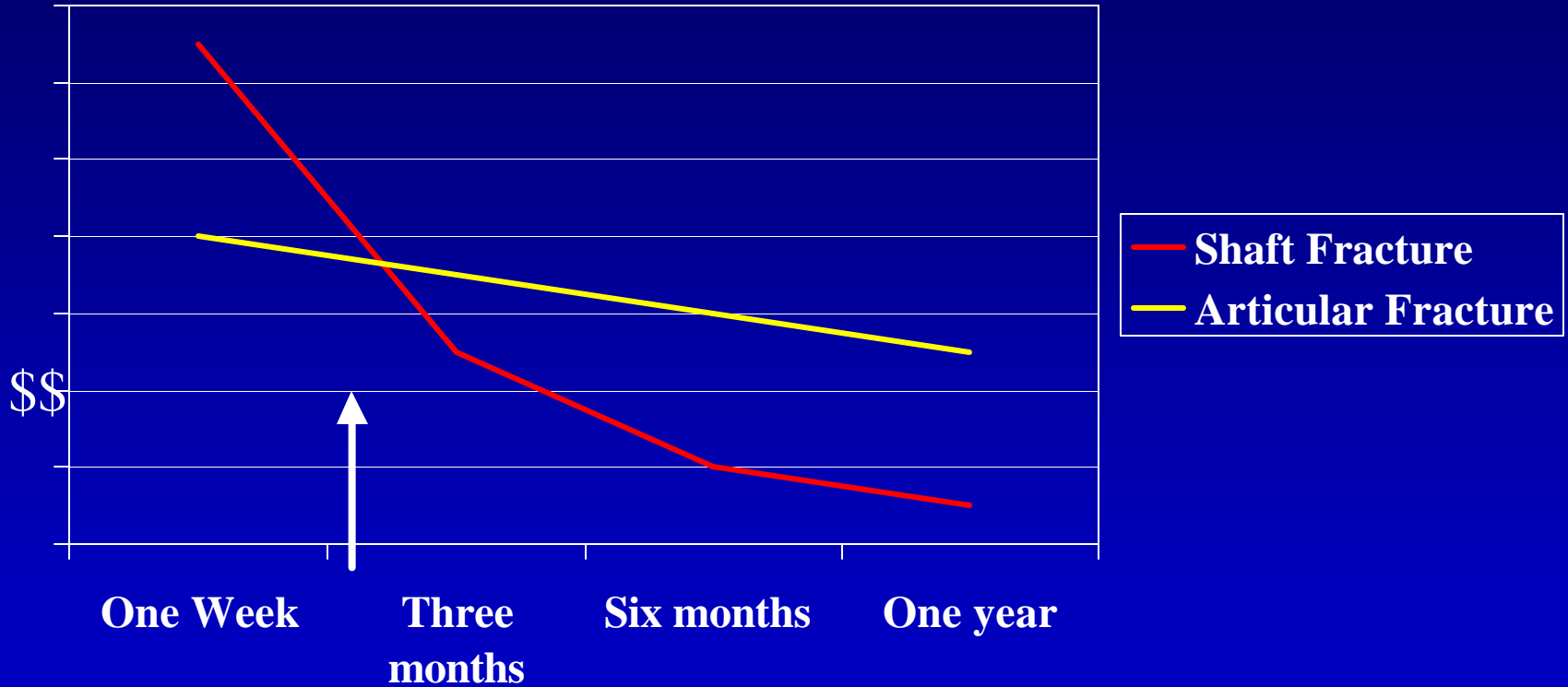


- 72A
- 72A1
- 72A1.1
- 72A1.2
- 72A1.3
- 72A2
- 72B1
- 72B1.1
- 72B1.2
- 72B1.3
- 72B2
- 72B2.1
- 72B2.2
- 72B2.3
- 72B3
- 72B3.1
- 72B3.2
- 72B3.3
- 72C
- 72C1
- 72C1.1
- 72C1.2
- 72C2
- 72C2.1
- 72C2.2

Median cost

\$35,460

Relative cost



This figure shows the sharp decline in costs associated with a shaft fracture after discharge (one week). It also shows a gradual decline in costs associated with an articular fracture following discharge, which include rehabilitation, adaptive equipment, etc.

CIREN Baltimore Case Outcome - Crash and Injury Characteristics (N = 90)

- ◆ 92% drivers (Mean age = 39 years)
 - 74% culpable
- ◆ 84% frontal crash
- ◆ 71% airbag & seatbelt
- ◆ Median change in velocity (delta v) = 27 mph
- ◆ Median Injury Severity Score (ISS) = 14
- ◆ **72% lower extremity injury**
 - **34% bilateral**
- ◆ **37% traumatic brain injury**

Pre-injury Patient Characteristics (N = 90)

- ◆ 63% full-time
- ◆ 61% prior medical condition
 - 45% obese
 - 27% hypertension
 - 13% diabetes
 - 87% on medication
- ◆ 34% smokers
- ◆ 16% prior DWI
- ◆ 28% positive CAGE (2+)
- ◆ 57% recent crisis
- ◆ 36% prior or current depression

Employment Status

(N = 90)

Full time	63%	Professional	24%
Part-time	9%	Labor	17%
		Admin Support	22%

Sample occupations

Cashier

OR nurse

Educator

Bank Teller

Clerical

Carpenter

Bartender

Assembly Line worker

Post Crash Employment

Among those employed full-time prior to crash
(N = 57)

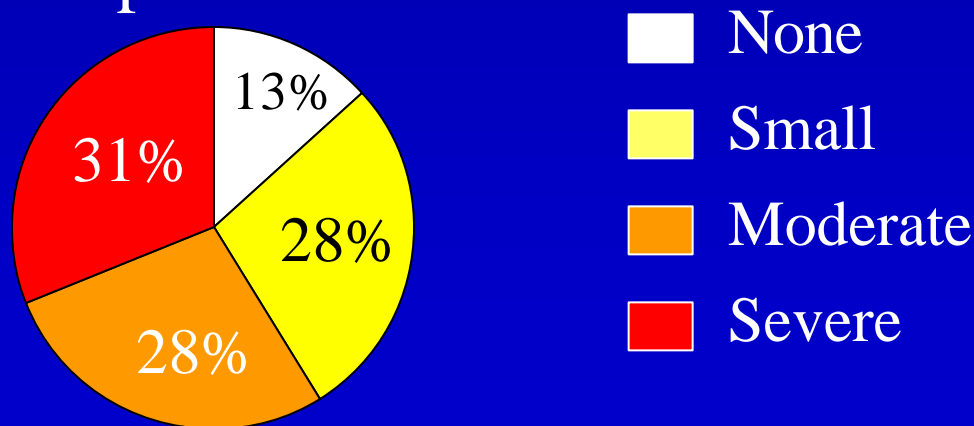
	<u>6 months</u>		<u>1 year</u>	
	n	%	n	%
Full time employment	35	61	40	70
Part-time employment	5	9	5	9
Sick leave	9	16	3	5
Unemployed	8	14	9	16

Median Costs and Financial Impact (N = 90)

◆ Median costs

- Hosp, professional, inpatient rehab = \$61,659
 - Inpatient rehab = \$14,165
- Hosp, professional, outpatient rehab = \$52,828
 - Outpatient rehab = \$ 3,360

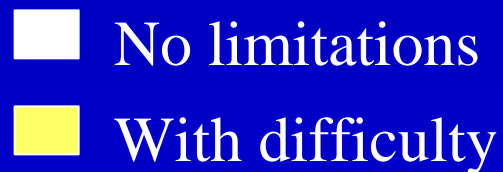
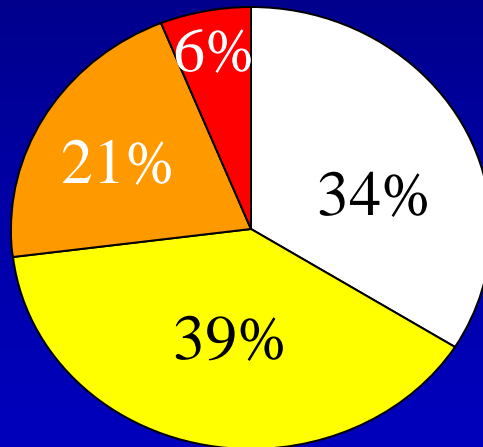
◆ Financial impact



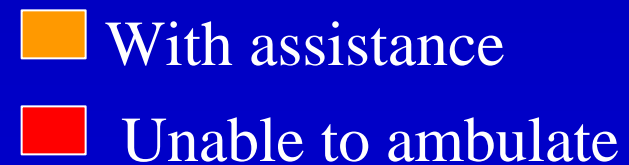
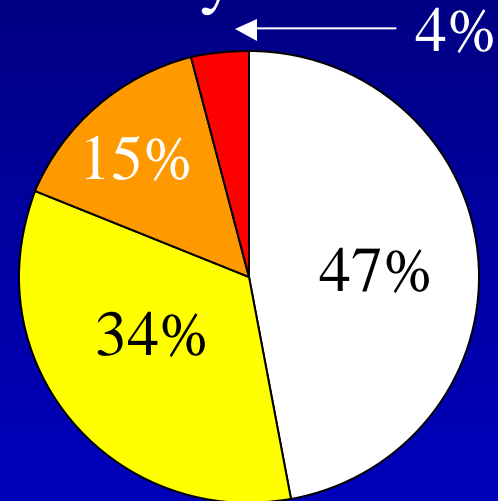
Ambulation

(N = 103)

6 months



1 year



Reasons Patients Had Not Returned to Work

Among those employed full or part-time prior to crash

	<u>6 months</u>		<u>1 year</u>	
	n	%	n	%
Physical limitations	18	62	9	45
Continued rehab	15	52	7	35
Behavioral changes	6	21	8	40
Cognitive problems	5	17	6	30
Psychological problem	9	31	10	50
Injury disability	5	17	9	45

**1999 Acura Integra
(case vehicle)**

VS

1990 Chrysler LeBaron

Roadway



Bituminous, 2-lane rural road

Point of Impact



Crash Circumstances

- ◆ Operator of V2 distracted by animal in car
- ◆ V2 drifted into travel path of V1
- ◆ Vehicles collide head-on

Case Vehicle



1999 Acura Integra

Vehicle 2 (POV)



1990 Chrysler LeBaron

Measurements



Delta V
CDC

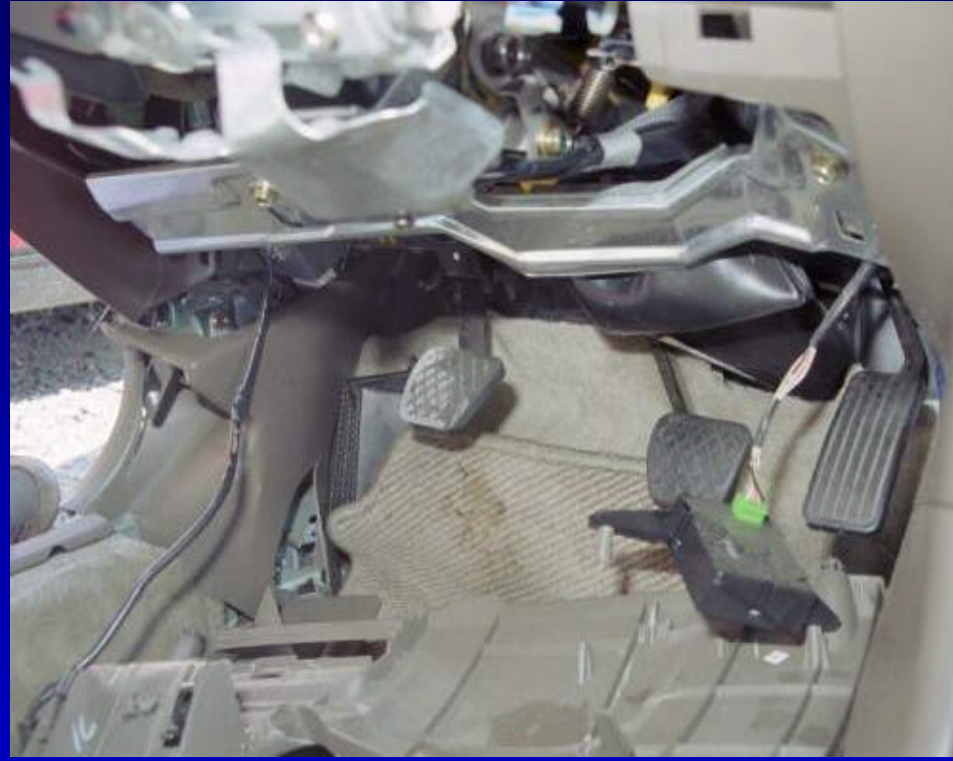
64 km/hr (40 mph)
12FDEW3

Measurements



PDOF 0 degrees
Max Crush 53 cm (21 in) at C2

Intrusions



Toepan

20 centimeters longitudinally

Floor pan

4 centimeters vertically

Dash Panel

2 centimeters longitudinally

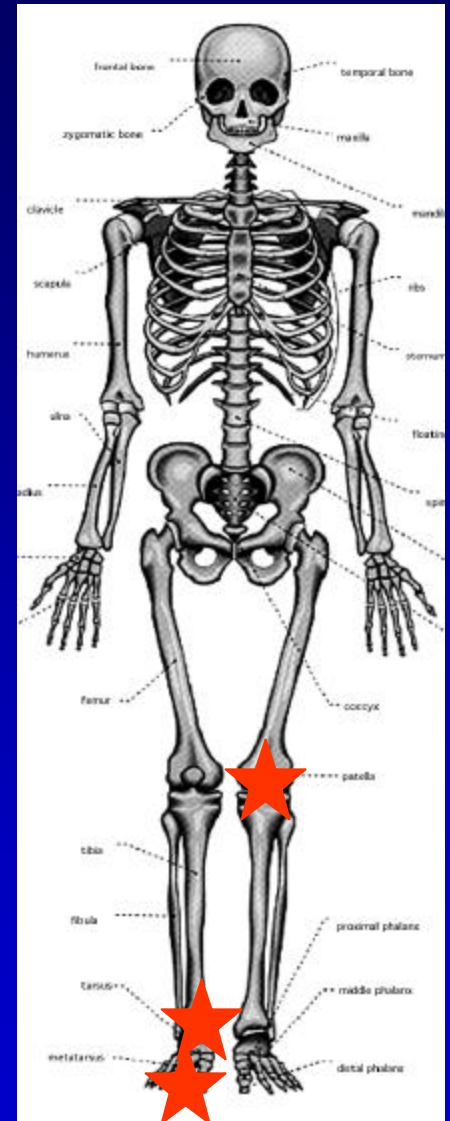
Belt Use



Note scratch marks on latch

Injury Summary

- ◆ 36 year old female
- ◆ 63 inches tall/165 lbs
- ◆ Injury Severity Score = 4
- ◆ Injuries
 - Left open patella fracture
 - Left patellar tendon laceration
 - Left knee laceration
 - Right open talo-navicular and calcaneal cuboid dislocation
 - Heel pad avulsion



Patient Characteristics

Pre-Injury

- ◆ 36 year old single female, lives alone
- ◆ Computer science/software trainer
- ◆ Traveled extensively in U.S.
- ◆ Enroute to work (not culpable)
- ◆ No significant past medical history

Patient Characteristics At Discharge

- ◆ Acute hospital stay x 8 days
- ◆ Inpatient rehab x 7 days
- ◆ Non-weight bearing
- ◆ Amputation ??

Patient Characteristics

At 6 Months

- ◆ Beginning ambulation
- ◆ Assistance in activities of daily living
- ◆ Outpatient therapy continues
- ◆ Receives disability pay
- ◆ Legal issues continue

Patient Characteristics At 1 Year

- ◆ Ambulating with cane, painful foot drag
- ◆ Return to part-time work (modified job)
- ◆ Unable to drive
- ◆ Increased dependence and isolation
- ◆ Symptomatic of Post Traumatic Stress Disorder
- ◆ Increased financial/legal concerns
- ◆ Future surgery anticipated

Patient Characteristics

Charges

- ◆ Total Medical Cost = \$72,000
 - Hospital cost = \$40,000
 - Professional cost = \$10,000
 - Clinic cost = \$5,000
 - Inpatient rehab = \$13,000
 - Outpatient rehab = \$4,000
- ◆ Out-of-pocket expenses = \$300 per month