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Mangled Extremity Severity Score

. . *

, . *

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:

가

mangled extremity severity score(MESS)

:

1

가

27

MES score,

,

가

:

MESS

가,

:

MESS

:

,

, MESS,

,

90 %

가 가

20

,

.

:

634-18

: 0652-250-1760, 1770

: 0652-271-6538

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*



score(MESS)

MESS

1)

1995 5 1998 6

17 (15 , 2)

10 (8 , 2),

27

Gustilo Anderson

(Table 2),

가 가

mangled extremity severity

Table 1. Distribution of age

age	10	20	30	40	50	60
salvage	3	2	5	1	3	3
amputation	1	2	1	2	3	1

Table 2. Classification of open fractures according to Gustilo and Anderson

	type IIIa	type IIIb	type IIIc
salvage	1	11	5
amputation	0	2	8

Table 3. Mangled Extremity Severity Score(By Helfet et al5))

Type Characteristics	Injuries	Point
Skeletal/soft tissue		
1. Low injury	Stab wound, simple closed wound, small caliber gunshot wounds	1
2. Medium injury	Open or multiple-level fracture, dislocations, moderate crush injuries.	2
3. High injury	Shotgun blast(close range), high-velocity gunshot wounds.	3
4. Massive crush	Logging, rail road, oil ring accidents.	4
Shock		
1. Normotensive hemodynamics	BP stable in field and in operating room.	0
2. Transiently hypotensive	BP unstable in field but responsive to IV fluid.	1
3. Prolonged hypotension	Systolic BP less than 90 mmHg in field and responsive to IV fluid only in operating room.	2
Ischemia		
1. None	A pulsatile limb without signs of ischemia.	0*
2. Mild	Diminished pulses without signs of ischemia	1*
3. Moderate	No pulse by Doppler, sluggish capillary refill paresthesia, diminished motor activity	2*
4. Advanced	Pulseless, cool, paralysed and numb without capillary refill.	3*
Age		
1. <30 years		0
2. >30<50 years		1
3. >50 years		2

* Points x 2 if ischemic time exceeds six hours.



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0 , Nottingham health
가 (Fig. 2)
Mann-Whitney U test
100 profile
38.9 (11-65) ,
41.7 (20-62) ,
34.2 (14-62) .
(Table 1) 20 40 (Table 7) , Mann-Whitney U test
가 13 가 , 24 , 3
가
가 17 (62.9%) 가 ,
가 7 (25.9%) 가 3 (11.1%)
.5 IIIc ,
2 3 .
IIIc 10 14.3% IIIb 14 13 IIIc 2
8 8 61.5%
37% .
가
가
MESS(Table 3)

(Table 4) Fisher-exact test

(Table 5) t-

test

Table 4. Patient profiles

	Group 1 (limb salvage)	Group 2 (early amput.)
Mode of injury (No. of patients)		
Motorcycle accident	7	0
Automobile accident	5	4
Pedestrian hit by motor vehicle	4	1
Other(machinery injury)	1	5
**Vascular injury (No. of patients)	4	8
Tibial fracture only injury (No. of patients)	13	0

**The two groups differed significantly(p=0.001)
according to Fisher exact test

Table 5. Hospital days versus total cost

Catagory Group	Hospital Days	Total cost(won)
Salvage	115.3	11,099,420
Amputation	88.1	9,705,501
p-value#	0.637	0.479

(# t-test)

Table 6. Predictive value of severity scoring systems

Score	sensitivity	specificity
MESI	6%	90%
MESS	22%	53%
PSI	33%	70%
LSI	61%	43%

MESI : Mangled extremity syndrome index

MESS : Mangled extremity severity score

PSI : Predictive salvage index

LSI : Limb salvage index

Table 7. Outcome with regard to walking and recreation

	Group 1 (limb salvage)	Group 2 (early amput.)
Function (No. of patients)		
Walking		
Limitation due to pain or swelling	8	8
Able to walk	15	10
Uses hand-held aids	5	5
Able to run without difficulty	4	5
Able to jump without difficulty	4	4
Able to climb stairs without difficulty	6	7
Able to drive	6	6
Participates in recreational sports	6	5

* Two groups differed no significantly($p>0.05$) according to Mann-Whitney U test

Table 8. mputation rate for type IIIc injuries(By Turen and DiStasio²⁾)

Author	percent of amputation
Geogiadis et al	88%
Padberg et al	88%
Caudle and Stern	78%
Katzman and Dickson	73%
Lange et al	61%
Gustilo et al	42%
Helfet et al	40%
Song et al	61.5%

가

가

(p<0.01, Fisher exact test)(Table 2, 4).

가

가

5

7

가 6

가 2

가 5

1

(p>0.01, Fisher exact

2

3

2

test).

17

4

가가

가

2

10

8

3

가

2

가

가

(Table 7),



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($p > 0.05$, Mann-Whitney U test). , 10 9 90%가 7
 , 1 MESS 6
 가 Nottingham Health Profile IIIb
 가 (Figure 2) 8 363 , 115.3
 , 10 370 , 88.1
 , ,
 , 가 ($p = 0.673$, t-test). (Table 5)
 11,099,420
 ($p > 0.05$, Mann-Whitney U test). MESS (1,995,140 -28,230,520),
 17 11 65%가 7 9,705,501 (2,703,370 -17,401,470)
 6 7
 4
 , 3 2 ($p = 0.479$, t-test).

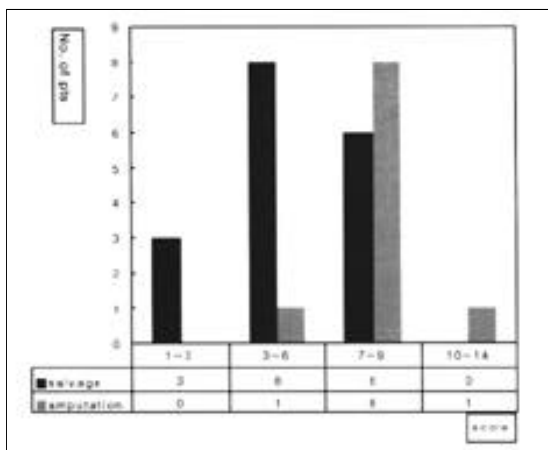


Figure 1. Distribution of MES score

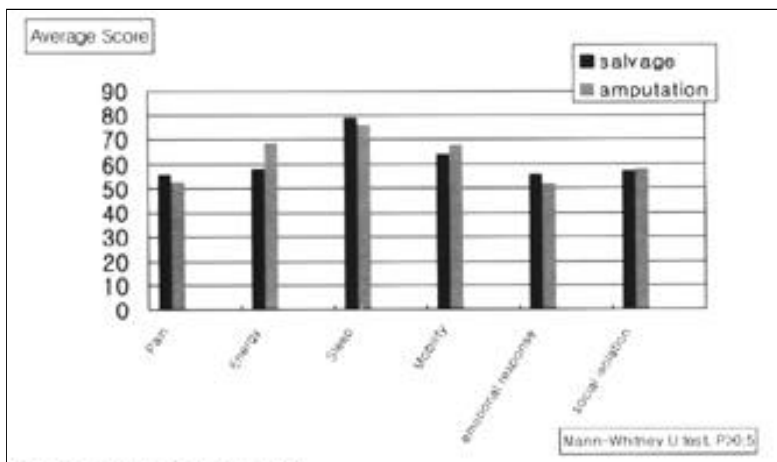
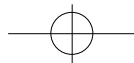


Figure 2. Self-assessment score



27% IIIb 43% 29%

, 17% IIIc 22%, 39%

6 , 6 가

6 가

(47.1%) 17 8

(17.6%) 2 , 3 MESS

가 2 . Kantzman Dickson⁷⁾

19 (Table 6)

IIIb ,

21% IIIc 79% , 58% . Johansen ⁶⁾ MESS

6 ,

7

, 7

. Hansen ⁴⁾ 100%

20% 75% Robertson¹⁰⁾

55%가 가

가 MESS score가

. Lange ⁷⁾ Russell ¹¹⁾

가

6 MESS IIIb

가 IIIc

가

IIIc 40% 88%

(Table 8). 27

IIIc 가 13 11 (84%) , 가

가

가

가

가

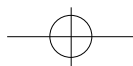


MESS

MESS 가

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Abstract

Limb Salvage versus Early Amputation according to Mangled Extremity Severity Score in Treatment of the Lower Extremity Open Fractures associated with Severe Soft Tissue Injury

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Purpose : To evaluate the availability of the mangled extremity severity score(MESS) in deciding the early treatment modality for the patients with open lower extremity fractures and severe soft tissue injury.

Materials and Methods : Analyzed 27 patients for the lower extremity open fractures with extensive soft tissue injury. A comparative study using a MESS, a cause of injury, vascular injury and a fracture pattern, average hospital stay and average hospital charges were analyzed, and daily living ability and subjective self-evaluation were assessed.

Results : There was statistically significant correlation applying MESS to patient group that had been operated by early amputation because of severe soft tissue and vascular injury. But there was no significant difference in the subjective self-assessment score, admission period and total cost during admission between each treatment method.

Conclusion : MESS can be used as an objective assessment criteria in deciding the proper treatment modality for the cases of lower limbs fracture with extensive soft tissues and vascular injury.

Key Words : Lower extremity open fracture, MESS, Limb salvage, Amputation