

Type of facial soft tissue injuries and its association with underlying facial bone fracture in motorcycle associated accident

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Introduction

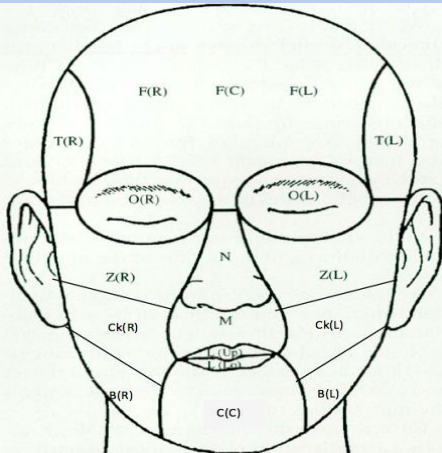
Motorcyclist are among the most vulnerable to be involved in RTA ¹. This is especially true in developing countries such as Malaysia, where 60% of road fatalities are related to motorcycle ². The significance of the type of soft tissue injuries sustained and its relationship with the underlying facial bone fractures has seldomly been explored. It can be theorized that types of soft tissue injury sustained might be able to predict the presence of underlying fracture. No previous study has looked into this association in motorcycle related injuries.

Objective

This study aims to explore the patterns of soft tissue injuries sustained by motorcyclists and identify possible association regarding the types of soft tissue injury sustained with underlying facial bone fractures.

Methodology

This is a retrospective cohort study. The trauma census of patients brought to the Emergency Department in the UKMMC over 1 year period was reviewed. The records of all patients sustaining any facial injuries following motorcycle-related RTA were identified. Only subjects 1. above 18 years old, 2. sustained motorcycle related injuries and 3. had CT scan of facial bone were included in the study. The type of the soft tissue injury sustained were divided to four different group namely laceration, contusion, abrasion and no injuries. The location of the facial soft tissue injuries was categorized to 17 different sites based upon the MCFONTZL classification with some modification³(see figure below). Subsequently, the CT scan of all patients was reviewed and any facial bone fracture was recorded according to its anatomical sites. The soft tissue injuries sustained was paired with the underlying bone fracture based on their location. Statistical significance was accepted when P-value < 0.05 for the purpose of this study. Statistical calculation was performed using SPSS version 25.



Results

A total of 271 of patients sustained motorcycle-related facial soft tissue injury over the study period. 73 patients meet the criteria and included in this study. Among these patients, male to female ratio

was 8:1. The majority of patient are of the age group 18 to 29 years old (58%) contributing to the mean age of 31.9 years. Most of the included patients sustained facial bone fractures (82%). In total there are 1241 facial zone being assessed (17 zones per patient). There were 214 zones (17%) that had underlying bone fractures. Among those fractures, 158 (13%) was directly related to the overlying soft tissue injury. Association between type of soft tissue injuries and presence of underlying bone fracture are presented in the table below

LOCATION	TYPE OF SOFT TISSUE INJURY	NO OF PATIENT (N)			p-value
		PRESENTED BONE FRACTURE		TOTAL	
		Yes	No		
Frontal	Laceration and/or Avulsion	9 (42.9)	12 (57.1)	21 (100.0)	<0.05*
	Abrasion and/or Hematoma	2 (10.5)	17 (89.5)	19 (100.0)	
	TOTAL	11 (27.5)	29 (72.5)	40 (100.0)	
Temporal	Laceration and/or Avulsion	0 (0)	3 (100.0)	3 (100.0)	N/A
	Abrasion and/or Hematoma	0 (0)	3 (100.0)	3 (100.0)	
	TOTAL	0 (0)	6 (100.0)	6 (100.0)	
Orbital	Laceration and/or Avulsion	6 (85.7)	1 (14.3)	7 (100.0)	0.66
	Abrasion and/or Hematoma	32 (69.6)	14 (30.4)	46 (100.0)	
	TOTAL	38 (72.7)	15 (28.3)	53 (100.0)	
Nasal	Laceration and/or Avulsion	2 (40.0)	3 (60.0)	5 (100.0)	0.66
	Abrasion and/or Hematoma	4 (40.0)	6 (60.0)	10 (100.0)	
	TOTAL	6 (40.0)	9 (60.0)	15 (100.0)	
Zygomatic	Laceration and/or Avulsion	4 (80.0)	1 (20.0)	5 (100.0)	>0.999
	Abrasion and/or Hematoma	35 (79.6)	9 (20.4)	44 (100.0)	
	TOTAL	39 (79.6)	10 (20.4)	49 (100.0)	
Upper Dentoalveolar	Laceration and/or Avulsion	2 (40.0)	3 (60.0)	5 (100.0)	0.54
	Abrasion and/or Hematoma	2 (16.7)	10 (83.3)	12 (100.0)	
	TOTAL	4 (23.5)	13 (76.5)	17 (100.0)	
Maxilla	Laceration and/or Avulsion	21 (72.4)	8 (27.6)	29 (100.0)	0.471
	Abrasion and/or Hematoma	7 (58.3)	5 (41.7)	12 (100.0)	
	TOTAL	28 (68.3)	13 (31.7)	41 (100.0)	
Lower Dentoalveolar	Laceration and/or Avulsion	5 (26.3)	14 (73.7)	19 (100.0)	>0.999
	Abrasion and/or Hematoma	0 (0.0)	2 (100.0)	2 (100.0)	
	TOTAL	5 (23.8)	16 (76.2)	21 (100.0)	
Mandible (Chin)	Laceration and/or Avulsion	17 (60.7)	11 (39.3)	28 (100.0)	>0.999
	Abrasion and/or Hematoma	7 (58.3)	5 (41.7)	12 (100.0)	
	TOTAL	24 (60.0)	16 (40.0)	40 (100.0)	
Mandible right left	Laceration and/or Avulsion	1 (100.0)	0 (0.0)	1 (100.0)	N/A
	Abrasion and/or Hematoma	2 (100.0)	0 (0.0)	2 (100.0)	
	TOTAL	3 (100.0)	0 (0.0)	3 (100.0)	
All sites	Laceration and/or Avulsion	67 (54.5)	56 (45.4)	123 (100.0)	P = 810
	Abrasion and/or Hematoma	91 (56.2)	71 (43.8)	162 (100.0)	
	TOTAL	158 (55.4)	127 (44.6)	285 (100.0)	

Discussions and Conclusions

Overall, no association was seen between type of soft tissue injuries (laceration/avulsion versus abrasion/contusion) and the underlying facial bone fracture. Looking specifically into sites, interestingly, laceration wound at the frontal area is significantly associated with underlying frontal bone fracture. It has been found previously that frontal bones are more resistant to fracture compared to other facial bones ⁴. Therefore, higher forces are needed to cause fracture in this site. It therefore can be postulated that laceration type of soft tissue are the results of higher force impact.

In conclusion, type of soft tissue injuries sustained following motorcycle accidents are not a predictor for the underlying facial bone fracture except in the frontal area. Fracture of the frontal bones are more likely present when there is laceration wound compared to abrasion or contusion.

References

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Declarations

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