A TWO YEAR AUDIT OF SOFT TISSUE MAXILLOFACIAL INJURIES AMONG PATIENTS ATTENDED TO AT THE UNIVERSITY OF NAIROBI DENTAL HOSPITAL IN 2010 AND 2011.

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A research project report submitted in partial fulfilment for the award of Bachelor of Dental Surgery (BDS) degree of the University of Nairobi.

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DECLARATION

I, Nurein Ahmed, hereby declare that this is my original work and has not been submitted anywhere else by any person for research purposes or a degree in any other institution.

Signature: [Signature]

Date: 5/11/12

Name: Nurein Ahmed
SUPERVISORS' APPROVAL

I, Nurain Ahmed Mohamed, submit this research proposal to the University of Nairobi/ Kenyatta National Hospital Research ethics and Standard Committee for approval.

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ABBREVIATIONS

ENT- EAR, NOSE & THROAT
HIV- HUMAN IMMUNE-DEFICIENCY VIRUS
IPV- INTERPERSONAL VIOLENCE
MF- MAXILLOFACIAL
MVA- MOTOR VEHICLE ACCIDENTS
STI- SOFT TISSUE INJURY
UON- UNIVERSITY OF NAIROBI
ABSTRACT

**Background:** Soft tissue injuries on the face are the most common presentation following maxillofacial trauma. Maxillofacial soft tissue injuries negatively impact both on function and aesthetics. The etiology of maxillofacial soft tissue injuries include motor vehicle accidents, interpersonal violence, human and animal bites, sports, falls and gun shot injuries.

**Objective:** The objective of this study was to assess retrospectively the aetiology and pattern of occurrence of maxillofacial soft tissue injuries among patients who attended and were treated at the University of Nairobi Dental Hospital.

**Study design:** The study was a retrospective study.

**Study area:** University of Nairobi Dental Hospital.

**Materials and methods:** Records of patients who were attended to at the University of Nairobi Dental Hospital between January 2010 and December 2011 with maxillofacial soft tissue injuries as either outdoor or indoor patients were analyzed. Age, gender, cause, site and type of injury were recorded.

**Results:** The results indicated that 44.3% of the patients who were attended to at UoN Dental hospital were due to interpersonal violence while 28.6% were due to motor vehicle accidents. The male to female ratio was 4.4:1 and 37.1% of the injuries occurred in the 21-30 years age group. Lacerations (34.2%) were the most type of injury observed followed by abrasions (22.9%) and contusions (18.6%). The lower third of the face was the most common extra-oral site involved. Intra-oral soft tissue injuries were sustained in 37.1% of cases.

**Conclusion:** The findings of this report showed that there was a high frequency of maxillofacial soft tissue injuries in our setting most commonly related to interpersonal violence followed by road traffic accidents. In addition, maxillofacial injuries tend to affect the young age group of 21-30 years mainly the male.

**Recommendation:** Better, stricter road safety laws need to be evolved and implemented. The legislation of safety belts and speed governors should be reinforced. There should be strict legislation against violence by prohibiting easy access to dangerous weapons. Education of the community on the effect of being in alcoholism and violent activities. There should be enhancement of security to reduce interpersonal violence. We need to have more organized pattern of record keeping for better quality of clinical management of maxillofacial soft tissue injuries as well as other facial injuries.
DEDICATION
To my father Mohamed Nurein, my siblings Saida, Fatma, Radhiya, Nurein, Mohiddin and Fathiya, their families plus my friends and all who have been my sole motivation to strive, THANK YOU!
ACKNOWLEDGMENTS

I am immensely grateful to Dr. B.N. Mua, Prof. Gathece and Dr. Walter Odhiambo who were resourceful throughout this. My group members and classmates, I would like to appreciate any support and effort that you rendered me towards the project.
1.0 INTRODUCTION AND LITERATURE REVIEW

1.1 Introduction
Trauma refers to medical or surgical problems associated with physical injury which is an adverse effect of a physical force upon a person. It can also be described as "a physical wound or injury, such as a fracture or a blow."

The prevalence of maxillofacial injuries has been reported to be 5% to 33% of the cases. A recent study by Zahoor et al on maxillofacial injuries in Pakistan showed that soft tissue injuries were the most frequently seen injury. Out of 2112 records of patients, 904 (43%) had isolated soft tissue injuries. Hussaini et al in their study on maxillofacial injuries in Malaysia found that out of 313 patients with maxillofacial injuries, 295 had soft tissue injuries. Of the STI's, lacerations accounted for 69% while abrasions and contusions accounted for 31%. Edalia K.B. (2010) in his investigation on aetiology, occurrence and clinical characteristics of MF-STI's reported 87% prevalence of soft tissue injuries on patients with maxillofacial injuries.

Studies pertaining to the pattern of occurrence of MF-STI's have also been documented. A study by Okoje et al showed that 55.9% of cases to be soft tissue lacerations. Hussaini et al reported upper lips (23%) and lower lips (18%) to be the most common extraoral site of injury. The incidence and etiology of facial Soft Tissue injuries is also influenced by age and gender. Most studies have shown a lower incidence of maxillofacial injuries in females. Generally young men are more affected by Maxillofacial trauma. According to Hussaini et al, males (79%) between 21 and 30 years old were the majority of patients with maxillofacial injuries.

Generally facial injuries are often caused by motor vehicle accidents, interpersonal violence, falls, sporting accidents and other forms of trauma like burns, gunshot injuries, animal bites and industrial accidents. Most studies on Maxillofacial trauma in Kenya have concentrated on maxillofacial fractures. A recent study done by Edalia K.B. on maxillofacial soft tissue injuries in Kenyatta national Hospital.

There is insufficient literature in our region to accurately illustrate the etiology and pattern of occurrence of these injuries. The aim of this study is to describe the etiology and pattern of occurrence of maxillofacial soft tissue injuries in the UON Dental Hospital over a 2 year period.
1.2 LITERATURE REVIEW

The common Maxillofacial Soft Tissue Injuries include avulsions, lacerations, contusions, crush injuries and abrasion injuries. Avulsion injuries may result in loss of tissue. Lacerations may be simple, multiple, contused, clean or contaminated. According to Bolts and Watts (2004), the aetiology of facial lacerations largely influenced their distribution. Following MVA, falls and accidents, the lips were the commonest site of injury. Lacerations resulting from blunt trauma commonly affected facial structures of anteromedial position, i.e. forehead, eyebrows and lips.

Injuries to the maxillofacial region may be particularly disabling. It is the region of specialized functions such as vision, hearing, olfaction, respiration, mastication and speech. Important vascular and neural structures which are intimately associated are present in this region and the psychological impact of disfigurement may also add to the level of resulting morbidity. Management is geared towards; saving life, restoring both function and aesthetics following maxillofacial trauma. Rankin and Borah concluded that facial deformity caused by trauma, congenital disabilities and post-surgical sequelae produced a negative impact on perceptions of social functionality, including employability, honesty and trustworthiness. Even minor facial scars may cause a significant psychological impact. The financial burden resulting from these injuries is also likely to be high. Young adults are mostly affected.

Studies pertaining to the pattern of occurrence and management of injuries to special maxillofacial injuries have also been documented. Nerve injuries involve mainly the facial nerve due to its predominant and superficial distribution. Branches of Trigeminal nerve injury has also been noted in patients with maxillofacial injury. Repair of the facial nerve may involve use of grafts harvested from either the sural or greater auricular nerves. Salivary gland injuries are rare and may include intraoral lacerations of the duct, penetrating or blunt trauma to the gland with fracture. According to a study by Akama M.K et al, blunt parotid gland injuries are rare and are not easily diagnosed.

Edalia K.B. (2010) in his investigation on aetiology, occurrence and clinical characteristics of MFSTI's reported that injuries to blood vessels, nerves, the parotid and submandibular glands to be less frequent than dentoalveolar injuries, tongue cuts and eyeball trauma.

Numerous studies dealing with the incidence and aetiology of maxillofacial injuries have been published. The main causes are Motor Vehicle accidents, Interpersonal violence, falls, Firearm injuries, industrial accidents, sports-related injuries and civil war.

The etiology of maxillofacial injuries varies from one country to another and even within the same country depending on the prevailing socioeconomic, cultural and environmental factors. The causes of maxillofacial injuries have changed over the past three to four decades and continue to do so. Road traffic accidents are reported as the main cause of facial injuries in
literature from developing countries whereas interpersonal violence remains the leading etiological source in the developed world. This is due to a combination of factors including improved road conditions, modern motor vehicle safety measures and implementation of mandatory wearing of seat belts in the developed countries. Since the etiology of STIs varies considerably from region to region, statistics reported by the studies conducted also vary widely. In the UK, a national survey reported that assault was the main cause of MF trauma. Bolts and Watts (2004) reported that falls from heights (56%) and assault (16%) were the main causes of STIs seen at their institution in Nottinghamshire, UK. H.M. Hussaini et al reported that MVA was the main cause of maxillofacial trauma in Malaysia. Both interpersonal violence and Motor vehicle accidents commonly involve young male adults with alcohol being the main associated factor.

Maxillofacial soft tissue injuries resulting from human and animal bites tend to be more destructive in terms of tissue loss and are associated with infections such as Hepatitis A, B, C HIV and tetanus.

The incidence and etiology of facial Soft Tissue injuries is also influenced by age and gender. Most studies have shown a lower incidence of maxillofacial injuries in females. Generally young men are more affected by Maxillofacial trauma. According to Bolts and Watts (2004), etiology is a significant determinant of the distribution of facial lacerations.

Maxillofacial trauma are commonly associated with multisystemic trauma. More than 50% of patients with MF trauma have concurrent multisystemic trauma requiring multidisciplinary management between emergency physicians and surgical specialists including ENT, trauma, plastic, ophthalmology and oral and maxillofacial surgeons. Complex STIs may involve multiple facial structures like the facial nerve and the parotid gland with resultant immediate and long-term complications that pose a major challenge in the management. Notably the psychological impact on the face can be devastating if the injuries are not properly managed.

Firearm injuries to the maxillofacial region may result in severe functional and aesthetic consequences for patients. Odhiambo et al. (2008) in a study of the clinical characteristics of firearm injuries in Kenya found that they were increasing and affected all age groups. Young male adults in the 3rd and 4th decade of life were largely affected. Males are mostly affected and death occurs mostly in those with abdominal wounds.
2.0 STATEMENT OF THE RESEARCH PROBLEM JUSTIFICATION & OBJECTIVES

2.1 Statement of the research problem
Maxillofacial Soft Tissue Injuries are very common in Kenya. Maxillofacial Soft Tissue Injuries if managed inappropriately or if left without management may compromise the quality of an individual's life due to both cosmetic disfigurement and functional disability. Because an individual's self-image and self-esteem are derived from his or her own facial appearance, any injury affecting these features requires particular attention.

2.2 Justification of the Study
Many studies on maxillofacial trauma in Kenya have emphasized on maxillofacial fractures and have overlooked soft tissue injuries. This study aims in establishing the aetiology and pattern of occurrence of MF-STI's already known. The information obtained from this study will help in improving the knowledge of the nature of the soft tissue injuries and can also be used in the formulation of management protocol for maxillofacial soft tissue injuries.

2.3 Objectives

2.3.1 Main objective
To describe the aetiology and pattern of occurrence of maxillofacial soft tissue injuries in patients who attended and were treated at the University of Nairobi Dental Hospital.

2.3.2 Specific objectives
a. To outline the aetiology of Maxillofacial Soft Tissue injuries at the UoN Dental Hospital
b. To discuss the pattern of occurrence of MF-STI's in UoN Dental Hospital
c. To determine the types of Maxillofacial Soft tissue injuries which presented at the University of Nairobi Dental Hospital
3.0 RESEARCH METHODOLOGY

3.1 Study Area
The study was conducted at the department of Oral and Maxillofacial Surgery in University of Nairobi Dental hospital. UoN Dental Hospital is a referral hospital as well as a tertiary learning institution. It is in Hurlingham area along Ralph Bunche Road, Valley road and ArgwingsKodhek Road, 3 kilometers from Nairobi Central Business District.

3.2 Study Design
This was a Retrospective study. Records of patients who were treated in the year 2010 and 2011 at the Oral diagnosis clinic as outpatients or in the department of Oral and Maxillofacial surgery as in-patients were analyzed.

3.3 Study Population
Records of patients who have visited and were attended to at the University of Nairobi Dental Hospital between January 2010 and December 2011

3.4 Inclusion Criteria
Patients who were attended to at the University of Nairobi Dental Hospital between January 2010 and December 2011

Patients who were attended to at the University of Nairobi Dental Hospital between January 2010 and December 2011 with complete records.

3.5 Exclusion Criteria
Patients who visited University of Nairobi Dental Hospital with incomplete records.
Records of patients who not visited the Dental Hospital in 2010 and 2011

3.6 Sample Design And Procedure
Studies have found that the prevalence of maxillofacial soft tissue injuries among patients with maxillofacial injuries is 81.7%. Using this prevalence:

\[ N = \frac{Z^2P(1-P)}{C^2} \]

Where N= sample size

\[ Z = \text{Degree of accuracy (1.96)} \]
P = prevalence (81.7%)
C = 100 - Confidence interval (0.95)

N = \((1.96)^2 \times 0.817(1-0.817)\)
\((1-0.95)^2\)

N = 229.744

= 230

If N is less than 10,000

\(nf = n + 1 + \frac{n}{N}\)

Where: nf is the desired population size
n is 230

N is estimate of the population size which is 100

nf = 230

1 + \(\frac{230}{100}\)

\(nf = 70\)

3.7 Sample selection method

Anon-probability convenient sampling method was used.
3.8 Variables

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Socio-demographic variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Age</td>
<td>• Years</td>
</tr>
<tr>
<td></td>
<td>• Gender</td>
<td>• Male or Female</td>
</tr>
<tr>
<td></td>
<td>Independent variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Aetiology of injury.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• RTA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IPV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Falls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Animal bites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Human bites</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sports injury</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Gun shots</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dependent variables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Type of STI</td>
<td>• Lacerations, perforation, avulsion, abrasion, crush</td>
</tr>
<tr>
<td></td>
<td>• Anatomical site of STI</td>
<td>• Upper face, mid-face, lower face, intra-oral</td>
</tr>
</tbody>
</table>

3.9 Data Collection Instruments and Technique
A data collection form was used to record data obtained from the records.

3.10 Data analysis and presentation
Data was analysed with the aid of a computer using Microsoft Excel software and SPSS version 17.0. The results are presented in form of literature, tables and figures.

3.11 Benefits of the Study
i. The information obtained in this study could be used in formulating a management protocol for MF-STI’s in UON Dental Hospital

ii. This research is in partial fulfillment for the award of a degree in Bachelor of Dental surgery from the University of Nairobi.

3.12 Ethical consideration
Approval was sought from the University of Nairobi and Kenyatta National ethics board before the commencement of the study.

Names of the patients will be withheld to maintain Patient-Doctor confidentiality.
4.0 RESULTS

INTRODUCTION
A total of 70 patient records were examined for those who were seen with maxillofacial soft tissue injuries in 2010 and 2011. The gender, age group, cause of injury, type of injury and anatomical site of injury was recorded.

4.1 Demographic Profile

4.1.1 Age Distribution
The peak age group was 21-30 years which formed 37.1% of the cases followed by 31-40 years old forming 21.4%. A decreasing trend was seen with age proceeding to both extremes. Fig.1

AGE DISTRIBUTION OF PATIENTS
4.1.2 Gender distribution

There was a male preponderance of the sample accounting for 81.4% with an overall male:female ratio of 4.4:1. The males also outnumbered females in each age group. Table 1

Table 1: Gender Distribution of Patients

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>57</td>
<td>81.4</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>18.6</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

4.2 Aetiology of Injury

Interpersonal violence was found to be the primary etiologic factor, accounting for approximately 44.3% of the injuries, followed by Motor Vehicle Accidents (28.6%). Other causative factors included falls (8.6%), sports injuries (8.6%), gun shots (4.3%), human bites (4.3%) and animal bites (1.4%). Fig. 2
4.3 Type of Soft Tissue Injury

Analysis of the records revealed that patients presented with varying types of maxillofacial soft tissue injuries. Lacerations (34.2%) was the most type of injury observed followed by abrasions (22.9%) and contusions (18.6%). Avulsions and perforations were the least type of injury observed with 10% and 4.3% respectively.

Fig. 3 DISTRIBUTION OF TYPE OF SOFT TISSUE INJURY

![Bar chart showing the distribution of types of soft tissue injuries. Lacerations are the most common at 34.2%, followed by abrasions (22.9%) and contusions (18.6%). Avulsions and perforations are the least common at 10% and 4.3% respectively.](image-url)
4.3.1 Extra-oral site of Soft Tissue Injuries

Figure 4 shows the extra-oral distribution of maxillofacial injuries. The most common extra-oral site involved was the lower face (45.7%), with 32 out of 70 having suffered. The lower lip was the most common followed by the upper lip (18 and 9 respectively). This was followed by mid-face (25.7%). The least common site was upper face (12.9%). 15.7% suffered soft tissue injuries to the whole face.

Fig.4 GRAPH OF EXTRA-ORAL DISTRIBUTION OF MF-STI'S
4.3.2 Intra-oral site of soft tissue injury

Out of 70 records that were analyzed, 26 showed records of intra-oral soft tissue injuries (37%). The labial mucosa was the most common site of injury with 17.1% followed by buccal mucosa (8.1%). The least common involved site was the gingiva and the tongue (7.1% and 4.3%) respectively.

Table 2: INTRA-ORAL SITE OF SOFT TISSUE INJURY

<table>
<thead>
<tr>
<th>Site of injury</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tongue</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Gingiva</td>
<td>3</td>
<td>7.1</td>
</tr>
<tr>
<td>Labial mucosa</td>
<td>12</td>
<td>17.1</td>
</tr>
<tr>
<td>Buccal mucosa</td>
<td>6</td>
<td>8.6</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>37.1</td>
</tr>
<tr>
<td>System</td>
<td>44</td>
<td>62.9</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>
5.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION
Most studies conducted revealed a male preponderance in the gender distribution of soft tissue injuries as shown by a study done by Hussaini et al which showed an overall male predominance of 79%\textsuperscript{15}. This was confirmed in this study as 81.4% of the patients studied were male and 18.6% were female. This more involvement of men could be attributed to by the fact that men are the primary bread winners of the family and tend to be outdoor most of the times. Also men are mostly involved in outdoor activities, sports, alcoholism and violent interactions.

In this study, the pattern of age distribution in maxillofacial soft tissue injuries revealed that people of all ages were affected. Patients in their third decade of life seem to be most affected. 37.1% of the patients studied in this study were aged from 21 to 30 years. This was in agreement with another study done in Malaysia\textsuperscript{15} where 34% of patients were aged between 21 and 30 years. This was also in agreement with a study done in India\textsuperscript{23} where 39.2% were aged between 21 and 30 years. This could be attributed to the fact that the third decade of life is the most active period of life and take part in dangerous exercises, sports and behaviours. The lowest incidence is seen in patients aged between 0-10 years and 81-90 years. This is due to the fact that these age groups are less likely to be involved in acts of violence and rarely drive cars.

The result of this study showed that Interpersonal violence is the main cause of maxillofacial soft tissue injuries at 44.6% followed by motor vehicle accidents at 28.6%. This was in accordance with a study done in India\textsuperscript{23} where 53.8% of soft tissue injuries were due to interpersonal violence. This also agrees with a study previously done in Nairobi, Kenya\textsuperscript{11} where interpersonal violence accounted for 74.9% of maxillofacial injuries. However this study contradicts with a study done in Malaysia\textsuperscript{15} by Hussaini et al where Road traffic accidents accounted for 75% of the maxillofacial soft tissue injuries. The reduced incidence of MVA’s may be attributed to introduction of safety belts and speed governers in the matatu industry in Kenya. Furthermore, the increased incidence of interpersonal violence may be attributed to increased alcoholism and unemployment.

The most frequent type of soft tissue injury seen in this study was lacerations(34.2%) followed by abrasions and contusions. This finding was in agreement with a study done in Malaysia\textsuperscript{15} where 69% of the cases were lacerations or lacerations with other wounds while abrasions and contusions accounted for 31%. In contrast, a study done in India\textsuperscript{23} revealed contusions to be the most common type of soft tissue injury with an incidence of 43.2%.
The lower third of the face is the most frequently affected extra-oral site with an incidence of 45.7%. This is in agreement with a study by Hussaini et al done in Malaysia\textsuperscript{15} where the lips and chin were the commonest site of injury. However this contradicts with a study by Worral SF that showed that the upper third of the face was the most frequently affected area in soft tissue injuries\textsuperscript{24}. Lacerations were most frequently observed extra-orally on the lips and intra-orally on the labial mucosa followed by the buccal mucosa and the gingiva. This is in agreement with a study by Gassner et al\textsuperscript{6}.

In this study, of the 70 patients with soft tissue injuries, 26 (37.1\%) of them sustained intra-oral soft tissue injuries. This is in contrast with a study done in Malaysia by Hussaini et al where 164 out of 295 patients with soft tissue injuries sustained intra-oral soft tissue injuries.
5.2 CONCLUSION
Based on the findings of this study the following were concluded:

1. the major cause of maxillofacial soft tissue injuries is interpersonal violence followed by motor vehicle accidents.
2. Males who are in their third decade of life are the most vulnerable to maxillofacial soft tissue injuries.
3. Most injuries affected extra-oral sites of the maxillofacial region particularly the lower third of the face. Most injuries were lacerations.
5.3 RECOMMENDATIONS

1. Education of the community on the effect of being in alcoholism and violent activities
2. Reinforcement of legislation of safety belts and speed governors
3. There should be enhancement of security to reduce interpersonal violence
4. We need to have more organized pattern of record keeping for better quality of clinical management of maxillofacial soft tissue injuries as well as other facial injuries.
REFERENCES

13. Okoje VN, Alonge TO, Oluteye OA, Denloye OO. Changing pattern of pediatric maxillofacial injuries at the Accident and Emergency Department of the University Teaching Hospital, Ibadan--a four-year experience: . Prehosp Disaster Med. 2010 Jan-Feb;25(1):68-71


APPENDIX
DATA COLLECTION FORM

A. BIODATA
1. Age ...........
2. Gender ...........

B. CIRCUMSTANCE OF INJURY
1. Duration between injury and treatment ...........
2. Date of injury ....................
3. Place of injury ....................

C. CAUSE OF INJURY
1. MVA ............
2. IPV ............
3. Fall ............
4. Animal bites ............
5. Human bites ............
6. Sports injury ............
7. Gun shots ............

D. EXTRA-ORAL SOFT TISSUE SITE INJURED
1. Upper face ............
2. Mid-face ............
3. Lower face ............
4. Whole face ............

E. INTRA-ORAL SOFT TISSUE STRUCTURES INJURED
1. Tongue ............
2. Mucosal surfaces ............

F. TYPE OF SOFT TISSUE INJURY
1. Simple lacerations ............
2. Multiple lacerations ............
3. Perforations ............
4. Abrasions ............
5. Crush ............
6. Avulsions ............