

# OUR PRIORITIES FOR MAXILLOFACIAL TRAUMA

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# MAXILLOFACIAL TRAUMA

**Your face is the start point of your self-esteem**

With your face you can

- ☐ Breathe
- ☐ See
- ☐ Eat
- ☐ Hear
- ☐ Smell
- ☐ Talk
- ☐ Smile
- ☐ Communicate



# MAXILLOFACIAL TRAUMA

- ❑ The management of facial injuries must first focus on threats to life
- ❑ But important secondary considerations are function and long-term cosmetics
- ❑ It is a multidimensional problem
  - ❑ Physical
  - ❑ Financial
  - ❑ Social
  - ❑ Psychological

ORIGINAL ARTICLE

# Incidence and patterns of maxillofacial trauma—a retrospective analysis of 3611 patients—an update

P. Manodh<sup>1</sup> · D. Prabhu Shankar<sup>1</sup> · Devadoss Pradeep<sup>1</sup> · Rajan Santhosh<sup>1</sup> ·  
Aparna Murugan<sup>1</sup>

## Mechanism of injury

- ☐ Road traffic accidents in 1,517 (43.4 %) injuries
- ☐ Assaults in 847 (23.5 %) injuries
- ☐ Falls in 542 (15.0 %) injuries
- ☐ Sports-related causes in 194 (5.4 %) injuries
- ☐ Other causes in 461 (12.8 %) injuries

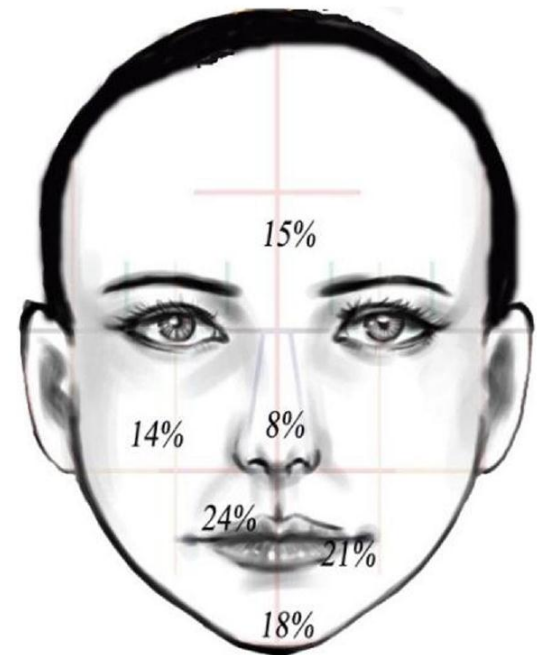
# TYPES OF INJURY

## Fractured bones

- ❑ Mandible was the most common bone fractured - 59.2 %
- ❑ Complex fractures (Lefort II, Lefort III, pan facial fractures) - 18.9 %
- ❑ Isolated facial bone fractures - 9.8 %

## Soft tissue injuries

- ❑ Upper lip - 24%
- ❑ Lower lip - 21 %
- ❑ Chin region - 18%



Manodh P, et al. Oral Maxillofac Surg. 2016;20:377–383.



# INITIAL EVALUATION

## **A**AIRWAY

- Airway patency/aspiration
- Cervical spine immobilization

## **B**BREATHING

- Oxygenation/Intubation
- Ventilation

## **C**CIRCULATION

- Bleeding control
- Hemorrhagic shock

## **D**ISABILITY

- Glasgow coma scale
- Neurological deficits

## **E**XPOSURE

- Eyes
- Teeth

# AIRWAY

- ☐ Even minor injuries can result in significant casualty to the airway
- ☐ Direct threats to the airway in patients with maxillofacial trauma are
  - ☐ Presence of broken teeth and dentures
  - ☐ Foreign bodies
  - ☐ Multiple mandibular fractures
  - ☐ Avulsed tissues
  - ☐ Massive edema of glottis
  - ☐ Direct injury to larynx and trachea

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. Anesthesiology. J Emerg Trauma Shock. 2016;9(2):73-80.

# AIRWAY

- ☐ Airway patency can decrease due to the displacement of maxilla or mandible posteriorly
- ☐ Aspiration risk increases in supine position
  - ☐ Altered mental status
  - ☐ Alcohol and/or drug intoxication
  - ☐ Altered laryngeal and pharyngeal reflexes
- ☐ Ingested or pooled blood can cause nausea and vomiting
  - ☐ The result is increased bleeding and salivation

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. Anesthesiology. J Emerg Trauma Shock. 2016;9(2):73-80.



# AIRWAY

- ☐ Check for signs of respiratory distress
- ☐ Look for symptoms and signs of shock
- ☐ Perform a standard airway evaluation
- ☐ Remember the risk of aspiration
- ☐ Determine the mechanism of trauma
- ☐ Evaluate for associated injuries
- ☐ Evaluate any structural damage to the airway

# CRITICAL DECISIONS

## Intubate vs. not intubate

### Indications of definitive airway in facial trauma patient

Absent spontaneous breathing

Comatose patient (Glasgow coma scale  $<9$ )

Airway injury or obstruction

Persistent oxygen saturation  $<90\%$

High risk for aspiration

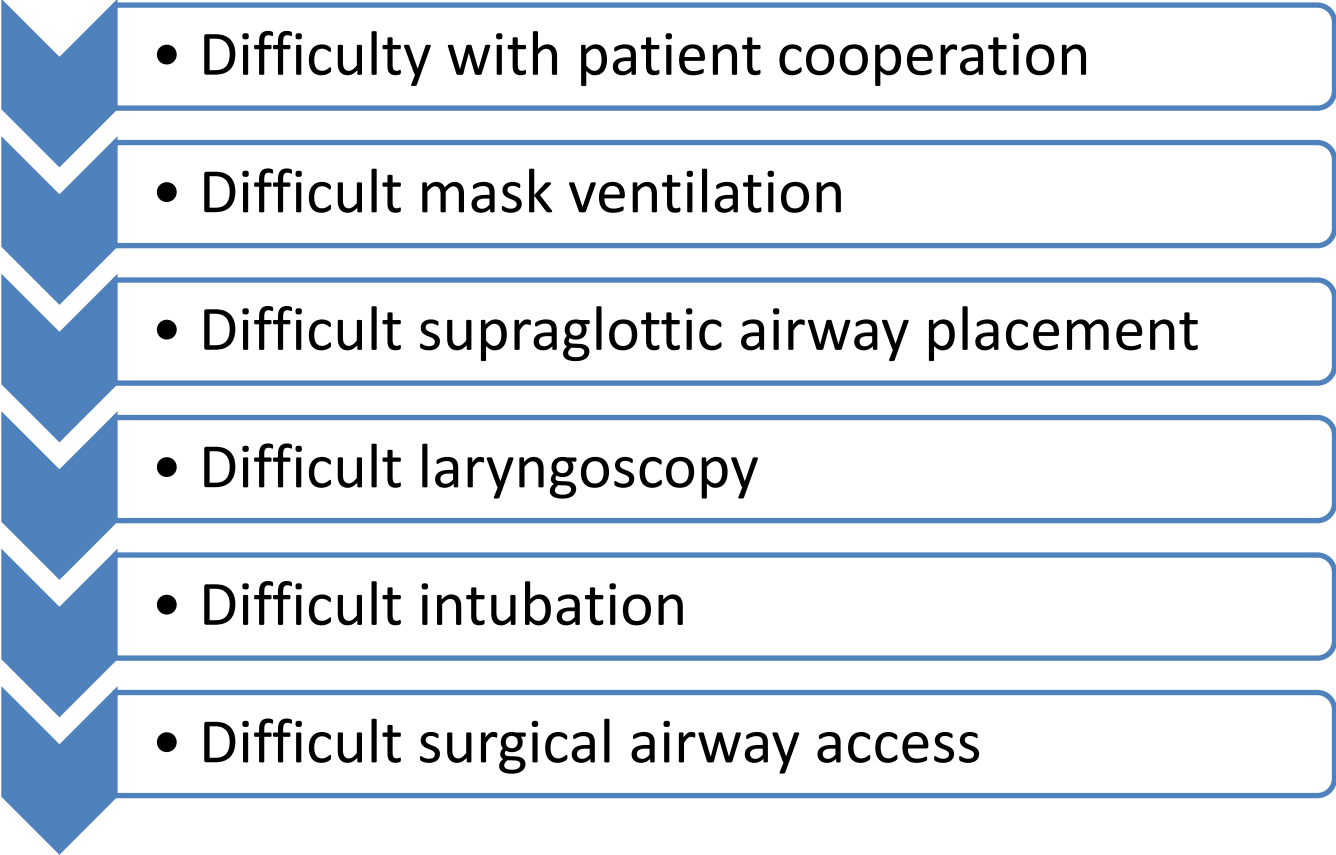
Systemic shock (systolic blood pressure  $<80$  mmHg)

'Cannot ventilate cannot intubate' situations

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. Anesthesiology. J Emerg Trauma Shock. 2016;9(2):73-80.

# CRITICAL DECISIONS

## Difficult airway situation or not?

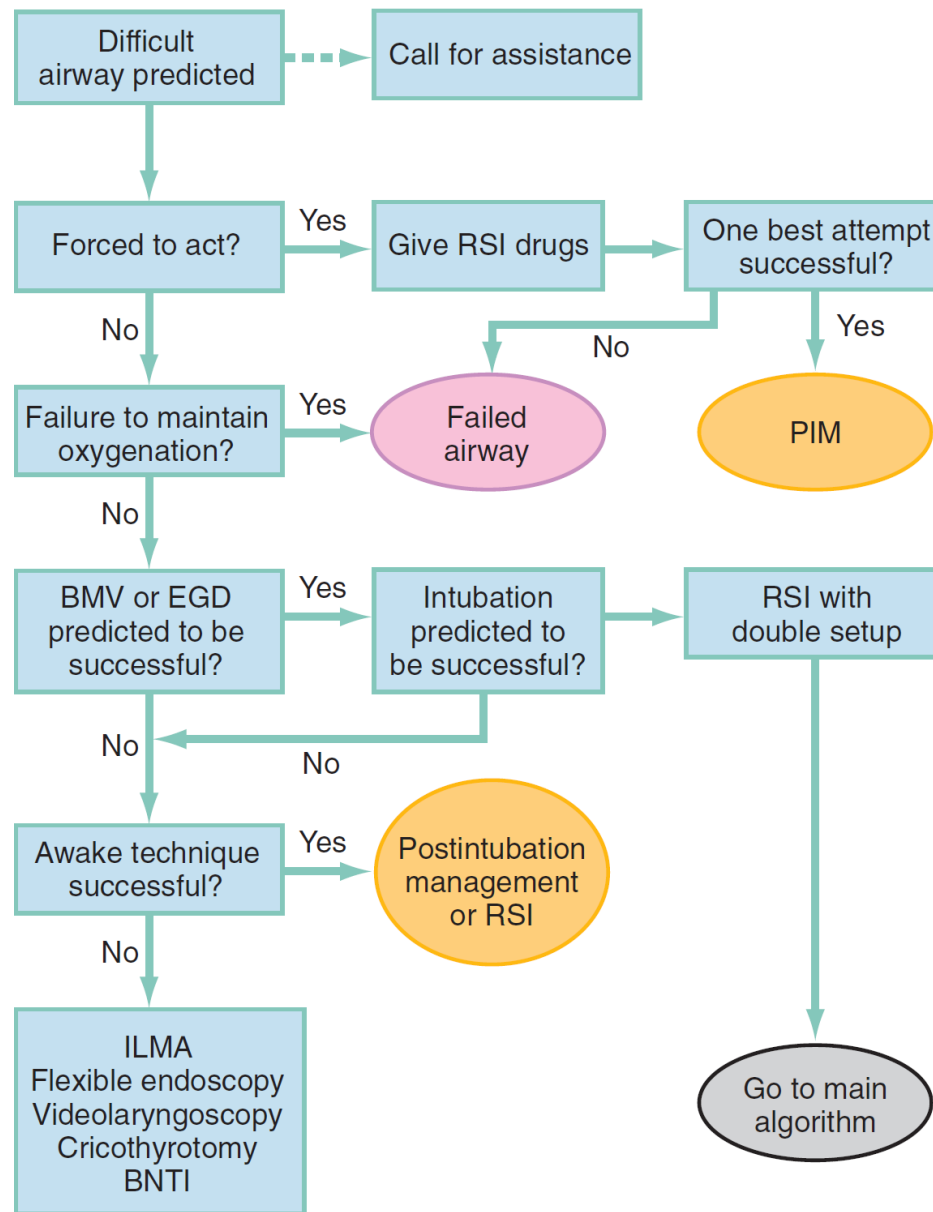
- 
- Difficulty with patient cooperation
  - Difficult mask ventilation
  - Difficult supraglottic airway placement
  - Difficult laryngoscopy
  - Difficult intubation
  - Difficult surgical airway access

American Society of Anesthesiologists: Practice guidelines for management of the difficult airway: An updated report. *Anesthesiology* 2013; 118.

# CRITICAL DECISIONS

- ☐ Awake intubation **vs.** intubation after induction of general anesthesia
- ☐ Non-invasive technique **vs.** invasive techniques for the initial approach to intubation
- ☐ Video-assisted laryngoscopy as an initial approach to intubation
- ☐ Preservation **vs.** ablation of spontaneous ventilation

American Society of Anesthesiologists: Practice guidelines for management of the difficult airway: An updated report. *Anesthesiology* 2013; 118.



Rosen's emergency medicine : concepts and clinical practice . Editor-in-chief, John A. Marx. 8th ed, 2012, p. 9



ORIGINAL RESEARCH

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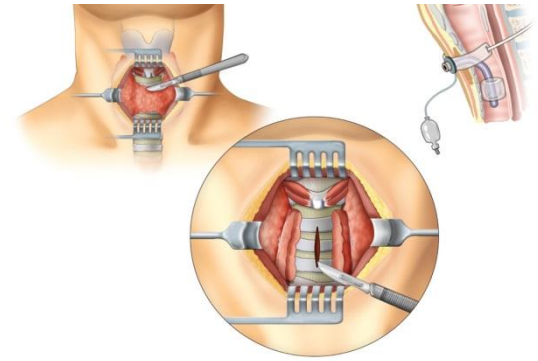
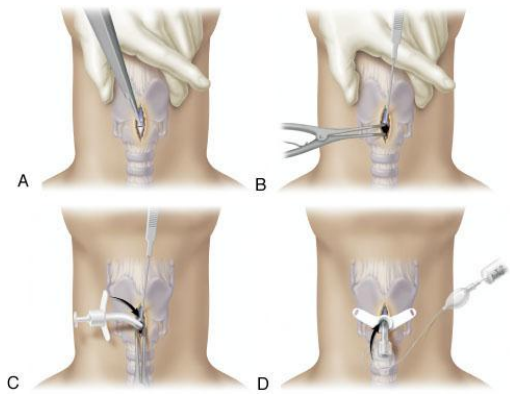
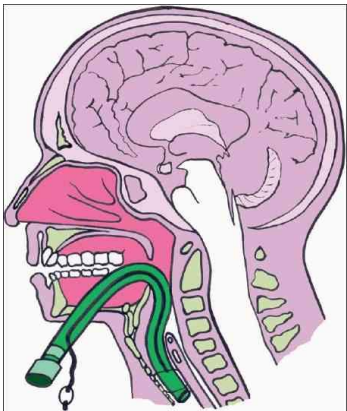
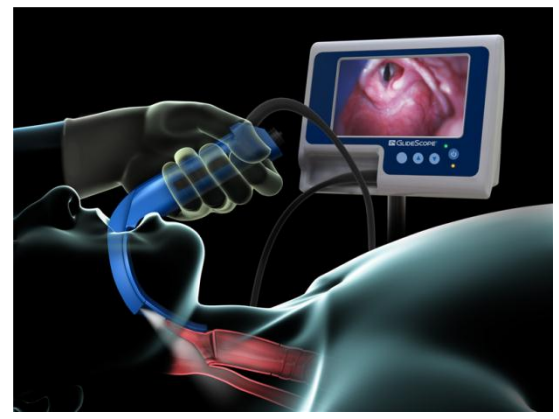
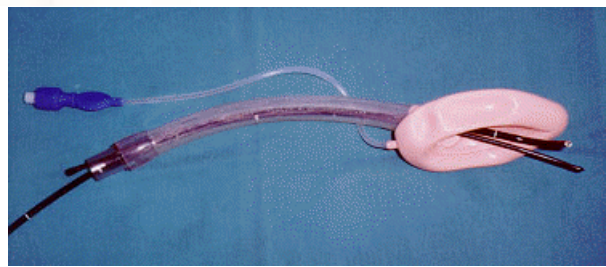
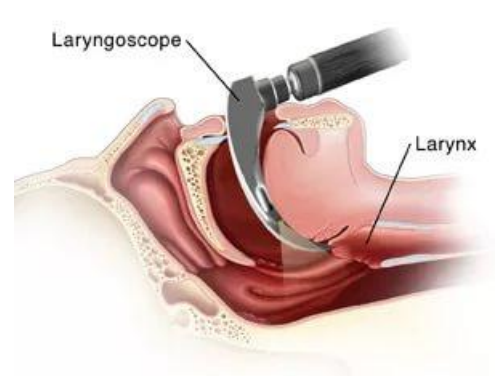


# The effectiveness of rapid sequence intubation (RSI) versus non-RSI in emergency department: an analysis of multicenter prospective observational study

Masashi Okubo<sup>1\*</sup>, Koichiro Gibo<sup>2</sup>, Yusuke Hagiwara<sup>3</sup>, Yukiko Nakayama<sup>4</sup>, Kohei Hasegawa<sup>5</sup> and On behalf of the Japanese Emergency Medicine Network Investigators

- ❑ 13 Japanese EDs – 2365 patients (761 RSI vs. 1604 non-RSI)
- ❑ Intubations with RSI had a higher success rate on the first attempt compared to those with non-RSI (73 vs. 63%;  $p < 0.0001$ ).
- ❑ The complication rates did not differ significantly between RSI and non-RSI groups (12 vs. 13%;  $p = 0.59$ ).

# THE BEST METHOD?



ORIGINAL CONTRIBUTION

# The Impact of a Soiled Airway on Intubation Success in the Emergency Department When Using the GlideScope or the Direct Laryngoscope

John C. Sakles, MD, G. Judson Corn, MD, Patrick Hollinger, MD, Brittany Arcaris, Asad E. Patanwala, PharmD, and Jarrod M. Mosier, MD

## ABSTRACT

**Background:** The objective was to determine the impact of a soiled airway on firstpass success when using the GlideScope video laryngoscope or the direct laryngoscope for intubation in the emergency department (ED).

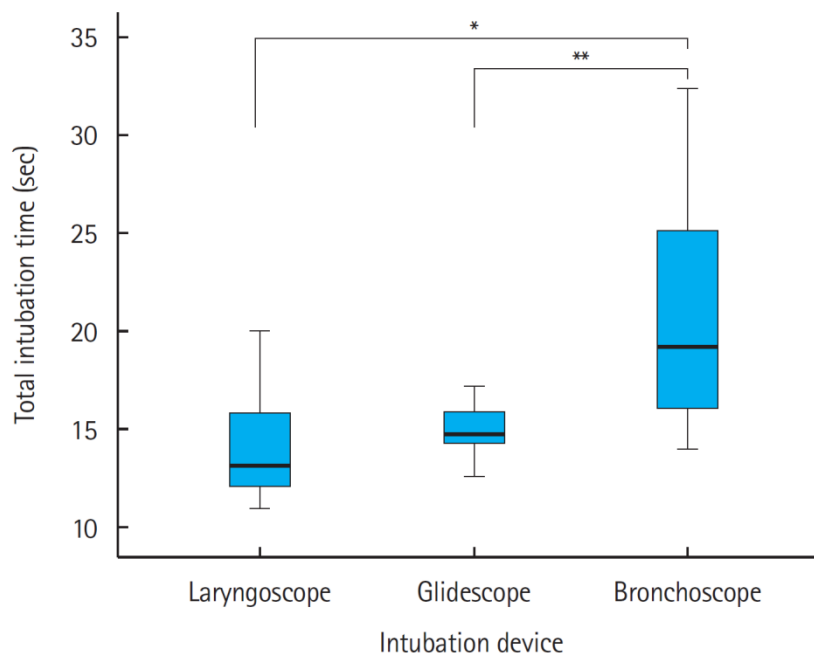
**Results:** When using the GlideScope, the firstpass success was lower in the SOILED group (249/306; 81.4%) than the in CLEAN group (586/644, 91.0%; difference = 9.6%; 95% confidence interval [CI] = 4.7%–14.5%). Similarly, when using the direct laryngoscope, the firstpass success was lower in the SOILED group (186/284, 65.5%) than in the CLEAN group (569/751, 75.8%; difference = 10.3%; 95% CI = 4.0%–16.6%). The SOILED airway was associated with a decreased firstpass success in both the GlideScope cohort (adjusted odds ratio [aOR] = 0.4; 95% CI = 0.3–0.7) and the direct laryngoscope cohort (aOR = 0.6; 95% CI = 0.5–0.8).

**Conclusion:** Soiling of the airway was associated with a reduced firstpass success during emergency intubation, and this reduction occurred to a similar degree whether using either the GlideScope or the direct laryngoscope.



## Comparison of intubation times using a manikin with an immobilized cervical spine: Macintosh laryngoscope vs. GlideScope vs. fiberoptic bronchoscope

Jung-In Ko<sup>1</sup>, Sang Ook Ha<sup>2</sup>, Min Seok Koo<sup>3</sup>, Miyoung Kwon<sup>3</sup>, Jieun Kim<sup>3</sup>, Jin Jeon<sup>4</sup>, So Hee Park<sup>5</sup>, Sangwoo Shim<sup>6</sup>, Youjin Chang<sup>7</sup>, Taejin Park<sup>1</sup>



**Table 2.** Intubation failure and dental injury rates

Device	Intubation failure	Dental injury
Laryngoscope	1 (2)	3 (5)
GlideScope	2 (4)	10 (19)
Bronchoscope	0 (0)	0 (0)

Values are presented as number (%).

**Fig. 1.** Total intubation time using each intubation device. \*P=0.008.  
\*\*P= 0.024.

# Airway Management in Maxillofacial Trauma: Do We Really Need Tracheostomy/Submental Intubation

Journal of Clinical and Diagnostic Research. 2014 Mar, Vol-8(3): 77-79

GEETA MITTAL<sup>1</sup>, RAJINDER K. MITTAL<sup>2</sup>, SUNIL KATYAL<sup>3</sup>, SANJEEV UPPAL<sup>4</sup>, VARUN MITTAL<sup>5</sup>

**Results:** Young patients with male predominance is the most common affected population. Panfacial fracture is the most common type of injury (39.83%) among facial fractures. Airway was managed with intraoperative change of nasotracheal to orotracheal intubation in 33.05% of the patients whereas submental intubation or tracheostomy was done in 8.62% of the patients.

**Conclusion:** Nasal route for endotracheal intubation is not a contraindication in the presence of nasal fractures, base of skull fractures and CSF leak. By changing the nasotracheal intubation to orotracheal intubation intraoperatively in cases panfacial fractures, most of the tracheostomies and submental intubations can be avoided.



# KEY POINTS – TRAUMATIZED AIRWAY

- ❑ There is a lack of evidence regarding the best practice for airway management in patients with a traumatized airway
- ❑ Practitioners should thus utilize the technique with which they are most competent
- ❑ A high degree of suspicion for airway disruption or a difficult airway should alert the physicians to consider alternative approaches
- ❑ Inability to intubate is an absolute indication for an emergency cricothyrotomy or surgical tracheostomy

# CERVICAL SPINE INJURY

- ❑ In a complex maxillofacial trauma scenario, cervical spine fracture should always be considered unless proven otherwise
- ❑ In a neurologically unstable patient, the cervical spine must be immobilized irrespective of the injury
- ❑ Accepted fact is that the application of collar protects and stabilizes the cervical spine temporarily until definitive management is done

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.

# CERVICAL SPINE INJURY

- ☐ Generally, without the adjunct of radiographic survey, the patient can be excluded from spine injury if they display the following
  - ☐ Patient with perfect neurological condition (normal GCS)
  - ☐ Not under the consequence of drugs (alcohol, others)
  - ☐ Absence of pain/tenderness in posterior midline of cervical spine
  - ☐ Devoid of distracting, painful impairments

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.



Contents lists available at ScienceDirect

## Journal of Cranio-Maxillo-Facial Surgery

journal homepage: [www.jcmfs.com](http://www.jcmfs.com)

## Maxillofacial trauma – Underestimation of cervical spine injury

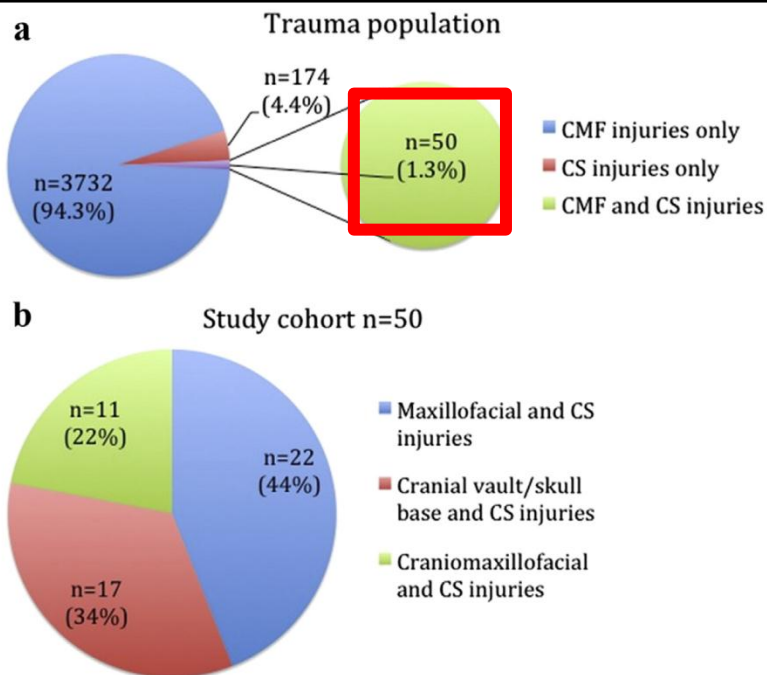
Waldemar Reich <sup>a,\*</sup>, Alexey Surov <sup>b,1</sup>, Alexander Walter Eckert <sup>a,2</sup><sup>a</sup> Department of Oral and Plastic Maxillofacial Surgery, Martin Luther University Halle-Wittenberg, Ernst-Grube Str. 40, 06120, Halle (Saale), Germany<sup>b</sup> Department of Diagnostic and Interventional Radiology, University Leipzig, Liebig Str. 20, 04103, Leipzig, Germany

Fig. 1. Monocentric trauma population suffering from head and neck fractures

## Conclusion

- Maxillofacial surgeons should be aware of a low but serious risk of underestimating an unstable cervical spine injury.



## Simultaneous head and facial computed tomography scans for assessing facial fractures in patients with traumatic brain injury

Li-Kuo Huang<sup>a,c</sup>, Hsueh Han Wang<sup>a</sup>, Hsi-Feng Tu<sup>b,d</sup>, Chih-Yuan Fu<sup>e,f,\*</sup>

- ❑ 200 patients (12.1%) had at least one facial fracture shown on the CT scans
- ❑ 166 (83.0%) patients with facial fractures required further facial CT scans
- ❑ Surgical intervention was mandatory in 73 (44.0%) of the 166 patients
- ❑ Fractures of the lower third of the face and orbit are easily overlooked in routine head CT scans



# BLEEDING

- ☐ Life-threatening hemorrhage can vary from 1.4% to 11%.
- ☐ Severe epistaxis ranges from 2% to 4%
- ☐ The purpose of hemostasis in maxillofacial trauma patient is two-fold
  - ☐ To protect the airway
  - ☐ To reduce blood loss
- ☐ The simultaneous use of two suction devices may be required

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.

# BLEEDING

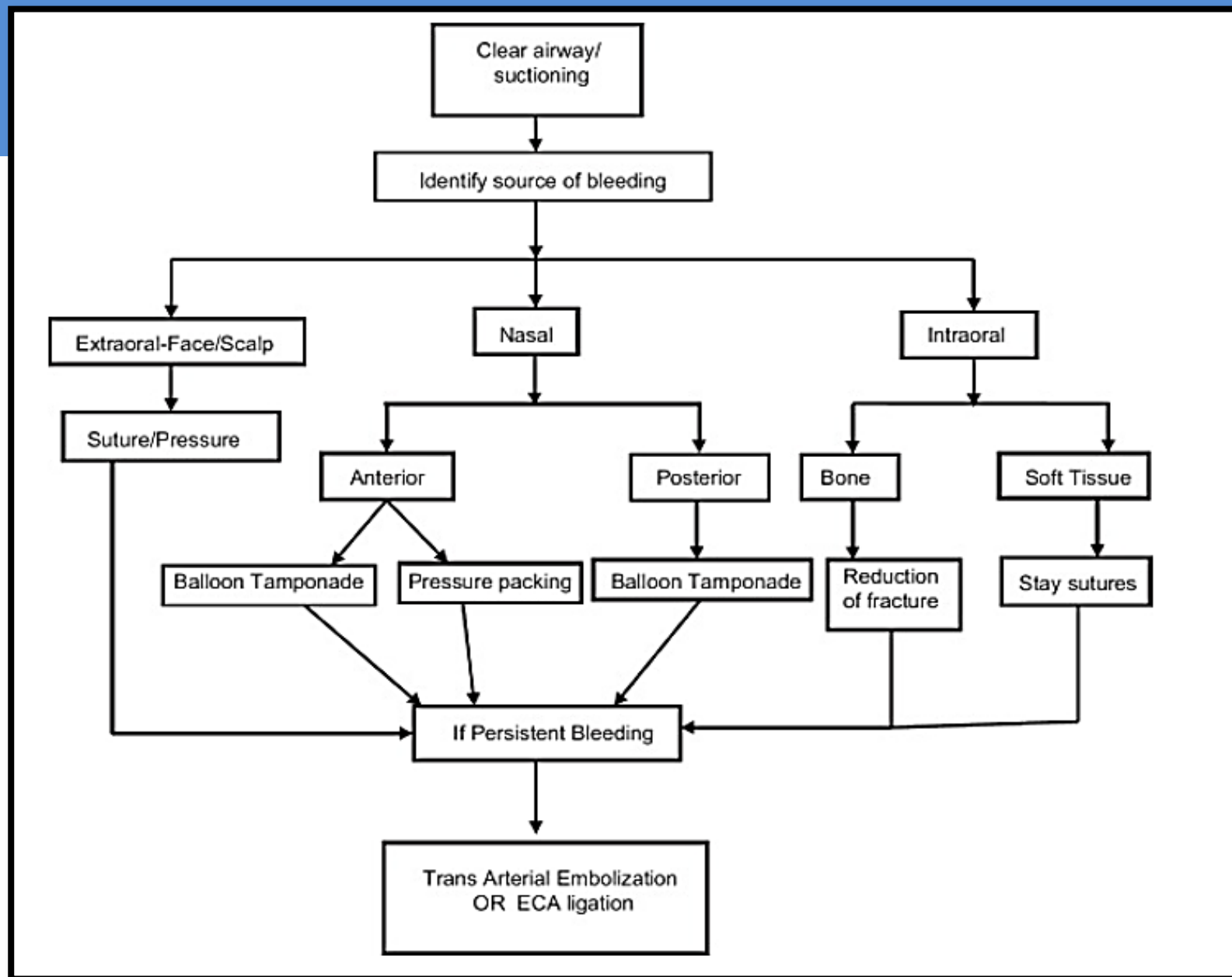
- ❑ Bleeding in many areas of the face can be controlled with external compression
- ❑ Severe intraoral bleeding or epistaxis can be more difficult to manage
- ❑ In severe anterior nasal bleeding, tamponade can often still be achieved by pinching the alae tightly
- ❑ Patients with severe oropharyngeal bleeding who do not require spinal immobilization should be allowed to assume a position of comfort - sit leaning forward

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.

# BLEEDING

- ☐ Pressure packing
- ☐ Balloon tamponade
- ☐ Urgent suturing of soft tissue lacerations
- ☐ Manual reduction of fractures
- ☐ Ligation of relevant vessels
  - Tissue ischemia is unlikely due to the extensive anastomoses among facial arteries
- ☐ Arterial embolization
- ☐ External carotid artery ligation

Jose A, et al. Management of maxillofacial trauma in emergency: An update of challenges and controversies. J Emerg Trauma Shock. 2016;9(2):73-80.



CLINICAL PAPER

## Angioembolisation in Maxillofacial Trauma: An Initial Experience in a Tertiary Care Center

Shivanand Gamanagatti<sup>1,3</sup> · Thotton Veedu Prasad<sup>1</sup> · Atin Kumar<sup>1</sup> ·  
Maneesh Singhal<sup>2</sup> · Sushma Sagar<sup>2</sup>

### Abstract

*Purpose* To analyze the safety, efficacy and outcome of angio-embolization in the management of refractory oronasal bleeding in patients of severe maxillofacial trauma.

*Materials and Methods* It was a retrospective analysis of 21 patients who were managed by angio-embolisation to control

associated injuries later, in which five patients had severe head injuries and four patients had history of hemorrhagic shock and cardiac arrest prior to the procedure.

*Conclusion* Angio-embolisation is a safe and effective technique in managing intractable bleeding in maxillofacial injuries.

- ❑ 21 patients (17 of them with road traffic accident)
- ❑ 12 (52%) patients showed active contrast extravasation on angiography
- ❑ Active arterial bleeding was observed from branches of internal maxillary, facial, and lingual arteries
- ❑ Gel foam embolisation alone in 16 patients, coil embolisation alone in two patients and both coil and gel foam embolisation in three patients





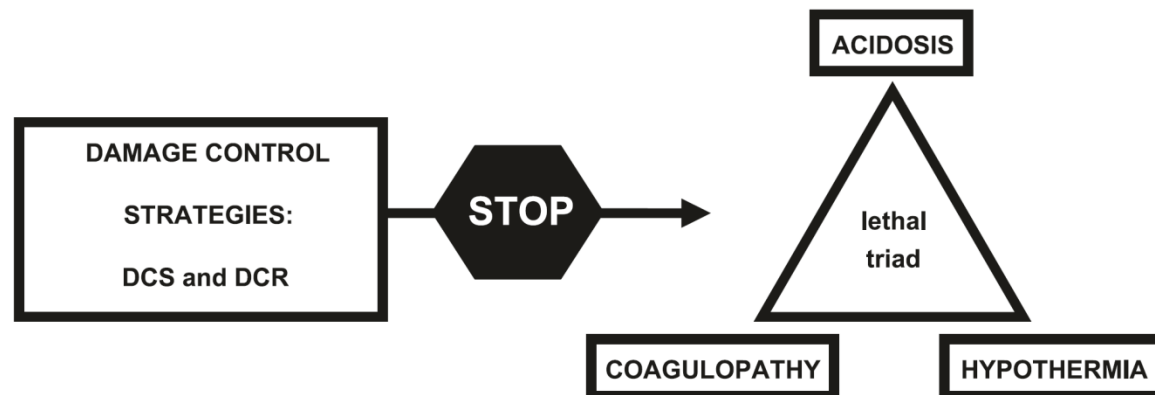
REVIEW

Open Access



# Maxillofacial and neck trauma: a damage control approach

Amir A. Krausz<sup>1</sup>, Michael M. Krausz<sup>2\*</sup> and Edoardo Picetti<sup>3</sup>



**Fig. 1** Role of damage control strategies (DCS and DCR) in severely injured patients. DCS = damage control surgery. DCR = damage control resuscitation



REVIEW

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# Maxillofacial and neck trauma: a damage control approach

Amir A. Krausz<sup>1</sup>, Michael M. Krausz<sup>2\*</sup> and Edoardo Picetti<sup>3</sup>

**Table 2** Hemostatic/Hemodynamic resuscitation following major trauma

Tranexamic Acid	within 3 h of injury loading dose 1 g over 10 min, followed by 1 g over 8 h
Ionized Calcium Levels	maintain in normal ranges during MT
Plasma : RBC	at least 1:2 (preferably 1:1) maintain Hb levels: 7–9 g/dl maintain coagulation parameters (repeated monitoring of PT, aPTT, fibrinogen levels, platelets count, viscoelastic testing) in normal ranges during MT
Fibrinogen	3–4 g administer in case of thromboelastometric signs of a functional fibrinogen deficit or a plasma fibrinogen level of less than 1.5 to 2 g/l
Platelet Count	50 × 10 <sup>9</sup> /l if ongoing bleeding and/or TBI: 100 × 10 <sup>9</sup> /l initial dose 4–8 single platelet units or 1 aphaeresis pack
Blood Pressure	SBP: 80 to 90 mmHg until hemorrhage control (no TBI) if severe TBI (GCS ≤ 8) MAP ≥ 80 mmHg consider rFVIIa if major bleeding and traumatic coagulopathy persist despite maximal attempts to stop bleeding in case of pre-trauma therapeutic anticoagulation or antiplatelets drugs consider specific treatment (ex. desmopressin, PCC, etc)

MT massive transfusion, Hb hemoglobin, PT prothrombin time, aPTT activated partial thromboplastin time, TBI traumatic brain injury, SBP systolic blood pressure, MAP mean arterial pressure, GCS Glasgow Coma Scale, rFVIIa recombinant activated coagulation factor VII, PCC prothrombin complex concentrate



REVIEW

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# Maxillofacial and neck trauma: a damage control approach

Amir A. Krausz<sup>1</sup>, Michael M. Krausz<sup>2\*</sup> and Edoardo Picetti<sup>3</sup>

## Hard signs mandating immediate exploration of the neck

- Uncontrollable hemorrhage
- Rapidly expanding hematoma
- Palpable thrill or audible bruit
- Focal neurological compromise
- Absent or decreased pulses in the neck or upper extremities

# OCULAR INJURY

- ❑ It has been recommended that a comprehensive visual examination be performed on presentation to the ED when an ocular injury is strongly suspected
  - ✓ Visual acuity
  - ✓ Extraocular movements
  - ✓ External examination
  - ✓ Optic nerve function
  - ✓ Pupil evaluation
  - ✓ Examination of anterior aspects of eye
  - ✓ Intraocular pressure measurement
  - ✓ Fundus examination

Welman T, et al. Assessment of emergency department eye examinations in patients presenting with mid-face injury. J Emerg Med. 2016; 50(3):422–426.



RESEARCH PAPER

## Ophthalmological Evaluation by a Maxillofacial Surgeon and an Ophthalmologist in Assessing the Damage to the Orbital Contents in Midfacial Fractures: A Prospective Study

Satishkumar G. Patil<sup>1</sup> · Imtiaz A. Kotwal<sup>2</sup> · Udupikrishna Joshi<sup>1</sup> ·  
Soumya Allurkar<sup>1</sup> · Nitin Thakur<sup>1</sup> · Aafreen Aftab<sup>1</sup>

### Results

- ❑ Forty-two of the 60 patients exhibited sub-conjunctival hemorrhage accounting for 70 % of ocular injuries recorded
- ❑ While 28 of the 60 patients displayed periorbital edema (53.3 %)
- ❑ 8 patients experienced diplopia (13.32 %)
- ❑ 8 patients showed relative afferent pupillary defect (13.32 %)





<http://dx.doi.org/10.1016/j.jemermed.2015.07.041>

## **Brief Reports**



### **ASSESSMENT OF EMERGENCY DEPARTMENT EYE EXAMINATIONS IN PATIENTS PRESENTING WITH MID-FACE INJURY**

Ted Welman, BSC, MBBS, Kumaran Shanmugarajah, BSC, MBBS, MRCS, Shiraz Sabah, BSC, MBBS, MRCS,  
James Bryan, BSC, Nadine Hachach-Haram, BSC, MBBS, MRCS, Nicholas Segaren, BSC, MBBS, MRCS, and  
Jonathan Collier, MA, BM, BCH, BDS, MFDS, FRCS(OMFS), PHD

## **Conclusion**

- ☐ Physicians assessing patients with mid-face trauma in the ED should rule out eye emergencies, including retrobulbar hemorrhage and penetrating globe injury
- ☐ They should initiate CT scan and assessment by specialist ophthalmologists

# DENTAL INJURY

- ❑ Avulsed teeth are among the lowest priorities in a critically ill trauma patient
- ❑ Dental trauma may occur with or without other facial injury
- ❑ Trauma to the mouth of sufficient force can avulse teeth from their sockets
- ❑ Fully or partially avulsed teeth should be removed from the mouth in neurologically impaired patients to prevent aspiration

Mayersak RJ. Initial evaluation and management of facial trauma in adults. UpToDate.  
Updated: Nov 07, 2016

# DENTAL INJURY

- ☐ In patients with minor trauma and no risk of aspiration, avulsed teeth should be reimplanted as soon as possible
- ☐ The tooth should be placed back in the socket as soon as possible
  - ☐ Ideally within 15 minutes and up to one hour
- ☐ When they cannot be immediately reimplanted, teeth are stored in a culture media or cold milk

Mayersak RJ. Initial evaluation and management of facial trauma in adults. UpToDate.  
Updated: Nov 07, 2016

*Journal section: Operative Dentistry and Endodontics*

*Publication Types: Research*

*doi:10.4317/jced.53022*

*<http://dx.doi.org/10.4317/jced.53022>*

## **Occurrence and timing of complications following traumatic dental injuries: A retrospective study in a dental trauma department**

**Shaul Lin <sup>1,2</sup>, Nir Pilosof <sup>1</sup>, Munir Karawani <sup>1</sup>, Ronald Wigler <sup>1</sup>, Arie Y. Kaufman <sup>1</sup>, Sorin T. Teich <sup>3</sup>**

- ❑ 166 patients (114 male and 52 female), with a total of 287 traumatized teeth
- ❑ Maxillary teeth were involved significantly more often in traumatic dental injuries
- ❑ The most frequent complication was pulp necrosis (34.2%)
- ❑ The most frequent complication related to avulsion was ankylotic root resorption (50%) diagnosed after a median of 1.18 years



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# Implementation of an oral and maxillofacial surgery trauma team in a major trauma centre

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Accepted 31 December 2016

## Abstract

In 2010, King's College Hospital in London was designated as a major trauma centre. To deal with the increasing number of patients, an integrated oral and maxillofacial team of the week was established in 2012 to provide a consultant-led, emergency service dedicated to acute care, and it was anticipated that this would reduce the duration of stay by 0.3 bed-days. To assess the effect of the new system, we compared the duration of stay between 1 October and 31 January 2011-2012 with the same period in 2012-2013. We also assessed the activity and training of registrars, and the department's perception of the post of trauma registrar. The mean total duration of stay had decreased significantly by 0.84 days ( $p=0.03$ ), the mean delay to operation had decreased by 0.3 days, and the mean postoperative stay had decreased by 0.5 days.

The new system was a cost-effective way of improving emergency OMFS care and it can be recommended to other centres with similar profiles

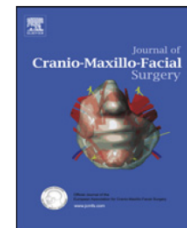




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## Journal of Cranio-Maxillo-Facial Surgery

journal homepage: [www.jcmfs.com](http://www.jcmfs.com)



The prevalence of psychological distress in a sample of facial trauma victims.  
A comparative cross-sectional study between UK and Australia

Shofiq Islam<sup>a,c,\*</sup>, Muhiuddin Ahmed<sup>a</sup>, Gary M Walton<sup>a</sup>, Timothy G Dinan<sup>d</sup>, Gary R Hoffman<sup>b</sup>

- ☐ 50 adult victims of facial trauma in UK was compared to a group of 52 patients in Australia
- ☐ Psychometric scores suggestive of anxiety and depressive state were common in both groups of patients
- ☐ 20% versus 11.5% for HADS depression subscale
- ☐ 20% versus 15% for HADS anxiety subscales

# CONCLUSION

- ❑ The management of facial injuries must first focus on threats to life
  - ✓ Difficult airway – aspiration
  - ✓ Bleeding
  - ✓ Head – cervical – neck injury
- ❑ Eye and dental injuries require special attention and evaluation
- ❑ But important secondary considerations are function and long-term cosmetics

**Your face is the start point of your self-esteem**