Management of maxillofacial trauma by dentists in Bengkulu Province, Indonesia

Penanganan trauma maksilofasial oleh dokter gigi di Provinsi Bengkulu, Indonesia

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ABSTRACT
Maxillofacial injuries are a group of injuries that can be life-threatening and interfere with vital functions. Proper and timely treatment is essential to prevent acute and long-term complications. Dentists play a central role in the initial assessment and treatment of these injuries. This study analyses how dentists in Indonesia manage maxillofacial injuries at various levels of healthcare facilities. A descriptive cross-sectional study was conducted using a structured questionnaire administered to 30 dentists working in community health centres and hospitals of various types. Data were analysed using SPSS to obtain frequency distributions, percentages, and descriptive statistics. The findings show variations in clinical management related to the type of health facility and the clinical experience of the dentist. Common core management steps include airway assessment, bleeding control, and the application of advanced trauma life support (ATLS) (ABCDE) principles in the early phase of treatment. It was concluded that the management of maxillofacial trauma by dentists in Indonesia varies according to the work environment and professional experience. Continuing education and targeted training are needed to improve the competence of dentists in optimally handling these cases.
Keywords: maxillofacial trauma, dentist, trauma management, ATLS, primary health centre, hospital, Le Fort fracture

ABSTRAK
Cedera maksilofasial merupakan kelompok cedera yang dapat mengancam nyawa dan mengganggu fungsi vital. Penanganan yang tepat dan tepat waktu sangat penting untuk mencegah komplikasi akut dan jangka panjang. Dokter gigi memainkan peran sentral dalam penilaian awal dan penanganan cedera ini. Studi ini menganalisis bagaimana dokter gigi di Indonesia menangani cedera maksilofasial di berbagai tingkatan fasilitas kesehatan. Studi deskriptif potong lintang dilakukan dengan menggunakan kuesioner terstruktur yang diberikan kepada 30 dokter gigi yang bekerja di puskesmas dan rumah sakit berbagai jenis. Data dianalisis menggunakan SPSS untuk memperoleh distribusi frekuensi, persentase, dan statistik deskriptif. Temuan menunjukkan variasi dalam pengelolaan klinis terkait dengan jenis fasilitas kesehatan dan pengalaman klinis dokter gigi. Langkah-langkah pengelolaan inti yang umum dilakukan meliputi penilaian jalan napas, pengendalian perdarahan, dan penerapan prinsip *advanced trauma life support* (ATLS) (ABCDE) pada fase awal perawatan. Disimpulkan bahwa penanganan trauma maksilofasial oleh dokter gigi di Indonesia bervariasi sesuai dengan lingkungan kerja dan pengalaman profesional. Pendidikan berkelanjutan dan pelatihan yang ditargetkan diperlukan untuk meningkatkan kompetensi dokter gigi dalam menangani kasus-kasus ini secara optimal.
Kata kunci: trauma maksilofasial, dokter gigi, penanganan trauma, ATLS, puskesmas, rumah sakit, fraktur Le Fort
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INTRODUCTION

Maxillofacial trauma encompasses injuries to the facial skeleton, oral cavity, and associated soft tissues, potentially involving vital structures such as the airway and major blood vessels. These injuries commonly arise from road traffic accidents, sports-related incidents, occupational trauma, and interpersonal violence, and may result in substantial functional and aesthetic impairment if inadequately treated.[6] Prompt and appropriate management is essential to prevent long-term complications, such as infection, uncontrolled haemorrhage, and irreversible damage to vital structures that may be life-threatening.[3]

Dentists have an important role in the early management of maxillofacial trauma, particularly in cases involving dentoalveolar injuries and fractures of the facial bones, as well as in the assessment and protection of the airway. As part of the multidisciplinary trauma team, dentists are responsible for initial examination, evaluation of facial and oral stability, and planning appropriate steps in management.[5] Competence in applying the *advanced trauma life support* (ATLS) protocol is also critical because ATLS provides a structured framework for the management of trauma patients with emphasis on airway protection, haemorrhage control, and overall stabilization.[4]

Several factors may influence how dentists manage maxillofacial trauma, including the level of clinical experience, availability of diagnostic and treatment facilities, and prior training in emergency care.[1] For example, hospitals equipped with CT scanners and panoramic radiography allow more accurate diagnosis and more comprehensive management, while primary health centres (*Puskesmas*) frequently face limitations in diagnostic tools and technical resources.[2] These differences may affect clinical decision-making and the choice of interventions in trauma cases.

Given the importance of continuous professional development, systematic use of ATLS principles, and adequate diagnostic facilities, this study aimed to analyse the management of maxillofacial trauma by dentists in Indonesia, with particular emphasis on differences between hospitals with comprehensive facilities and primary health centres (PHC). The study also sought to evaluate the implementation of ATLS-based procedures by dentists when managing potentially life-threatening maxillofacial trauma.

METHODS

This study employed a cross-sectional descriptive design. Data were collected through a survey of dentists practising in PHC and hospitals of different levels (types A/B and C/D) in Indonesia.

The sample consisted of 68 dentists who were actively involved in managing patients with maxillofacial trauma. Respondents represented a range of educational backgrounds and years of professsional experience and were employed in type B hospitals, type C/D hospitals, and PHCs (*puskesmas*).

Research instrument

Data were obtained using a structured questionnaire comprising three main sections: a) demographic characteristics of respondents (age, sex, professional position, years of practice, and workplace); b) clinical management of maxillofacial trauma, including types of fractures encountered, clinical conditions managed, and interventions performed; c) implementation of ATLS procedures in trauma management, particularly the use of the ABCDE approach.

Data collection procedure

The questionnaire was distributed to dentists working in the selected healthcare facilities. Respondents were asked to complete the instrument based on their actual experience in managing maxillofacial trauma cases. Participation was voluntary and responses were anonymized.

Data analysis

Completed questionnaires were coded and entered into SPSS v. 25. Descriptive statistics (frequency and percentage) were used to sum-

marize respondent characteristics and management approaches. Results are presented in tables and narrative form.

RESULTS

The demographic characteristics of the respondents are presented in Table 1.

Table 1 Characteristics of respondents by sex, age, and years of practice

Characteristic		n (%)
Sex	Male	23 (34)
	Female	45(66)
Age (years)	< 30	20 (32)
	30–40	22 (29)
	41–50	15 (22)
	> 50	11 (16)
Years of practice	< 1	7 (10)
	1–3	18 (26)
	4–6	28 (41)
	> 6	15 (22)

Management of maxillofacial trauma

The main interventions reported by respondents in the management of maxillofacial trauma were 1) airway assessment and protection: all respondents reported performing airway assessment as the initial step; 2) haemorrhage control: 90% reported active measures to control bleeding; 3) application of ATLS (ABCDE): 85% reported applying ATLS principles in the early management of trauma.

Table 2 Management of maxillofacial trauma by dentists

Intervention	n (%)
Airway assessment (A – Airway)	68 (100)
Haemorrhage control	61 (90)
ATLS (ABCDE) protocol	58 (85)
Panoramic radiography or CT scan	50 (73)
Cervical spine immobilization	45 (67)

Further details on the procedures performed are shown in Table 2. These findings indicate that most respondents adhered to basic trauma management principles, particularly in airway assessment and bleeding control. However, the use of advanced diagnostic tools and additional stabilizing measures varied across facilities.

DISCUSSION

This study provides an overview of current practices in the management of maxillofacial trauma by dentists working in different healthcare settings in Bengkulu Province Indonesia, namely hospitals with varying levels of resources and PHC. Although most respondents reported implementing ATLS principles, variability was observed in specific interventions, particularly those requiring advanced diagnostic facilities and specialized skills.

Role of dentists in maxillofacial trauma management

The results confirm the central role of dentists in the initial assessment and management of maxillofacial trauma, especially in evaluating airway patency and controlling haemorrhage. This is consistent with previous reports that airway assessment is the primary priority in the management of facial trauma because airway compromise and massive bleeding are major contributors to morbidity and mortality in these patients.[1,5] Applying the ATLS framework, which emphasizes airway, breathing, circulation, disability, and exposure (ABCDE), facilitates a systematic and prioritised approach to trauma care [4].

Variation in management by type of healthcare facility

Differences in management were apparent between dentists working in hospitals with comprehensive facilities and those in *puskesmas*. In type B hospitals, advanced imaging modalities such as CT scans and panoramic radiographs were more frequently used, enabling more precise diagnosis of fractures and associated injuries.[2,9] This supports earlier findings that centres equipped with adequate diagnostic resources can provide more accurate assessment and more comprehensive management of complex maxillofacial trauma, including Le Fort fractures and injuries extending to the cranial base.[3,8,10]

By contrast, dentists in *puskesmas* often relied on conservative measures due to limited access to diagnostic imaging and specialist support. With restricted resources, clinical decisions must frequently be made based solely on physical examination and basic investigations, which can lead to simpler, symptom-focused management strategies.[6,7,14] These constraints may delay definitive treatment, particularly in complex fractures that ideally require imaging and specialist intervention.

The epidemiological pattern of maxillofacial trauma in Indonesia, including the predominance of motorcycle-related accidents and midface or mandibular injuries, has been documented in several local studies.[7,9,11,14-16] Such patterns emphasise the need for both adequate emergency management and appropriate referral pathways from primary to secondary and tertiary care.

Importance of continuing education and skills development

Although most respondents reported using ATLS principles, the findings suggest that further training remains necessary, especially for dentists working in primary health centres and facilities with limited resources. Previous studies have highlighted the importance of updated knowledge and advanced technical skills in the effective management of maxillofacial trauma, particularly in emergency settings and in paediatric or combined head injury cases.[1,3,8,13]

Structured continuing professional development programmes focusing on maxillofacial trauma-such as workshops on airway management, haemorrhage control, fracture stabilisation, interpretation of imaging, and referral criteria-would be beneficial for dentists at all levels of care. Improving these competencies is expected to reduce complications and improve functional and aesthetic outcomes in patients with facial injuries.[2,5,12]

Implications for clinical practice and future research

The present findings underscore the need to strengthen trauma management training for dentists working in *puskesmas* and clinics with limited diagnostic support. Emphasis should be placed not only on correct implementation of ATLS-based initial management, but also on a) early recognition of complex fracture patterns (e.g. Le Fort, midface, and mandibular fractures); b) timely referral to higher-level facilities; and c) interdisciplinary collaboration with oral and maxillofacial surgeons, emergency physicians, and neurosurgeons.

Future studies with larger and more diverse samples, as well as multicentre designs, are needed to obtain a more comprehensive picture of maxillofacial trauma management across Indonesia. In-depth evaluations of ATLS implementation, barriers to the use of diagnostic imaging, and patient outcomes would provide more detailed evidence to inform clinical guidelines and policy development.

It is concluded that dentists in Indonesia generally follow appropriate principles in the initial management of maxillofacial trauma, particularly in airway assessment, haemorrhage control, and the application of ATLS-based approaches. However, the range and depth of interventions differ according to the type of healthcare facility and the clinician's experience.

To ensure effective and optimal management of maxillofacial trauma, continuous training and skills enhancement for dentists especial-

ly in resource-limited settings-together with improvements in diag- nostic and treatment facilities are essential.

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