

## The Incidence of Mandibular Angle Fractures Accompanied by Impacted Third Molar at Oral Surgery Clinic of Hasan Sadikin Hospital, Bandung - West Java

Insidensi Fraktur Angulus Mandibular Yang Disertai Gigi Impaksi di Klinik Bedah Mulut Rumah Sakit Hasan Sadikin Bandung-Jawa Barat

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### Abstract

Mandibular fracture is a discontinuity of mandible bone that usually leads to trauma. The fractured area is mostly the mandibular angle located in the third molar area. Therefore, this study aims to examine the incidence of mandibular angle fractures accompanied by impacted teeth in the oral surgery clinic of Hasan Sadikin Hospital. This is a retrospective observational study and the data used were collected from the medical records of patients with mandibular angle fractures accompanied by impacted third molars at the Oral Surgery Clinic of Dr. Hasan Sadikin Bandung from January 2017 to December 2019. Panoramic radiographs were obtained for confirmation and the data collected were age, gender, fracture aetiology and location, impacted tooth type and classification, as well as treatment. The number of mandibular angle fractures with impacted third molars in male patients (92.8%) was more than in females (7.2%). Fractures caused by traffic accidents and fights were 85.8% and 14.2%, respectively, while all patients were treated with ORIF. The percentage of cases according to the classification of third molars in angle fractures are classes IA (20%), IB (6.7%), IIA (20%), IIB (20%), IIC (13.3%), IIIC (6.7%), and unerupted tooth seeds (13.3%). The incidence of mandibular angle fracture with impacted third molars at the Oral Surgery Clinic, Dr. Hasan Sadikin over the last three years has increased. This case is more common in males due to traffic accidents and is treated with surgery (ORIF).

**Keywords:** Mandibular fracture, angle, impacted the third molar, Hasan Sadikin hospital.

### Abstrak

Angulus mandibula merupakan daerah pada mandibula yang paling sering mengalami fraktur. Sebagian besar fraktur angulus mandibula berlokasi pada daerah gigi molar 3 rahang bawah. Tujuan penelitian ini adalah melihat angka kejadian fraktur angulus mandibular yang disertai gigi impaksi di klinik bedah mulut RS Hasan Sadikin. Penelitian ini merupakan penelitian observasional retrospektif dengan mengumpulkan data rekam medis pasien fraktur angulus mandibular yang disertai impaksi molar ketiga rahang bawah di Klinik Bedah Mulut RSUP Dr. Hasan Sadikin Bandung selama bulan Januari 2017 sampai Desember 2019 dan data hasil pemeriksaan rontgen panoramik sebagai konfirmasi. Data yang dikumpulkan berupa usia, jenis kelamin, etiologi fraktur, lokasi fraktur, jenis impaksi gigi, klasifikasi impaksi gigi dan perawatan. Fraktur angulus mandibula disertai dengan impaksi molar ketiga rahang bawah dengan jumlah penderita pria (92,8%) lebih banyak dibanding wanita (7,2%). Fraktur yang diakibatkan kecelakaan lalu lintas (85,3%), dan perkelahian (14,7 %). Klasifikasi gigi molar 3 pada fraktur angulus yaitu kelas IA (20%), kelas IB (6,7%), kelas IIA (20%), kelas IIB (20%), kelas IIC (13,3%), kelas IIIC (6,7%), dan Benih gigi belum erupsi (13,3%). Seluruh pasien dirawat dengan pendekatan operatif (ORIF). Jumlah kasus fraktur angulus mandibula yang disertai impaksi gigi molar 3 rahang bawah di Klinik Bedah Mulut RSUP Dr. Hasan Sadikin selama 3 tahun terakhir terus meningkat dimana lebih sering terjadi pada laki-laki, dengan etiologi kecelakaan lalu lintas dan seluruhnya dirawat dengan pendekatan operatif (ORIF).

**Kata kunci:** Fraktur mandibula, angulus, impaksi molar ketiga rahang bawah, rumah sakit Hasan Sadikin

## INTRODUCTION

The etiologic factors of mandibular fractures are dominated by trauma caused by traffic accidents, fights, falls from a height, and sporting activities.<sup>1</sup> According to a study on facial trauma surgery by Dorafhsar et al. (2018), the angle of the mandible is the most frequently fractured area with an incidence of 31%.<sup>2</sup> Meanwhile, loss of continuity of the mandible due to facial trauma or pathological conditions can be fatal when not treated properly.<sup>3</sup>

Based on anatomical areas, mandibular fractures are classified into symphysis, parasymphysis, body, ramus, angle, coronoid process, and the condyle. Several studies have discussed the incidence of mandibular fracture by region.<sup>3</sup> A previous investigation conducted by Morris et al. (2015) observed 4143 mandibular fractures over 17 years with distribution Angulus (27%), symphysis (21.3%), condyle (18.4%), body (16.8%), unspecified parts (7.1%), ramus (5.4%), alveolar (2.9%), and coronoid (1%).<sup>4,5</sup>

The diagnosis of mandibular fracture was carried out based on anamnesis, physical examination, and investigations. In each case of trauma, the examination of a suspected patient followed the ATLS rules, which consist of a primary survey including an examination of the airway, breathing, circulation, and disability.<sup>3,5</sup> There is a need to pay attention to the possibility of airway obstruction which can be caused by the fracture of the mandible or intraoral bleeding causing blood aspiration and clots in the patient. Moreover, the fracture fragment in bilateral unfavourable angle fractures will be pulled back by m. Digastricus and m. Geniohyoid that causes the tongue to be pushed back and interfere with the airway.<sup>1,6</sup> The mechanism of trauma is also important to describe the type of fracture that occurs.<sup>7,8</sup>

The third molars are the last teeth to erupt in the oral cavity, at the age of 18-24 years. This makes the third molars be impacted more often than the other teeth because there is often not enough room for their eruption. According to Chu et al, 28.3% of the 7468 patients were impacted, where mandibular third molars occurred most (82.5%).<sup>9</sup> The commonly used classification of mandibular third molar impaction is Pell and Gregory based on depth and distance to the second molar. Several complications can occur related to impacted teeth, these include infection of the gums and surrounding bone, dentigerous cysts, and susceptibility to fractures of the mandibular angle.<sup>10</sup>

A previous study in Hungary by Soos et al. (2020) discovered that the incidence of impacted teeth was 72.6% of all mandibular angle fractures.<sup>1</sup> This is caused by the disruption of bone thickness, especially

in the cortical area which causes the mandibular angle to become weaker and prone to fracture.<sup>11,12</sup>

A common complication of mandibular angle fracture with impacted teeth is infection. Meanwhile, this infection can be more severe in angle fractures accompanied by infected teeth without definitive treatment.<sup>2</sup> Postoperative infection complications of retained impacted teeth in are also increasing based on Ellis' study of 402 mandibular angle fracture patients. It was discovered that infectious complications decreased after tooth extraction at the fracture line.<sup>4</sup>

The definitive treatment for mandibular fractures is reduction/reposition of the fracture fragments or closed and open reduction through fixation with plates.<sup>3</sup> The closed reduction is indicated by fractures without displacement of the segment (undisplaced), at the mandibular condyle, in children, edentulous fractures, and those without impaired occlusion. The indications for open reduction include those with a displacement of the fractured segment, unfavourable, multiple facials, and bilateral condylar.<sup>10</sup> Moreover, the tooth preserved at the fracture line has been debated by clinicians because of infection which is the most feared complication during treatment.<sup>2</sup> The indications of impacted teeth that are recommended for extraction include tooth mobility, periapical and periodontal disease, root fracture, and partially erupted teeth.<sup>2,3</sup>

There is a need to understand the frequency of mandibular angular fractures with impacted teeth for clinicians to determine the significant relationship. This can also minimize the risk of fracture by extracting the mandibular third molars. Furthermore, it will help reduce infectious complications which are mostly associated with mandibular fractures.<sup>1,11</sup>

Therefore, this study aims to determine the incidence of mandibular angle fracture with impacted third molars at the Dr. Hasan Sadikin Oral Surgery Clinic in Bandung, which is related to the number of cases, age, gender, fracture aetiology and location, and tooth impaction type, classification of impacted teeth and treatment.

## MATERIALS AND METHODS

This study has obtained a research ethics permit and was conducted from November to December 2020 using a retrospective observational method by collecting data from patients' medical records at the Oral Surgery Clinic of Dr. Hasan Sadikin Bandung. The population includes mandibular angle fractures patients with impacted third molars who came to the emergency department or the Oral Surgery Clinic of

the Central General Hospital Dr. Hasan Sadikin Bandung and has been confirmed by the results of the Panoramic X-ray examination from January 2017 to December 2019. The inclusion criteria were mandibular angle fracture patients with impacted third molars, with complete medical record data such as number, age, gender, and therapy, and subsequently, a panoramic x-ray was performed. The age was grouped into less than 25 years, 26-35 years, 36-45 years, and 46-55 years according to the Ministry of Health 2009. Fracture findings were classified according to the anatomical region of the mandible in line with Raymond J Fonseca (2018). The cases of impacted mandibular third molars were classified according to Pell and Gregory. These therapies are grouped into closed and open reduction internal fixation (ORIF).<sup>2,3,4</sup>

## RESULTS

From the results of the collection of medical record data obtained, 14 patients met the inclusion criteria, consisting of 13 males and 1 female with an age range of 24-55 years (mean 25 years). The most common cause of mandibular angle fracture with impacted mandibular third molars are traffic accidents. The study variables are based on gender, age, fracture aetiology and location, type and classification of an impacted tooth, while treatment was carried out as shown in Table 1.

The results showed that mandibular angle fracture patients with impacted third molars were dominated by the age group of fewer than 25 years and the most frequent aetiology was traffic accidents. Furthermore, the location of angle fractures accompanied by impaction of the mandibular third molars were mostly on one side (unilateral) and was treated with ORIF (Open Reduction Internal Fixation).

## DISCUSSIONS

Mandibular fracture ranked second among maxillofacial fractures. According to Elis et al., 2,137 (45.4%) out of 4,711 patients had at least 1 mandibular fracture. Therefore, several studies were carried out to determine the relationship between the location and potential of the fractures with the impaction of the third molars. It was discovered that the location of the fracture is influenced by the intensity, location, and direction of impaction of the third molars, as well as intrinsic factors, namely shape, density, bone thickness, muscle, and presence or absence of teeth.<sup>1,13,14</sup>

In this study, traffic accidents were the main aetiology of mandibular angle fractures accompanied by

impaction of the third molars, followed by violence or physical assault. These results are in line with the reports by Chrcanovic et al., (Brazil), Gaddipati et al., (India), Mehra et al., (India), Patil (India), Samieirad, et al., (Iran), and Tiwari. et al., (India) stated that traffic accidents were the most common cause of fractures with an average of 89%, followed by violence or falls. Furthermore, temperate trauma that occurs in temperate to elevated-speed accidents can be classified as moderate to high force.<sup>11,15</sup>

Approximately 57.1% of patients with mandibular angle fractures accompanied by impacted third molars had an age range of 18-30 years. Tiwari et al., also stated that the patients were usually adolescents and within the age of 20 years. However, some studies stated that mandibular condyle fracture patients are usually in their 40s, while other reports failed to prove that age does not significantly predict fracture patterns.<sup>11,16</sup>

Generally, male patients experience mandibular fractures more often than females. This is in line with previous investigations, where male patients were assumed to experience physical acts of violence more often than females. In this study, physical acts of violence were the most common aetiology for mandibular angle fractures and ranked second among the factors causing mandibular condyle fractures. Furthermore, it has also been discovered that traffic accidents are the most common cause in male patients.<sup>1,11,15</sup>

The presence of an unerupted third molar was a risk factor for mandibular angle fracture. This is consistent with previous results, where impacted third molars increased the risk of mandibular angle fracture, but reduce the risk of mandibular condyle fracture.<sup>11</sup> According to Soos' investigation, the impaction of the third molars belonging to Pell and Gregory class II, III, and B was significantly associated with the occurrence of mandibular angle fracture.<sup>1,12</sup> This is supported by a report which showed that the total incidence of mandibular angle fractures with impaction class II (A and B) + class III + class B reached 53%.<sup>1,15,16</sup> In a finite element study by Bezzera et al, impacted mandibular third molars altered bone thickness in the angular area, making the mandible more susceptible to fracture.<sup>12,17</sup>

The incidence of mandibular angle fractures with the presence of third molars is more common in impacted Pell & Gregory class II or III and position B. Traffic accidents are the most common aetiology for mandibular angle fractures accompanied by impacted third molars. Furthermore, it was discovered that the young adults are the age group with more of these fractures. All mandibular angle fractures accompanied by impacted third molars were treated with an

operative approach (ORIF). Based on these results, clinicians are recommended to consider the impaction of third molars in cases of mandibular angle

fractures to apply the best treatment measures and minimize complications.

## TABLES

Table 1. Characteristics of the Study Sample

Variable	Characteristics	n (%)
Gender	Male	13 (92.8%)
	Female	1 (7.2%)
Age	<25 years	12 (85.3%)
	26 - 35 years	2 (14.7%)
	36 - 45 years	0
	46 - 55 years	0
Fracture aetiology	Traffic accident	12 (85.3%)
	Fight	2 (14.7%)
Fracture location	Unilateral	13 (92.8%)
	Bilateral	1 (7.2%)
Types of impacted teeth	38	9 (60%)
	48	6 (40%)
Impaction Classification according to Pell & Gregory	Class IA	3 (53.8%)
	Class IB	1 (33.6%)
	Class IIA	3 (12.6%)
	Class IIB	3 (12.6%)
	Class IIC	2 (14.7%)
	Class IIIC	1 (7.2%)
Care	Cannot be classified (dental seed)	2 (14.7%)
	Closed reduction	0 (0%)
	Open reduction Internal Fixation	14 (100%)

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