



Influence of degree of edentulism in mandible fractures

Influência do grau de edentulismo em fraturas mandíbulas

Raul Seabra Guimarães Neto¹, Andrezza Lauria¹, Raquel Correia de Medeiros¹, Danillo Costa Rodrigues¹, Roger William Fernandes Moreira¹

¹Department of Oral and Maxillofacial Surgery, School of Dentistry of Piracicaba, State University of Campinas (UNICAMP) – Piracicaba, SP, Brazil.

Abstract

Objective – To characterize epidemiologically the aspects of incidence, treatment and complications of mandibular fractures in dentate, partially dentate and edentulous patients. **Methods** – Data were collected from medical records of patients seen by the department of Oral and Maxillofacial Surgery, Piracicaba School of Dentistry/UNICAMP, from January 1999 to October 2009. **Results** – Were selected 738 adult patients, grouped into three age groups (18 to 30 years, 31-64 years and over 64 years), whose degree of edentulism was informed, being 330 dentition (45%), 367 partially serrated (50%) and 41 edentulous (5%). The ratio between male and female was 4:1, mean age of 31 years, with higher incidence in caucasians, and 81% were economically active. The most common causes were traffic accidents (54%), followed by assault (20%), falls (15%), sports accidents (4%) and work (4%). Condylar fractures accounted for 29% of all fractures, followed by fractures of the body (25%), symphysis (24%) and angle (19%). The only significant difference between the sites of fracture was found in the edentulous, which presented a low incidence of angle fractures. **Conclusions** – It was observed that this population, homogeneous as to the cultural and socio-environmental factors, the dentate, partially dentate and edentulous behaved similarly as to the mandibular fractures resulting from trauma energies of similar intensities.

Descriptors: Mandibular fracture; Jaw; Epidemiology; Facial trauma

Resumo

Objetivo – Caracterizar epidemiologicamente os aspectos de incidência, tratamento e complicações de fraturas mandibulares em pacientes dentados, parcialmente dentados e edêntulos. **Métodos** – Os dados foram coletados de prontuários de pacientes atendidos pelo departamento de Cirurgia Oral e Maxilofacial, Faculdade de Odontologia de Piracicaba/UNICAMP, de janeiro de 1999 a outubro de 2009. **Resultados** – Foram selecionados 738 pacientes adultos, agrupados em três faixas etárias (18 a 30 anos, 31-64 anos e mais de 64 anos), cujo grau de edentulismo foi informado, sendo 330 dentições (45%), 367 parcialmente serrilhadas (50%) e 41 edêntulas (5%). A proporção entre homens e mulheres foi de 4:1, idade média de 31 anos, com maior incidência em caucasianos e 81% economicamente ativas. As causas mais comuns foram os acidentes de trânsito (54%), seguidos pelo assalto (20%), quedas (15%), acidentes esportivos (4%) e trabalho (4%). As fraturas condilares representaram 29% de todas as fraturas, seguidas de fraturas do corpo (25%), sínfise (24%) e ângulo (19%). A única diferença significativa entre os locais de fratura foi encontrada no edêntulo, que apresentou baixa incidência de fraturas angulares. **Conclusões** – Observou-se que esta população, homogênea quanto aos fatores culturais e socioambientais, dentada, parcialmente dentada e edêntula, comporta-se de forma semelhante às fraturas mandibulares resultantes de energias de trauma de intensidades semelhantes.

Descritores: Fraturas mandibulares; Mandíbula; Epidemiologia; Traumatismos faciais

Introduction

According to the *World Health Organization* (WHO), epidemiological surveys provide an important basis for estimating the current situation and future needs for the oral health care of a population in different population groups, and this knowledge is indispensable for the implementation of actions according with the needs and risks encountered as well as allowing comparisons over time and space, assessment of risk and protective factors, as well as programs related to the health disorders and conditions found¹.

Traumas are constantly highlighted as a cause of reduced productivity, being more influential than cancer and heart disease together in the decrease in productive time. Traumas in the maxillofacial area represent an important part of this context. Likewise, this type of injury has a direct relationship between the severity and occupational disability of the patient². The mandible, due to its topography, anatomy and projection in the

lower third of the face is often affected by trauma and may result in fractures, especially in traffic accidents, assaults, falls and sports accidents³.

There are few publications relating the characteristics of facial fractures and the number of teeth present. The present study had the objective of retrospectively evaluate the influence of the degree of edentulism in the epidemiological characteristics of mandibular fractures treated by the department of Oral and Maxillofacial Surgery of Piracicaba School of Dentistry – Unicamp, from January 1999 to October 2009.

Methods

The study was submitted to the Ethics Committee (CEP/FOP-UNICAMP) and approved under protocol 131/2008. The same investigates the influence of three different degrees of mandibular fractures in edentulous patients treated by the Oral and Maxillofacial Surgery from School of Dentistry of Piracicaba, State University of Campinas (FOP-UNICAMP).



For the present epidemiological study, cross-sectional retrospective data were obtained from the evaluation of clinical records of 2182 patients suffering from facial trauma, of which 738 charts were selected of patients diagnosed with mandibular fracture. The study period was from January 1999 to October 2009.

According to the information provided by patients and/or caregivers, systematic identification, demographic, socioeconomic and trauma etiology data were collected. Clinical examination, medical history, diagnosis of facial trauma, solicitation and evaluation of diagnostic exams, treatment and postoperative follow-up, as well as filling in the forms, were performed by the students of the postgraduate level (masters and doctorate students in Oral and Maxillofacial Surgery). Incomplete medical records, medical records did not show the degree of edentulous individuals and isolated dentoalveolar fractures were excluded.

This present study assessed gender, age, race, economic activity, trauma etiology, preoperative and postoperative clinical findings, imaging exam findings, the type of treatment provided, as well as its complications.

Descriptive statistics of the analyzed charts were performed. To calculate the mean and standard deviation, the Microsoft Excel 2007 was used. To evaluate the difference between the dentate, partially dentate and edentulous patients regarding the studied variables, we used the Kolmogorov-Sminorv statistical test and it was considered significant if the p values <0.05.

Results

It was analyzed the records of 2,182 patients who were victims of facial trauma from January 1999 to October 2009, attended by the area of Maxillo-Facial Trauma Surgery, Piracicaba School of Dentistry. According to the inclusion criteria of the present study, 738 charts (34%) were selected of patients with mandibular fractures, with a mean age of 31 years.

According to gender, 597 mandibular fractures occurred in males (81%) and 141 in females (19%), giving a ratio of incidence between male and female of 4:1. Fifty percent of the sample was partially dentate, 45% of the group was dentate and 5% of the group was edentulous. The females had higher incidences of partially dentate and edentulous, and the higher incidence of male was dentate.

Most of the patients were young adults, followed by adults and the elderly. These groups presented were 60%, 38% and 2% of the patients, respectively (Figure 1). Most of the dentate patients (81%) were young adults and the majority of the partially dentate (51%) and edentulous patients (67%) were adults. There was no dentate patient over 64 years old (Table 1).

Table 1. Distribution of patients according to the degree of edentulism and age

| | 18-30 yrs | 31-64 yrs | Over 64 yrs |
|-------------------|-----------|-----------|-------------|
| Dentate | 81% | 19% | 0% |
| Partially dentate | 48% | 51% | 1% |
| Edentulous | 10% | 67% | 23% |

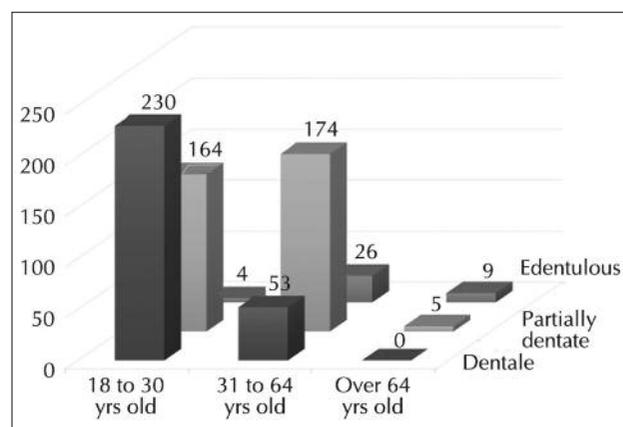


Figure 1. Distribution of patients according to the degree of edentulism and age groups

Regardless of the degree of edentulism, the majority of patients were economically active (81%). The most obvious difference was observed in the partially dentate, which presented patients six times more active than inactive. The highest incidence of mandibular fractures occurred in the white race (or color) (57.6%), followed by brown races (29.8%), black (11.6%), yellow (0.7%) and Indian (0.3%). Dividing the sample according to the degree of edentulism, there was no change in this order, but the incidence varied according to the degree of edentulism and race (Figure 2).

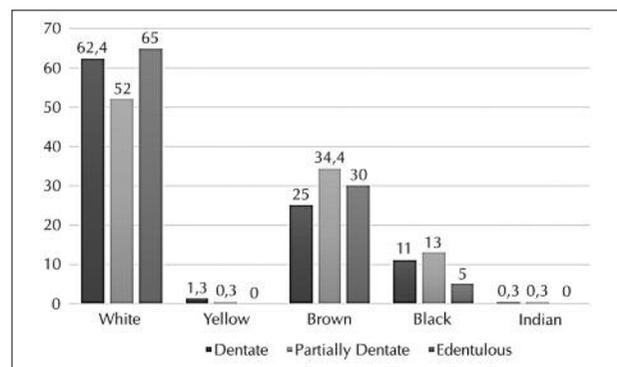


Figure 2. Distribution of mandibular fractures according to race and degree of edentulism

Traffic accidents (car, motorcycle, bicycle and pedestrian accidents) accounted for 54% of fractures, followed by assault (20%), falls (15%). The sports accidents and work represented together 8% of the causes. In edentulous patients, falls were the leading cause of mandibular fractures, whereas in dentate and partially dentate, the main causes were traffic accidents. The second most common etiologic agent in dentate and partially dentate was assault. Traffic accidents accounted for the second most common etiologic agent of fractures in edentulous patients. Generally the six different groups of etiological factors had incidence rates more equivalent to edentulous than to partially dentate, and in these cases, also more equivalent ratios than in dentate patients (Figure 3).

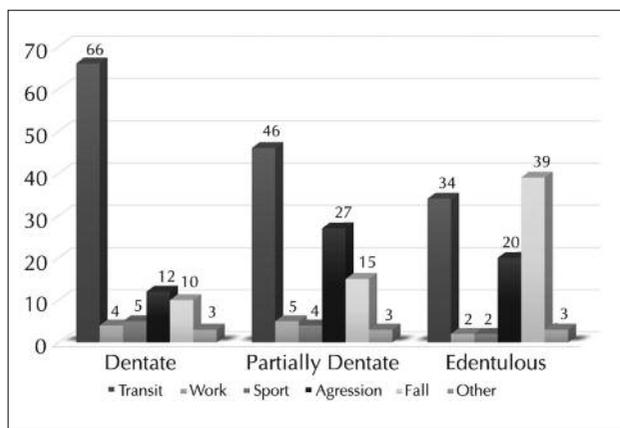


Figure 3. Incidence of mandibular fractures according to the degree of edentulism and etiologic agent

The majority of mandibular fractures occurred in young adults, independent of the degree of edentulism and the etiologic agent. Falls were the most common cause of mandibular fractures in the elderly. The condyle fractures were the most common (29%) followed by fractures of the body (25%), symphysis (24%) and angle (19%). Ramus fractures were unusual, hence presenting rates of incidence of 3%.

Condylar fractures showed no significant difference between the edentulous and the other two groups ($p > .05$). The angle fractures were less common in the edentulous (5%) than in the dentate (19%) and partially dentate (20%) and this difference was statistically significant ($p < 0.05$). Fractures of the mandibular body showed a lower degree of incidence in the dentate (21%) and increased with the progressed degree of edentulism. Symphysis fractures showed no statistically significant difference between the groups (Figure 4).

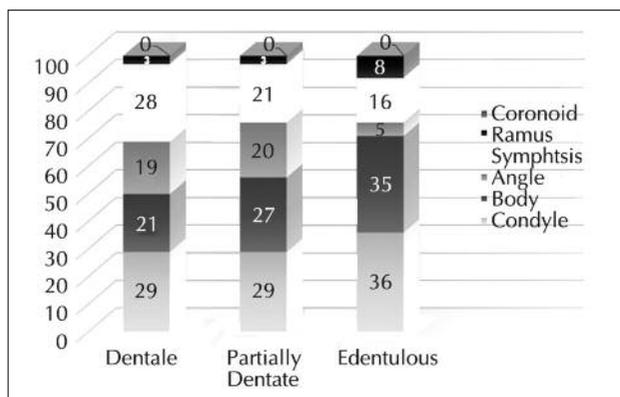


Figure 4. Incidence of fractures in different anatomic sites according to the degree of edentulism

The main fracture site had more than one fracture line in 10% of the dentate, 12% in the partially dentate and 17% in the edentulous. The dentate patients formed the group that received fewer surgeries for mandibular fractures. Partially dentate and edentulous patients had very similar rates of treatment.

The incidence of complications increased with the

progressed degree of edentulism, being 8% for the dentate, 10% for the partially dentate and 12.5% for the edentulous. Complications were grouped into 7 categories, the most common were: infection (3.1%), present in the dentate and partially dentate; NAI paresthesia (1.4%) present in the dentate, partially dentate and edentulous; facial nerve paralysis (0.9%), present in the dentate and partially dentate. No complications were significant and there was no significant difference between the incidence of types of complications of dentate, partially dentate and edentulous patients.

Discussion

When considering the degree of edentulism, it was found that dentate patients were mainly in the youngest age group (18-30 years), partially dentate patients in the two initial groups (18-30 years and 31-64 years) and edentulous patients, predominantly, in the middle range. It is known that younger patients are more subject to traumatic agents⁴, as well as edentulism progresses as age advances⁵. The causes of fractures in this population therefore seem to be more associated with the environmental, behavioral and economic factors than with the age at which the patient finds himself. Comorbidities associated with aging seem to interfere more in the treatment than in cases of mandibular fractures⁶⁻⁷.

Mandibular fractures, in this study, were more common in caucasians (57.6%), with different incidence rates for the different degrees of edentulism – 62.4% for the dentate group, 52% for the partially dentate and 65% for the edentulous group. The second race most affected was the brown (29.8%), followed by the black race (11.6%), yellow (0.7%) and Indian (0.3%). As in the caucasians, these last four showed different varied incidence rates according to the degree of edentulism. These results differ from Matos *et al.*⁸, who evaluated a group of 126 Brazilian patients suffering from mandibular fractures, selected from 700 other patients in this state of São Paulo, and found the following distribution: 70% incidence in whites, 24% in crossbred, and 6% in blacks.

According to the 2014 National Household Sample Survey (PNAD), the black self-named category represented 8.57% of the Brazilian population and the white category, 45.5%. The brown category accounted for 45.04% and the yellow and indigenous categories represented respectively 0.49% and 0.40%⁴. There is a scarce debate in the scientific literature consulted about the racial aspect. It can be said that in the scope of Brazilian dentistry there is no consensual definition. The various individual perceptions make the definitions even less universal. For Kilsztajn *et al.*⁹, the concept of race is a political-social construct and the intense process of Brazilian mestizaje is responsible for the multiple individual perceptions of color. The vast majority of Brazilians (95.7%) are concentrated in this categories: white (54.2%), brown (10.4%), black (7.4%), and the ambiguous colors dark (20.8%) and light brown (2.9%), which include both black and white dark hair.

Another five categories (yellow, light, mulatto, dark and dark brown) account for another 3.5%.

The incidence of mandibular fractures, when discriminated with the degree of edentulism, presented a mathematical difference between genders, being on average between genders with 55% for dentate patients, 40% for partially dentate and 5% for the edentulous. The variation found between genders was not significant.

Evaluating dentate, partially dentate and edentulous patients as the rate of economic activity was found: partially dentate (86%), dentate (77%) and edentulous (68%). This can best be explained by the distribution of these groups in 3 age groups, and the dentate are grouped mainly in the first age group (81%), the partially dentate in both initial age groups (48% and 51%, respectively) and 2 final age groups in the edentulous at the end of the lifecycle. The first and second age groups are the most economically active. Based on data from demographic health indicators in Brazil in 2009⁴, it is clear that the older population remains increasingly in economic activity and while the young population (zero to 18) takes a little more to enter the labor market.

From the moment in which patients were grouped according to the degree of edentulism for evaluation, that is, when evaluating the effect of the mandibular fractures in different anatomical sites and different degrees of edentulism, similar results were obtained. The only significant difference was found for the incidence of angle fractures that showed a low incidence in edentulous. These results indicate that the incidence of angle fractures suffered great influence of factors related to the individual himself, or that the level of edentulism clearly altered the incidence of angle fractures in the sample. The other anatomical sites of mandibular fracture (condyle, body, symphysis and work) had different effects depending on the degree of edentulism, however, none of these differences were significant. The region of the mandibular body is more susceptible to fractures of the seroma area of a smaller cross section in atrophic mandibles¹⁰.

Edentulous patients had a higher need for surgical therapy, which was performed in 46% of the patients, the sum of the percentages of surgical treatment (41%) more conservative treatment associated with surgical treatment (5%). For the dentate, the rate of surgical treatment was 37%, a result of the sum of 43% of surgical treatment plus 3% of surgical treatment associated with conservative treatment. The partially dentate showed values very close to those found for the edentulous. Oikarinen *et al.*¹¹ found an incidence of conservative treatment for 83% of the dentate patients, 63% of patients partially dentate and 54% for the edentulous patients.

The incidence of complications, in general, increased by a constant scale of approximately 2%, with an increase of the degree of edentulism. From 8% in the dentate, it rose to 10% in partially dentate and 12.5% in the edentulous. This epidemiological study will contribute to a better understanding of the influence of the degree of edentulism in the behavior of mandibular fractures, pointing out the main features of the three

subpopulations investigated. Facial trauma that results in mandibular fracture incapacitates people in economic activity and requires high treatment costs. The results suggest carrying out permanent actions to prevent traffic accidents, domestic and interpersonal violence.

Conclusion

The methodology used in this study and the results showed that with the exception of the mandibular angle fractures (which were significantly less common in edentulous patients), the incidence of mandibular fractures at other anatomic sites did not relate to the degree of edentulism. In addition, there was a low complication rate with no significant difference between any group for dentate, partially dentate and edentulous complications.

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Corresponding author:

Raquel Correia de Medeiros
Av. Limeira, 901, PO Box 52,
Piracicaba-SP, CEP 13414-903
Brazil

raquelcorreiademedeiros@gmail.com

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