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Original research article

Epidemiological assessment of maxillofacial fractures in the inhabitants of Lower Silesia, Poland in 2002–2006 – Pattern of maxillofacial fracture

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ABSTRACT

Introduction: This study is a continuation of research on maxillofacial traumatology conducted by the Maxillofacial Surgery Department of the Medical University in Wrocław, Poland. Since 1956, a statistical review of maxillofacial fractures has been kept in 5 or 10-year periods of reference. Such an analysis is useful in identifying the frequency of the phenomenon, deciding on suitable treatment precautions, verifying treatment methods, and analyzing costs and losses incurred as a result of absence at work due to maxillofacial fractures. The sociological aspect of these studies includes indicating the sources of adverse social phenomena.

Aim: The aim of this epidemiological study was to analyze maxillofacial fractures among the inhabitants of Lower Silesia treated in the Maxillofacial Surgery Department of Wrocław Medical University in 2002–2006.

Material and methods: The study was based on clinical documentation of 937 patients in whom dependencies between chosen parameters were identified. To evaluate the type of fracture, the classification of fractures developed by Samolczyk-Wanyura was adopted.

Results and discussion: The most common causes of fractures in both sexes were assaults (57.1%) and motor vehicle accidents (16.8%). Almost 50% fewer fractures were work related in comparison with other authors' data from previous years, and the greatest number of maxillofacial fractures was reported in young males from urban backgrounds aged 18–25. The most frequent type of fracture was mandibular fracture.

Conclusions: It was concluded that the main causes of maxillofacial fractures were related with assault and motor vehicle accidents. This means that violence is a very serious social problem.

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1. Introduction

A faster pace of life, dynamic development of the automotive industry, rapid growth in the number of car owners and a dramatic increase in incidents of violent assault are the causes of considerable growth in maxillofacial injuries. Maxillofacial skeleton fractures are the most common among these injuries.¹ Young people have become more aggressive and they are consuming more alcoholic beverages; it leads to more assaults the victims of which are usually young males aged under 30.² Apart from typical maxillofacial injuries with low kinetic energy, incidents of maxillofacial bones fractures caused by guns and pneumatic weapons which are part of criminal activities are becoming more and more frequent.³ Technological advancement and rapid development of mechanization in many fields of life have caused the increase in the number of maxillofacial injuries both at home and at work.⁴

Another cause of fractures is falls from height. Growing popularity of mass sports closely correlates with the increasing number of fractures in the maxillofacial area caused by lack of proper head protection, as well as by inappropriate or hazardous behavior. In the case of children, maxillofacial fractures are usually a result of participation in kinetic games, falling off the bike, falling on a hard surface, being hit by a swing, hitting against a table corner or a door handle, or being hit by a motor vehicle.⁵ Among people aged over 70, the most common cause is falling down the stairs or hitting a hard surface due to balance problems. In such cases, the condition of bone tissue is really important as age-related bone changes make it more prone to fractures.

The least frequent causes include iatrogenic injuries caused by dental treatments i.e. root canal treatment, trismus treatments or cyst removal.⁶ Falling on a hard surface during an epilepsy seizure, which occurs with the frequency of 40–70 incidents per 100 000 citizens in developed countries, is a common cause of maxillofacial fractures.⁷

Numerous attempts to classify maxillofacial fractures have been made. The first and still the most popular classification of maxillofacial fractures is Le Fort classification created in 1901.⁸ Even though Le Fort classification is simple and practical, it is not always commensurate with current multi-organ injuries that are close to the maxillofacial skeleton, and in case of which numerous dislocations and bone defects may be found only intraoperatively. Additionally, it does not include alveolar process fractures and midline fractures.

Only clinical classification of maxillofacial fractures that includes accompanying soft tissue injuries, morphological and functional complications and general condition of the patient compensates for the shortcoming of Le Fort fracture classification. Among such classifications, those known from Polish literature, e.g. Perczyńska-Partyka and Samolczyk-Wanyura may be mentioned.⁹ The latter one includes clinical anatomopathological fractures of the upper face region and it is based on the anatomical and architectural structure of the maxillofacial skeleton, the injury mechanism, the intraoperative image of neighboring soft tissue damage, as well as accompanying morphological and functional complications. Based on this classification, a computer program

with a central register of maxillofacial injuries has been created. At the same time, it was suggested that different maxillofacial surgery centers should keep a register that would contain injury circumstances, a detailed description of the fracture, coexistent injuries, complications and treatment methods. It was assumed that such a central register based on one classification would facilitate information exchange between the centers and standardization of treatment methods.

2. Aim

The aim of this epidemiological study was to analyze maxillofacial fractures in the inhabitants of Lower Silesia treated in the Maxillofacial Surgery Department of Wrocław Medical University in 2002–2006.

3. Material and methods

The analyzed group was selected among 6012 patients hospitalized in the Maxillofacial Surgery Department of Wrocław Medical University in years 2002–2006. Before conducting the study, the authors obtained appropriate permits to use medical documentation of patients with maxillofacial fractures treated in the clinic from the Commission of Bioethics at Wrocław Medical University (KB – 235/2008).

Medical documentation of 937 patients with maxillofacial fractures was used. To classify craniofacial skeleton fractures, the Samolczyk-Wanyura classification was applied. Demographic data of the subjects was evaluated. The dependencies between a greater number of incidents and the season, the fracture cause and their dependence on sex and age were established.

To fulfill the abovementioned tasks, all of the data acquired from the case history cards was entered into a spreadsheet. Afterwards, the data was analyzed statistically in accordance with standard methodology used in medical science (Statistica 9.0). As the basic method of analyzing variable interdependencies in this study, the χ^2 test of independence was used.

In the statistical part of the research, to evaluate dependencies between the dependent variable and the independent variable, the authors applied the χ^2 test. To measure the strength of dependencies for nominal features, the contingency coefficient C was used. All χ^2 tests were done at the statistical significance level of $\alpha = 0.05$. There were instances where empirical data was incomplete. This very reason influenced the tables where deviations in samples collected from 937 people may be found. This does not result from a mistake, but, as mentioned before, from incomplete data. Since the analyzed sample of people is numerous, such lack of data influences the second or third decimal digit in the calculated χ^2 statistics. The analysis may be assumed as reliable. To relate the results to the general population, interpretations were made on the basis of percentage indicators (%).

The classification of maxillofacial fractures according to Samolczyk-Wanyura¹⁰ includes:

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