



Gingival Hyperplasia, Dental Fractures and Malocclusion and Its Relationship with Epilepsy as a Risk Factor

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Abstract

Objective: To assess the relationship between gingival hyperplasia, dental fractures, and malocclusion with epilepsy.

Methodology: Epidemiological, descriptive, and cross-sectional and prolective study, in 160 subjects, divided into two groups: 80 epileptic patients and 80 subjects without this condition in an age range between 20 and 59 years. For the epidemiological survey, an examiner was standardized (κ = 0.992, p = 0.0001).

Results: The frequency of gingival hyperplasia, dental fractures, and malocclusion was high, with gingival hyperplasia and dental fractures being the most frequently observed clinical conditions in epileptic patients. A highly significant association was observed between the presence of gingival hyperplasia (X^2_{MH} = 140,823, p = 0.0001), dental fractures (X^2_{MH} = 29,789, p = 0.0001) with epilepsy, not in the case of the type of occlusion (X^2_{MH} = 7,589, p = 0.834).

Conclusions: Apparently the prescription of phenytoin in epileptic patients makes them more susceptible to developing hyperplasia, likewise, in subjects with this disease it predisposes them to a greater extent to suffer dental fractures, however, it remains unknown what type of dental fractures they are to which they are more exposed.

Keywords

Epilepsy; Cross-sectional Study; Gingival Hyperplasia; Dental Fractures

Introduction

Epilepsy according to the definition of the World Health Organization (WHO) and the International League against Epilepsy (LICE), is a disease of chronic (long-term) and recurrent or repetitive presentation of paroxysmal (sudden onset) phenomena that they originate from disordered and excessive neuronal discharges, which have very diverse causes and varied clinical manifestations [1,2]. About 1% of the world population suffers from some form of epilepsy, and 10% of them have more than one crisis in a month. Its importance in the dental field lies in the fact that some studies have linked it as a risk factor for certain alterations and clinical conditions at the level of the oral cavity, such as: gingival hyperplasia, dental fractures, and malocclusions [3-6].

Gingival hyperplasia

The term gingival hyperplasia refers to the increase in volume of the gingival tissue, which is generally related to taking certain anticonvulsant medications, which produces a gingival enlargement due to drugs. This alteration causes malnutrition and disfigurement of the gums, which, together with poor oral hygiene, results in increased susceptibility to oral infections, periodontal diseases, bone resorption and the presence of halitosis [1,4-6]. Gingival hyperplasia associated with people with epilepsy is an adverse reaction that appears after the systemic use of some drugs. At the moment, its pathogenesis is not precisely known and its etiology is unknown, however, the presence of pain when chewing, speech disorders, gingival hemorrhage, periodontal disorders, alteration in dental occlusion and aesthetic changes is reported.5 Hyperplasia Gingival can appear in up to 50% of patients treated with phenytoin, in the same way it has been associated (although less frequently) with the administration of other antiepileptics, such as valproic acid, carbamazepine, phenobarbitone, and vigabatrin [3-5]. The incidence of this periodontal alteration ranges widely between 07% and 70%; being the presence of dental plaque an aggravating factor of the picture. Furthermore, it constitutes one of the most frequent adverse effects of calcium

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antagonists, especially nifedipine, whose incidence ranges between 0.5 and 83%; although it has also been associated with other agents such as diltiazem [7-11].

Dental fractures

Oral trauma in most epileptic patients is caused by seizures, the intensity of which determines the extent of damage in the affected area and tissues. Globally, between 6% and 40% of people with epilepsy suffer oral trauma due to the lack of security and control in their epileptic seizures [12]. In general, dental trauma is related to blows to the face and mouth in this type of patient, which can cause injuries to the teeth and supporting tissues, such as fractures at the coronary or root levels, dental mobility, injuries to the gums and bones, even loss of dental organs. The frequency of this type of injury in epileptic patients is present in an approximate range between 20% and 25% of reported cases [13,14].

Tooth malocclusion

A dental malocclusion refers to a misalignment of the dental organs, or how the upper and lower dental organs relate to each other. Worldwide, its frequency is highly variable, however, prevalences have been observed where 90/100 inhabitants present it, which is why it is considered a public health problem worldwide and the third leading cause of oral morbidity. In epileptic patients, this predisposition to develop any type of alteration of dental occlusion is indirectly increased by the sequelae generated at the level of the oral cavity, due to the seizures they present, in such a way that any damage at the dental level and of supporting tissues, have an impact on the stability of the relationship that the dental organs must have, which has an impact on dental occlusion. Epidemiological studies have shown that class I malocclusion according to the Angle classification is the most frequent compared to Classes II and III, however, there is no reference that relates malocclusions to epilepsy directly, reason Therefore, it is interesting to investigate in this field, since if they are related they will surely have to do with traumatic issues due to seizures rather than with the disease itself [15-17]. Based on the foregoing, the purpose of this work was to determine the relationship between gingival hyperplasia, dental fractures and malocclusion with epilepsy as a risk factor, in a sample integrated with a group of people with epilepsy and another without the disease.

Methodology

Study design and participants

A descriptive study was carried out, in the cross-sectional modality, in which a convenience sample made up of 160 people between 20 and 59 years old, of both sexes, organized into two groups of 80 subjects each. The first group was made up of people who had epilepsy and the second group was made up of people without the disease. 17 subjects were excluded from the study because they did not consent to their inclusion in the study, or were not present on the day of the epidemiological survey, which they were replaced by other candidates.

Ethical and legal considerations of the study

The approval was granted by the Bioethics and Biosafety Committee of the Line of Research in Dental Occlusion (LIFESZ-230506), attached to the Faculty of Higher Studies Zaragoza, of the National Autonomous University of Mexico. Likewise, the informed consent of the participants was required and to ensure adequate hygienic sanitary conditions and prevention of infection transmission during the epidemiological survey, the provisions of the technical regulation of the Ministry of Health of Mexico were taken into account (NOM013-SSA2-200635).

Examiner standardization

The standardization of a Dental Surgeon was carried out through the direct method, which was measured by calculating absolute and

relative concordances, and the value of the Cohen's kappa coefficient statistic was calculated, in order to verify that These concordances were not due to chance ($\kappa = 0.992$, $p = 0.0001$). To record the data, an epidemiological record was used in which the record of the findings was considered during the clinical evaluation, after verifying the reliability of the instrument through a pilot test.

Means

The oral examination was carried out by illuminating the clinical field with the use of a white light front lamp Led (XM-L, T6-4, LED 5200LM, Cree®, USA.), Disposable gloves, a # 5 flat dental mirror, without magnification and Michigan-type periodontal probe, both brand Hu-Friedy®, in addition to paper tips, disposable gloves, protective glasses and mouth covers.

Variables and clinical assessment

The variables considered of interest in the present study were: epilepsy, gingival hyperplasia, dental fractures, and malocclusion. Subjects with epilepsy had a clinical record and a previous diagnosis from the Neurology Service of the Hospital 20 de Noviembre, from the Institute of Safety and Services. Social Workers of the State (ISSSTE), Mexico City. For the clinical assessment of the presence of gingival hyperplasia, dental fractures and malocclusion, the respondent was seated in a chair, with his head back, and was carried out the path from premolar to premolar, both upper and lower. During the tour, the clinical characteristics of the gum were taken into consideration, such as color, texture, and presence of bleeding. In the teeth, the presence of some type of dental fracture was considered and in cases of dental loss, it would be taken as positive data if the subject reported with certainty that they had lost it due to dental trauma caused by a seizure crisis. To assess the presence of dental malocclusion, the relationship between the first molars to each other was clinically assessed. In the case of the absence of any of them, the canine relationship was taken into account. For their registration, the criteria established by Angle were considered, considering only classes I, II and II as categories of dental malocclusion, without subdivisions or types.

Statistical methods

For statistical analysis, the statistical package SPSS v.20.0 (IBM, USA) was used. To measure the presence of gingival hyperplasia, dental fractures and malocclusion, frequencies and proportions were calculated. To determine the association between epilepsy with gingival hyperplasia, dental fractures and the type of dental occlusion, the Mantel and Haenszel Chi-square value was calculated because the variables were dichotomous and nominally measured, except for the analysis of the association between the epilepsy and dental malocclusion, since in this case the Pearson's Chi-square value was calculated. A confidence level of 95% was considered in all cases. The tables were designed in Microsoft® Excel v.365.

Results

The study sample was made up of 160 people, whose distribution by age and sex was proportionally balanced, with an average age of 42.3 ± 5.19 (Table 1). The frequency of cases of gingival hyperplasia was high since approximately 5:10 examined subjects presented this clinical condition, however, when observing the behavior of this event, considering the condition of the presence of epilepsy, the frequency of gingival hyperplasia was much greater in patients with the disease compared to those who did not present it, a condition that showed a highly significant association between both variables ($\chi^2_{MH} = 140.823$, $p = 0.0001$) (OR = 6.84; 95% CI = 3.61– 8.33; $p = 0.045$) (Tables 2 and 3). Regarding the presence of dental fractures, this occurred in approximately seven out of ten patients, which shows that their frequency was also high, when observing their behavior according to the presence of epilepsy, dental fractures also They turned out to be highly related to this disease, since the frequency with which it was observed in the group of sick patients presented approximately four times more than the non-epileptic subjects (χ^2_{MH}

Sex	Age group*									
	20-29		30-39		40-49		50-69		Total	
	f	%	f	%	f	%	f	%	f	%
Women	22	13.8	20	12.5	23	14.4	23	14.4	88	55
mens	20	12.5	25	15.6	13	8.1	14	8.8	72	45
Total	42	26.3	45	28.1	36	22.5	37	23.1	160	100

*in completed years

Table 1: Distribution of the study sample by age and sex

Gingival hyperplasia	f	%
Absent	77	48.1
Present	83	51.9
Dental fracture		
Absent	50	31.3
Present	110	68.8
Occlusion type		
Normoclusión	22	13.8
Maloclusión	138	86.3
Malocclusion type		
Normoclusión	22	13.8
Class I malocclusion	54	33.8
Class II malocclusion	54	33.8
Class III malocclusion	30	18.8

Table 2: Frequency of cases of gingival hyperplasia, dental fracture, type of occlusion and type of malocclusion in the study group

	Epileptics		Non-epileptic	
	F	%	f	%
Gingival hyperplasia				
Absent	1	0.6	76	47.5
Present	79	49.4	4	2.5
				p=0.0001
Dental fracture				
Absent	9	5.6	41	25.6
Present	71	44.4	39	24.4
				p=0.0001
Occlusion type				
Normoclusión	5	3.1	17	10.6
Maloclusión	75	46.9	63	39.4
				p=0.834
Malocclusion type				
Class I malocclusion	30	18.8	24	15.1
Class II malocclusion	31	19.4	23	14.4
Class III malocclusion	14	8.8	16	10
				p=0.076

Table 3: Frequency of cases of gingival hyperplasia, dental fracture, type of occlusion and type of malocclusion according to the condition of epilepsy

= 29,789, $p = 0.0001$) (OR = 3.84; 95% CI = 1.92–5.76; $p = 0.039$) (tables 2 & 3). Considering the variable type of dental occlusion, as expected, approximately nine out of ten surveyed subjects presented malocclusion, however, they were not observed Significant differences

in the frequency of this clinical condition between epileptic patients compared to non-epileptic patients, which evidenced the absence of a relationship between dental malocclusion with epilepsy ($X^2_{MH} = 7,589$, $p = 0.834$) (tables 2 & 3). Finally, attention was drawn to the behavior of dental malocclusion cases according to the Angle classification, since what was reported for other populations with epilepsy status showed that classes I and II were the most frequent and that their distribution according to the condition of the disease in question had no relevance, therefore, for both the group of epileptic and non-epileptic patients, the distribution of cases was similar ($X^2 = 8,907$, $p = 0.076$) (Tables 2 and 3).

Discussion

Gingival hyperplasia occurred very frequently in the general study population, however, the behavior of this clinical condition showed differences by study group, where the group made up of subjects with epilepsy had a higher frequency compared to the non-epileptic group [2,3], a difference that was relevant showing that the condition of being epileptic generated a greater probability of presenting gingival hyperplasia [1,5]. This behavior was expected since, as is known in epileptic patients, antiepileptic drugs are prescribed, such as phenytoin, which in its side effects is considered the development of gingival hyperplasia [3,5-17]. Also, among the most relevant findings is the fact that it was observed how many times an epileptic subject was more likely to develop gingival hyperplasia, since, as observed, this risk increased in patients with this disease up to nine times compared to a subject. Non-epileptic. Dental fractures in the general study population also occurred with a high frequency, since approximately seven out of ten evidenced some type of fracture in some of their teeth. It was considered very important to measure this variable considering the risk that subjects with epileptic seizures have to traumatic events, which leads them to undergo uncontrolled processes that can increase the risk of dental fractures [15]. The behavior of this variable showed that the frequency of these fractures was higher in epileptic patients compared to those without the disease, which suggests that an epileptic crisis can indeed increase the risk of dental fracture, however, it would have been also important to incorporate the type of dental fracture as a study variable, this with the purpose that in addition to observing if there were differences regarding the presence of dental fractures, if they had different characteristics with the type of dental fractures in patients without this disease and as a consequence, determine if the severity of the damage due to the type of dental fracture predisposes them to other events that affect the integrity of their stomatognathic system.

The behavior of the type of dental occlusion was generally similar to that reported for other populations [11-18], in fact, the frequency of malocclusions was very high since practically nine out of ten subjects evidenced it clinically. Likewise, it was considered that epileptic patients would have a greater probability of experiencing some type of malocclusion, however, when analyzing the groups of interest for the study, the differences observed between both, did not show that the type of occlusion will be associated with epilepsy, in such a way that malocclusion was even more frequent in patients without the disease in question, which rules out in this population the probability or the risk that epilepsy could be related to a higher probability of developing some type of malocclusion. Similarly, analyzing the type of dental malocclusion, Angle's classes I and II were the ones that occurred more frequently compared to class III, an unexpected behavior since their distribution according to what was reported by other authors was malocclusion. Class I should have occurred more frequently than II and III and it did not turn out that way [19], which means that any oral disorder or disease can be different in its manifestation from person to person and from population to population due to its multifactorial etiological character. Therefore, at least in this population epilepsy should not be considered as a risk factor for the development of any type of dental malocclusion.

Conclusion

From the results obtained in the present investigation, it is confirmed that the use of phenytoin in epileptic patients turns out to be a specific risk factor for this group towards the development of gingival hyperplasia. Likewise, it seems that the risk of having seizures in this group of patients also predisposes them to a greater extent to suffer fractures of their dental organs, however, the question of what type of dental fractures are most exposed in comparison remains with dental trauma presented by subjects without this disease, which would make it possible to evaluate the possible impact on the integrity of their stomatognathic system. Likewise, since no relationship is observed between epilepsy with dental malocclusion, epilepsy should not be considered as a direct risk factor for the development of any type of dental malocclusion; in fact, there is no theoretical model that associates these variables, however, indirectly, it could influence the development of dental occlusion if there were differences regarding the type of dental fractures, in particular if dental trauma type 3, 4 and 5 according to the Andreasen classification were more frequent in epileptic patients compared with non-epileptic subjects.

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