

HISTO-MORPHOLOGICAL STUDY OF FUNCTIONAL OVERLOAD (CLINICAL EXPERIMENTAL STUDY)

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Abstract

Traumatic occlusion function is a continuous overload of dental system in chewing function which causes various damage in periodontal. This overload is visible not only in the full dental system, but also in the lack of teeth. Histo-morphological changes are noticed not only in the soft tissues but also in the periodontal and alveolar process with their atrophy.

The aim of our study: is to investigate the Histo-morphological changes in the periodontal of experimental animals (guinea pig) comparing them to the morphological changes of the patients.

Material and Methods: In this study we have investigated and treated 88 patients at the age of 20 – 70 for a period of more than 10 years. In our study, we have taken into consideration the causing factors and consequences of functional overload in the oral cavity. We have also studied the histo-morphological changes of functional overload in the experimental animals.

Results and discussion: The main cause of functional overload of teeth is the absence of substitution for a long period of time and the prosthesis which are badly put. We noticed macroscopic and microscopic changes in the periodontal of patients and animals too. In the patients, the macroscopic changes were gingival hypertrophy, the damage of contact point, the teeth movability and their displacement.

Radiology showed us vertical and horizontal atrophy. In the experimental animals histo-morphological changes were shown in the damage of periodontal ligaments, hematopoietic disorders of pulp and necrotic lesions.

The results of clinical treatment of the patients have been valued for a period of time about 5–15 years based on the subjective and radiological data before and after treatment where functional overload interruption was observed.

Conclusions: To avoid histo-morphological changes that are caused by functional overload of teeth remained in the oral cavity; the prosthetic treatment of the lack of teeth with various kinds of prosthesis should absolutely be done.

Introduction

The lack of the teeth in the stomatological apparatus happen according the different reasons⁽¹⁾. The main reasons are mentioned as: **the carious processes with their causes; chronically periodontal in advanced phase; the different systematical diseases which are accompanied with less of teeth; different traumas and fractures at the dental system** etc.^(2,3) The absence of the teeth gives the structural functional changes which needed to be under consideration⁽⁴⁾. The overload functional causes are the absence of the teeth, their mobility, the contact point's damage and occlusal pre-functions^(5,6).

The consequences of absence of the teeth are teething and tissues – boning which are shown by mobility of the teeth, the contact point's damage, and while at those of tissues consequences are more advanced. The teeth absence is accompanied by the tissues – boning changes of the actual teeth in the dental system. In the above mentioned case is damaged the adapting capacity of periodontal, have a widening of periodontal space. The biggest forces given more advanced changes like: pressure and pulling of the periodontal tissues which are accompanied by functional overload. When this force is actives for a long time at the actual teeth, happen the damage of the equilibrium of the reserve forces of the

periodontitis, which is accompanied by the overload of the actual teeth^(7,8). In actual dental system happen the widening of the periodontal space, the non-equal atrophy of the alveolar process, the pocket gingival establishment, displacement of the teeth and their mobility^(9,10).

Histo-morphologically changes are accompanied by the blood signs at the peridontium, increase of the acidity of the tissues, which altogether accompanied by boning re-sorption. In this case, statistical of the teeth damaged and consequently the teeth remove⁽¹¹⁾. The diagnose of the damage to the: functional equilibrium, functional overload of the chewing apparatus was shown through the radiological analysis where are shown: non equal atrophy of the alveolar process, migration of the teeth as result of the overload, the lack of the contact point's, the widening space between the teeth, re-move of the teeth etc^(12,13,14). The treatment manner of the functional overload is the therapeutic and prosthetic procedure.

The aim of study:

1. To determine the causes and consequences of the functional overload;
2. To shown the histo-morphological changes of the functional overload;
3. To determine the preferred manners for treatment of the functional overload.

Material and method

We have treated 88 patients 20-70 years old divided in two groups:

First group: 47 are treated as patients with functional overload;

Second group: 48 are as patients of the control group.

The treatment of the patients is performed by therapeutic and prosthetic procedure. Experimentally, we have study the functional overload, investigated the macroscopic and microscopic changes at the patients as well at the animals. We determinate the criteria's of the selection to the patients for both above mentioned groups, which included: patients with absence of the teeth and non-treated by therapeutic and prosthetic procedure, as well patients with gingival damages at the alveolar process. The prosthetic treatment was performed in accordance with two basic processes.

- a. According to the kind of the teeth absence (kind of defect);
- b. According the form and re-sorption of the alveolar process.

Results

We have treated 88 patients divided in 2 groups; 47 (or 53%) as treated patients and 41 (or 46,6%) as controlled patients. We have used for the teeth absence the Kennedy classification. Based at the classification of above mentioned the first class of defect is about 40% and the second class of defect is about 23%. **Table No. 1**

Defects of teeth absence	Percentage %
Defect of first class	39,8
Defects of second class	22,7
Defects of fourth class	37,5

Table No. 1 Time of teeth missing at patients

According the classification was investigated the first defect class about 39,8%.

The time of absence of teeth at the patients study is as follow: 6 months till one year (43.20%), up 3 years (15,90%), 5 years (30,70%) and over 6 years (10,20%) Table No. 2.

Time of patients without teeth	Percentage %
6 months till 1 year	43,20%
More as 3 years	15,90%
5 years	30,70%
6 years	10,20%

Table No. 2 Time of teeth missing at patients

The time for patients with over 5 years is about 40,90%. The damages at the oral cavity are greater at the patients with long time more as 5 – 6 years without teeth.

The damages at the oral cavity are usually accompanied by below signs: a] gingival lesions caused by bacterial plaque (about 13, 60%) of patients; b] gingival lesions caused by bad construct of prosthesis (about 4,50% of patients); and chronically and generalized periodontitis (about 43,20% of patients). The damages at the oral cavity are as well as accompanied by atrophies of the alveolar process. Table No. 3

Damages at the oral cavity	Percentage (%)
gingival lesions casued by bacterial pllaque	13,60
esions caused by bad prosthesis carried out	4,50
cronicall and generalized of periodontitis	43,20

Table No. 3 Damages of oral cavity

The first and second atrophy level was investigated at 78,40% of patients; the third atrophy level was investigated at 10,20% of patients; the third and fourth atrophy level was investigated at 3,40% of patients and the fourth atrophy level was investigated at 8% of patients. The atrophy of second level has predominated at 78% of all cases, continuing by chronically and generally periodontitis at 43,20% of all cases (Photo No 1).



Photo. No 1 Patients with movibility of teeth

Based at the results of microscopically changes at the patients we have investigated the below phenomena: **a]** red gingival; **b]** deepening of gingival pocket; **c]** mobility of teeth; **d]** vertically and horizontally atrophy of the alveolar process (Photo No 2).



Photo Nr 2. Macroscopical changes at the oral cavity

While at the animals (guinea pig) the histo-morphological changes are accompanied by presence of staphylococcus, streptococcus and echerica coli based at the microbial analysis of the gingival pocket of the guinea pig (Photo No 3).



Photo No 3. Staphylococcus, streptococcus and echerica coli at animals of study

Some other specific phenomena's are investigated at the animal's teeth like: by the vertical chewing forces the enamel layer was totally deviated and the layer thin of **Osteodentine** was accompanied by the **Osteonecrotical** signs. The pathological pulp is thinned by the increase of the hemapoetic activity as result of growth of the chewing forces on the animal tooth (Photo 4, 5).

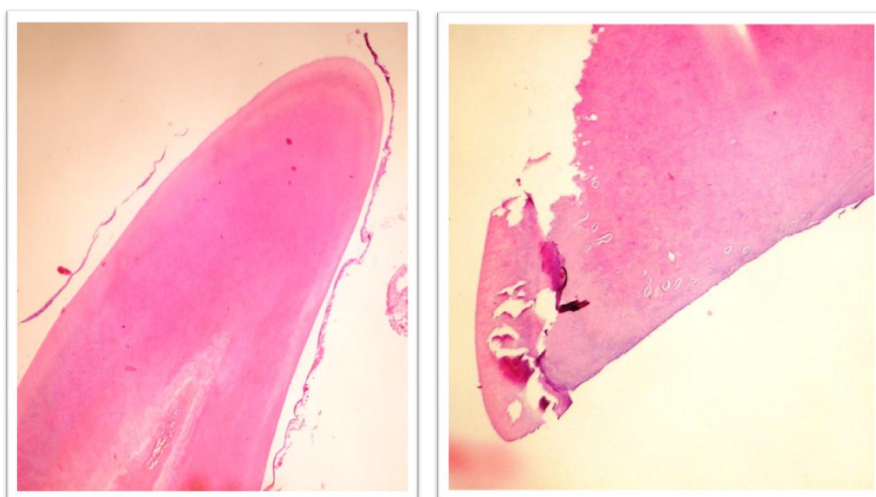


Photo No. 4 Osteonecrotices focus at the animal of guinea pig

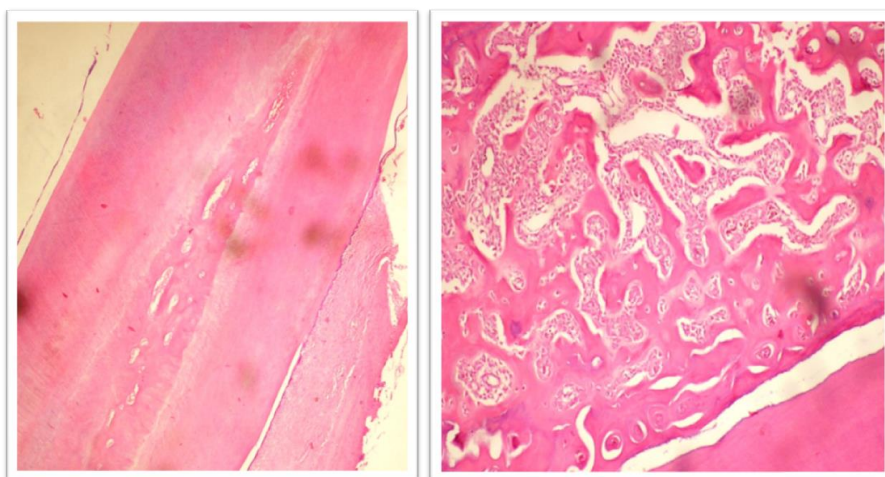


Photo No. 5 Pathologies changes at the pulp of animal tooth

The results are evaluated by: **a]** the subjective data; **b]** the clinical data and **c]** the radiological data. We have investigated the recovering and interruption of the pathological process which was caused by the overload of the teeth and paradont have not enough time to re-take the normal function through the activation of the compensator mechanisms. At the all treated patients are recovered about 68,20% and the un-treated (un-recovered) were about 31,80% of all patients. Based at the final results was investigated that at the treated group of patients the recovering was about 61,70%, while at the control group the recovering was investigated at 75,60%.

Discussion

According the study by author **(4)** was investigated the absence of distal teeth defect (defect of first class) at 40% of cases.

As longer patients will be by teeth missing, the greatly will be damages at the oral cavity. According the Robos study **(11)** in the case of in-regular fixed bridges, are more present microbes staphylococcus, etc., which were investigated in our study also.

Based at the study analysis, we investigated a correlation between the study group and defects of the teeth ($r = -0,540$; or $p \leq 0,001$,

where the control group shown more defects at the fourth class.

We have investigated a negative power correlation, between both groups and the time of absence of teeth $r = -0,902$ or $p \leq 0,001$, where the treated group represent a long time without tooth. A weak correlation $r = -0,318$ or $p \leq 0,003$ between both groups and atrophy of the alveolar process at the treated group has heavy damages.

Also, was investigated an important moderation correlation between damages of the oral cavity and the time without teeth $r = 0,595$; $p \leq 0,001$.

Based at the statistically analysis exist a weak positive correlation between the time without teeth and the atrophy of the alveolar process $r = 0,367$ and $p \leq 0,001$.

Conclusion

1. The absence of the teeth causes a heavy and important problems at the stomatognathic apparatus;
2. Their elimination carried out by therapeutically–prosthetic manner and procedures;
3. As soon as was performed the substitution of the lack teeth lessen are the damages of the stomatognathic apparatus.

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