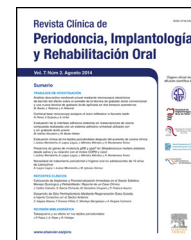




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## ORIGINAL ARTICLE

### The influence of primary occlusal trauma on the development of gingival recession

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#### KEYWORDS

Periodontics;  
Gingival recession;  
Traumatic dental  
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**Abstract** This study aimed to histometrically evaluate the presence of gingival recession in the mesial surface of the teeth of rats experimentally subjected to primary occlusal trauma. This evaluation verified the distance from the cement-enamel junction (CEJ) to the free marginal gingiva (FMG) and to the height of the alveolar bone crest (CEJ-crest bone distance). There were 10 animals, randomly divided into 2 groups: occlusal trauma (OT) ( $n=5$ ) – creation of an occlusal interference by fixing an orthodontic wire segment on the mandibular first molar occlusal face, which was randomly chosen, and a Control Group (CG) ( $n=5$ ) – five animals with no exposure to the OT variable were euthanised after 14 days to obtain the initial parameters. The inter-group evaluation showed there was no significant difference between OT  $\times$  CG when the CEJ-FMG distance ( $P=0.192$ ) was evaluated after 14 days, but there was a significant difference between the two groups as regards the CEJ-alveolar crest bone distance ( $P=0.0142$ ). Thus, it can be concluded that the OT induction model, after 14 days of experiment, promoted bone resorption. This was observed by the increase in the CEJ-alveolar crest bone distance. It also did not promote gingival recession, which was evaluated by the CEJ-FMG distance.

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## PALABRAS CLAVE

Periodoncia;  
Recesión gingival;  
Oclusión traumática;  
Encía

## La influencia del trauma oclusal primario en el desarrollo de la recesión gingival

**Resumen** El objetivo de este estudio fue evaluar histométricamente en ratas la presencia de recesión gingival en la superficie mesial de los dientes sometidos experimentalmente a trauma oclusal primario a partir de la evaluación de la distancia desde la unión esmalte cemento (CEJ) a la encía marginal libre y la altura de la cresta ósea restante (distancia de la CEJ-cresta ósea). Con este fin, 10 animales fueron divididos al azar en 2 grupos: trauma oclusal (TO) (n=5) – creación de una interferencia oclusal mediante la fijación de un segmento de alambre de ortodoncia en la superficie oclusal del primer molar elegido al azar; y un grupo control (CO) (n=5) – 5 animales sin la introducción de la variable TO fueron sometidos a eutanasia después de 14 días para obtener los parámetros iniciales. La evaluación intergrupo no mostró diferencias significativas entre los grupos TO × CO al evaluar después de 14 días la distancia de la CEJ-encía marginal libre (p=0,192) pero mostró una diferencia significativa entre los grupos TO × CO en cuanto a distancia de la CEJ-cresta ósea alveolar (p=0,0142). Por lo tanto, se concluye que el modelo de inducción del TO después de 14 días del experimento promueve reabsorción ósea siendo observado por el aumento en la distancia de la CEJ-cresta ósea alveolar y no promueve la recesión gingival evaluada a partir de la distancia de la CEJ-encía marginal.

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## Introduction

Gingival recessions correspond to the migration of the free gingival margin apically to the cemento-enamel junction, resulting in the exposure of the root surface.<sup>1</sup> Studies show that gingival recessions are frequent in patients with periodontal disease and their incidence, prevalence and extension are distinct between populations.<sup>2,3</sup> However, there is an increase in their incidence and severity correlated with the aging of the individuals.<sup>4,5</sup>

Gingival recessions have a multifactorial nature and can be associated with predisposing factors related to periodontal biotype,<sup>6</sup> presence of bone dehiscence and fenestration,<sup>7</sup> patient's habits, such as: tobacco<sup>8-10</sup> and cocaine use,<sup>11</sup> abnormal mucogingival insertion and frenulum pull,<sup>2,12</sup> malpositioned teeth.<sup>2,7</sup> There are also trigger factors or primary etiological factors, which are those directly responsible for the beginning and evolution of the recessions: accumulation of plaque, calculus and presence of periodontal diseases,<sup>8,9</sup> excessive orthodontic tooth movement, leading the tooth out of the alveolus<sup>13,14</sup> and physical trauma, such as traumatic brushing,<sup>9,15</sup> tongue and lip piercings<sup>9,16</sup> and iatrogenicities.<sup>3,5</sup>

On the other hand, occlusal trauma (OT) is defined as a non-infectious lesion that affects the inserting periodontium (cementum, periodontal ligament and alveolar bone) due to occlusal forces that exceed its adaptive capacity.<sup>17</sup> OT can occur in a tooth with normal support (primary occlusal trauma) or in a tooth with reduced support (secondary occlusal trauma).<sup>17</sup> Some authors have suggested occlusal trauma would also be an etiological factor in the development and worsening of gingival recessions,<sup>18-20</sup> however, data related to the OT influence on the gingiva seem controversial.<sup>21</sup> Such controversy exists because of the impossibility of prospective monitoring patients with

OT due to the experiment's ethical conduct. Therefore, there are doubts about the OT involvement in gingival recession's primary or secondary etiology: the clinical studies published are retrospective<sup>21</sup> or case reports.<sup>18-20</sup> Most are case reports and have low scientific evidence, as they do not isolate the variables studied, increasing the results biases. Thus, the doubts about the occlusal trauma influence on the development and worsening of gingival recessions persist in the periodontics and it is necessary to carry out studies to elucidate this topic.

Due to the doubts raised about the primary occlusal trauma and its influence on the gingiva, this study aimed to histometrically evaluate the primary occlusal trauma influence on the development of gingival recessions and alveolar bone resorption in rats.

## Material and methods

### Animals

The animals used were ten Wistar breed rats, 16-week-old male adults, weighing between 215 g and 315 g. The animals were kept in plastic cages with *ad libitum* access to food and water in the vivarium at the Universidade do Sagrado Coração. The animals used in this study are standard type and had systemic and oral health at baseline. This study was submitted to USC Ethics Committee in Animals' Experiment and it was accepted under the protocol numbered 28/13.

### Experimental design

To delineate the experiments, the 10 animals were randomly divided by sort into the following groups:

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