Pharmacological Effect of Nandrolone Phenylpropionate
on the Healing of Dental Extraction Wounds:
A Histological Investigation in Rats

by

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Introduction

The distinct stages of the wound healing following teeth extraction were established through several clinic[1], radiographic[2, 4, 5, 6] and histological[7, 2, 3, 8, 4, 9, 10] studies.

It is recognized, however, that metabolic changes take place during and after surgical procedures, which must be studied in connection with healing processes.

The anabolic steroids because of their effect have been experimentally used following fractures[11] as well as for the healing of soft tissues[12] with promising results. LASSILA and STAUFFER[13], did not verify any significant influence of anabolic steroids on the healing of teeth extraction wounds.

For this reason, the purpose of this paper is to verify the anabolic steroid effects, following nandrolone phenylpropionate administration, at the different stages of teeth extraction wounds.

Material and Method

For the present study, we used forty-eight male albino rats (Rattus norvegicus, Wistar strain) weighing about 100 grams each.

Before and during the entire experimental period, the animals received standard food and water ad libitum, except for 24 hours after tooth extractions when solid food was discontinued.

The right upper incisors were extracted and the mucous membrane sutured with 5-0 mononylon. For this procedure, the animals were anesthetized with sulphuric ether. For observational purposes, the animals were divided into two groups: control and experimental.

In the first group, each animal was injected with 0.5 ml of almond oil; in the second group, each one received in 0.5 ml of almond oil 1 mg of nandrolone phenylpropionate. These injections were administered intraperiotoneally on a daily basis.

Four animals were killed after postoperative periods of 2, 4, 8, 12, 16 and 20 days. After each rat was put to death, the anatomical pieces could be obtained. These

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were placed in 10 per cent formalin and, after fixation, decalcified in a formic acid-
sodium citrate solution[14]. After this, they were embedded in paraffin for 15 minutes
in vacuum. The blocks thus obtained were cut by a rotary microtome into serial sec-
tions 6 microns thick. The tissues were subsequently stained with hematoxylin and
eosin for morphologic study.

Results

The results obtained after the respective passage of post-operative days are com-
paratively given in Table 1.

Table 1. The healing process following incisors extraction

<table>
<thead>
<tr>
<th>Postoperative day</th>
<th>Animal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
</tr>
<tr>
<td>2</td>
<td>Some young fibroblasts and newly formed capillaries (Fig. 1). Great</td>
</tr>
<tr>
<td></td>
<td>number of macrophages and some polymorphonuclear neutrophils. Alveolar</td>
</tr>
<tr>
<td></td>
<td>crest with some resorption.</td>
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<tr>
<td>4</td>
<td>Great number of fibroblasts and newly formed capillaries (Fig. 3).</td>
</tr>
<tr>
<td></td>
<td>Macrophages and some polymorphonuclear neutrophils. Alveolar crest</td>
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<tr>
<td></td>
<td>with resorption.</td>
</tr>
<tr>
<td>8</td>
<td>Alveolus practically filled by well vascularized connective tissue and</td>
</tr>
<tr>
<td></td>
<td>numerous fibroblasts. Some osseous trabeculae (Fig. 5). Some lympha-</td>
</tr>
<tr>
<td></td>
<td>cytes, plasma cells and great number of macrophages.</td>
</tr>
<tr>
<td>12</td>
<td>Thin osseous trabeculae throughout the alveolus (Fig. 7). Between these</td>
</tr>
<tr>
<td></td>
<td>trabeculae there is a well vascularized connective tissue. Alveolar crest</td>
</tr>
<tr>
<td></td>
<td>remodeled.</td>
</tr>
<tr>
<td>16</td>
<td>Thicker osseous trabeculae than those of 12 days fulfil the alveolus</td>
</tr>
<tr>
<td></td>
<td>(Fig. 9). Some areas with thin osseous trabeculae.</td>
</tr>
<tr>
<td>20</td>
<td>Alveolus entirely fulfilled by newly formed bone. Few osteoblasts.</td>
</tr>
</tbody>
</table>

Discussion

Following an injury inflicted on the soft and hard tissues, there is an increase in
Fig. 1 *Control.* Young fibroblasts and newly formed capillaries at the apical third. (Hematoxylin and eosin stain, ×100).

Fig. 2 *Experimental.* Great number of young fibroblasts and numerous newly formed capillaries at the apical third. (Hematoxylin and eosin stain, ×100).

Fig. 3 *Control.* Great number of fibroblasts and newly formed capillaries at the medial third. (Hematoxylin and eosin stain, ×100).

Fig. 4 *Experimental.* A well vascularized connective tissue and numerous fibroblasts at the medial third. (Hematoxylin and eosin stain, ×100).

Fig. 5 *Control.* Few osseous trabeculae at the apical third. (Hematoxylin and eosin stain, ×100).

Fig. 6 *Experimental.* Numerous osseous trabeculae at the apical third. (Hematoxylin and eosin stain, ×100).
proteinic catabolism, disturbing the nitrogen balance. The anabolic steroids have been employed to increase the proteinic anabolism and balance the nitrogen retention.

In anabolic steroids treated animals, SINGH and Udupa[11] verified a repair acceleration in osseous fractures. However, Lassila and Stauffer[13] did not verify such increasing action in the healing of tooth extraction wound.

In the present work, the repair occurred more rapidly in experimental animals. This fact could be established by major fibroblasts, newly formed capillaries and ground substance quantity at 2 postoperative days.

Since the acid mucopolysaccharides synthesis is often directly proportional to the fibroblast quantity, we can assume that in the subsequent postoperative stages the healing of extraction wound would increase in the experimental animals.

This hypothesis is based upon the anabolic steroids which play a favorable role in the acid mucopolysaccharides synthesis[11, 12].

It is supposed that the major and more rapidly organic matrix calcification results
from the combination of calcium with the chondroitin sulphate of the ground substance or collagen fibers[15].

This assumption is corroborated by the fact that a rapider recovery takes place in experimental animals than in the controls.

**Conclusion**

The nandrolone phenylpropionate administration, following rat incisors extraction, accelerates the wound healing.

**References**


