

Volume 79, Issue 4  
(July 2009)

[◀ Previous Article](#)   [Volume 79, Issue 4 \(July 2009\)](#)   [Next Article ▶](#)

 [Add to Favorites](#)    [Share Article](#)    [Export Citations](#)    [Track Citations](#)    [Permissions](#)

[Full-text](#)

[PDF](#)

Carmen Gonzales, Hitoshi Hotokezaka, Ken-Ichiro Matsuo, Tatsunori Shibazaki, Joseph H. Yozgatian, M. Ali Darendeliler, Noriaki Yoshida (2009) Effects of Steroidal and Nonsteroidal Drugs on Tooth Movement and Root Resorption in the Rat Molar. The Angle Orthodontist: Vol. 79, No. 4, pp. 715-726.

Original Articles

## Effects of Steroidal and Nonsteroidal Drugs on Tooth Movement and Root Resorption in the Rat Molar

Carmen Gonzales<sup>a</sup>, Hitoshi Hotokezaka<sup>b</sup>, Ken-Ichiro Matsuo<sup>c</sup>, Tatsunori Shibazaki<sup>d</sup>, Joseph H. Yozgatian<sup>a</sup>, M. Ali Darendeliler<sup>e</sup>, and Noriaki Yoshida<sup>f</sup>

### Abstract

**Objective:** To test the hypothesis that the administration of aspirin, acetaminophen, meloxicam, celecoxib, and prednisolone have no effect on root resorption and tooth movement.

**Materials and Methods:** A mesial force of 50 g was applied to the left maxillary first molars of sixty 10-week-old male Wistar rats using nickel titanium closed coil springs attached to the cervical area of the incisors. The rats were randomly divided into 12 groups of 5 each. High and low doses of aspirin, acetaminophen, meloxicam, celecoxib, and prednisolone were administered via drinking water for 2 weeks. The experimental control group had tooth movement but received no drug. The negative control group received neither tooth movement nor drugs. The amount of tooth movement was measured on digitized lateral cephalometric radiographs. Rats were sacrificed after 2 weeks. Mesial and distal roots (distobuccal and distopalatal) were examined using scanning electron and three-dimensional (3D) scanning laser microscopes. The surface area, depth, volume, and roughness of the root resorption craters were measured.

**Results:** When compared with experimental control rats, only prednisolone- and high-dose celecoxib-treated groups showed significantly less root resorption and less tooth movement. Although low dose celecoxib-treated group significantly decreased the tooth movement, root resorption was similar to the control group. Furthermore, resorption craters showed a smoother surface in the prednisolone-treated rats.

**Conclusions:** The hypothesis was rejected. Administration of prednisolone and high-dose celecoxib reduces root resorption and interferes with tooth movement in rats. Both drugs may interfere in the arachidonic acid cascade depending on dose thresholds.

**Keywords:** [Anti-inflammatory](#), [NSAID](#), [Steroid](#), [Glucocorticoid](#), [Cyclooxygenase](#), [COX](#)

Accepted: August 2008;

<sup>a</sup> PhD student, Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

<sup>b</sup> Senior Assistant Professor, Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

<sup>c</sup> Resident in Orthodontics, Okumura Dental Clinic, Nagasaki, Japan

AN  
GLE  
ORTHODONTIST

www.angle.org

An International Journal of Orthodontics and Dentofacial Orthopedics

79

A Publication of the Edward H. Angle Society of Orthodontists and  
the EH Angle Education and Research Foundation

Volume 79 (4)

November 2009

[Current Issue](#)  
[Available Issues](#)

An Open Access Site  
Courtesy of the  
EH Angle Education and  
Research Foundation

Please **contribute** to the  
Angle Foundation to help keep  
this website free and open access

### Journal Information

ISSN: 0003-3219

Frequency: Bimonthly

### Register for a Profile

Not Yet [Registered?](#)

*Benefits of Registration Include:*

- A Unique User Profile that will allow you to manage your current subscriptions (including online access)
- The ability to create favorites lists down to the article level
- The ability to customize email alerts to receive specific notifications about the topics you care most about and special offers

[Register Now!](#)

<sup>d</sup> Assistant Professor, Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

<sup>e</sup> Professor and Chair, Department of Orthodontics, University of Sydney, Sydney Dental Hospital, South Western Sydney Area Health Service, Sydney, Australia

<sup>f</sup> Professor and Chair, Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University Graduate School of Biomedical Sciences, Nagasaki, Japan

Corresponding author: Dr Hitoshi Hotokezaka, Department of Orthodontics and Dentofacial Orthopedics, Nagasaki University, Sakamoto 1-7-1 Nagasaki, 852-8588 Japan ([hotoke@nagasaki-u.ac.jp](mailto:hotoke@nagasaki-u.ac.jp))

## Related Articles


### Articles Citing this Article

[Google Scholar](#)

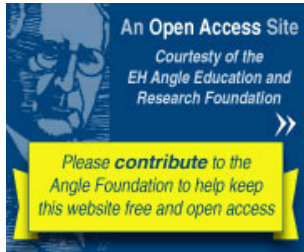
### Search for Other Articles By Author

- ⊖ Carmen Gonzales
- ⊖ Hitoshi Hotokezaka
- ⊖ Ken-Ichiro Matsuo
- ⊖ Tatsunori Shibazaki
- ⊖ Joseph H. Yozgatian
- ⊖ M. Ali Darendeliler
- ⊖ Noriaki Yoshida

### Search in:

 Angle Online

Search



top ▲