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Original Articles

Trigeminal Expression of N-Methyl-D-Aspartate Receptor Subunit 1 and Behavior Responses to Experimental Tooth Movement in Rats

Zhi Yang^a, Yan Wang^a, Wei Luo^b, Xiaochuan Hua^c, Peter Wamalwa^d, Jing Wang^c, Zhihe Zhao^e, Yun Lu^c, Zhengyu Liao^a, and Wenli Lai^f

Abstract

Objective: To test the hypothesis that peripheral N-methyl-D-aspartate (NMDA) receptors play a role in pain induced by experimental tooth movement.

Materials and Methods: Male Sprague-Dawley rats weighing between 200 g and 300 g were used in this study. Expression of NMDA receptors subunit 1 (NMDAR1) in the mandibular portion of the trigeminal ganglion (TG) was determined by Western blotting 4 hours and 1, 2, 3, 5, 7, and 14 days after tooth movement. Changes in the time taken by the rats on nocifensive behavior then effects of NMDA receptor antagonist MK-801 and force magnitude on these changes in behavior and NMDAR1 expression were evaluated.

Results: Experimental tooth movement led to a statistically significant increase in NMDAR1 expression at protein level from day 1 to 7 after force application initiating tooth movement. Time spent on nocifensive behavior dramatically increased from day 1 to 7. The rhythm in NMDAR1 expression in the TG and behavioral activities correlated well with the initial orthodontic pain responses. The magnitude of the nocifensive behavior and NMDAR1 expression were both force magnitude dependent and could be reduced by peripheral NMDA receptor antagonist MK-801.

Conclusions: The hypothesis is accepted. Peripheral NMDA receptors are modulated by experimental tooth movement and involved in the development of tooth movement pain.

Keywords: [NMDA Receptor](#), [Experimental tooth movement](#), [Trigeminal ganglion](#), [Pain](#), [Face grooming](#)

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^a PhD student, State Key Laboratory of Oral Diseases, Department of Orthodontics, West China College of Stomatology, Sichuan University, Chengdu, China

^b Private Practice, Zhejiang, China

^c Graduate MS student, Department of Orthodontics, West China College of Stomatology, Sichuan University, Chengdu, China

^d Senior Dental Officer, Department of Orthodontics, Kenyatta National Hospital and Postgraduate Student, Department of Orthodontics, West China College of Stomatology, Sichuan University, Chengdu, China


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^e Professor and Chairman, Department of Orthodontics, West China College of Stomatology, Sichuan University, Chengdu, China

^f Associate Professor and Vice Chairman of Department of Orthodontics, West China College of Stomatology, Sichuan University, Chengdu, China

Corresponding author: Wenli Lai, Associate Professor and Vice Chairman of Department of Orthodontics, West China College of Stomatology, Sichuan University, Section 3, No. 14, Ren Min Nan Road, Chengdu, China
(Wenlilai@hotmail.com)

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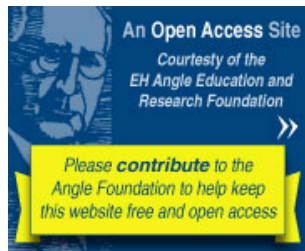
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