

## The Lunar Cycle and Its Relationship to Dental Emergencies: Acute Pulpitis

Ayse Zeynep Zengin<sup>1\*</sup>, Emre Bodrumlu<sup>2</sup>, Yesim Deniz<sup>3</sup><sup>1</sup>Ondokuz Mayıs University, Faculty of Dentistry, Department of Dental and Maxillofacial Radiology, Samsun, Turkey<sup>2</sup>Bulent Ecevit University, Faculty of Dentistry, Department of Endodontics, Zonguldak, Turkey<sup>3</sup>Onsekiz Mart University, Faculty of Dentistry, Department of Dental and Maxillofacial Radiology, Çanakkale, Turkey

\*Corresponding author: Ayse Zeynep Zengin | Received: 04.12.2019 | Accepted: 17.12.2019 | Published: 21.11.2020|

**Abstract:** The aim of this study is to investigate a possible relationship between the full moon/lunar cycle and acute irreversible pulpitis emergencies. Acute pulpitis patients treated at the Department of Endodontics over a 3-year period were reviewed. Each lunar phase (new moon, first quarter, full moon, and last quarter) was considered a 1-day period, and the number of acute pulpitis emergencies per lunar day was calculated. Of 8533 referrals, 688 were recorded on 105 lunar-phase days. There was no significant difference in the number of acute pulpitis cases among phases of the Moon; however, on average, there were 15% more acute pulpitis cases at full moon ( $P = 1.09$ ,  $\chi^2 = 6.06$ ). The effect of the Moon on acute pulpitis remains unconfirmed.

**Keywords:** Lunar cycle, endodontics, emergency.

### INTRODUCTION

Certain theories have been developed to explain apparent lunar effects. These effects have been attributed to differences in ambient moonlight, barometric pressure (weather conditions), geomagnetic and gravitational forces, and solar corpuscular radiation. The gravitational force between the Moon and the Earth is a major regulator of tidal changes in water anywhere on Earth. This fact raised the hypothesis that similar gravitational effects might exist between the Moon and the human body [2].

Irreversible pulpitis reflects severe inflammation that cannot be resolved even if the cause is removed. Spontaneous throbbing pain, lasting several minutes or hours, is common [3], and may occur more frequently when lying down, particularly at night. Acute pulpal pain is primarily due to increased pulpal pressure [4]. A literature search did not reveal any studies investigating a possible relationship between phases of the Moon and acute pulpitis. The purpose of this study was to investigate whether acute pulpitis cases were more frequent on full moon days, and associations between acute pulpitis frequency and phases of the Moon.

### EXPERIMENTAL SECTION

This study was a retrospective analysis of 8533 endodontic emergency patients (with a clinical

diagnosis of irreversible pulpitis) that presented to the Endodontics Department at Ondokuz Mayıs University Faculty of Dentistry (Samsun, Turkey) over a 36-month period. The departmental emergency database, in which all daily referrals to the endodontic emergency unit are recorded, was the source for this study. Characteristics of the endodontic emergency cases included percussion sensitivity, a history of spontaneous pain and (in most cases) a widened periodontal ligament space on radiography. Etiologic factors contributing to the irreversible pulpitis included deep carious lesions and inadequate restorations with recurrent caries.

Data on the fraction of the Moon visible from the Earth from 2010 through 2012 were provided by the Astronomical Applications Department of the United States Naval Observatory. Each lunar phase (new moon, first quarter, full moon, and last quarter) was considered a 1-day period, and the number of acute pulpitis emergencies per lunar day was calculated. A total of 688 acute pulpitis cases were evaluated on 105 lunar days during the 36-month period, excluding weekends and holidays.

For statistical analysis, associations between acute pulpitis frequency and phases of the Moon were evaluated using a  $\chi^2$  test.

Quick Response Code



Journal homepage:

<https://crosscurrentpublisher.com/ccijmb/>

**Copyright © 2020 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## RESULTS

Detailed results are summarized in Table-1. No significant difference in the occurrence of acute pulpitis among phases of the moon was found; however, on average, there were 15% more acute pulpitis cases on full moon days ( $P=1.09$ ,  $\chi^2=6.06$ ).

**Table-1: Occurrence of pulpitis cases according to lunar phase day**

Moon phase	Days	Pulpitis cases	Average
Full moon	26	188	7.52
First quarter	27	162	6
Last quarter	26	168	6.46
New moon	26	170	6.54
<b>Total</b>	<b>105</b>	<b>688</b>	<b>6.55</b>

## DISCUSSION

Tidal effects related to gravitational forces between the Earth and Moon have given rise to hypotheses that human phenomena may be influenced by lunar phases. Many studies have investigated possible relationships between phases of the Moon and human actions such as aggressive behavior [5, 6], abnormal behavior [7], injuries [8], births [9], suicide [10, 11], clinical depression [12], and emergency admissions [13-15]. However, only a few showed significant associations [5, 8].

This study investigated associations between the occurrence of acute pulpitis and the phases of the Moon. Although no significant differences were found among lunar phases, the average number of cases was greatest at full moon.

Irreversible pulpitis is characterized by intense acute pain that is unresponsive to painkillers; hence, the patient needs urgent endodontic therapy [16], and root canal treatment or extraction is indicated for teeth with signs and symptoms of irreversible pulpitis. Acute pulpitis is characterized by increased pulpal pressure due to inflammation [4]. We hypothesized that the full moon stage of the Moon is related to acute pain in pulpitis because of a tide-like effect on the pulp, which is 80% water [17]. Although not significant, the greater number of acute pulpitis cases on full moon days might have been influenced by lunar effects.

Pulpitis pain may be more prevalent when lying down, particularly at night. Acute pulpal pain is primarily due to increased pulp fluid pressure and release of exudate or transudate into the canal space [4]. There are various explanations for pain that disturbs sleep at night. Maximum histamine secretion occurs at 03:00 pm, and minimum histamine secretion occurs at 11:00 pm [18]. Histamine reduces pain perception; therefore, increased pulpal pain at night might be due to decreased histamine secretion. Further, increased cephalic blood pressure during lying down or bending can cause pulpal pain to occur or increase [19].

## CONCLUSION

Although no effect of the Moon on the occurrence of acute pulpitis was revealed, this study introduces the concept of an association between lunar phase and pulpitis, and further studies including increased numbers of years and cases are warranted to clarify this subject.

**Acknowledgement:** We thank to Soner Cankaya for statistical analyses.

## REFERENCES

- Sitar, J. (1990). The causality of lunar changes on cardiovascular mortality. *Journal of Czech Physicians*, 129, 1425–1430.
- Zargar, M., Khaji, A., Kaviani, A., Karbakhsh, M., Yunesian, M., Abdollahi, M. (2004). The full moon and admission to emergency rooms, *Indian Journal of Medical Science*, 58, 191–195.
- Pitt Ford, T. R., Rhodes, J. S., & Pitt Ford, H. E. (2002). Endodontics problem solving in clinical practice. Endodontic emergencies. (pp. 195–199) London: Martin Dunitz.
- Walton, R. E., & Torabinejad, M. (2002). Principles and practice of endodontics. In: Pulp and periradicular pathosis. (pp. 27–48). United States of America: W.B. Saunders Company.
- Owen, C., Tarantello, C., Jones, M., & Tennant, C. (1998). Lunar cycles and violent behaviour. *Australian and New Zealand Journal of Psychiatry*, 32, 496–499.
- Simón, A. (1998). Aggression in a prison setting as a function of lunar phases. *Psychological Reports*, 82, 747–752.
- Templer, D. I., & Veleber, D. M. (1980). The moon and madness: a comprehensive perspective. *Journal of Clinical Psychology*, 36, 865–868.
- Laverty, W. H., & Kelly, I. W. (1998). Cyclical calendar and lunar patterns in automobile property accidents and injury accidents. *Perceptual and Motor Skills*, 86, 299–302.
- Ghiandoni, G., Seclì, R., & Rocchi, M. B., & Ugolini, G. (1998). Does lunar position influence the time of delivery? A statistical analysis. *European Journal of Obstetrics Gynecology and Reproductive Biology*, 77, 47–50.
- Gutiérrez-García, J. M., & Tusell, F. (1997). Suicides and the lunar cycle. *Psychological Reports*, 80, 243–250.
- Yvonneau, M. (1996). Views from Dordogne, and the moon, on suicide. *Encephale*, 4, 52–57.
- Wilkinson, G., Piccinelli, M., Roberts, S., Micciolo, R., & Fry, J. (1997). Lunar cycle and consultations for anxiety and depression in general practice. *International Journal Social Psychiatry*, 43, 29–34.
- Allen, J. L. (1986). Emergency admissions and lunar cycles. *Journal of Emergency Nursing*, 12, 85–88.

14. Kamat, S., Maniaci, V., Linares, M. Y., & Lozano, J. M. A. (2014). Pediatric psychiatric emergency department visits during a full moon. *Pediatric Emergency Care*, 30(12), 875-8.
15. Francis, O. J., Kopke, B. J., Affatato, A. J., & Jarski, R. W. (2017). Psychiatric Presentations During All 4 Phases of the Lunar Cycle. *Advances in Mind Body Medicine*, 31(3), 4-7.
16. McDougal, R. A., Delano, E. O., Caplan, D., Sigurdsson, A., & Trope, M. (2004). Success of an alternative for inter immangement of irreversible pulpitis. *Journal of American Dental Association*, 135, 1707–1712.
17. Yoon, S. H., Brudevold, F., Smith, F. A., Gardner, D. E. (1965). Fluoride, Calcium, Phosphate, Ash, and Water Content of Human Dental Pulp. *Journal of Dental Research*, 44, 696–700.
18. Özalp, E. A. (1990). *Farmakoloji*. Istanbul, Istanbul University.
19. Alaçam, T. E. (2012). In: *Temel ve endodontik mikrobiyoloji*. Ankara, Mimtaş Kitapevi.