

## ORIGINAL ARTICLE

## TREATMENT OF ODONTOGENIC PHLEGMONS IN PATIENTS TAKING INTO ACCOUNT THE BIORITHM OF LIFE

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David S. Avetikov, Vitaliy O. Lychman, Kateryna P. Lokes, Dmitriy V. Steblovsky, Valeriy V. Bondarenko, Oksana A. Shlykova, Ihor P. Kaidashev  
POLTAVA STATE MEDICAL UNIVERSITY, POLTAVA, UKRAINE

### ABSTRACT

**The aim:** Of our study was to establish how the biological rhythm of human affects the reparative functions of the body in terms of odontogenic purulent-inflammatory diseases of the maxillofacial localization.

**Materials and methods:** The research was conducted on the basis of the Department of Maxillofacial Surgery on the basis of «Poltava Regional Clinical Hospital. M.V. Sklifosovsky». A total of 40 patients with odontogenic phlegmons of maxillofacial localization.

**Results:** On the first day of the study, the indicators of the clinical condition of patients did not have a significant difference in all study groups. On the 3rd day of all studied groups, the number of points probably decreased compared to the first day of the study by 22.5%, 23.1%, 23.7%, 22.7%, respectively. On day 5, we have observed a significant difference between the previous results in all groups: 1a - 26.6%, 1b - 23.8%, 2a - 23.9%, 2b - 24.0%.

**Conclusions:** The most effective treatment results were observed in patients of the morning chronotype who underwent surgery in the morning. Thus, the influence of the morning chronotype of the circadian rhythm on the course of reparative processes is manifested in the later stages of reparative regeneration.

**KEY WORDS:** chronotype, biological rhythm, phlegmones

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### INTRODUCTION

The chronotype is a construct that captures a person's circadian phenotype, whether it is morning or evening behavioral preferences, or a subjective measurement based on the timing of reported behavior. This phenotype is organized by an evolutionarily acquired circadian clock system, which is organized in the order of the main pacemaker located in the suprachiasmatic nucleus of the hypothalamus, which synchronizes the peripheral generators present in almost all cells of the body. Thus, the evening chronotype is most consistently associated with the severity of mood disorder symptoms, where evidence suggests that it is a transdiagnostic correlator of severity, anxiety symptoms, attention deficit, and maladaptive behaviors such as aggression. Longitudinal studies indicate the possibility that the evening chronotype precedes depression and anxiety.

Neural processes associated with affective regulation may underlie the associations between the evening chronotype and inflammatory diseases of the maxillofacial area (phlegmons and abscesses) [1].

The chronotype changes with age, which creates a mismatch between the (late) and (early) circadian clock. In general, evening (late) chronotypes are characterized by a higher number of points, which determines the degree of importance of the clinical condition. In addition, the time of day plays an important role, because the effect of

chronotype on the characteristics of the clinical condition of patients is strongest in the morning and disappears in the afternoon [2]. Some authors argue that clinical data studied at different times of the day can affect not only circadian rhythms [3], but in general can impair cognition, emotional functioning and decision making [4] and also affect the reparative functions of the body.

### THE AIM

The aim of our study was to establish how the biological rhythm of human affects the reparative functions of the body in terms of odontogenic purulent-inflammatory diseases of the maxillofacial localization, namely wound cleansing and healing.

### MATERIALS AND METHODS

The research was conducted on the basis of the Department of Maxillofacial Surgery on the basis of «Poltava Regional Clinical Hospital. M.V. Sklifosovsky». A total of 40 patients with odontogenic phlegmons of maxillofacial localization (1-3 cell spaces), aged 40 to 60 years, without systemic chronic diseases, regardless of gender, participated in the study.

Patients were divided into 2 groups, each of which included 2 subgroups, namely:

**Table I.** Characteristics of the clinical condition of patients with odontogenic phlegmons of the maxillofacial localization depending on the circade rhythm

The term of the study	A group of patients			
	1a (n=10)	1b (n=10)	2a (n=10)	2b (n=10)
1st day	21,3±0,30	22.0±0,21	21,9±0,17	21,5±0,22
3rd day	16,5±0,16*	16,8±0,13	16,7±0,26	16,6±0,22
5th day	12,1±0,23* ** ***	12,8±0,13	12,7±0,15	12,6±0,16
7th day	5,7±0,21* **	6,1±0,10	6,2±0,13	5,9±0,10

**Notes:**\* -  $p < 0.05$  relative to the previous study period;\*\* -  $p < 0.05$  relative to group 2b;\*\*\* -  $p < 0.05$  relative to group 2a.

1 group (20 patients) with morning chronotype:

- a. Opening and drainage of phlegmon in the morning (from 06:00 to 12:00) - 10 patients;
- b. Opening and drainage of phlegmon in the evening (from 15:00 to 21:00) - 10 patients.

2 group (20 patients) with evening chronotype:

- a. Opening and drainage of phlegmon in the morning (from 06:00 to 12:00) - 10 patients;
- b. Opening and drainage of phlegmon in the evening (from 15:00 to 21:00) - 10 patients.

To characterize the reparative processes in the treatment of these patients, we evaluated the following characteristics:

- temperature (from 0 - 3 points);
- pulse (from 0 to 3 points);
- pain (from 0 to 3 points);
- collateral edema (0-1 points);
- opening the mouth (from 0 to 3 points);
- features of the wound condition (from 0 to 4 points);
- the amount of purulent exudate (from 0 to 2 points);
- the presence of granulation tissue (from 0 to 2 points);
- epithelialization of the wound (from 0 to 2 points).

**RESULTS**

Treatment of patients of all study groups was carried out according to the standard protocol of medical care, opening and drainage of phlegmons of maxillofacial localization and medical treatment were performed. The methods of treatment of patients were the same for all experimental groups.

Assessment of the clinical condition of patients was performed on the 1st, 3rd, 5th and 7th day after surgery. Characteristics of the scores that characterize the clinical condition of patients are shown in table I.

On the first day of the study, the indicators of the clinical condition of patients did not have a significant difference in all study groups. This can be justified by the fact that the clinical course was similar in all groups and all patients received the same treatment.

On the 3rd day of all studied groups, the number of points probably decreased compared to the first day of the study by 22.5%, 23.1%, 23.7%, 22.7%, respectively among ourselves.

According to the results of the study on day 5, we observed a significant difference between the previous results in all experimental groups: 1a - 26.6%, 1b - 23.8%, 2a - 23.9%, 2b - 24.0%. However, in patients of the morning chronotype, we noted an improvement in the clinical condition after surgery in the morning, in contrast to the surgery performed in the evening, which was characterized by a probable decrease in the number of points by 23.8%. There was also an improvement in the clinical condition of patients in this group compared to patients with evening chronotype when opening the phlegmon in the morning by 26.6%.

On the 7th day of the study, we observed a significant decrease in the number of points relative to the 5th day of the study in all groups: 1a - 53.7%, 2b - 52.3%, 2a - 51.7%, 2b - 53.1%, which characterized the improvement of the clinical condition.

**DISCUSSION**

However, the best results, as on the 5th day of the study, were observed in group 1a (patients of the morning chronotype, who underwent surgical treatment in the morning). The number of points in this group was probably lower by 26.6% compared to the 3rd day of postoperative period.

According to the study, it was found that circadian rhythms have an impact on the course of reparative processes in patients with purulent-inflammatory diseases of the maxillofacial localization, depending on the time of surgery.

Almost all life on Earth undergoes regular 24-hour ecological cycles. This, in turn, has led to the evolution of daily (diurnal) rhythms driven by autonomous cells with biological clocks that allow organisms to anticipate and adapt to temporary changes in their environment. In mammals, circadian timing occurs due to the preserved loops of the transcription and translation feedback oscillators, which form a round-the-clock clock [5]. The round-the-clock clock causes important physiological reactions, including temporary gates of a number of inflammatory processes [6-8] and antioxidant reactions [9]. It functions as a cell-autonomous synchronization mechanism [10],

allowing temporary segregation of both physiological and pathophysiological programs [11, 12]. At the cellular level, the circadian clock consists of a feedback loop transcription - translation [13]. Thus, according to Correa and the authors, the morning chronotype has a better assessment of emotional images, better sleep quality, a more positive mood than the evening [14]. From the publications of foreign authors [15] it is also known that due to frequent sleep deprivation, this applies to owls, or sleep deprivation in people with early chronotype, these people have the most pronounced metabolic signs of sleep deprivation, which in turn affected elevated medium chain acylcarnitines in healthy blood [16].

But the influence of circadian rhythms on the course of reparative processes under conditions of odontogenic phlegmon is not presented in the literature.

## CONCLUSIONS

The most effective treatment results were observed in patients of the morning chronotype who underwent surgery in the morning. In this case, probable clinical changes were recorded on the 5th and 7th day in their absence on the 1st and 3rd day. Thus, the influence of the morning chronotype of the circadian rhythm on the course of reparative processes is manifested in the later stages of reparative regeneration.

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## ORCID and contributionship:

David S. Avetikov: 0000-0002-7055-3589<sup>A</sup>  
 Vitaliy O. Lychman: 0000-0001-7953-7756<sup>B, D</sup>  
 Kateryna P. Lokes: 0000-0002-8847-837X<sup>D</sup>  
 Dmitriy V. Steblovsky: 0000-0001-7907-8406<sup>D</sup>  
 Valeriy V. Bondarenko: 0000-0002-3374-0246<sup>C</sup>  
 Oksana A. Shlykova: 0000-0002-6764-2767<sup>E</sup>  
 Ihor P. Kaidashev: 0000-0002-4708-0859<sup>F</sup>

## Conflict of interest:

*The Authors declare no conflict of interest.*

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## CORRESPONDING AUTHOR

### Vitaliy O. Lychman

Poltava State Medical University  
 23 Shevchenko st., 36024 Poltava, Ukraine  
 tel: +380951266514  
 e-mail: li4man@i.ua

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