



## Symptomatic Changes of Oral Mucosa during Normal Hormonal Turnover in Healthy Young Menstruating Women

Usha Balan, Nitin Gonsalves, Maji Jose, KL Girish

### ABSTRACT

**Introduction:** Changes in hormonal levels, such as those that occur during puberty, pregnancy, menstruation and menopause, have varying effects on oral cavity. Many researchers have proposed a direct link between changing hormonal status and oral health among females.

**Objectives:** To study the various symptoms and clinical manifestations of oral cavity during normal course of menstrual cycle in healthy women.

**Method:** Our study comprised of forty healthy young women volunteers with normal menstrual cycle of 28 to 30 days. A proper menstrual history was recorded from the study subjects. The entire cycle was divided into four phases comprising of bleeding, proliferative, ovulation and secretory. All the study subjects had a menstrual cycle of 28 to 30 days. Thorough recording of oral discomforts during various phases of the cycle was done during the study period.

**Results:** 30% of study subjects complained of aphthous ulcers, 5% had herpes labialis, 25% of them complained of depression, 8% showed gingival bleeding.

**Conclusion:** Complaints, like oral ulcerations, mood variations, recurrent herpetic lesions, gingival bleeding in females during normal menstrual period, are attributed to the role of female sex hormones.

**Clinical significance:** Lesions, like oral ulcers, recurrent herpetic lesions and increased gingival bleeding, seen in females during normal menstrual periods, could be related to hormonal turnover and therefore treated accordingly.

**Keywords:** Oral mucosa, Menstruation, Estrogen, Progesterone.

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### INTRODUCTION

Oral mucous membrane is an excellent indicator of the constitutional state of the patient.<sup>1</sup> The keratinized and non-keratinized mucosae of the oral cavity are normally under trophic influence of various hormones.<sup>2</sup> Many studies have shown that oral mucosa is sensitive to the effect of sex hormones. They affect the oral cavity as their level changes during puberty, pregnancy, various phases of menstruation and menopause.<sup>3-5,7</sup>

In many women, arrival of monthly menses evokes several oral changes, like:

**Gingival changes:** Gingival exudate increases during menstrual cycle reaching a peak at ovulation and then declining during secretory phase (Lindhe and Altstrom, 1967, Lindhe et al 1969).<sup>4</sup> Increase in tooth mobility occurs due to increase in gingival exudates.<sup>5</sup> Cohen et al (1971) attributed hormonal imbalances and ovarian dysfunction to periodic gingival changes seen during menstruation.<sup>6</sup>

Machtei proposed that gingival inflammation was lower during menstruation than during ovulation and premenstruation.<sup>7</sup> This is attributed to serum estradiol which is a natural form of estrogen that peaks and drops during ovulation and premenstruation. Muhleman over 50 years ago described a case of 'gingivitis intermenstrualis' which he observed as consisting of bright red hemorrhagic lesions of the interproximal papillae identified prior to menstruation.<sup>8</sup>

Other complaints seen during menstruation are as follows:

- Burning sensation in the oral cavity
- Prolonged hemorrhage following oral surgery
- Swollen salivary glands<sup>5</sup>
- Activation of herpes labialis and oral aphthous ulcers
- Infections with *Candida albicans*: Infections with *Candida albicans* have been documented in some

women during menstrual cycle.<sup>8</sup> Theaker et al 1992 found increased candidal adherence to buccal epithelial cells *in vitro* during various phases of menstrual cycle and indicated implication of hormonal influence and hormonal factors in the etiology of candidiasis.<sup>9</sup>

- **Mood alterations:** Throughout their reproductive years, women suffer from a higher prevalence of depression than men. Associations of depression with concentrations of gonadal hormones and gonadotrophins have been reported in both adults and adolescents. Estrogen levels have been implicated in menstrual cycle associated mood changes which have in turn been linked with increased susceptibility to major depression (Warner et al 1991).<sup>10</sup>
- **Periodontal condition:** Relationship between menstrual cycle and periodontal disease was studied. Mild to moderate pathologic conditions were seen with good ovulatory cycles and severe periodontitis were seen in anovulatory cycle (Wiener et al 1956).<sup>11</sup>

Our study was aimed to find symptomatic changes of oral mucosa in normal menstruating healthy women.

## STUDY DESIGN

Our study comprised of 40 healthy young women volunteers with normal menstrual cycle without any local or systemic diseases, abnormal endocrinal or immunological status without any habits or consumption of drugs, like oral contraceptives, and were nonanemic. None of them had any fixed or removable appliances.

A proper menstrual history was recorded from the study subjects. The entire cycle was divided into four phases comprising of bleeding (1-4 days), proliferative (5-13 days), ovulation (14-16 days) and secretory (17-28-30th days). All the study subjects had a menstrual cycle of 28 to 30 days. Thorough recording of oral discomforts during various phases of the cycle was done during the study period. Thorough clinical examination of oral cavity was done during the course of the study (period of 3 months). Various regions of the oral mucosa were thoroughly examined to rule out any surface lesions. Status of the teeth and periodontal condition were noted with a blunt instrument periodontal pocket probe. Gingivae were examined according to Loe and Sillness to know the gingival status.<sup>11</sup>

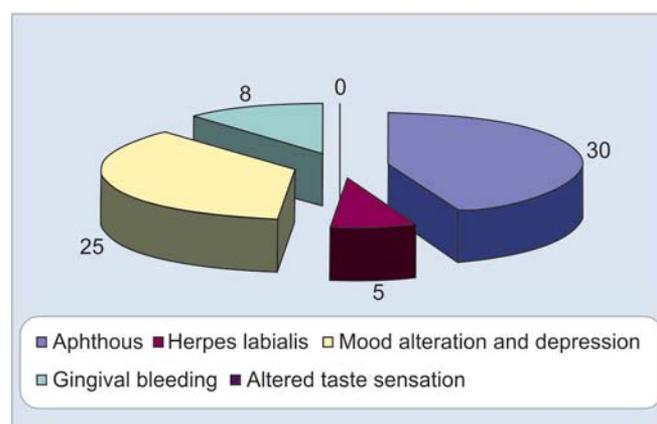
A questionnaire was given to the study subjects, wherein they had to record whether they had the following changes during various phases of the cycle. Oral discomforts, like dry mouth, burning mouth, abnormal taste sensation, oral ulceration, bleeding gums, mood alterations

or depression, were recorded if observed and percentage was calculated.

## RESULTS

### Analysis of Oral Discomforts and Mood Alterations among Study Subjects during Normal Menstrual Cycle

Thirty percent of study subjects complained of aphthous ulcers, 5% had herpes labialis, 25% of them complained of depression, 8% showed gingival bleeding. None of them had altered taste sensation (Fig. 1 and Table 1).



**Fig. 1:** Percentage calculation of oral discomforts and mood alterations in study subjects during normal menstrual cycle

**Table 1:** Analysis of clinical data during normal menstrual cycle (analysis of oral discomforts and mood alterations among study subjects during normal menstrual cycle)

Clinical symptoms	N	Affected number	Percentage
Aphthous ulcers	40	12	30
Herpes labialis	40	2	5
Mood alteration and depression	40	10	25
Gingival bleeding	40	3	8
Altered taste sensation	40	Nil	0

## DISCUSSION

Hormonal effects reflect physiological or pathological changes in almost all types of tissues of the body. Oral mucosa is like a mirror that reflects the systemic status of an individual. Ovarian hormones play a major role in the life of a woman in general. Levels of these hormones fluctuate during menstrual cycle.

For many women, arrival of monthly menses evokes corresponding oral changes.<sup>5</sup> Oral discomforts, like slight burning sensation,<sup>5,7,8</sup> bleeding with minor irritation,<sup>12,7,8</sup> redness to gums,<sup>7,12</sup> recurrent oral ulcers<sup>13,14</sup> and herpes labialis,<sup>8,15</sup> infection with *Candida albicans*,<sup>8</sup> increased

tooth mobility<sup>2,7,12</sup> and emotional upsets<sup>2,10</sup> have been reported. Linkages between changes in oral epithelium and hormonal changes have not been well established.

In the present study, 40 young female volunteers were chosen and thorough clinical history was taken and oral examination was performed.

In our study, aphthous ulcers were seen in 30% of study subjects most occurring few days prior to menstruation. Relationship of oral aphthae with menstruation have been reported by various authors.<sup>13,14,16,17</sup> In aphthae, the mechanism of ulceration is considered to be affected by cellular immune systems. Alterations in immune response are known to occur within the menstrual cycle. Fluctuations of steroidal sex hormones during menstrual cycle could be attributed to the changes in immune mechanism.<sup>16</sup>

Few researchers<sup>13,16</sup> have demonstrated clear relationship between aphthae and menstrual cycle with ulceration being most troublesome in the luteal phase between ovulation and menstruation and this cyclic oral ulceration was considered to be modulated by changing levels of progesterone.<sup>14</sup>

During luteal phase, there is action of progesterone on tissues previously subjected to considerable estrogen activity.<sup>13</sup> Few authors proposed that hypersensitivity reaction to exogenous antigens (food stuffs) or stress can precipitate recurrent aphthous stomatitis in susceptible persons.<sup>14</sup> Dayal J et al have correlated psychological stress of premenstrual period of menstrual cycle with occurrence of oral aphthae.<sup>2</sup>

Most of our study subjects are of student age who are constantly stressed with their exams, so presence of aphthae whether related to stress or to decrease in estrogen prior to menstruation altering the immunity and rendering the mucosa susceptible to ulcers could not be proved.

Recurrent herpes labialis was reported in 5% of study subjects. Segal et al have reported interaction between changes in the menstrual cycle and other events, like trauma, fever and sunburn to influence the onset of herpes labialis.<sup>15</sup>

Mood alteration was seen in 25% of our study subjects. Depression is associated with changing concentration of gonadal hormones in adults and adolescents. Estrogen level has been implicated in menstrual cycle associated mood changes. Many authors<sup>2,10</sup> have correlated psychological stress during premenstrual period of menstrual cycle with drowsiness or depression. In our study, whether this change was related to stress or to change of hormone level could not be correlated.

Gingival bleeding was noticed prior to menstruation in 8% of our study subjects. Gingival disease is correlated with the changing levels of hormones<sup>18</sup> during various phases

of menstrual cycle.<sup>4</sup> Gingival changes in menstruation are attributed to hormonal imbalances and in some instances accompanied by a history of ovarian dysfunction. Exudate from inflamed gingiva is increased during menstruation suggesting aggravation of existing gingivitis.<sup>12</sup> Matchie has proposed that the gingival bleeding seen during menstruation may be due to serum estradiol which peaks and drops during ovulation and premenstruation.<sup>7</sup> In our study, the increased gingival bleeding observed may be attributed to the serum estradiol which peaks and drops during ovulation and premenstruation.

## SUMMARY AND CONCLUSION

Complaints, like oral ulcerations, mood variations, recurrent herpetic lesions, gingival bleeding in females during normal menstrual period, are attributed to the role of female sex hormones.

## CLINICAL SIGNIFICANCE

Lesions, like oral ulcers, recurrent herpetic lesions and increased gingival bleeding seen in females during normal menstrual periods, could be related to hormonal turnover and therefore treated accordingly.

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## ABOUT THE AUTHORS

### Usha Balan (Corresponding Author)

Reader, Department of Oral Pathology, KMCT Dental College Manassery, Kozhikode-673602, Kerala, India, Phone: 09746590178  
e-mail: tkmithran@yahoo.com

### Nitin Gonsalves

Reader, Department of Oral Pathology, AJ Shetty Dental College Mangalore, Karnataka, India

### Maji Jose

Professor, Department of Oral Pathology, Yenepoya Dental College Mangalore, Karnataka, India

### KL Girish

Reader, Department of Oral Pathology, Sree Mookambika Dental College, Kanyakumari, Tamil Nadu, India