

# Impact of oral contraceptives on periodontal health

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## Abstract

**Background:** Oral contraceptives pills (OCPs) are common and a convenient form of contraception. The use of hormonal contraceptives by women has been considered to influence gingival and periodontal disease progression.

**Aim:** This study was conducted to assess the effect of oral contraceptive pills on the periodontal health.

**Materials and method:** A cross-sectional comparative study was conducted among 200 females aged 18 years and above of Jaipur city. The study subjects were divided into two groups i.e. contraceptive users and non-contraceptive users, each group consisted 100 females. Data was collected using Modified WHO Performa (1997). Periodontal status was examined using Community Periodontal Index (CPI) and Loss of Attachment (LOA). Chi-square test and one sample t-test was used for statistical analysis and P value was set ( $p < 0.05$ ) as significant.

**Results:** Mean CPI score in subjects and non-contraceptive users was  $2.34 \pm 0.81$  and  $1.16 \pm 0.89$  respectively. Mean LOA score in each group was  $0.28 \pm 0.45$  and  $0.19 \pm 0.50$  respectively.

**Conclusion:** Oral Contraceptive pills had adverse effects on periodontal health.

**Keywords:** Oral contraceptive, community periodontal index, loss of attachment, periodontal health.

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## Introduction

Oral cavity is the mirror of general health and the target organ for number of adverse reactions that arise due to side effects of medications<sup>1</sup>. The initiation of contracep-

tives created interest in their effect on oral and periodontal tissues in the late 1960's and 1970's<sup>2</sup>. Many studies had linked the use of oral contraceptive (OC) to increased gingival inflammation<sup>3,4</sup> and some suggested that periodontal attachment loss is likely to occur in contraceptive users<sup>5,6</sup>.

Women are more sensitive to oral health problems because of the hormonal changes they experience during their lifetime. These hormonal changes not only affect the general health but also the oral health. There are five stages in a women's life during which changes in hormone levels make them more susceptible to oral health

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problems – puberty, monthly menstruation cycle, use of oral contraceptives, pregnancy, and menopause<sup>7</sup>.

Current oral contraceptives consist of low doses of estrogens (0.05mg/day) and progestin (1.5mg/ day). Oral contraceptive agents are one of the most commonly used classes of drugs by females. The number of women on oral contraceptives has reached approximately 50 million worldwide, as a result of such widespread use; many systemic and oral side effects have been identified.<sup>1</sup> The systemic side effects include- nausea, vomiting, diarrhea, stomach cramps, weight loss, acne, breast tenderness, skin pigmentation changes in menstrual flow etc<sup>8</sup>.

There are many Studies which show the negative effects of oral contraceptives on periodontal health<sup>9-10</sup>. The two possible factors influencing the effects of oral contraceptive pills (OCP's) on periodontal condition include dosage and the duration of intake of the pills. A continued exposure of OCP use results in a higher risk of periodontal disease, it can be due to increased production of pro-inflammatory cytokines and prostaglandins from elevated levels of these hormones<sup>11</sup>.

Studies have shown that females who use oral contraceptives have higher prevalence of gingival inflammation, loss of attachment and periodontal disease progression<sup>3-5,9-10</sup>. However, recent studies based on large or small population suggested that current combined oral contraceptives (COC) do not affect periodontal health, possibly related to lower level of progesterone and estradiol than previously used medications<sup>12-14</sup>.

However, there is a need to reassess the impact of contemporary oral contraceptives on periodontal health. The present study was an attempt to assess the impact of oral contraceptives on periodontal health.

## **Materials and method**

This comparative cross-sectional study was conducted among 200 females aged 18 years and above. The study subjects were selected by convenient sampling technique and categorized into two groups. Group A included 100 female subjects who were taking OC pills while group B includes 100 females who had no history of taking OC pills. During the period of two months out of all the females visiting the health centers, sub-centers and hospitals, females fulfilling the inclusion and exclusion criteria were selected. The subject's selection was done till the desired sample size was reached

### **Inclusion criteria**

1. Subjects who were above 18 years of age.
2. Subjects who were married
3. Subjects who had no history of pregnancy

### **Exclusion criteria**

1. Those who consumed alcohol and tobacco in any form
2. Medically compromised.
3. Those who were under any type of medications other than OCP.
4. Those who had periodontal problem
5. Those who had undergone any periodontal treatment prior to 6 months of study.

Visits to the selected health centers, sub-centers and hospitals were made after obtaining the permission from concerned authorities. Ethical approval was obtained from the institutional ethical committee to carry out the study. Informed verbal consent was obtained prior to the data collection. Data was collected using modified WHO proforma (1997) which includes demographic details and Community Periodontal Index (CPI) and Loss of Attachment (LOA) index. The information regarding oral hygiene habits and duration of oral contraceptive pills was also recorded. Oral examination was carried out using Mouth mirror, and CPITN probe.

**Scoring****criterion for CPI**

<b>0</b>	Healthy
<b>1</b>	Bleeding On Probing
<b>2</b>	Calculus detected, but all the black band visible
<b>3</b>	Pocket 4-5 (gingival margin within black band visible)
<b>4</b>	Pocket 6mm or more (Black band not visible)
<b>X</b>	Excluded sextant
<b>9</b>	Not recorded

**Loss of attachment:**

- Helps us obtain an estimate of the lifetime accumulated destruction
- Most reliable way of examining for loss of attachment

in each sextant is to record this immediately after recording the CPI score for that particular sextant

- Pocket depth gives some idea of loss of attachment but is unreliable when there is gingival recession.

**Scoring****criterion for CPI**

<b>0</b>	Loss of attachment 0-3mm(CEJ not visible & CPI score 0-3 If the CEJ is not visible & the CPI score is 4, or if the CEJ is visible
<b>1</b>	Loss of attachment is 4-5mm(CEJ within the black band
<b>2</b>	Loss of attachment is 6-8mm(CEJ between the upper limit of the black band & the 8-5mm
<b>3</b>	Loss of attachment 9-12mm(CEJ between the 8.5mm & 11.5mm rings
<b>4</b>	Loss of attachment 12mm or more
<b>X</b>	Excluded sextant (Less than two teeth present
<b>9</b>	Not recorded (CEJ neither visible nor detectable)

### Statistical analysis

Data thus obtained was entered in Microsoft excel sheet 2007 and subjected for statistical analysis using SPSS 20.0.0 version. Chi-square and one sample t-test were used for statistical analysis. Level of significance was set at  $p < 0.05$  as significant.

### Results

The present comparative cross-sectional study was con-

ducted among randomly selected 200 females aged 18 years and above. The mean age was 26.37 & 27.08 years for group A and B respectively

Mean CPI score in group A and B was  $2.34 \pm 0.81$  and  $1.16 \pm 0.89$  respectively. Mean LOA score in group A and B was  $0.28 \pm 0.45$  and  $0.19 \pm 0.50$  respectively.

Table I. On applying one sample t-test the mean difference of CPI and LOA was 1.75 and 0.235 respectively which was found highly statistical significant ( $p=0.00$ ) for both the groups.

**Table I Mean difference between CPI and LOA in both the groups**

	Test Value = 0					
	t*	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
CPI	23.782	199	.000	1.75000	1.6049	1.8951
LOA	6.916	199	.000	.23500	.1680	.3020

\*One-Sample t-Test

Table II depicts the association of periodontal status (CPI) and duration of intake of oral contraceptive pills. Bleeding on probing was observed highest (62.5%) in 8 months while calculus was observed highest (100%) in 9 and 15 months. Periodontal pocket (4-5mm) was found

highest (100%) in 18 months while periodontal pocket (6-8 mm) was observed highest (18.75%) in 36 months. A Highly significant association was observed among CPI and duration of intake of OCP ( $P=0.000$ ) which shows that more the duration of OC intake, poorer is the periodontal health of the subjects.

**Table II- Effect of oral contraceptive on periodontal health (CPI) with duration of OCP use.**

	Duration of intake (Months)								Total	x <sup>2</sup> #	P <sup>###</sup> value
	6.00	8.00	9.00	12.00	15.00	18.00	24.00	36.00			
Healthy	0(0.00%)	0(0.00%)	0(0.00%)	3(8.82%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	3	75.11	0.00
BOP**	1(33.33%)	5(62.5%)	0(0.00%)	4(11.76%)	0(0.00%)	0(0.00%)	0(0.00%)	0(0.00%)	10		
Calculus	2(66.66%)	3(37.5%)	7(100%)	8(23.5%)	2(100%)	0(0.00%)	12(42.85%)	6(37.5%)			

Table III shows the association of periodontal status (LOA) and duration of intake of oral contraceptive pill. Loss of attachment (0-3mm) was observed highest

(100%) in 6, 8,9,15 and 18 months. Loss of attachment (4-5 mm) was observed highest (68.75%) in 36 month. A highly significant association was observed between LOA and duration of intake of OCP (P=0.000).

**Table III- Effect of oral contraceptive on periodontal health (LOA) with duration of OCP use.**

	Duration of intake								Total	x2**	p# value
	6.00	8.00	9.00	12.00	15.00	18.00	24.00	36.00			
<b>0-3mm</b>	3 (100%)	8 (100%)	7 (100%)	29 (85.29%)	2 (100%)	2 (100%)	16 (57.14%)	5 (31.25%)	72	27.78	0.00  (HS)
<b>4-5mm (cementoen amel junction (CEJ) within black band)</b>	0 (0.00%)	0 (0.00%)	0 (0.00%)	5 (14.7%)	0 (0.00%)	0 (0.00%)	12 (42.85%)	11 (68.75%)	28		
	3 (100%)	8 (100%)	7 (100%)	34 (100%)	2 (100%)	2 (100%)	28 (100%)	16 (100%)	100		

\*LOA= Loss of attachment, \*\*x2= Chi-square test, # p < 0.05 (significant), HS= highly significant

## Discussion

There have been several studies concerning the effect of oral contraceptives on the gingiva and periodontal tissues. The elevated ovarian hormones could predispose women to increased gingival inflammation and periodontal destruction. Both estrogen and progesterone are known to cause increased gingival exudates, edema and inflammation<sup>15</sup>.

Oral contraceptives (OCs) enhance periodontal breakdown by reducing the resistance to dental plaque and can induce gingival enlargement in otherwise healthy females<sup>15,2</sup>. The long term use of OC may cause clinical attachment loss (CAL), increased gingival inflammation and gingival enlargement<sup>2,16,17</sup>.

In the present study it was found that the women who are consuming oral contraceptives for 1 and a half to 2 years had bleeding on probing, deeper periodontal pocket depth, calculus and significant attachment loss. This indicates that the longer the duration of OC intake, the poorer is the periodontal health. Studies conducted by Tilakaratne A et al<sup>18</sup> and GM knight<sup>19</sup> showed that the mean

LOA was high among women who had used OC between 2 to 4 years which means they had poor periodontal health. Similarly in the study done by CL Pankhurst et al<sup>20</sup> it was found statistically significant gingival inflammation after longer periods of medication (p<0.001). Study conducted by Taichamn LS<sup>13</sup> showed that OC users had mild gingivitis but there was no significant association found in relation to periodontal status.

Oral contraceptives have pronounced effects on gingival microvasculature and it has been shown that human gingiva contains receptors for progesterone and estrogen. Hormonal dosage and duration of intake are the possible factors which influence the effect of OC on the periodontal condition. A continued exposure of OCP for longer duration results in higher risk of periodontal disease development due to increased production of pro-inflammatory cytokines and prostaglandins as a result of elevated levels of the hormones<sup>7,9,21</sup>.

In the study we found that among the females who are non-contraceptive users, some of them had good periodontal health while some of them had poor periodontal health this can be due to various other reasons such as

inadequate knowledge about oral hygiene aids, inadequate oral hygiene practices and improper diet.

## Conclusion

Females on contraceptives for longer duration had higher pocket depth, gingival bleeding and attachment loss as compared to the non-contraceptive user group. Contraceptive users had poor periodontal and gingival health. A comprehensive medical history and assessment of vital signs are extremely important in this group of patients. Treatment of gingival and periodontal inflammation exaggerated by oral contraceptives should include establishing an oral hygiene program. As OC pills have poor effect on oral health, females should use other measures of birth control.

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## Conflict of interest

None.

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