



## The Effect of Removable Partial Denture and Salivary Changes during Pregnancy

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### Abstract

The calcium, inorganic – phosphate of 20 pregnant women with age (20 – 45) years wearing removable partial denture divided into 3 trimester and 10 women married non pregnant as control.

In resting saliva the concentration of calcium not changed significantly in pregnant women, and inorganic – phosphorus found not to be changed significantly.

The aim of this study was to see the pregnancy related change in human saliva and relation to the oral findings and effect of wearing removable partial denture.

### Introduction

Oral cavity and its related structures are important since it serves as an indicator and mirror for general health status of the whole body.<sup>[1, 2]</sup>

Pregnancy, which is a non – pathological condition with many associated general physiological alterations that related to the documented increased production of maternal hormones in addition to the new placenta hormones.<sup>[3]</sup>

20% of pregnant women develop some degree of iron deficiency therefore, additional source of iron are required mainly in late pregnancy.<sup>[4]</sup>

Salivary electrolytes concentrations have been found to be related to the hormonal activity and output.<sup>[5]</sup>

One might anticipate that some of these physiological changes would be reflected in salivary secretion and composition during pregnancy<sup>[6]</sup>. Therefore, saliva may provide a potential means for detection and investigation of the physiological alterations that occur during and after pregnancy.<sup>[7]</sup>

Calcium is present in all intestinal

secretion bile, pancreatic and gastric juice included.<sup>[8]</sup>

Calcium plays a large role in information of bones and teeth and only 20 – 30% of dietary calcium is absorbed under normal condition.<sup>[9]</sup>

The aim of this study is to determine the effects of the pregnancy on the human whole salivary secretion and composition and related to the wearing removable partial dentures.

### Material and Method

20 healthy pregnant women were taken after agreement to participate in this study the mean age (20-45) years those were divided into 3 groups according to time of last menstrual into group A of first trimester (1-14) weeks Group B of second trimester (15-28) weeks Group C of third trimester (29-45) weeks 10 married non pregnant women were taken to represent the comparison group.

Each woman has been asked about name, age address, social condition hospitalization medication, duration of

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disease, family history habits like (smoking , Alcoholic) Environment exposure were similar for all the subjects.

#### 1. Collection of saliva samples:

All samples were taken between the hours 9 and 11 a.m. resting whole saliva was collected from all subjects by direct expectoration in to sterile container over the period of 10 min resting saliva measured by volume and expressed as 1 ml/min. as in appendix.

#### 2. Calculation Calcium (mg\dl)

$$= \frac{\text{Test blank}}{\text{Sand. - blank}} \times \text{Con. Of standard}$$

#### 3. Calculation phosphorus estimation (mg\dl)

$$= \frac{\text{Sample blank}}{\text{Stand. - blank}} \times \text{Con. - Of standard (5mg\dl)}$$

## Results

### a. Calcium (Ca)

#### 1. Group A – first trimester:

The mean and S.D in sample (20 women) was  $(4.420 \pm 3.800)$  mg\dl with the denture while for (20 women) was  $(3.470 \pm 1.590)$  mg\dl without denture shown in table 1 fig 1.

#### 2. Group B second trimester:

The mean and S.D in sample (20 women) was  $(3.330 \pm 1.700)$  mg\dl with the denture while for (20 women) was  $(4.865 \pm 2.165)$  mg\dl without denture shown in table 1 fig 1.

#### 3. Group C third trimester:

The mean and S.D in sample (20 women) was  $(3.480 \pm 1.560)$  mg\dl with the denture while for (20 women) was  $(5.450 \pm 3.050)$  mg\dl without denture shown in table 1 fig 1.

#### 4. The Control Group:

The mean and S.D in sample (20 women) was  $(4.995 \pm 2.130)$  mg\dl with the denture while for (20 women) was  $(5.395 \pm 3.245)$  mg\dl without denture shown in table 1 fig 1.

### b. Inorganic phosphorus:

#### 1. Group A – first trimester:

The mean and S.D in sample (20 women) was  $(11.800 \pm 2.680)$  mg\dl with the denture while for (20 women) was  $(13.5 \pm 2.810)$  mg\dl without denture shown in table 2 fig 2.

#### 2. Group B second trimester:

The mean and S.D in sample (20 women) was  $(12.900 \pm 3.990)$  mg\dl with the denture while for (20 women) was  $(14.750 \pm 3.230)$  mg\dl without denture shown in table 2 fig 2.

#### 3. Group C third trimester:

The mean and S.D in sample (20 women) was  $(12.610 \pm 2.670)$  mg\dl with the denture while for (20 women) was  $(13.660 \pm 2.950)$  mg\dl without denture shown in table 2 fig 2.

## The Control Group

The mean and S.D in sample (20 women) was  $(12.950 \pm 2.955)$  mg\dl with the denture while for (20 women) was  $(15.350 \pm 4.150)$  mg\dl without denture shown in table 2 fig 2.

## Discussion

In the present investigation Ca level in resting saliva found not to be changed significantly during pregnancy.

And lower level of resting salivary Ca was observed in the 1<sup>st</sup> trimester as compared with both of control group and 3<sup>rd</sup> trimester group, probably may be due to the vomiting of pregnancy and low dietary Ca intake.

With the denture saliva significant low salivary Ca concentration can be detected in pregnant women when compared with non – pregnant control.

Salivary inorganic phosphorus concentration during pregnancy shown no significant changes in both women with removable partial denture and without denture.

Low salivary inorganic phosphorus concentration observed in 1<sup>st</sup> trimester of pregnancy as compared with 2<sup>nd</sup> trimester in women without removable partial denture.

No important oral findings of pregnant women were observed, only dryness and fissuring of lower lip, in addition to miscellaneous conditions that demonstrated in 3% of them.

Periodontal disease is caused by the accumulation of plaque in and around the gingival sulcus. The clinical picture varies from person to person and site to site. The disease may present as nothing more than a persistent gingivitis or may result in severe destruction of the periodontal tissues. The reason for this is that individuals show wide variations in their *susceptibility* to periodontal disease, which may be due to imbalances between the invading microorganisms and the immunological defence mechanisms of the host. Secondary factors, which locally affect the invasion potential of the microorganisms, or systemically affect the ability of the host to respond to the disease state, are significant to the clinical presentation. Local secondary factors include plaque traps (for example, carious cavities, overhanging margins, and partial dentures) and decreased antibacterial action of saliva. Systemic secondary factors include those of a genetic, infective, hormonal, haematological, and nutritional nature (for example, pregnancy, the effects of anticonvulsant drugs, and diabetes) .  
[10]

*Candida* is a common oral commensal. It becomes pathogenic if the environment favours its proliferation e.g dentures. [11]

The low level of salivary Ca in pregnant women in case of stimulated saliva, may be explained on the base of wide spread hormonal changes which occur during pregnancy and affect the calcium metabolism. In the last (10 weeks) of pregnancy the fetus obtain about (18g) of Ca from the maternal source, this additional Ca comes mostly from the increased intestinal absorption of Ca and associated with doubling of the circulating 1,25 dihydroxycholecalciferol , rather than from the maternal skeleton which is protected by increased calcitonin level during pregnancy as it lowers the circulating Ca and phosphate level [12, 13]. This may be attributed in addition to the increase intestinal absorption to decrease the Ca excretion in the body fluids during pregnancy, whole saliva is one of body fluids therefore the decrease in the Ca level of the pregnant women cleared particularly in the last (10 weeks) of gestation and this supported the present finding of lower stimulated salivary Ca level at 2nd and 3rd trimesters compared with control group rather in first trimester of pregnancy. [14]

## Suggestions

1. Further investigation are needed to study salivary component.
2. Oral hygiene index and gingival index in addition to the degree of teeth mobility may be assessed in pregnant women in each trimester of pregnancy beside the biochemical analysis of saliva to see if any relation may exist between them.

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Table (1):Distribution of concentration of Calcium (mg/dl) with and without removable P.D

With the denture			Without the denture		
Type	N	Mean	S.D	Mean	S.D
Group A	20	4.420	3.800	3.470	1.590
Group B	20	3.330	1.700	4.865	2.165
Group C	20	3.480	1.560	4.450	3.050
Control Group	10	4.995	2.130	5.395	3.245

Calcium (mg\dl)

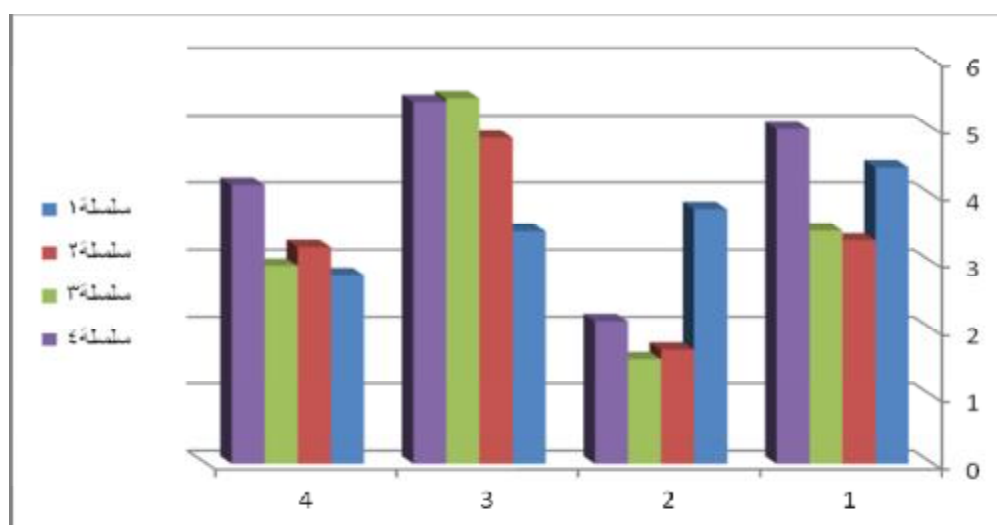
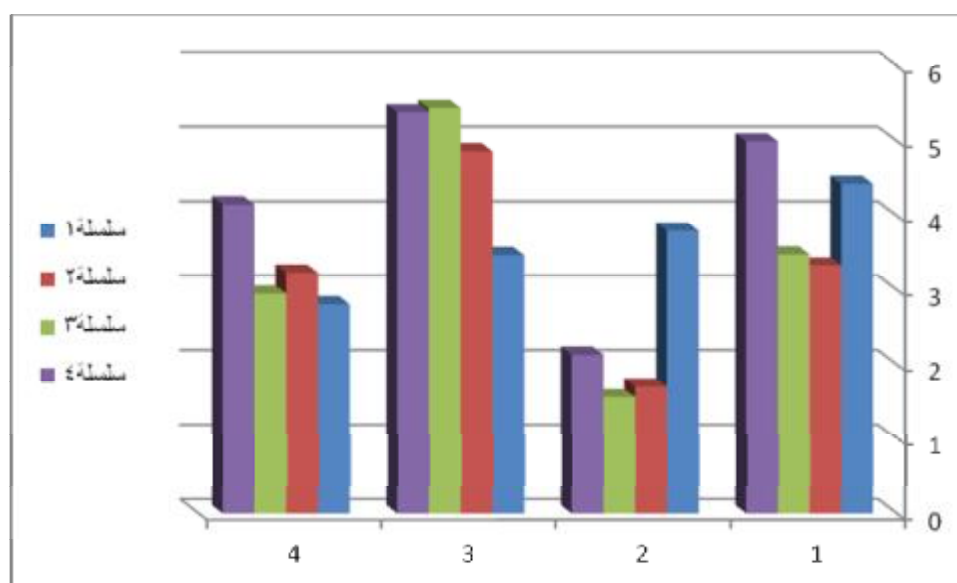


Fig (1) :Relation between concentration of Calcium in whole saliva (mg/dl)

**Table (2):**Distribution of concentration of Inorganic phosphorus (mg/dl) with and without removable P.D

With the denture			Without the denture		
Type	N	Mean	S.D.	Mean	S.D.
Group A	20	4.420	3.800	3.470	2.810
Group B	20	3.330	1.700	4.865	3.230
Group C	20	3.480	1.560	5.450	2.950
Control Group	10	4.995	2.130	5.395	4.150

**Fig (2) :**Relation between concentration of inorganic phosphor in whole saliva (mg/dl)