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## Homocysteine levels in implant failure patients: An observational study

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**Abstract**---Background: Dental implants have been a part of our lives since 1965 when studies of Branemark commenced. Today, ever increasing number of dental implants in total or partial edentulous patients provides an outstanding treatment alternative to conventional prosthetic rehabilitation all around the world. However, widespread use of dental implants has brought along a gradually increasing condition called “disease of peri-implant tissues”. The present study was conducted for assessing the Homocysteine levels in implant failure patients. Materials & methods: A total of 25 subjects with clinical and radiographic evidence of peri-implantitis and 25 healthy controls were enrolled. Complete demographic and clinical details of all the subjects were obtained. Fasting (minimum of 12hrs) venous blood samples were collected. The venous blood was collected in plain vials which will be sent to the laboratory for biochemical analysis and evaluation of systemic parameters of both peri-implantitis group and control group. Serum homocysteine was assessed by means of Elisa Immunoassay. Results: Mean serum homocysteine levels among subjects of the control group and peri-implantitis group were 13.27  $\mu\text{mol/L}$  and 25.2  $\mu\text{mol/L}$  respectively. Significant results were obtained while comparing the mean serum homocysteine levels among subjects of the peri-implantitis group and control group. Conclusion: Homocysteine levels are significantly altered in peri-implantitis patients.

**Keywords**---Homocysteine, Implant, Serum homocysteine.

## Introduction

Dental implants have been a part of our lives since 1965 when studies of Branemark commenced. Today, ever increasing number of dental implants in total or partial edentulous patients provides an outstanding treatment alternative to conventional prosthetic rehabilitation all around the world. However, widespread use of dental implants has brought alone a gradually increasing condition called “disease of peri-implant tissues”.<sup>1, 2</sup> Therefore, the treatment of peri-implant diseases has been an utmost importance. At first, interrelationship between dental implant and surrounding soft and hard tissues was needed to be clarified at molecular cellular and clinical level. To provide treatment for peri-implant disease, in the light of early studies, it has been realized that peri-implant lesions are very similar to periodontal lesions in terms of infectious and inflammatory characteristics. Therefore, dental professionals have attempted to treat peri-implant lesions using their experience and knowledge on periodontal diseases. However, as the incident of peri-implant diseases rose, clinicians were in need of classifying them.<sup>3- 5</sup> Hence; under the light of above mentioned data, the present study was conducted for assessing the Homocysteine levels in implant failure patients.

## Materials & Methods

A total of 25 subjects with clinical and radiographic evidence of peri-implantitis and 25 healthy controls were enrolled. Complete demographic and clinical details of all the subjects were obtained. Fasting (minimum of 12hrs) venous blood samples were collected. The venous blood was collected in plain vials which will sent to the laboratory for biochemical analysis and evaluation of systemic parameters of both peri-implantitis group and control group. Serum homocysteine was assessed by means of Elisa Immunoassay. All the results were recorded and analysed by SPSS software. Student t test was used for evaluation of level of significance.

## Results

Mean age of the subjects of the control group and peri-implantitis group was 43.2 years and 41.8 years respectively. There were 13 males and 12 females in the control group and 14 males and 11 females in the peri-implantitis group. Gender wise distribution was found to be comparable in between both the study groups. Mean serum homocysteine levels among subjects of the control group and peri-implantitis group was 13.27  $\mu\text{mol/L}$  and 25.2  $\mu\text{mol/L}$  respectively. Significant results were obtained while comparing the mean serum homocysteine levels among subjects of the peri-implantitis group and control group.

Table 1: Comparison of age

Parameter	Control group	Peri-implantitis group
Mean Age (years)	43.2	41.8
+SD	3.5	4.9

Table 2: Serum homocysteine ( $\mu\text{mol/L}$ ) levels among subjects of both the study groups

Serum homocysteine	Healthy controls	Peri-implantitis
Mean	13.27	25.2
SD	3.16	4.41

## Discussion

Replacing missing teeth with titanium dental implants has become a routine procedure. High survival rates, ranging from 95% to 98% over a period of 10 years has been reported and have encouraged clinician to consider this type of oral rehabilitation. However, survival rates does not take into account the presence of biological complications, and, despite the remarkably high survival rate of dental implants, there are increasing numbers of patients presenting with peri-implant diseases.<sup>6-8</sup>

Peri-implant diseases have been classified as either peri-implant mucositis or peri-implantitis. Peri-implant mucositis has been defined as soft tissue inflammation around a functioning dental implant with bleeding on probing (BOP), and peri-implantitis is distinguished by accompanying loss of supporting marginal bone past normal bone remodelling. If not diagnosed and not properly managed, peri-implant diseases may lead to loss of the implant.<sup>7-9</sup> Hence; under the light of above mentioned data, the present study was conducted for assessing the Homocysteine levels in implant failure patients.

Mean age of the subjects of the control group and peri-implantitis group was 43.2 years and 41.8 years respectively. There were 13 males and 12 females in the control group and 14 males and 11 females in the peri-implantitis group. Gender wise distribution was found to be comparable in between both the study groups. Mean serum homocysteine levels among subjects of the control group and peri-implantitis group was 13.27  $\mu\text{mol/L}$  and 25.2  $\mu\text{mol/L}$  respectively. Khichy A et al assessed the C-reactive proteins (CRP) levels and IL-6 levels in patients with peri-implantitis. A total of 20 patients with confirmed clinical and radiographic diagnosis of peri-implantitis were included in the present study. Another set of 20 subjects who reported for routine health check-up were included as healthy controls. Mean levels of CRPs in patients of the peri-implantitis group and the control group was found to be 0.795 mg/dL and 0.294 mg/dL respectively. Mean IL-6 levels among the patients of the peri-implantitis group and the control group was found to be 12.178 pg/ml and 6.458 pg/ml respectively. While analyzing statistically, significant results were obtained. Enhanced periodontal inflammation in peri-implantitis patients is accompanied by a considerable increase in the concentration of CRPs and IL-6.<sup>10</sup>

Significant results were obtained while comparing the mean serum homocysteine levels among subjects of the peri-implantitis group and control group. Choline is classified by the Food and Nutrition Board as an essential nutrient and is likely to contribute to the biological activity of CS-OSA. It is a precursor of phospholipids, which are essential components of biological membranes, and is involved in cell signaling and lipid transport/metabolism. One of its metabolites, betaine,

participates in the methylation of homocysteine to methionine and therefore reduces the plasma total homocysteine levels. This reduction positively affects collagen cross-linking, since homocysteine has been shown to interfere with post-translational modifications of collagen through direct and indirect inhibition of lysyl oxidase as well as through down regulation of other genes involved in collagen cross-linking. Elevated levels of plasma homocysteine have been detected in patients with chronic periodontitis. These elevated homocysteine levels reduced after periodontal treatment, indicating an important role of homocysteine in periodontal pathologies.

## Conclusion

Homocysteine levels are significantly altered in peri-implantitis patients.

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