

# Normo Hyper and Extreme Hypercomplementemia in Human Chronic Periodontitis

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## To cite this article:

Ibrahim M. S. Shnawa, Baha H. H. Alamiedi, Zainab M. H. Al Fatlawy. Normo Hyper and Extreme Hypercomplementemia in Human Chronic Periodontitis. *American Journal of Biomedical and Life Sciences*. Special Issue: Advances in Oral Immunity. Vol. 3, No. 4-1, 2015, pp. 4-6. doi: 10.11648/j.ajbls.s.2015030401.12

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**Abstract:** Forty-Nine chronic periodontitis patients were diagnosed by the dentist of the team. Of which 27 were generalized chronic and the other 22 were localized chronic periodontitis. Ten subjects with normal mouth hygiene were considered as controls. Blood and saliva samples were collected from both of the test patients and controls. Sera, saliva and salivary proteins were subjected to C3 and C4 determinations using ready made plates of radial immunodiffusion in gel containing anti-C3 and anti-C4 antibodies. Generalized chronic periodontitis patients were showing higher C3 levels than localized chronic periodontitis patients. Both of the disease forms were of higher C3 and C4 levels than controls. Females have lower C3 levels than male chronic periodontitis patients. C4 levels were slightly increased than normal control levels. Male C4 levels approximate female levels. Four cases of C3 and C4 hypercomplementemia in each of the disease forms. One extreme combined C3 and C4 hypercomplementemia in the generalized form and one extreme C4 hypercomplementemia was noted in the localized form. Thus, normo, hyper and extreme hypercomplementemia C3 and C4 were noted among chronic periodontitis patients. These hypercomplementemia cases are secondary non-genetic, infection and /or inflammation induced.

**Keywords:** Chronic, Complement C3 and C4, Localized, Generalized, Periodontitis

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## 1. Introduction

Today, insight to the immune system is functional in its attitude. In this attitude, immune system may be expressed as tripartite system having: Natural (Innate), cross-road and adaptive functions [1, 2]. Structurally speaking, however, it consists of: Lymphoid component, Haemopoietic component, mononuclear phagocyte component, Complement component and genetic component [3]. Among which, complement system [1] in its functional sense occupies an immune cross-road function [4]. Since it takes part both in natural and adaptive immunity [4]. Complement system has three activation pathways, namely, the classical, the properdin and the lectin pathways. The classical pathway almost operates in adaptive immunity [3, 4]. During adaptive responses there is continual activation for the classical pathway mediated by either and/or inflammation. Such activation may lead to either excessive activation outcomes or to downregulation that might cause pathologic conditions [5]. In chronic

infection state like periodontitis, in which the infectious agent and its own specific antibodies form complexes deposited in the gum, periodontal tissues as well as the stomium melleum in general. The C3 and C4 levels in the gum and periodontal tissue approximate 1/25 or 1/3 that of circulating levels, besides the difficulty in their detection due to either rapid degradation or immune complex deposition [6, 7]. The aim of the present work was to report on hyper and extreme hypercomplementemia in chronic periodontitis patients.

## 2. Main Body

Forty-Nine chronic periodontitis patients were diagnosed by the dentist in the team. Of which 27 were generalized form and 22 were localized form. Ten normal mouth hygiene subjects were elected for the study as controls [8, 9].

Blood(without anticoagulant) and saliva samples were collected as in [10]. Salivary proteins were separated as in [10, 11]. Sera, saliva and salivary proteins were subjected to C3 and C4 determinations using ready made plates of radial immunodiffusion in gel containing anti-C3 and C4 antibodies [12]. Biometry was performed as in [13].

### 3. Results and Discussion

There were elevations of the serum C3 concentration mean values that ranged from 1.5 to 2 folds than that of controls. Males have higher mean values than females Table 2. There was an age group-wise variations in C3 concentration means Table 3. The C3 herd plot was of normal distribution curve, patients were showing; low moderate and high C3 responders Figure 1. The overall C4 concentration means were presented in Table 3. Males approximate or slightly higher than female periodontitis patients. Combined C3 and C4 hypercomplementemia were found as three cases among the generalized form of the disease and as four cases among the localized form of the disease. One case of extreme hyper complementemia in each of the disease forms Table 4. Whole saliva preparations and salivary protein preparations were found to be C3 and C4 negative in the test patients and controls.

The C3 herd plot as well as the complement response patterns as low, moderate and high among periodontitis patients can act as a probe of herd immunity among periodontitis patients in this area Figure 1. [14]. The absence of C3 and C4 complement components can either due to rapid degradation of complement by gum tissue micro - environmental enzyme activities. Or due to immune complex deposition in the periodontal tissues [15, 16, 17, 18, 19]

Single C3, C4 and combined C3-C4 hypercomplementemias can be attributed to the continual exposure to the periodontal bacterial pathogens or to their antigens alone or together with epitope-paratope-complement complexes. Another, possibility of physiological nature that might be the cause, which is the replenishing responses to an in situ rapid complement catabolism [4, 20, 21]

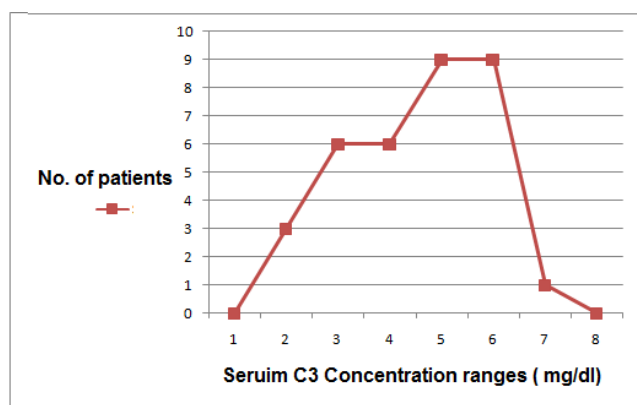


Figure 1. Serum C3 herd plot of chronic periodontitis patients

Table 1. The study patients

Entity	Number of patients		
	Male	Female	Total
-Generalized chronic periodontitis	17	10	27
-Localized chronic periodontitis	15	7	22
Total	32	27	49

Table 2. C3 concentrations mean in the sera of periodontitis patients

Entity	Mean C3 concentrations (mg/dl)		
	Male	Female	Total
Generalized chronic	175.57	171.22	173.34
Localized chronic	180.19	134.44	157.67
Control	106.6	90.95	98.5
Total	178.19	152.3	165.51

Table 3. C4 concentrations means in sera of periodontitis patients

Entity	C4 concentrations (mg/dl)		
	Male	Female	Total
Generalized chronic	51.4	47.51	49.31
Localized chronic	49.2	47.41	48.8
Control	31.08	33.3	32.19
Total	50.15	47.46	48.8

Table 4. Hypercomplementemia in periodontitis patients sera

Chronic periodontitis type	Hypercomplementemia Type	Concentration in mg/dl	
		C3	C4
Generalized	Combined	197.4	50.3
		192.4	50.8
	Extreme combined	203.2	61.4
		-	50.5
	Single	197.4	-
Localized	Combined	197.4	50.3
		197.4	51.4
	Extreme combined	197.4	57.4
		198	61.8

### 4. Conclusions

1-Chronic periodontitis is associated with rise in C3 and C4 levels.

2-Normo, hyper and extreme hypercomplementemia were noted among periodontitis patients

3-C3 levels may be of use as a probe for herd immunity among periodontitis patients.

### Acknowledgments

The authors wish to thank, department of biology, college of science, department basic science, department of oral medicine college of dentistry, Babylon University for help extended by them during the conduction of this work.

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