



Periodontal Status of Male Body Builders and Relationship with Protein Supplement Intake: An Observational Study

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ABSTRACT

Dietary intake is considered as one of the risk factors for periodontal disease. Due to lack of evidence in relationship between protein intake and periodontal status the aim of this study is to assess the periodontal status in male body builders (BB) on protein supplements (PS) versus non body builders (NBB). The objective of this study is to assess the periodontal status of BB on PS and NBB who are not on PS. 60 subjects of age 20 – 45 years old male BB and NBB were included in the study. A questionnaire including the demographic details and amount of protein intake /Kg body weight was used to collect information. Periodontal status was assessed using Plaque index (PI), Gingival index (GI), Probing pocket depth (PPD) and Clinical attachment level (CAL). Periodontal parameters were comparatively lesser in BB (2.06 ± 0.53 , 2.13 ± 0.54) than NBB (3.38 ± 0.55 , 3.48 ± 0.55) which was statistically significant ($P < 0.05$). There was no significant difference between PI and GI among BB and NBB. The periodontal health was significantly better in BB than NBB. The study suggests a positive relationship between periodontal health and PS intake.

Keywords- protein, periodontal disease, body builders, supplement

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Introduction

Periodontal disease is a chronic inflammatory disease affecting the supporting tissues of the teeth that has a high global prevalence. It is a multi-factorial disease with numerous risk factors [1]. Identification and knowledge of these risk factors is essential for diagnosis, prevention and management of the disease. Physical fitness enhances the general health and improves the quality of life. Bodybuilding is the practise of progressive resistance training to regulate and develop one's muscles by muscle hypertrophy for aesthetic purposes [2]. An individual who engages in this activity is referred to as a bodybuilder. Physical inactivity has been linked with poor oral health [3]. Similarly, obesity, caused by higher body mass index (BMI), causes a cascade of proinflammatory events that is correlated to various chronic systemic diseases. The proinflammatory markers involved in periodontal disease and muscle metabolism are same, thereby suggesting that systemic challenge generated by periodontal disease could also influence physical fitness and vice versa [4].

Studies have shown that there is an inverse relationship between high protein intake and periodontitis [5]. Also, protein deprivation leads to breakdown of periodontal ligament, degeneration of gingival tissues and bone resorption [6]. Due to lack of evidence in relationship between protein intake and periodontal status the aim of this study is to assess the periodontal status in male body builders (BB) on protein supplements (PS) versus non body builders (NBB).

MATERIAL AND METHODS

This was a cross sectional study in which 60 subjects of age 20 – 45 years old male BB and NBB were included. Bodybuilders were selected from different gymnasium centres that satisfied the inclusion criteria. Inclusion criteria-

- Current male body builders aged between 20-45 years that are practising bodybuilding for at least 5 years or more.
- Comparison group included non-body builders' males aged between 20-45 years
- Individuals with >20 teeth in the oral cavity
- Those who gave consent to take part in the study

Exclusion criteria-

- Medically compromised patients
- Patients with history of usage of antibiotics, anticonvulsants, calcium channel blockers etc.
- Beginner and intermediate body builders with <5 years of training

A pretested and validated questionnaire including the demographic details and amount of protein intake /Kg body weight was used to collect the information. The first section included social and demographic details such as name, age, gender, details related to past medical and past dental history, details related to personal habits such as oral hygiene practices and dietary habits such as amount of Protein intake in gram per kg body weight. The periodontal status was assessed using Plaque index (PI), Gingival index (GI), Probing pocket depth (PPD) and Clinical attachment level (CAL). A minimum sample size of 30 was calculated for each group i.e. 30 body builders and 30 non body builders.

Statistical analysis

Data recorded was transferred into the MS Excel sheet and subjected to statistical analysis. We used the software STATA ver. 10.1, 2011 for carrying out the statistical analysis. Pearson's Chi-square test was used to find any relationship between categorical variables and spearman's correlation was used to find the relationship between continuous variables

RESULTS

The analysis consists of 30 body builders and 30 non body builders. The mean age of the participants was found to be 27 ± 3.22 years. Periodontal parameters were comparatively lesser in BB (2.13 ± 0.54 , 2.06 ± 0.53) than NBB (3.38 ± 0.55 , 3.48 ± 0.55) which was statistically significant ($P < 0.05$). There was no significant difference between Plaque Index and Gingival Index among BB and NBB. (Table 1,2). The z- value and percentage changes in both groups are demonstrated in Table 3 and 4.

	Plaque Index	Gingival Index	Probing Pocket Depth	Clinical Attachment Level
Average	1.606666667	1.676666667	2.13	2.06
SD	0.541347828	0.528943862	0.544660603	0.535369676
SE	0.0987861	0.096522603	0.099390621	0.097695196

Table 1: PI, GI, PPD and CAL scores of body builders

	Plaque Index	Gingival Index	Probing Pocket Depth	Clinical Attachment Level
Average	2	2.043333333	3.483333333	3.383333333
SD	0.49060132	0.495276539	0.551539121	0.551539121
SE	0.089525788	0.090378931	0.100645825	0.100645825

Table 2: PI, GI, PPD and CAL scores of non-body builders

	Plaque Index	Gingival Index	Probing Pocket Depth	Clinical Attachment Level
Z-VALUE	-1.044366707	-0.980908665	-3.3827169	-3.33600514

Table 3: Z-value in normal distribution

	Plaque Index	Gingival Index	Probing Pocket Depth	Clinical Attachment Level
% change	24.4813278	21.86878728	63.53677621	64.2394822

Table 4: Percentage change among both BB and NBB groups

DISCUSSION

Many epidemiological studies have shown positive associations between specific nutrients such as calcium, vitamin C and D, fatty acids with periodontal health [6, 7]. Protein, however, is a much less studied nutrient from periodontal health point of view. The aim of the current study was to evaluate the effect of protein supplements on periodontal status of individuals. The present study shows that the periodontal status is comparatively better in body builders than non-body builders. There were statistically significant differences for probing pocket dept and clinical attachment loss among both the groups, however, plaque index and gingival index were not statistically different. Physical activity has a beneficial effect on periodontal health, as is evident by many studies showing positive effects for individuals who exercise as

compared to those who don't [8]. Body builders are involved in heavy physical activity and strength training; therefore, the findings of the present study support the evidence that periodontal status is better in body builders than non-body builders [9]. Similar results are reported by another study by Dodington D *et al* 2021 suggested that consuming ≥ 1 g protein/kg body weight/day was associated with reductions in periodontal disease burden following scaling and root planning in patients who were non-smokers [10]. Mahmoud R *et al* 2022 conducted a study to estimate the effect of protein, creatine and amino acid supplements on the oral health of bodybuilders. The author concluded that the frequency of protein intake was directly associated with increased caries, plaque accumulation and gingival inflammation [11]. A study by Aral K *et al* 2017 suggested that bodybuilding and supplement usage may decrease gingival inflammation by downregulating interleukin (IL)-1 β , apoptosis-associated speck-like protein containing C-terminal caspase-recruitment domain (ASC), and caspase 1 (CASP1) [12].

The current recommendation of protein in 0.8 g per kg body weight and unlike for other nutrients like calcium and vitamin D, the requirement of this nutrient does not increase with age [13].

There are studies in the literature where the dosage of protein supplements is compared with the periodontal parameters. A study by Adegboye A *et al* 2016 suggested that the intake of calcium, whey protein and casein were inversely associated with periodontitis [5].

Protein also has a positive effect on alveolar bone thickness and recovery from ligature induced bone resorption [14]. It has also been shown that whey protein may prevent alveolar bone loss by increasing the serum level of heterocyclic protein amino acids such as hydroxyproline [15].

LIMITATIONS OF THE STUDY

The limitation of the study includes small sample size and observational nature of the study. Large randomized controlled clinical trials with control of confounding factors such as differences in absorption and utilization of protein among the study subjects, dietary pattern, type, composition and concentration of protein supplements, usage of drugs, daily oral hygiene methods, exercise intensity are some of the factors which have not been taken into account in the present study.

CONCLUSION

The periodontal health was significantly better in BB than NBB. The study suggests a positive relationship between periodontal health and PS intake. The impact of protein intake on periodontal health is an unexplored topic in the literature. Since periodontal disease is multifactorial, prospective and analytical studies are required to evaluate the relationship between protein and periodontitis.

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