

A Study to Assess Anti-Inflammatory Effect of Vitamin D on Gingivitis: A Dose Dependent Randomised Controlled Trial

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INTRODUCTION

Gingivitis the mildest periodontal disease affects half the globe. Inflammation redness, swelling, bleeding, and pus are more prevalent than discomfort in diagnosing gingivitis.^[1] Everyone is affected. Wealthy countries have witnessed a decade-long gingivitis reduction. Gingivitis varies by geography.^[2] Gingivitis bleeding gums close to at least one tooth affects over half of Americans, with men, blacks, and Mexican Americans having greater rates than whites.^[3] Early lesions accelerate disease.^[4] Bacterial plaque at the gingival margin causes gingivitis, although diet may contribute. Vitamin deficits caused gingivitis.^[5]

Gingivitis needs plaque removal. Therapy kills most mouth germs. Self-care and frequent professional cleanings may do this.^[6] Scaling, root planning,

ABSTRACT **Introduction:** Vitamin D deficiency increases gingivitis risk. Studies show that higher vitamin D levels reduce inflammation. **Materials and Methods:** College conducted a double-blind, randomized, controlled trial on 451 people's vitamin D and gingival health at baseline. For three months, participants were given a placebo (group A), 1000 international units (IU) of vitamin D3 per day (group B), 500 IU per day (group C), or 2000 IU per day (group A). Gingival scores were recorded for three months to assess the anti-inflammatory effect (the first, second, and third). Vitamin D levels also affected gingivitis. **Results:** Vitamin D dose-dependently reduces gingivitis inflammation. Vitamin D administration negatively correlated with gingival index score. Anti-inflammatory vitamin D levels are 32–37 ng/ml. **Conclusion:** Vitamin D supplementation can reduce gingivitis severity. The optimal blood vitamin D level is 30–35 ng/ml.

KEYWORDS: Anti-inflammatory, gingivitis, vitamin D

and curettage treat clinical gingivitis. Flossing and chlorhexidine or hydrogen peroxide mouthwashes may cure gingivitis.^[7] Vitamin D pills cure gingivitis affordably and safely.^[8]

Vitamin D may decrease gingival inflammation, according to NHANES III cross-sectional data. Those with the highest 25(OH) D levels had 20% less bleeding on probing than those with the lowest levels.^[9] Clinical attachment level (CAL) inversely linked with 25(OH) D levels in over-50s.^[10] Vitamin D is necessary but

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secondary. Treating the aforementioned may cure vitamin D deficiency.^[11] Vitamin D levels may rise from 50 to 80 nmol/L with 1700 IU daily. Supplement recommendations prioritize safety.^[12,13] This research studied vitamin D's dosage-dependent gingivitis-fighting properties. To minimize gingivitis inflammation, we must establish the serum vitamin D level that correlates with gum health following oral vitamin D consumption.

MATERIALS AND METHODS

IRB 02/IEC/RDCHRC/2022/039 accepted Rama Dental College's research. This randomized, double-blind, placebo-controlled trial assessed vitamin D's anti-inflammatory benefits. This two-year research screened from June to October 2022. Participants were recalled on vitamin D oral consumption days 30, 60, and 90. Each follow-up included clinical gingivitis and biochemical vitamin D and calcium assays. All applicants will have periodontal pockets under 3 millimeters. Loe and Sillness gingivitis index-1963 gingivitis >1. 20-65 ng/mL serum 25-hydroxyvitamin D patients were selected.

Missing teeth, severe periodontal disease with active bleeding gums, poorly damaged teeth (due to dental caries, cervical abrasion, or enamel loss), severely fractured teeth, or temporary fillings are not considered. No orthodontics were hired. Dental prophylaxis or procedures within a month were omitted. Side-effect-prone vitamin D pill users.

Clinical assessment of gingivitis for the study assessed gingiva inflammation using Loe and Silness index criteria and blood vitamin D and/or calcium levels at week 0 and week 12.

Intervention: Groups A–D got 2000, 1000, 500, and a placebo, respectively. Vitamin D kits comprising 30 pills of 2000 IU, 1000 IU, 500 IU, and placebo were randomly distributed. Vitamin D pills were taken regularly.

RESULTS

In Table 1, we can see how old the study participants were at the start, how old they were at the conclusion, and how many of them dropped out.

Vitamin D baseline: 9.91% monthly increases. Following one month, gingival scores declined from 2.4 to 1.7, 0.8, and 0.3 after three months. A Wilcoxon paired test comparing baseline values to future scores indicated group A had a statistically significant anti-inflammatory impact after one month. Group B's vitamin D increased 5.62 per month from 26.50 + 3.68 to 43.67 + 8.80. 2.3 gingival scores began this group. One month, 2.0, two

Table 1: Distribution of study subjects by study groups

Study subject groups	Group A	Group B	Group C	Group D
Subjects at the start of the study	24	24	24	24
Subjects at the end of the study	22	22	22	22
Male	13	13	14	14
Female	11	11	10	10
No of Dropouts	2	2	2	2
Mean age	30.56	30.23	30.66	30.45
SD	10.34	9.44	8.34	9.45

Table 2: Summary statistics of the levels

Group	Variable	Follow-ups	Mean	Standard deviation	Standard error	
A	Serum vitamin D	Baseline	22.47	6.98	1.49	
		Final visit	52.2	10.18	2.17	
	Serum calcium	Baseline	9.66	0.28	0.06	
		2 visit	9.75	0.24	0.05	
		3 visit	9.91	0.21	0.04	
		Final visit	9.99	0.26	0.05	
	Gingival score	Baseline	2.41	0.54	0.12	
		2 visit	1.78	0.63	0.13	
		3 visit	0.9	0.74	0.16	
		Final visit	0.34	0.6	0.13	
	B	Serum vitamin D	Baseline	26.80	3.68	0.78
			Final visit	43.67	8.80	1.87
Serum calcium		Baseline	9.61	0.34	0.07	
		2 visit	9.64	0.30	0.06	
		3 visit	9.79	0.31	0.06	
		Final visit	9.94	0.39	0.08	
Gingival score		Baseline	2.39	0.57	0.12	
		2 visit	2.01	0.58	0.12	
		3 visit	1.16	0.71	0.15	
		Final visit	0.55	0.66	0.14	
C		Serum vitamin D	Baseline	23.98	5.05	1.07
			Final visit	36.81	6.13	1.30
	Serum calcium	Baseline	9.60	0.42	0.09	
		2 visit	9.56	0.42	0.09	
		3 visit	9.74	0.25	0.05	
		Final visit	9.80	0.35	0.07	
	Gingival score	Baseline	2.24	0.46	0.09	
		2 visit	1.96	0.46	0.09	
		3 visit	1.43	0.75	0.16	
		Final visit	0.88	0.98	0.21	
	D	Serum vitamin D	Baseline	28.18	3.07	0.65
			Final visit	28.52	4.04	0.86
Serum calcium		Baseline	9.86	0.40	0.08	
		2 visit	9.71	0.40	0.08	
		3 visit	9.83	0.45	0.09	
		Final visit	9.92	0.48	0.10	
Gingival score		Baseline	2.23	0.61	0.13	
		2 visit	1.96	0.63	0.13	
		3 visit	1.90	0.67	0.14	
		Final visit	1.89	0.64	0.13	

months, 1.1, and three months, 0.5. After two months, this group demonstrated strong anti-inflammatory benefits. After three months, group C's gingival scores reduced from 2.2 to 1.9, 1.4 to 0.8, and 0.8 to 0.2, showing an anti-inflammatory effect ($P = 0.0001$). Vitamin D rose 4.27 per month from 23.98 ± 5.65 to $36.8 \pm 1 + 6.13$ [Table 2].

DISCUSSION

Dental hygiene requires mouthwash.^[7] Vitamin D levels increased in all groups after taking tablets.^[14] Oral vitamin D improved linearly, according to Heaney, Davies, Chen, and colleagues (2003).^[15] Earlier research had similar findings. Vitamin D reduces inflammation *in vitro*. Vitamin D reduces antigen-triggered T-cell proliferation and cytokine production, specifically interleukin-2 and interferon.^[16,17]

Consequently, 500–2000 I.U. U/day oral vitamin D intake reduces inflammation. 500 I.U. induces anti-inflammation. Further research: Anti-inflammatory vitamin D requires 500 IU daily.^[18] Inanir A, Ozoran K, Tutkak H, and Mermerci B (2004) observed that patients administered calcitriol for six months had substantially greater BMD and lower blood IL-1 and TNF-alpha than those given calcium alone.^[18]

CONCLUSION

Vitamin D's anti-inflammatory effects are most noticeable around 2,000 IU, but there is no safe or effective maximum dose. At 30–35 ng/ml, oral vitamin D supplementation protects against gingivitis' inflammatory process. This range was best for this effect.

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Conflicts of interest

There are no conflicts of interest.

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