ISSN: 2347-6567

International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR |Vol.14 | Issue 1 | Jan - Mar -2026
www.ijamscr.com
DOI: https://doi.org/10.61096/ijamscr.v14.iss1.2026.29-36

Research

Ginger as a Potential Remedy for Periodontitis Treatment

Dr.G.Laxmi Priya[1], Dr.T.Madhavi Padhma[2], Dr.KVNR Prathap[3], Dr.Vengal rao[4], Dr.Srujan kumar[5], Dr.Darshika chandini[6]
1-Student, 2-Professor and Hod, 3,4-Professor, 5,6-Senior Lecturer
Department of Public Health Dentistry, Mamata Dental College, Khammam, India
*Author for correspondence: Dr.G.Laxmi Priya
Email: laxmigurrala999@gmail.com

Published on: 27.1.26

Published by: Futuristic Publications

Abstract

Periodontitis is an oral inflammatory condition related to tooth-supporting tissues (e.g., the gingiva, alveolar bone, and periodontal ligament) and affects 70%–80% of people globally. Periodontitis can be linked with some serious diseases, like cardiovascular disorders, oral cancer, and metabolic syndrome, and it has not been declared an ideal therapy with minimum side effects against it.

AIM: To investigate the opinions Ginger as a Potential Remedy for Periodontitis Treatment.

OBJECTIVE: To investigate the efficacy and safety of ginger as a potential remedy for periodontitis treatment, and to explore its mechanisms of action in reducing inflammation and combating bacterial infections associated with periodontitis.

METHOD: A cross-sectional survey was conducted among 200 dental students, comprising 78 males (39%) and 122 females (61%). The survey included 15 questions about Ginger as a Potential Remedy for Periodontitis Treatment among undergraduate dental students were analyzed based on gender, age and year of study using chi-square tests to identify statistically significant differences.

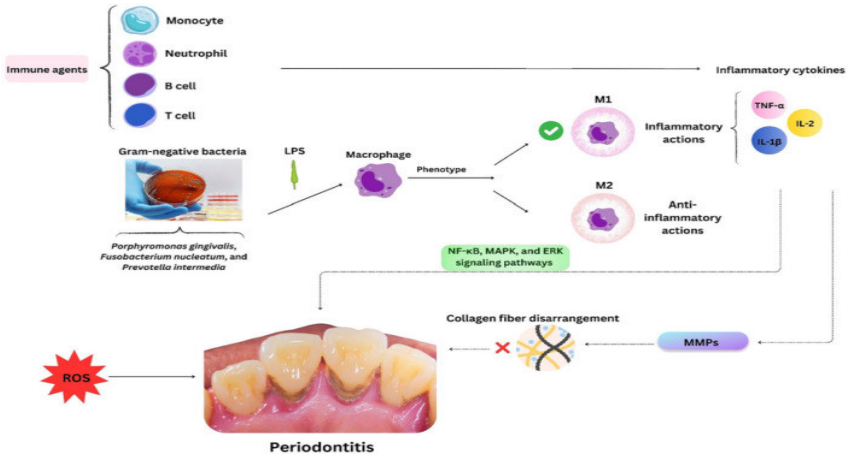
Keywords: bioactive components, ginger, inflammation, pathogenesis, periodontitis.

INTRODUCTION:

Periodontitis is a chronic inflammatory problem destructing protective tissues of the tooth, for instance, the gingiva, alveolar bone, and periodontal ligament (altogether named the periodontium). Based on epidemiological reports, this oral problem involves 70%–80% of individuals all over the world and is related to several life-threatening diseases, such as cardiovascular disorders, oral cancer, and metabolic syndrome. This oral condition manifests multiple signs and symptoms, like gingival bleeding, pain, flossing, receding gums, and tooth loss. For disease treatment, some approaches have been proposed, e.g., antibiotic therapy, root loaning, tooth scaling, and surgical methods (for the severe stage). Unfortunately, these therapeutic choices are not efficient enough and affordable. Thus, the suggestion of an effective way with minimum side effects seems to be required. For the time being, natural products have gained much interest in light of their effectiveness against many illnesses (such as oral disorders) and low side effects. In this line, one of the natural products with a herbal origin is ginger (Zingiber officinale). Ginger, as a spicy flavour ingredient, possesses diverse chemical constituents, comprising raw fibres, organic acid, lipids, polysaccharides, terpenes, and phenolic compounds. This plant has reflected its striking role in herbal medicine due to its wide pharmacological activities, like antioxidative, anti-inflammatory, anti-cancer, cardioprotective, antidiabetic, chemoprotective, and immunoprotective functions. Recently, it has been declared that ginger can be a potential candidate for periodontitis treatment. Hence, we aimed to discuss the possible therapeutic capacity of this plant against this inflammatory oral disease based on the present documents.

1.1. Periodontitis and Pathogenic Mechanisms

It is stated that periodontal tissue destruction, the main signature of periodontitis, occurs due to inflammatory reactions of the host immune system because of periodontal pathogens. The host reactions are mainly triggered by neutrophils, B and T lymphocytes, macrophages, and monocytes (Figure 1). These immune system-related agents can stimulate the formation of inflammatory factors, for example, cytokines, chemokines, proteolytic enzymes, and arachidonic acid metabolites, which participate in bone resorption and tissue demolition through activation of several signaling pathways, like nuclear factor kappa B (NF-κB), mitogen-activated protein kinase (MAPK), and extracellular-regulated kinases (ERK) signaling pathways Among pro-inflammatory cytokines, the pathogenic roles of some of them, for instance, interleukin (IL)-1ß and tumor necrosis factor-α (TNF-α), have been demonstrated .Some Gram-negative anaerobic bacteria, such as Porphyromonas gingivalis, Fusobacterium nucleatum, and Prevotella intermedia, can also activate inflammatory occurrences and finally result in tooth loss and periodontal ligament destruction. The existence of these pro-inflammatory cytokines induces the formation of matrix metalloproteinases (MMPs) by neutrophils, junctional epithelial cells, fibroblasts, and macrophages. MMPs are involved in the demolition of collagen fibers, particularly in periodontal ligaments. Plus, an imbalance between the production of reactive oxygen species (ROS) by phagocytic cells and their clearance in periapical lesions may lead to bone loss and periapical damage in this disease. It seems that the impairment of the immune system function, antioxidant system capacity, and release of factors from dental pathogens are more involved in disease pathogenesis; however, other effective factors are recommended to be discovered in different studies.



1.2. **Ginger Components: Their Effects on Inflammatory Mediators and Inflammatory Disorders**

It has been demonstrated that ginger components, such as shogaol, gingerols, and zingerone, are chiefly responsible for the therapeutic effects of ginger, especially in inflammatory conditions. 6-shogaol can repress lipopolysaccharide (LPS)-conferred formation of inflammatory factors (e.g., IL-6 and prostaglandin E2 (PGE 2)) by suppressing nuclear translocation and phosphorylation of NF-kB and triggering peroxisome proliferator-activated receptor gamma (PPAR-γ), a suppressor of NF-kB activation, in BV2 microglia cells . 6-shogaol has also shown its potential for repressing PGE2 expression induced by IL-1 by inhibiting the enzymatic function of PGE synthase and prostaglandin-endoperoxide synthase 2 (PTGS2), causing reduced production of receptor activator of NF-kB (RANKL) and so attenuation of osteoclast differentiation. Similarly, 6-gingerol, a main bioactive compound of ginger, can effectively repress the LPS-induced expression of inducible nitric oxide synthase (iNOS), one of three important enzymes producing nitric oxide (NO). Moreover, 6-gingerol can inhibit the phosphorylation of mammalian target of rapamycin (mTOR), Akt, and signal transducer and activator of transcription 3 (STAT3), a key signalling pathway in the inflammatory responses in macrophages. Zingerone is known as a good choice for inflammatory osteolysis conferred by implanted titanium (Ti) particles. In these conditions, Zingerone is capable of inhibiting bone resorption and osteoclast differentiation by attenuating the NF-κB signalling pathways in vitro. Also, it has been pointed out that this compound is effective in decreasing the levels of high-sensitivity C-reactive protein (hs-CRP), transforming growth factor-ß (TGF-ß), and IL-6 in chronic inflammatory disorders affecting joints and bones. Overall, the beneficial effects of ginger compounds comprising 6-, 8-, and 10-gingerols, Zingerone, and 6-Shogaol, on inflammatory disorders like multiple sclerosis, colitis, rheumatoid arthritis, and systemic lupus erythematosus have been approved In conclusion, these reports suggest that components of ginger play a crucial role in anti-inflammatory actions and therapeutic effects by modulating inflammatory factors and related agents.

METHODOLOGY:

A) study design and area: A cross-sectional study was carried out at tertiary care teaching hospital khammam.

B) Study population: The health care students including those of first year to internship dental students who responded to the offline paper print questionnaire survey.

C) Study Instrument: A self-administered questionnaire was designed based on Ginger As A Potential Remedy For Periodontitis Treatment: had a total 15 questions. Each participant has to fill their demographic data like Name, age, and year of study.

Participants have to select one option from the answers provided against questions and the questions were based Ginger as a Potential Remedy for Periodontitis Treatment

D) Pilot study: A pilot study was conducted on a group of students to assess the validity and reliability of study

E) Sampling method: The sampling method used is convenience method

F) Inclusion criteria: The students who were interested in study and who are willing to participate

G) Exclusion criteria: students who are not willing to participate are excluded

H) Organizing the study: The study was designed in a paper-based version of the self-administered questionnaire of 15 questions focusing on knowledge, awareness.

Includes the sections of demographic data: Name, Age, Sex and Year of study demographic information and asked to answer all questions by selecting one option from the provided answers.

Statistical analysis: Data from the filled questionnaire was conducted in a tabular form in an excel worksheet and evaluated for analysis.The analysis was performed by SSPS version 29.

RESULTS:

A total of 200 students took part in this with females (61%) and male of (39%). Age of the participants ranging from 21-25 years. In this study

Females were more likely to demonstrate perception in dissection room experiences than male. Significantly second and third years showed greater familiarity with advanced applications than first, fourth years and intern students.

AGE

	N	Minimum	Maximum	Mean	Std. Deviation
Age	200	21	25	22.48	1.05

GENDER

		Frequency	Percent
Valid	MALE	78	39.0
	FEMALE	122	61.0
	Total	200	100.0

YEAR OF STUDY

		Frequency	Percent
Valid	1 BDS	25	12.5
	2 BDS	26	13.0
	3 BDS	50	25.0
	4 BDS	35	17.5
	INTERN	64	32.0
	Total	200	100.0

Distribution and comparison of responses based on gender:

Item	Response	Males		Females		Chi-Square value	P value
		n	%	n	%		
Q1	1	8	14.5	6	4.2	5.06	0.02
	2	47	85.5	138	95.8		
Q2	1	5	9.1	7	4.9	6.05	0.11
	2	8	14.5	10	9.7		
	3	5	14.5	93	6.9		
	4	3	61.8	113	78.5		
Q3	1	4	7.3	9	6.2	0.01	1
	2	51	92.7	135	93.8		
Q4	1	37	67.3	106	73.6	2.29	0.51
	2	8	14.5	17	11.8		
	3	7	12.7	10	6.9		
	4	13	5.5	11	7.6		
Q5	1	3	5.5	8	5.6	0.03	1
	2	52	94.5	136	94.4		
Q6	1	3	5.5	10	6.9	1.60	0.652
	2	3	5.5	14	7.9		
	3	4	7.3	14	9.7		
	4	45	81.8	106	73.6		
Q7	1	1	1.6	9	6.2	7.752	0.051
	2	32	55.2	57	39.6		
	3	1	1.8	12	8.3		
	4	21	38.2	66	45.8		
Q8	1	13	23.6	21	14.6	2.538	0.468
	2	36	65.5	107	74.3		
	3	4	7.3	9	6.2		
	4	2	3.6	7	4.9		
Q9	1	15	27.3	38	26.4	0.012	1
	2	40	72.7	106	73.6		
Q10	1	4	7.3	23	16	9.1721	0.021
	2	46	83.6	90	62.6		
	3	1	1.8	18	12.5		
	4	4	7.3	13	9		
Q11	1	9	16.4	44	13.6	6.321	0.097
	2	12	21.8	28	19.4		
	3	6	10.9	22	15.3		
	4	28	50.9	50	34.7		

Q12	1	23	41.8	70	48.6	6.955	0.073
	2	9	16.4	36	25		
	3	8	4.9	20	13.9		
	4	15	27.3	18	12.5		
Q13	1	10	18.2	12	8.3	7.267	**0.063**
	2	6	10.9	10	6.2		
	3	6	10.9	9	6		
	4	33	60	113	78.5		
Q14	1	5	9.1	12	8.3	0.251	**0.968**
	2	4	7.3	11	7.6		
	3	4	7.3	8	5.6		
	4	42	76.4	113	78.5		
Q15	1	5	9.1	22	15.3	8.732	**0.0127**
	2	1	1.8	20	13.9		
	3	49	89.1	99	68.8		

P≤0.05 is statistically significant

Distribution and comparison of responses based on year of the study:

Item	Response	I BDS		II BDS		III BDS		IV BDS		INTERN		Chi-Value	P-Value
		n	%	n	%	n	%	n	%	n	%		
Q1	1	2	8.7	2	7.7	5	10.0	2	5.6	3	4.7	1.466	**0.836**
	2	21	91.3	24	92.3	45	90.0	34	94.4	61	94.3		
Q2	1	1	4.3	3	11.3	7	14.0	1	2.8	0	0	30.825	0.002
	2	3	13	6	23.1	8	16	2	5.6	3	4.7		
	3	4	17.4	4	15.4	5	10	1	2.8	4	6.8		
	4	15	65.2	13	15	30	60	32	88.9	57	89.1		
Q3	1	3	13	0	0	4	8	0	0	6	9.4	6.935	0.138
	2	20	87	26	100	46	92	36	100	58	96.8		
Q4	1	18	78.3	14	53.7	44	88	15	41.7	52	82.7	35.562	0.0004
	2	2	8.27	5	19.2	3	6	10	27.8	5	7.8		
	3	3	13	4	15.4	2	4	4	11.1	4	2.6		
	4	0	0	3	11.5	1	2	7	19.4	3	4.7		
Q5	1	2	8.7	2	7.7	2	4	0	0	5	7.8	3.645	0.456
	2	21	91.3	24	92.3	48	96	36	100	59	92.2		
Q6	1	1	4.3	3	11.5	0	0	3	8.3	6	9.4	15.074	0.237
	2	1	4.3	0	0	4	8	4	11.1	8	12.5		
	3	1	4.3	1	3.8	4	8	3	8.3	9	14.1		
	4	20	87	22	84.6	42	84	26	72.2	41	64.1		
Q7	1	0	0	2	7.7	8	16	0	0	0	0	70.091	0.001
	2	6	21.6	5	19.2	13	26	13	36.1	52	81.2		
	3	3	13	1	3.8	5	10	3	8.3	1	1.6		
	4	14	60.9	18	69.2	24	48	20	55.6	11	17.2		
Q8	1	3	13	7	26.9	13	26	5	13.9	9	16.4	18.2038	**0.109**
	2	16	69.6	17	65.4	27	54	29	80.6	54	84.4		
	3	2	8.7	1	3.8	6	12	1	2.8	1	3.8		
	4	2	8.7	1	3.8	4	8	1	2.8	1	1.6		
Q9	1	9	39.1	8	30.8	12	24	6	16.7	18	28.1	4.146	**0.386**

	2	14	60.9	18	69.2	38	76	30	83.3	46	71.9		
Q10	1	1	4.3	5	19.2	6	12	5	13.9	10	15.6	12.690	**0.391**
	2	19	82.6	16	61.5	37	74	24	66.7	40	62.5		
	3	0	0	5	19.2	4	8	3	8.3	7	10.9		
	4	3	13	0	0	3	6	4	11.1	7	10.9		
Q11	1	6	26.1	9	34.4	12	24	11	30.6	15	23.4	25.612	**0.012**
	2	4	17.4	5	19.2	13	26	10	27.8	8	12.5		
	3	3	13	1	3.8	9	18	10	27.8	5	10.7		
	4	10	43.7	11	42.3	16	32	5	13.9	36	56.2		
Q12	1	15	65.2	15	57.7	27	54	18	50	18	21.8	35.376	**0.0004**
	2	5	21	7	26	11	22	8	22.	14	21.9		
	3	3	13	2	7.7	8	16	7	19.4	8	12.5		
	4	0	0	2	7.7	4	8	3	8.3	24	37.5		
Q13	1	4	17.4	5	19.2	2	4	3	8.3	8	12.5	26.162	**0.0102**
	2	2	8.7	4	15.4	2	4	4	11.1	4	6.2		
	3	1	4.3	4	15.4	1	2	7	19.4	2	3.1		
	4	16	69.6	13	50	45	19	22	61.1	50	78.1		
Q14	1	1	4.3	2	7.7	6	12	6	16.7	2	1.7	21.922	**0.038**
	2	4	17.4	0	0	2	4	4	11.1	5	7.8		
	3	4	17.4	1	3.8	2	4	8	8.6	2	3.1		
	4	14	60.9	23	88.5	40	80	23	63.9	55	85.9		
Q15	1	2	9.1	3	12.5	9	18	9	25	4	6.2	18.845	**0.015**
	2	1	4.5	0	0	4	8	8	22.2	8	12.5		
	3	19	86.4	21	87.5	37	74	19	52.8	52	81.2		

Discussion:

The study assessed about Ginger as a Potential Remedy for Periodontitis Treatment among undergraduate dental students in Khammam city. The demographic analysis revealed that participants were primarily between 20 and 26 years old, with a slight female majority**.**

In summary, experimental and clinical reports of recent documents have proposed herbal therapy using ginger as a suitable candidate for treating periodontitis. The current preclinical studies indicated that ginger as well as its compounds, especially 6-Shogaol, have a striking role in suppressing Gram-negative bacterial involved in disease incidence (e.g., Porphyromonas gingivalis, Fusobacterium nucleatum, and Prevotella intermedia), blocking the formation of inflammatory agents (e.g., prostaglandins, and leukotrienes), and inhibiting osteoclast-related signaling pathways (like MAPK and NF-κB signaling pathways), ROS production, Ca2+ oscillation, NFATc1, and nuclear factor of activated T-cell as well as osteoclast differentiation, leading to attenuating alveolar bone resorption. Also, the elimination of MMPs has been usually considered as a subsidiary therapeutic strategy in periodontal diseases. Ginger has been shown to remarkably diminish MMP-2 and MMP-9, as well as MMP-1 and MMP-8, the two main collagenases, expression in Human gingival fibroblasts (HGFs) when compared with lipopolysaccharides-stimulated. The clinical evidence has supported these outcomes and showed that this herbal product is able to decrease the levels of inflammatory mediators (IL-6, IL-1ß, TNF-α, and hs-CRP), and improve clinical indices (e.g., CAL, PD, GI, and PI).

Conclusion:

It can be concluded that ginger would be an effective natural product that may help mitigate inflammation and tissue damage characteristics of periodontitis. Furthermore, given its minor adverse effects on cell viability as demonstrated by the results of cytotoxicity assays, it is expected to be safe and have minimal adverse effects on tissues. However, more research is needed to validate these results.

References:

1. Rezaei-Tazangi F., Mirhosseini A. F., Fathi A., Roghani-Shahraki H., Arefnezhad R., and Vasei F., "Herbal and Nano-Based Herbal Medicine: New Insights Into Their Therapeutic Aspects Against Periodontitis," Avicenna Journal of Phytomedicine 14, no. 4 (July 2024): 430. [DOI] [PMC free article] [PubMed] [Google Scholar]
2. Aref Nezhad R., Motedayyen H., and Roghani-Shahraki H., "Do Cytokines Associate Periodontitis With Metabolic Disorders? An Overview of Current Documents," Endocrine, Metabolic & Immune Disorders - Drug Targets 22, no. 7 (2022): 778–786. [DOI] [PubMed] [Google Scholar]
3. Sanz M., Marco del Castillo A., Jepsen S., et al., "Periodontitis and Cardiovascular Diseases: Consensus Report," Journal of Clinical Periodontology 47, no. 3 (2020): 268–288. [DOI] [PMC free article] [PubMed] [Google Scholar]
4. Shin Y. J., Choung H. W., Lee J. H., Rhyu I. C., and Kim H. D., "Association of Periodontitis With Oral Cancer: A Case-Control Study," Journal of Dental Research 98, no. 5 (2019): 526–533. [DOI] [PubMed] [Google Scholar]
5. Rekabi A., Ram A., Nazari A., Arefnezhad R., and Rezaei-Tazangi F., "Does Crocin Create New Hope for the Treatment of Oral Problems? A Focus on Periodontitis," Molecular Biology Reports 51, no. 1 (December 2024): 224. [DOI] [PubMed] [Google Scholar]
6. Gasner N. and Schure R., Periodontal Disease. StatPearls (StatPearls Publishing, 2021). [PubMed] [Google Scholar]