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FORMULATION AND EVALUATION OF PERIODONTAL CANDIES

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ABSTRACT
Periodontal disease is one of the major public health problems in the world and is most common cause of tooth loss in population. Periodontal diseases, if left unchecked, can lead to major health problems.

There are a number of traditional Herbal remedies for the treatment and management of diseases related to teeth, gum and oral hygiene. Use of clove oil is an age old remedy still practiced for periodontal problems. Our aim is to present an overall view of the current strategies adopted for the formulation and application of traditional herbal remedies.

Two popularly known spices were selected for the preparation of Mouth Dissolving tablets (MD tablets) and candies. MD Tablets prepared from Ginger / Sunthi and Cinnamon, and candies prepared from Sunthi, in different proportions, along with Citric acid were taken for the study. Cloves are widely used in dental care, and are effective against a large number of bacteria. The main component of clove oil is eugenol,with β-caryophyllene and eugenyl acetate.

KEYWORDS: *Clove Oil, Alum, Amla Powder, Anti-Bacterial, Herbal Extracts*

INTRODUCTION

Periodontal disease is caused by bacteria in dental plaque. Plaque is the sticky substance that forms on teeth soon after have brushed.

In an effort to get rid of the bacteria, the cells of Immune system release substances that inflame and damage the gums, periodontal ligament or alveolar bone.

This leads to Swollen, bleeding gums, a sign of gingivitis (the earliest stage of periodontal disease).

Damage from periodontal disease also can cause teeth to become loose. This is a sign of severe periodontitis (the advanced stage of disease).

It can prevent Periodontal disease by practicing good oral hygiene and visiting dentist regularly.

Most people should see the dentist about once every six months. But if already have gum disease then it may need to visit more often.

Daily brushing and flossing, when done correctly, can help to remove most of the plaque from teeth.

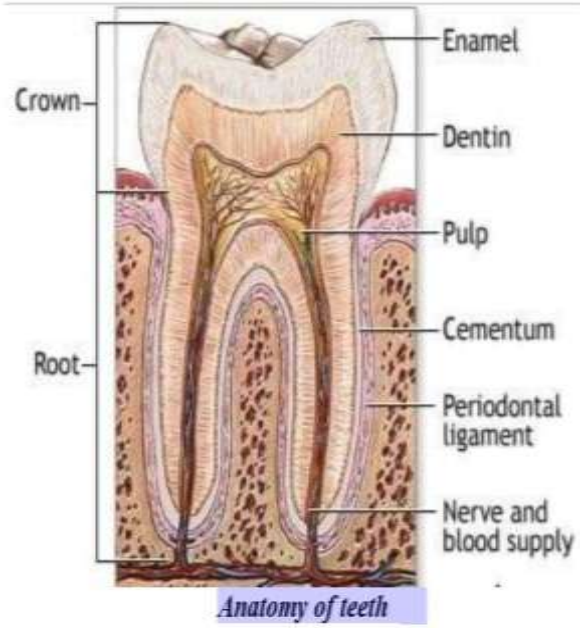
Professional cleanings by dentist or dental hygienist will keep plaque under control in places that are harder for a toothbrush or floss to reach. If oral hygiene Slips or skips dental visits, plaque builds up on the teeth. Eventually, it sp reads below the gum line.

2.1 Anatomy of teeth

A. Enamel: Enamel is a hard mineral covering the surface of the crown. It protects the tooth.

B. Dentin: Dentin is the largest part of the tooth. Although not as hard as enamel, it provides additional protection to the tooth. It also supports the crown of the tooth.

C. Pulp: The pulp contains the nerve endings and blood vessels. If you eat something too hot or cold, or fall and hurt the tooth, it is the nerves in the pulp that hurt. The blood vessels feed the tooth to keep it alive and healthy.



Anatomy of teeth

2.2 Risks and Prevention

The bacteria in plaque are the main cause of periodontal Disease. But several other factors also can contribute. They include other diseases, medicines and oral habits. These factors can increase risk of gum disease or make it worse once the infection has set in.

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1. Genes
Some people are more likely than others to get periodontal disease because of their genes. But genes do not make gum disease inevitable.
Even people who are highly prone to periodontal disease can prevent or control the disease with good oral care.

2. Stress
Stress can make periodontal disease worse and harder to treat. Stress weakens body's immune system. This makes it harder For body to fight off infection, including periodontal disease.

3.Fluctuating Hormones
Whenever hormone levels go up and down in the body, changes can occur in the mouth. Puberty and pregnancy can temporarily increase the risk and severity of gum disease. So can menopause.

2.3 Periodontitis
Periodontitis (per-e-o-don-TIE-tis), also called gum disease, is a serious gum infection that damages the soft tissue around teeth.
Without treatment, periodontitis can destroy the bone that supports your teeth. This can cause teeth to loosen or lead to tooth loss.
Periodontitis is common but can usually be prevented. It's often the result of not taking care of your mouth and teeth.

To help prevent periodontitis or improve your chance of successful treatment, brush at least twice a day, floss daily and get regular dental checkups.

2.4 Symptoms
Healthy gums are firm and fit snugly around teeth. The color of healthy gums can vary.
They may range from light pink in some people to dark pink and brown in others.

Symptoms of periodontitis can include:
1) Swollen or puffy gums.
2) Bright red, dark red or dark purple gums.
3) Gums that feel tender when touched.
4) Gums that bleed easily.
5) A toothbrush that looks pink after brushing your teeth.
6) Spitting out blood when brushing or flossing your teeth.
7) Bad breath that won't go away.
8) Pus between your teeth and gums.

2.5 When to see a dentist
Follow your dentist's recommended schedule for regular checkups. If you notice any symptoms of periodontitis, make an appointment with your dentist as soon as possible. The sooner you get care, the better your chances of reversing damage from periodontitis.

2.6 Causes
In most cases, the development of periodontitis starts with plaque. Plaque is a sticky film mainly made up of bacteria. If not treated, here'show plaque can advance over time to periodontitis:

1. Plaque forms on your teeth when starches and sugars in food interact with bacteria commonly found in your mouth. Brushing your teeth twice a day and flossing once a day removes plaque, but plaque quickly comes back.

2. Plaque can harden under your gum line into tartar if it stays on your teeth. Tartar is more difficult to remove. You can't get
rid of it by brushing and flossing — you need a professional dental cleaning to remove it. Because plaque and tartar are filled with bacteria, the longer they stay on your teeth, the more damage they can do.

3. Plaque can cause gingivitis, the mildest form of gum disease. Gingivitis is irritation and swelling of the gum tissue around the base of your teeth. Gingiva is another word for gum tissue. Gingivitis can be reversed with professional treatment and good home oral care, but only if treated early before you have bone loss

2.7 When to see a dentist
Follow your dentist's recommended schedule for regular checkups. If you notice any symptoms of periodontitis, make an appointment with your dentist as soon as possible. The sooner you get care, the better your chances of reversing damage from periodontitis.

2.8 Risk factors
Factors that can increase your risk of periodontitis include:
1. Gingivitis.
2. Poor oral health care habits.
3. Smoking or chewing tobacco.
4. Hormonal changes, such as those related to pregnancy or menopause.
5. Recreational drug use, such as smoking marijuana or vaping.
6. Obesity.
7. Poor nutrition, including a low vitamin C level.
8. Genetics.
9. Certain medicines that cause dry mouth or gum changes.
10. Conditions that lower immunity, such as leukemia, HIV/AIDS and cancer.

3.LITERATURE SURVEY
1. Reenu Yadav(2016) Formulation and characterization of antimicrobial oral gel from some herbal extracts for treatment of periodontal disease.
2. R.Bhramaramba(2015) Formulation and Evaluation of herbal gel containing Terminalia chebula Retz., leaves extract.
3. Biresh Sarkar(2015) Formulation and Evaluation of herbal gel containing extract of Cedrus deodara
4. Dr Rohit Jain(2014) Herbs in periodontology-local drug delivery
5. Deepak p pawar(2013) Formulation and evaluation of herbal gel containing lantana camara leaves extract.
6. Manisha singh(2014)Formulation and evaluation Herbal Gel Containing Ethanolic Extract of Ipomoea Fistulosa.
7. R.D. Bhalke , G. V. Kirloskar, R. R. Bhutada N. K. Jagtap and M. A. Giri (2020)Design, development and evaluation

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of topical antinflamatory herbal gel.
8. Anuradha D Otari, Dr Rupali A Patil Dr Chandrashekhar D. Upasani(2022)Formulation And Evaluation Of Transdermal Herbal Formulation Containing Ethanolic extract of zingiber officinale

4. AIM & OBJECTIVES

4.1 Aim – Formulation And Evaluation Of Periodontal Candies

4.2 Objectives

a) Identify the etiology of periodontal diseases.
b) Describe and summarize the pathophysiology of periodontal diseases.
c) Outline the treatment and management options available for periodontal diseases.
d) Review interprofessional team strategies for improving care coordination and communication to advance the treatment of periodontal diseases and improve outcomes

4.3 Herbal product

a) Clove Oil

Common name: Clove, caryophyllus
Family : Myrteace
Biological source: It is the volatile oil obtained from steam distillation of dried flower buds of Eugenia caryophyllus

Habitat

A tree native to the Molucca Islands beside New Guinea and Southern Philipinnes. Mainly imports from Madagascar and Indonesia.

Constituents

15-20% volatile oil with eugenol as main component (85-90%)Flavonoids, (quercetin and kaemferol derivatives); Tannins, furfural.

Use

Primarly as spice; The essential oil has marked antibacterial activity and is used as antiseptic and local anaesthetic (eugenol) in dentistry; Has a moderate role as carminative stomachic and tonic.



Fig.1 Clove oi

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b) Amla Powder

Synonym: Emblica, Indian goose berry, Amla
Family: Euphorbiaceae.
Biological Source: Consists of dried as well as fresh fruits of the plant Emblica officinalis.
Active Constituents: Vitamin C, Phyllemblin, tannins.

Uses

1**.** Diuretic
2. laxative
3. Enhance the oral health.



Fig.2 Amla

c) Guava

Common names: Psidium guajava, also known as guava, include l, lemon guava, apple guava, and red guava
Biological source : Psidium guajava is the plant itself, specifically its fruit**.**
Family : Myrtaceae
Chemical constituents: Flavonoids, phenolic acids, triterpenoids, vitamins,

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and minerals, as well as volatile components like sesquiterpenes and monoterpenes.

Uses

a) Shown to inhibit the growth of bacteria associated with periodontitis gastrointestinal issues, diabetes, and inflammation.

b) It's used to treat conditions like diarrhea, dysentery, stomach pain, and cough**.**



Fig.3Guava

d) Cinnamon

Synonyms: Cortexcinnamoni ,Ceylon cinnamon

Biological Source: Cinnamon is the dried inner bark of the coppiced shoots of Cinnamomum zeylanicum Nees.,

Family :Lauraceae

Chemical constituents: Cinnamon aldehyde, which is the primary component, along With ugenol, and other terpenes like cinnamyl acetate, caryophyllene, and linalool.

Uses

1. Cure headache
2. Treats dental problems Curing common cold problems Good for diabetes patients
3. Treats Skin infections/Cuts/Wounds Cure swelling with pain
4. Removes the foul smell Helps in arthritis
5. Protection from fungal infection
6. Lowers risk of heart diseases.



e) Alum

Synonyms: potash alum, crystalline solid

Biological Source: Potassium Alum is A hydrated state of PotassiumAluminum

(KAI(SO4)2-12H2O)

Uses

1. Alum can be use din periodontitis for its astringent properties, which help shrin tissues and reduce inflammation and bleeding.
2. It can also act as an antibacterial agent, inhibiting bacterial growth and potentially reducing plaque and gingivit.

5. NEED OF WORK

Dental caries is a common oral health problem, and prevention is key. Herbal lozenges that combine these ingredients can help prevent decay by reducing bacteria in the mouth, improving gum health, and promoting remine ralization of tooth enamel.

Guava leaves and clove oil are well-known for their antimicrobial, anti-inflammatory, and pain- relieving properties, which can help prevent and manage dental caries (tooth decay) naturally.

With growing concerns about the side effects of synthetic chemicals in oral care products, herbal formulations like guava and clove-based lozenges provide an alternative that may be perceived as safer and more gentle, particularly for people with sensitivities or those seeking more holistic health options.

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6. PLAN OF WORK

Literature Survey – Review of existing research and data on periodontal candies.
Collection of Data – Gathering information from reliable sources on formulation and evolution on periodontal candies.
Selection of crude drug –
a) Clove Oil, b) Amla Powder, c)Guava, d) Cinnamon, e) Alum

Collection Of Crude Drug.
Preparation of material and methods.
Selection of the effective method of preparation.
Experimental design
Formulation and preparation of periodontal candies
Result & discussion
Conclusion
Reference

7. MATERIAL & METHOD

Ingredients

Sr. No	Ingredients	Quantity	Uses
1	Clove	0.5 g	Analgesics
2	Cinnamon	0.4 g	Antibacterial
3	Amla Powder	3.5 g	Antioxidant
4	Guava	02 g	Blood Sugar regulate
5	Alum	0.3 g	Astringent
6	Jaggery	03g	Sweetner

Method of Preparation
1. Weight all the ingredient as per above table.
2. Triturate all the ingredient like clove cinnamon Amla powder powder.
3. Make fine powder of alum and and pass it by sieve
4. Then add it to triturated powder and mix it properly.
5. Then melt the jiggery and add the above powder
6. Take some mould and pour it into the mould.
7. After that freeze it

Apparatus Required
Beaker
Glass rod
Measuring cylinder
Water bath
Spatula
Electronic balance
Mould

8. EVALATION TEST FOR PERIODONTAL CANDY

1. Texture
a. Soft and chewy: A soft and chewy texture can be comfortable for consumers and may help distribute the active ingredients.
b. Easy to dissolve: A candy that dissolves easily in the mouth can help release the active ingredients.

2. Flavor
1. Pleasant taste: A pleasant taste can enhance consumer compliance and enjoyment.
a. Freshness: A refreshing flavor, such as mint or citrus, can help leave the mouth feeling clean.

3. Appearance
1. Attractive color: An attractive color can make the candy more appealing to consumers.
2. Shape and size: A convenient shape and size can make the candy easy to consume on-the-go.

4. Other Considerations
1. Salivation: A candy that stimulates salivation can help wash away bacteria and food particles.
2. Breath freshening: A candy that freshens breath can enhance consumer confidence.

Evolution test
1. In Vitro Tests
a. **Antimicrobial activity**: Test the candy's ability to inhibit the growth of
periodontal pathogens, such as Porphyromonas gingivalis and Aggregatibacter actinomycetemcomitans. Anti-inflammatory activity: Evaluate the candy's ability reduce inflammation in cell cultures or enzyme assays.
2. In Vivo Tests
a. Animal studies: Conducts studies in animal models of periodontal disease to evaluate the candy's effectiveness in reducing inflammation, bacterial load, and tissue damage.
b. Human clinical trials: Conduct randomized controlled trials in humans to evaluate the candy's efficacy in reducing periodontal disease symptoms, such as bleeding on probing, pocket depth, and plaque index.
c. Parameters to Evaluate
1. Gingival index: Assess the severity of gingivitis and inflammation.
2. Plaque index: Evaluate the amount of plaque accumulation.
3. Bleeding on probing: Measure the presence and severity of bleeding on probing.
4. Pocket depth: Assess the depth of periodontal pockets

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Periodental Disease Findings

9. RESULT

The herbal candy formulation, incorporating spices like cinnamon, and cloves, may provide a promising approach to preventing
and managing periodontal disease. The combination of anti microbial, anti- inflammatory, and antioxidant properties of these spices
can help reduce plaque, gingivitis, and bad breath. By developing effective and safe herbal candies, individual scan enjoy a
convenient and tasty way to support their oral health and prevent periodontal disease**.**

10. CONCLUSION

Clove is used to treat various health conditions, including intestinal parasites, migraine headaches, colds, impotence, and gastrointestinal problems such as nausea, vomiting, diarrhea and gas.

The health benefits of clove oil can be attributed to its antimicrobial, antifungal, antiseptic, antiviral, aphrodisiac and stimulating properties.
The oil is used for treating a variety of health disorders including
toothaches, indigestion, cough, asthma, headache, and stress and blood impurities.
Clove is rich in minerals such as calcium, hydrochloric acid, iron, phosphorus, sodium, potassium, and vitamin A and vitamin C.
The most prominent use of clove oil is in dental care. The germicidal properties of the oil make it very effective for relieving dental pain, tooth ache, sore gums and mouth ulcers.
Clove oil contains the compound eugenol, which has been used in dentistry since numerous years.
Gargles with diluted Clove oil help in easing the throat.
The characteristic smell of Clove oil helps removing bad breath.
As a result, clove oil is added to numerous dental products and medications,
Including, mouth washes, and tooth pastes.
Dentists also mix Clove oil with zinc oxide and prepare a white filling material as a temporary alternative to root canal

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