

Exploring the Causes, Symptoms and Management of Toothache: a comprehensive Review

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ABSTRACT

Toothache, a prevalent oral health concern, affects millions of individuals worldwide. This article provides a comprehensive overview of toothache, exploring its common causes, presenting symptoms, and viable management strategies. The primary causes of toothache include dental caries, dental abscesses, gum disease, dental trauma, and tooth sensitivity. The article also delves into the symptoms of toothache, such as sharp or throbbing pain, sensitivity to hot and cold, and discomfort when chewing. The importance of timely dental evaluation and the potential complications of untreated toothache are discussed. Management approaches encompass both at-home remedies, such as over-the-counter pain relievers and saltwater rinses, as well as professional interventions like dental fillings, root canals, and tooth extraction.

Key words: toothache, symptoms, treatment and management

I. INTRODUCTION

Toothache is also known as dental pain or odontalgia, is pain in the teeth or their structures, caused by dental diseases or pain referred to the teeth by non dental diseases. Toothache is a serious problem worldwide. It may present in several ways, none of which is pleasant. The type and nature of the pain experienced is usually an indication of the level of decay of the offending tooth.[1] A toothache is a pain in and around the tooth that is caused by tooth decay, abscessed tooth, damaged filling and infected gums. It is caused when micro organisms survived on the food stuffs, that the individual eats. The micro organisms form on a sticky plaque that attaches itself to the surface of the individual's teeth[2]

Enamel is the hard, outer layer of a tooth and covers a softer inner layer called dentine. Dentine is the tooth's sensitive layer with several microscopic tubes that originate from the center of the tooth. The pulp chamber at the center of the

tooth contains pulp that is made up of blood vessels and nerves. Damages that reaches the dentine can cause discomfort, but as the damage approaches the center it is more likely to cause pain as there is less structure to insulate and protect the pulp.[3]

Dental cavities (carries) are holes in the two outer layer of a tooth called enamel and the dentin. Food particles deposited in the dental cavities encourage bacterial growth and bacterial toxins and foods generate pain[4]. Heat stimulus to the nerves of the dental pulp (inner living tooth tissue) by hot or cold drinks generates sharp pain, whereas bacterial invasion in the pulp damages the nerve cells, deteriorates oral health and causes dull pain.[5]

SIGNS AND SYMPTOMS

Toothache can present with a range of signs and symptoms, varying in intensity and duration. The most common indication of toothache include:

pain: The primary symptom of toothache is pain, which can be sharp, throbbing, or constant. The intensity of the pain may vary from mild discomfort to severe agony, depending on the underlying cause.[6]

Sensitivity: Tooth sensitivity is the another prevalent symptom of toothache. the affected tooth may become sensitive to hot or cold temperatures, making it uncomfortable to consume certain foods and beverages.

Discomfort when chewing: Toothache can cause discomfort or pain while chewing or biting down on food. This can lead to difficulty in eating and may affect one's dietary choices.

swelling and redness: In some cases, the surrounding gum tissue may become swollen or tender. There might be redness or inflammation around the affected tooth, indicating an underlying dental issue.[7]

Bad breath or foul taste: Peristanttoothache can lead to bad breath and an unpleasant taste in the mouth due to bacterial buildup and infection.

Fever and headache: If the toothache is a result of an abscess or severe infection, it can lead to systemic symptoms like fever and headache.

Radiating pain: The pain from a toothache can sometime radiate to the jaw, ear or other parts of the head and neck.

It is important to note that toothache can be caused by various factors, including dental carriers, gum diseases, dental trauma, tooth sensitivity or dental abscesses, the specific symptoms may experienced may vary based on the underlying cause. If you experience persistent or severe toothache, it is essential to seek professional dental evaluation and treatment to identify the cause and receive appropriate care. Early intervention can help alleviate the pain and prevent potential complications associated with untreated toothache.[8]

CAUSES OF TOOTHACHE

1.Tooth Decay: One of the most common causes of toothache is dental caries (cavities). Bacteria in the mouth produce acids that erode tooth enamel, leading to the formation of cavities. When these cavities expose the sensitive inner layers of the tooth, it can result in pain and sensitivity.[9]

2.Gum Disease: Infections of the gums, such as gingivitis and periodontitis, can lead to toothache. As the gum tissues become inflamed and recede, the roots of the teeth may become exposed, leading to pain and discomfort.[10]

3.Dental Abscess: An abscess is a pocket of pus that forms at the root of a tooth or between the tooth and gum. It is often caused by severe tooth decay, trauma, or a bacterial infection. Abscesses can be extremely painful and require immediate dental attention.[11]

4.Tooth Fracture or Cracks: Physical trauma to a tooth, biting down on hard objects, or excessive tooth grinding (bruxism) can cause fractures or cracks in the tooth. These fractures may expose the sensitive inner layers of the tooth, leading to pain.[12]

5.Dental Sensitivity: Tooth sensitivity can occur when the protective enamel on the tooth's surface wears away, exposing the underlying dentin. This can lead to discomfort and pain, especially when consuming hot, cold, sweet, or acidic foods and beverages.[13]

6.Impacted Wisdom Teeth: When wisdom teeth (third molars) don't have enough space to emerge properly, they may become impacted, causing pressure and pain in the back of the mouth.

7.Dental Procedures: Toothache can also be a common side effect of certain dental procedures, such as fillings, root canals, or tooth extractions. The pain is usually temporary and should subside over time.

8.Sinus Infections: Sometimes, sinus infections can cause referred pain in the upper back teeth, giving the sensation of a toothache.

It's essential to consult a dentist if you experience persistent toothache, as they can properly diagnose the cause and recommend appropriate treatment to alleviate the pain and address the underlying issue.

TREATMENT AND MANAGMENT NONOPOID ANALGESICS

Nonopioidanalgesic options include acetaminophen andnon-steroidalanti-inflammatory drugs (NSAIDS).These drugs are very effective trusted source for relieving mild or moderate dental pain and are some of the most frequently recommended analgesics by dentists. Acetaminophen can temporarily relieve mild to moderate pain and fever.

The American Dental Association suggests that NSAIDs are often more effective than other options for reducing dental pain. As such, they typically recommend them as first-line therapy for treating toothache.

These drugs usually work similarly by blockingthe cyclooxygenase enzyme to treat pain and inflammation. This is why doctors refer to these drugs as COX inhibitors.[14]

Examples of NSAIDs a person can take for tooth pain include:

NSAID	Dosage	Risks
Ibuprofen	The recommended dose is 400mg every 4–6 hours. People should not exceed more than 3,200 mg daily.	Ibuprofen may impact the heart, gastrointestinal health, and kidneys. It may also cause skin reactions. These drugs are not advisable for pregnant people from 30 weeks.
Aspirin	The recommended dose is 1–2 tablets	Some people may experience an allergic

	(325mg) every 4 hours, or 3 tablets every 6 hours. People should not exceed 12 tablets, or 3,900 mg, daily.	reaction to aspirin, and it can cause stomach bleeding in some individuals.
Naproxen	Doctors recommend a starting dose of 500mg, then 250 mg every 6–8 hours as necessary. A person should not exceed a daily dose of 1,250 mg.	This drug may impact heart, gastrointestinal, kidney, and liver health and result in skin reactions. Doctors do not advise these for pregnant people from 30 weeks.
Diclofenac	The recommended dose is 100mg per day. People should not exceed unless a doctor advises.	research suggests that taking diclofenac may increase the risk of heart problems. It may also impact gastrointestinal, kidney, and liver health.

OPIOID ANALGESICS

Opioids are a class of painkillers that can reduce pain by binding to opioid receptor. When this occurs, opioids block the body's pain messages sent through the spinal cord. Dental pain is often the reason for a person's first encounter with opioids.

These drugs are effective for relieving pain and are generally safe when people use them for a short time, as a doctor prescribes.[15]

As opioid analgesics require a prescription, a medical professional will advise the dosage that a person requires. Some examples of opioid analgesics that a dentist or doctor may prescribe for dental pain:

Codeine: This option is available as a tablet, and people can take 15–60 mg every 4 hours as necessary, but it should not exceed 360 mg in 24 hours. However, research suggests that codeine is less effective for managing dental pain than nonopioid analgesics. People can also use co-codamol, which contains both codeine and acetaminophen.[17]

Oxycodone: It is advisable to use oxycodone at the lowest effective dosage for the shortest duration. The recommended dosage is 5–15 mg every 4–6 hours as necessary for pain.

Hydrocodone: This option is also available as a tablet that can contain acetaminophen. Depending on the strength of the tablet, a person can take 1–2 tablets every 4–6 hours as necessary. They should not exceed a daily dosage of eight 2.5–5 mg tablets or six 7.5–10 mg tablets.

Morphine: People can take morphine as an oral solution. It is often available in three concentrations: 2, 4, and 20 mg per milliliter. The recommended dosage to start treatment in adults is 10–20 mg every 4 hours.[18]

ANTIBIOTICS

If the cause of the tooth pain is a bacterial infection, then a person will likely receive a course of antibiotics to clear the infection. However, it is important that dentists follow proper guidelines and only prescribe necessary antibiotics to prevent the risk of antibiotic resistance. Some antibiotics that a dentist may commonly prescribe include:

Amoxicillin
clindamycin
azithromycin
doxycycline

some scenarios where antibiotics may be used in the context of a toothache:

1. **Dental Infections:** If a toothache is caused by a bacterial infection, such as a dental abscess, antibiotics may be prescribed. Dental abscesses are pockets of pus that can form at the root of a tooth or between the tooth and the gum. Antibiotics can help to control the infection and prevent it from spreading, but they are usually prescribed in conjunction with dental treatment, such as a root canal or tooth extraction.
2. **Pre- or Post-Dental Procedures:** Dentists may prescribe antibiotics before certain dental procedures, such as extractions or surgery, to prevent infection. They may also prescribe antibiotics after these procedures if there's an increased risk of infection due to the complexity of the procedure or the patient's medical history.
3. **Gum Disease:** In cases of advanced gum disease (periodontitis), antibiotics may be used as part of the treatment plan to help control bacterial infection and inflammation in the gums. However, they are often combined with

other treatments like scaling and root planing (deep cleaning).[16]

TOPICAL ANESTHETICS

Topical anesthetics describe creams or gels that can help reduce pain by numbing a sore area. People can apply them directly to the sore tooth. Traditional topical anesthetics often contain lidocaine or benzocaine as active ingredients.

Benzocaine can help reduce toothache by blocking nerve signals around the painful area. A person can apply benzocaine gels up to 4 times daily or as per the instructions of their dentist or doctor.

1. **Topical Benzocaine Gel:** Benzocaine gel can be applied directly to the affected area of the mouth or gums. It provides localized numbing and can temporarily alleviate toothache pain. Follow the product's instructions for proper application.
2. **Oral Lozenges and Sprays:** Some oral lozenges and throat sprays contain benzocaine, which can help numb the oral tissues, including the affected tooth or gum area. These products are typically used as directed on the packaging.
3. **Dental Procedures:** Dentists may also use benzocaine as a local anesthetic during certain dental procedures, such as fillings, cleanings, or minor oral surgeries, to numb the area and minimize pain during the procedure.[19]

Lidocaine is a local anesthetic that is sometimes used in dentistry to relieve pain associated with toothaches or dental procedures. It works by blocking nerve signals in the body, which temporarily numbs the area where it is applied. Here are some ways in which lidocaine may be used for toothache:

1. **Topical Lidocaine Gel:** Dentists may apply a topical lidocaine gel to the affected area of the mouth or gums to numb the area before performing certain dental procedures, such as filling cavities or placing dental crowns.
2. **Local Anesthetic Injections:** In cases of severe toothache or for more invasive dental procedures like root canals, dentists may administer lidocaine as a local anesthetic through an injection. This numbs a larger area and provides more profound pain relief.
3. **Over-the-Counter Products:** Some over-the-counter oral gels and creams contain lidocaine or similar numbing agents. These products can be used by individuals to temporarily alleviate toothache pain until they can see a dentist.[20]

ALTERNATIVE DRUG FREE OPTION

A person may want to address their toothache with natural remedies. Some options may include:

Saline solution: Using salt water as a mouthwash can help loosen debris between the teeth, which may aggravate the sore tooth. As salt is a natural disinfectant, it can help reduce inflammation.

Cold compress: Wrapping a cold pack in a cloth and then placing it against the side of the face can help to reduce swelling and pain.

Elevation: Resting with the head propped up on a pillow can help to reduce dental pain when lying down.

Avoid triggers: avoid hot, cold, sweet or acidic foods and drinks that can exacerbate tooth sensitivity and pain.

Maintain oral hygiene: gently brush and floss your teeth to ensure proper oral hygiene. Avoid vigorous around the painful area.

Soft diet: stick to soft and easy to chew foods to prevent additional discomfort while eating.

Acupressure: some people find relief through acupressure. Gently applying pressure to certain points on the body, such as the hand or between the thumb and index finger, might help reduce pain perception.

Hydrogen Peroxide Rinse: A diluted hydrogen peroxide solution (1:1 with water) can help reduce oral bacteria and soothe gum inflammation. Swish the mixture in your mouth for a minute and then spit it out.

Rinsing with Baking Soda: A baking soda and water rinse (1:1 ratio) can help neutralize acids in the mouth and reduce pain. Rinse and spit out the mixture after swishing for a short time.[21]

HERBAL METHODS

Clove oil: clove oil contains eugenol, a natural compound with analgesic and antiseptic properties. Applying a small amount of clove oil to cotton ball and placing it near the painful tooth or gum area might provide temporary relief.[22]

Peppermint oil: peppermint oil has a cooling effect and may help reduce pain. Dilute a few drops of peppermint oil in a carrier (such as coconut oil) and apply to the affected area.[23]

Tea tree oil: tea tree oil has antibacterial properties and might help combat infections. Like with other essential oils, dilute a few drops in a carrier oil and apply to the affected area.[24]

Ginger: ginger has anti-inflammatory properties and might help reduce pain. Chew on a small piece of fresh ginger root or make a ginger tea by steeping sliced ginger in hot water.

Turmeric paste: turmeric contains curcumin, which has anti-inflammatory and analgesic property. Make a paste by mixing turmeric powder with a small amount of water and applying it to the affected area.[25]

Guava leaves: guava leaves have anti-inflammatory and antimicrobial properties. Chewing on fresh guava leaves or using them to make a mouthwash might provide some relief.

Aloe vera gel: aloe vera has soothing property and might help alleviate discomfort. Apply a small amount of pure aloe vera gel to the affected area.[26]

Plantain leaves: plantain leaves have been used for their potential anti-inflammatory effects. Chewing on or placing crushed plantain leaves near the painful area might offer some relief.[27]

Cayenne pepper: cayenne pepper contains capsaicin, which can temporarily reduce pain by numbing nerves. Mix a small amount of cayenne pepper with water to create a paste and apply it to the area.

PREVENTION

The best way to prevent toothache is to keep teeth and gums healthy. Good oral hygiene is an important step in maintaining oral health.

- Brushing teeth twice a day with a fluoride toothpaste.
- Cleaning between teeth daily using floss or sticks.
- Eating a balanced diet that limits sugary beverages and snacks.
- Visiting a dentist regularly.
- Avoiding tobacco products.[28]

II. CONCLUSION

In conclusion, this review article has thoroughly examined the multifaceted realm of toothache. By delving into its underlying causes, diverse symptoms and available treatment options, a comprehensive understanding of this common dental woe has been achieved. The exploration of historical and modern remedies has illuminated the evolution of dental care, while emphasizing the paramount role of prevention through oral hygiene and regular dental check-ups.

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