

# HAVE YOU HAD AN INCREASE OF "CRACKED TOOTH SYNDROME"?



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There has been a significant increase in the incidence of cracked teeth due to high levels of stress and anxiety due to the COVID-19 pandemic. Cracks allow bacterial invasion which can lead to inflammation and infection. Diagnosis and treatment of cracked teeth is one of the most fascinating and

challenging aspects of Endodontics. Fascinating because it, at times, requires the collaboration of the general dentist with multiple specialists. Challenging because there are various views on the detection and treatment of it. In fact, there are different opinions on the management and preservation of cracked teeth when the crack extends onto the root surface. Some dentists extract cracked teeth because they think the prognosis is hopeless. However, according to Kang et al., the preservation of cracked teeth with subgingival extensions can have a success rate ranging from 66.7% to 88.3% at 21 years. In this article, I will be focusing on the diagnostic and treatment challenges related to cracked teeth.

## Definition of a Cracked Tooth

It is important to distinguish between a "cracked tooth" and "vertical root fracture". These terms are often used interchangeably in dental literature. According to Rivera et al., a cracked tooth is defined as a longitudinal incomplete fracture, which starts from the coronal tooth structure and extends apically. There can also be mesiodistal extensions that involve the marginal ridges and proximal surfaces. Cracks may extend onto the root surface, but not always. In contrast, vertical root fractures are usually found in endodontically treated teeth, occur in the buccolingual direction, and are considered hopeless requiring an extraction. Cracks usually start coronally and extend apically, whereas vertical root fractures are opposite, originating apically.

Cracking can affect any tooth in the dental arch, however, they are primarily seen in the posterior dentition with more cracks occurring in the mandible. Factors which negatively affect the success and survival rate of endodontically treated cracked teeth are multiple cracks in multiple directions, deep probing depths of more than 6mm, terminal location of tooth in the dental arch, pre-operative pain, presence of class II cavities and pulp necrosis at the initial examination. Mandibular molars are more prone to cracks due to the protruding palatal cusp of the maxillary molars, especially if it is the only remaining tooth in the quadrant. Maxillary premolars are also more prone to cracks due to the steep inclines on the non-functional cusp which leads to high torque forces during mastication.

## Cracking the Code on Cracked Teeth - Diagnostic Steps

The term "longitudinal" fracture is used because the crack typically changes over time and distance. The dynamic nature of the cracks cause challenges with diagnosis and treatment of these teeth. **Visual**

**examination is considered the main technique for crack examination and is ideally done with an electronic microscope.**

Here are diagnostic steps that should be taken when evaluating cracks:

- **What are the patient's symptoms?** Cracked teeth are often characterized by acute pain on mastication and brief pain with cold. Grainy, tough foods can be particularly challenging.
- **Dental history?** Did the patient bite on something hard, have a history of clenching and grinding, chew ice, or cracked other teeth?
- **Can we see the crack on detailed examination?** Magnification, special dyes, restoration removal and transillumination should be used.
- **What is the status of the pulp and periapical tissues?** Vitality testing, periodontal probing, and the tooth sloth are invaluable. Is there irreversible pulpitis or pulp necrosis?
- **What do the radiographs show?** Typically, a cracked tooth shows no signs on an x-ray however a vertical root fracture can show a j-shaped radiolucent lesion.
- **Is surgical assessment needed?** This is used as a last resort only in the most challenging cases.

## Different Cracks= Different Treatment Options

There are 5 different types of fractures that each require different treatment.

1. Craze Lines - These are cracks that only affect the enamel. There is typically no pain. No treatment is needed.
2. Fractured Cusp - This is a complete or incomplete fracture usually directed both mesiodistally and buccolingually. Typically, it crosses the marginal ridge and also the buccal or lingual groove. A restoration is typically present. This fracture generally extends to the cervical third of the crown or root and ends at or just below the gum line. Symptoms include mild pain on biting with a normal



pulp and normal periapex. Treatment is removal of the fractured cusp and restoration of the tooth with a full crown. Prognosis is usually good. Root canal is only needed if the pulp chamber is affected or there is irreversible pulpitis.

3. Greenstick Fracture/Cracked Tooth - This is an incomplete fracture that is located in the crown portion of the tooth only or may extend from the crown to the proximal root. Growth/propagation of the crack includes both mesial and distal marginal ridges and is seen extending onto the distal root surface. A restoration is usually not present and the crack is more centered when viewed from the proximal. This type of crack is more likely to cause pulpal and periapical pathosis as it extends apically. The patient may feel acute pain when chewing or a sharp, brief pain when exposed to cold. Transillumination works great to detect a cracked tooth as the

