

### Pulpal and Pulp Space Diagnoses

Diagnostic term	+/- Secondary to	Definition and clinical presentation including symptoms	Response to diagnostic tests and findings from imaging procedures	Management recommendations to preserve the tooth
Clinically normal pulp		A clinical diagnostic category in which the patient has no symptoms from the tooth in question that can be attributed to the pulp as the source.	Intact tooth or restored tooth. Early/initial caries may be present, but not close to pulp on a 2D radiograph. Responds within normal limits (i.e., same as control teeth) to pulp testing. Response may be reduced if secondary or tertiary dentine formation, pulp stones induced by normal aging, restoration, or previous vital pulp treatment. No apical radiolucency.	No endodontic intervention is required.
Hypersensitive pulp	-Secondary to: Non-carious dentine exposure	A clinical diagnostic category in which the pulp is generally healthy, but its response is heightened due to exposed dentinal tubules or transitory post-interventional pulpal responses (e.g., recent restoration, gingival recession).  Associated with Mild or moderate symptoms triggered by cold/sweet stimuli	Responds with a heightened (increased intensity, but not prolonged) response to thermal testing, tactile stimulus or stream of air. No apical radiolucency.	No intervention, or pulpal protection, depending on the aetiology.

Mild pulpitis	-Secondary to: Moderate or deep caries Moderate or deep restoration or crown with or without microleakage Trauma (dental hard tissue fracture with or without pulp exposure) Cracked tooth External cervical resorption Other cause (e.g., tooth wear, operator-induced or local non-infectious cause)	A clinical diagnostic category based on subjective and objective findings indicating that the pulp is mildly inflamed and is not infected.  Associated with no, mild, or moderate symptoms triggered by cold/sweet stimuli.	A range of responses from normal to heightened (increased intensity, but not prolonged) with pulp testing. Radiographic evidence of caries close to pulp on 2D radiograph (inner third or quarter) but radiopaque hard tissue visible on radiograph between pulp and carious lesion. No apical radiolucency present/transient apical breakdown in cases of trauma. Apical radiopacity may be present.	Depending on severity, dental restoration or vital pulp treatment. Cracked tooth may require cuspal coverage. Root treatment unlikely to be required.
Severe pulpitis	-Secondary to: Extremely deep caries Extremely deep restoration or crown with or without microleakage Trauma (dental hard tissue fracture with pulp exposure) Cracked tooth External cervical resorption Other cause (e.g., tooth wear, operator-induced)	A clinical diagnostic category based on subjective and objective findings that may indicate an increased progressive level of pulpal inflammation and possibly infection of the coronal pulp portion. May or may not be associated with a range of symptoms triggered by thermal stimuli or be spontaneous in nature.  Associated with no, mild, moderate, or severe symptoms.	A range from normally responsive to prolonged pain to pulp testing (thermal). The tooth may or may not be tender to percussion and/or palpation. Restoration or caries considered to be close to pulp on radiograph, or other indication of bacterial invasion close to pulp. Apical radiolucency (typically seen in younger patients) or radiopacity may be present on radiographic images.	Depending on severity of symptoms and objective findings, including intraoperative assessment of the disease progression within the pulp space and restorative considerations, pulpotomy (partial or full) or root canal treatment.

Pulp necrosis	-Secondary to: Deep/Extremely deep caries Extremely deep restoration or crown with microleakage Trauma (dental hard tissue fracture with or without pulp exposure) Cracked tooth External cervical resorption Other cause (e.g., tooth wear, operator-induced)	A clinical diagnostic category indicating loss of vitality of the dental pulp. Pulp may be partly or completely necrotic.	Generally, no response to pulp testing (thermal or electric). Restoration, traumatic loss of dentine, tooth wear or caries may appear close to the pulp on radiograph. Tooth may or may not be tender to percussion and/or palpation. An apical radiolucency may be present.	Interventions include regenerative endodontic treatment and root canal treatment.
	-Secondary to: Trauma (resulting in injury to supporting structures)	A clinical diagnostic category indicating rupture or crushing of the nerve-blood vessel bundle to the tooth (e.g., lateral/intrusive luxation, avulsion).	Generally, no response to pulp testing up to 3 months post-trauma. Root canal obliteration signifies repair process. Arrested root development without periapical radiolucency maybe a sign of sterile pulp necrosis. Apical radiolucency and radiographic signs of external inflammatory root resorption (i.e., signs of root canal infection) may be present depending on the time between the event and the diagnosis.	The pulp may revascularize depending on the type of trauma and apex maturity. If the probability of revascularization is low, root canal treatment or regenerative endodontic procedure is indicated to prevent infection/inflammatory resorption.
Inconclusive pulp status		A clinical diagnostic category is which the pulp is unresponsive and its condition is uncertain (e.g., post-trauma, advanced	The pulp is usually non-responsive to pulp testing (thermal or electric). No apical radiolucency. Tooth	No intervention, but ongoing monitoring for evidence of pulp necrosis is required.

		tertiary dentine deposition, extensive restoration/crown). Associated with no or unclear symptoms (e.g., tenderness).	may or may not be tender to percussion and/or palpation.	
Previous regenerative endodontic treatment		A clinical diagnostic category indicating that the tooth has been endodontically treated with regenerative endodontic treatment (e.g., revitalization procedure).	May be responsive to pulp testing (thermal, electric) and may show radiographic evidence of material in pulp chamber. Root canal obliteration by reparative hard tissues is possible. Apical radiolucency may or may not be present. May be evidence from comparative radiographs of continued root development.	Depending on history, clinical and radiographic findings may or may not require intervention. Intervention on evidence of root canal infection is root canal treatment.
Previously initiated root canal treatment		A clinical diagnostic category indicating that the tooth has had root canal treatment started.	Generally, unresponsive to pulp testing (thermal, electric). Radiographic signs of intracanal dressing may or may not be present in one or more canals, but no obturation material. Apical radiolucency may or may not be present.	Intervention with root canal treatment.
Previously obturated root canal		A clinical diagnostic category indicating that the tooth has a root canal filling placed in at least one canal.	Not responsive to pulp testing (thermal, electric). Radiographic evidence of obturation material (or retrograde filling material) in at least part of the root canal space. Apical	Depending on history, clinical and radiographic findings may or may not require intervention. Intervention (e.g., non-surgical or surgical root canal treatment) if there is evidence of infection (e.g., swelling or pain from tooth

			radiolucency may or may not be present.	that is not attributed to other cause) expanding radiolucency, or a newly emerging apical radiolucency.
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**Definitions:**

Control teeth – Adjacent or contralateral teeth that are employed for comparative clinical testing.

(Pulp) diagnostic term - The term used to describe the state of the vital pulp, or its absence, the condition of the pulp space and/or pulp replacement after regenerative procedures.

Moderately deep caries - Caries reaching halfway to inner third through dentine, with a clear zone of hard or firm dentine between the caries and the pulp, which is readily radiographically detectable when located on an approximal or occlusal surface. There is no or low risk of pulp exposure during operative treatment.

Deep caries - Caries reaching the inner quarter of dentine, but with a zone of hard or firm dentine between the caries and the pulp, which is radiographically detectable when located on an approximal or occlusal surface. There is a risk of pulp exposure during operative treatment (ESE, 2019).

Extremely deep caries - Caries penetrating the entire thickness of the dentine, radiographically detectable when located on an approximal or occlusal surface. Pulp exposure is unavoidable during non-selective operative caries removal (ESE, 2019).

Normal response to pulp testing - A diagnostic procedure to determine pulpal status can be performed with electrical, mechanical or thermal methods to assess the pulp's response to the stimulus (AAE, 2020). A normal response would include a sensate response for 1 or 2 seconds after the stimulus, that is not exaggerated and lingering compared with adjacent or contralateral control teeth.

Symptoms - Something that a person feels or experiences that may indicate that they have a disease or condition. Symptoms can only be reported by the person experiencing them. They cannot be observed by a health care provider or other person and do not show up on medical tests.

<https://www.cancer.gov/publications/dictionaries/cancer-terms/def/symptom>

Mild symptoms - Heightened and potentially prolonged reaction to cold, warm and sweet stimuli that can last up to 5 seconds then subsides (Wolters et al., 2017)

Moderate symptoms - Clear symptoms, heightened and prolonged reaction to cold, which can last for great than 5 seconds, pain that can be more or less suppressed with pain medication (Wolters et al., 2017)

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Severe symptoms - Severe spontaneous pain and lingering pain (vs adjacent or contralateral teeth) reaction to warm and/or cold stimuli, often, sharp to dull throbbing pain, patients may have trouble sleeping because of the pain. Tooth is sensitive to touch and/or percussion (Wolters et al., 2017)

Vital Pulp Treatment - Strategies aimed at maintaining the health of all or part of the pulp (ESE, 2019)

**References:**

European Society of Endodontontology (ESE) developed by; Duncan HF, Galler KM, Tomson PL, Simon S, El-Karim I, Kundzina R, Krastl G, Dammaschke T, Fransson H, Markvart M, Zehnder M, Bjørndal L (2019) European Society of Endodontontology position statement: Management of deep caries and the exposed pulp. *Int Endod J.* 52, 923-934. doi: 10.1111/iej.13080.

NHI National Cancer Institute. NCI Dictionary of Cancer Terms <https://www.cancer.gov/publications/dictionaries/cancer-terms/def/symptom> [accessed on 7th June 2025].

Wolters WJ, Duncan HF, Tomson PL, Karim IE, McKenna G, Dorri M, Stangvaltaite L, van der Sluis LWM (2017) Minimally invasive endodontics: a new diagnostic system for assessing pulpititis and subsequent treatment needs. *Int Endod J.* 50, 825-829. doi: 10.1111/iej.12793.

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