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# Diagnosis and Management of Dentin Hypersensitivity



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# Disclosure

I have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation

# Outline

- ▶ Definition
- ▶ Epidemiology
- ▶ Etiopathogenesis
- ▶ Diagnosis
- ▶ Management:
  - At-home treatment
  - In-office treatment
- ▶ Conclusion

# Dentin Hypersensitivity (DH)

- ▶ Sharp, acute pain that results from the exposure of dentin surfaces to stimuli such as thermal, evaporative, tactile, osmotic, chemical or electrical.
- ▶ Cannot be associated with any other dental disease.

# Epidemiology

- ▶ 20 to 50 y/o
- ▶ Females
- ▶ Buccal
- ▶ Canines and premolars
- ▶ High prevalence in patients with periodontal disease



Rees JS, Addy M. A cross-sectional study of dentine hypersensitivity. *J Clin Periodontol.* 2002;29:997-1003. doi: 10.1034/j.1600-051X.2002.291104.x.

Rees JS, Addy M. A cross-sectional study of buccal cervical sensitivity in UK general dental practice and a summary review of prevalence studies. *Int J Dent Hyg.* 2004;2:64-69. doi: 10.1111/j.1601-5029.2004.00068.x.

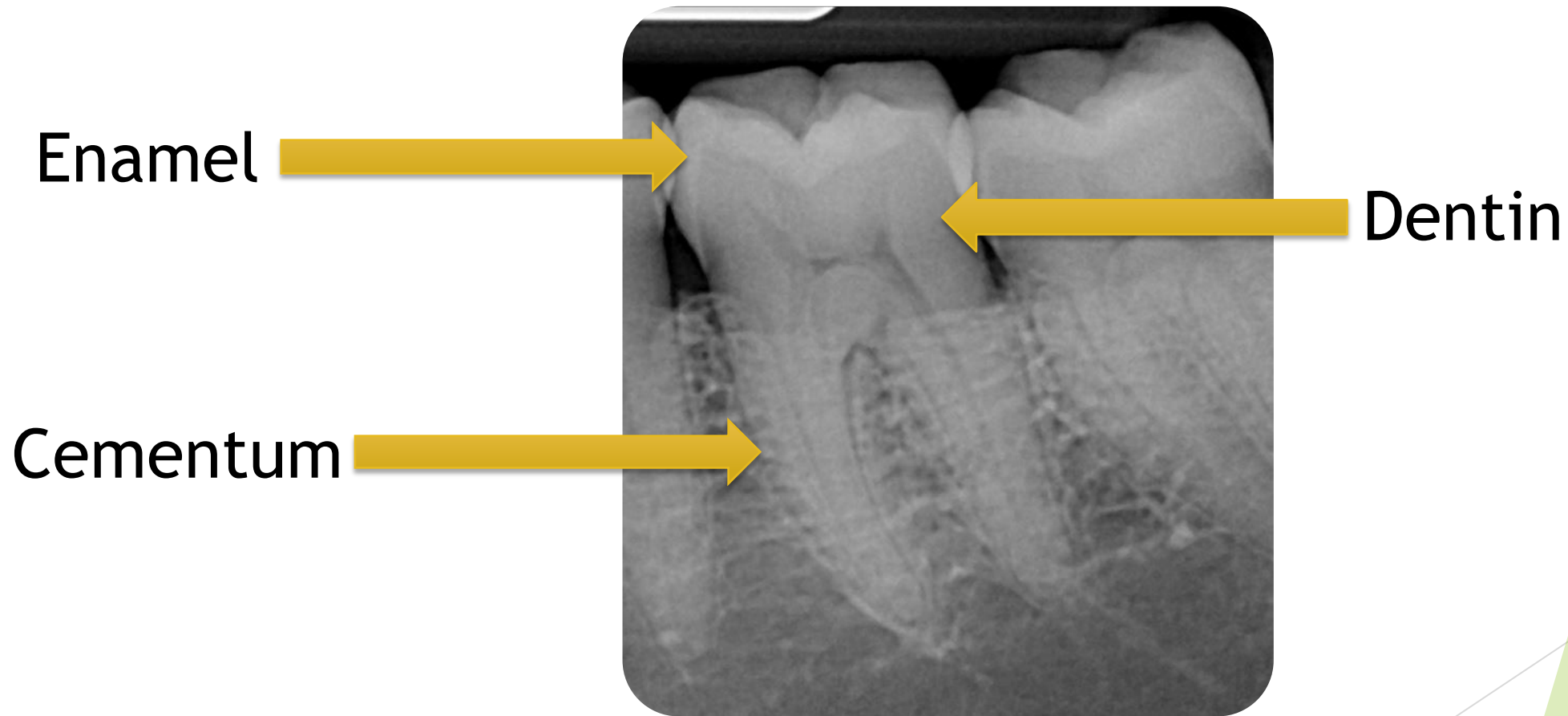
Amarasena N, Spencer J, Ou Y, Brennan D. Dentine hypersensitivity in a private practice patient population in Australia. *J Oral Rehabil.* 2011;38:52-60. doi: 10.1111/j.1365-2842.2010.02132.x.

Flynn J, Galloway R, Orchardson R. The incidence of hypersensitive teeth in the west of Scotland. *J Dent.* 1985;13:230-236. doi: 10.1016/0300-5712(85)90004-1.

Gillam DG, Aris A, Bulman JS, Newman HN, Ley F. Dentine hypersensitivity in subjects recruited for clinical trials: clinical evaluation, prevalence and intra-oral distribution. *J Oral Rehabil.* 2002;29:226-231. doi: 10.1046/j.1365-2842.2002.00813.x.

# Etiopathogenesis

- ▶ Anatomy of the tooth:



Justin Felix, Aviv Ouanounou. Dentin hypersensitivity: Etiology, Diagnosis, and Management  
Compendium of Continuing Education in Dentistry. 2019; 40(10): 653- 657.

# Pathogenesis

- ▶ Localization

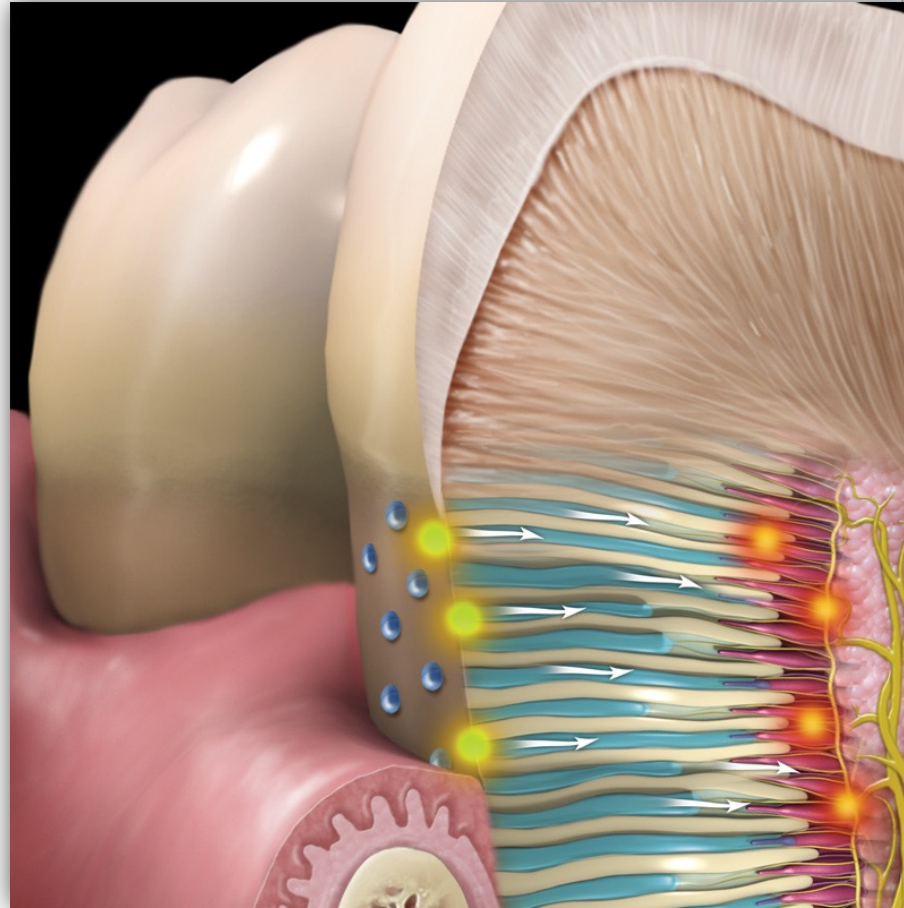


- ▶ Initiation



# Etiology of DH

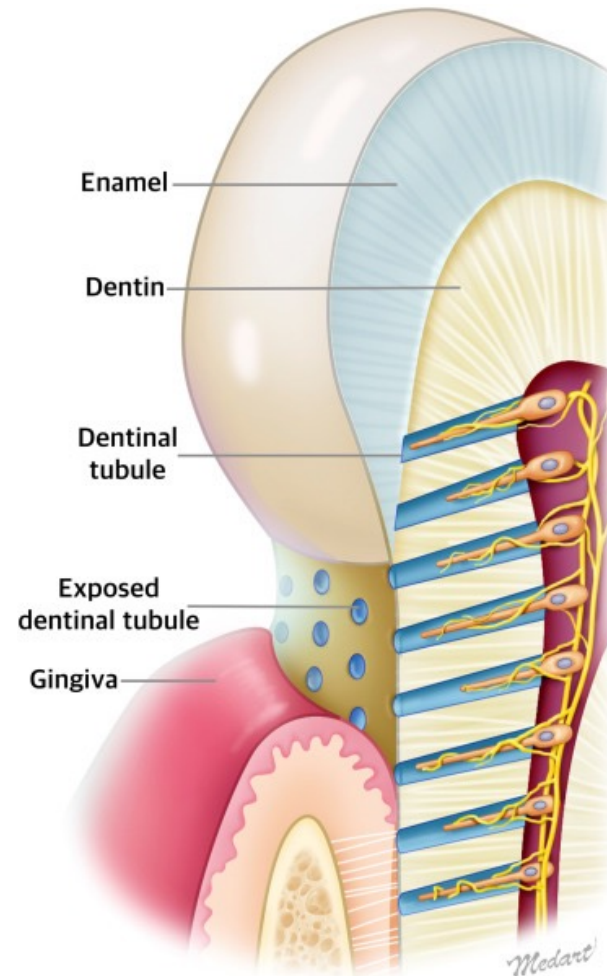
- ▶ Direct innervation theory
- ▶ Odontoblast receptor
- ▶ Fluid movement/ Hydrodynamic theory





# Hydrodynamic Theory

- ▶ Widely accepted theory
- ▶ Dr. Bannstrom 1964
- ▶ Movement of fluids
- ▶ Open tubules
- ▶ Stimulate A-delta fibers



Ji Won Kim, Joo- Cheol Park. Dentin hypersensitivity and emerging concepts of treatment. Journal of Biosciences. 2017 59(4): 211-217.

# DH Causes



**Gingival  
recession**



**Enamel loss**

# Gingival recession

- ▶ Physiological causes
- ▶ Incorrect tooth brushing technique
- ▶ Periodontal disease
- ▶ Periodontal therapy
- ▶ Frenulum insertion
- ▶ Teeth malposition
- ▶ Lack of keratinized gingiva
- ▶ Thin biotype
- ▶ Tooth dehiscence
- ▶ Orthodontic treatment
- ▶ Trauma from occlusion

Susin C, Haas AN, Oppermann RV, Haugejorden O, Albandar JM. Gingival recession: epidemiology and risk indicators in a representative urban Brazilian population. *J Periodontol.* 2004;75(10):1377-1386. doi:10.1902/jop.2004.75.10.1377

## Enamel loss



**Attrition**



**Abrasion**



**Erosion**



**Abfraction**

Davari AR., Ataei E., Assarzadeh H. Dentin Hypersensitivity: Etiology, Diagnosis and Treatment; a Literature Review. J Dent Shiraz Univ Med Sci, Sept. 2013; 14(3): 136-145.

Justin Felix, Aviv Ouanounou. Dentin hypersensitivity: Etiology, Diagnosis, and Management Compendium of Continuing Education in Dentistry. 2019; 40(10): 653- 657.

# Clinical features

- ▶ Acute pain
- ▶ Short duration
- ▶ Most common complaint: cold stimuli

# Diagnosis of DH

- ▶ Thorough patient history and clinical examination.
  - ▶ Look for exposed dentin.



# Differential diagnosis

- ▶ Cracked tooth syndrome
- ▶ Fractured restoration
- ▶ Fractured tooth
- ▶ Dental caries
- ▶ Acute hyperfunction of teeth
- ▶ Palatal-gingival groove
- ▶ Hypoplastic enamel
- ▶ Congenital open cemento-enamel junction
- ▶ Atypical facial odontalgia
- ▶ Pulpitis



# Prevention

- ▶ Remove etiological factors
- ▶ Diet
- ▶ Tooth brushing methods
- ▶ Plaque control
- ▶ Occlusal splint

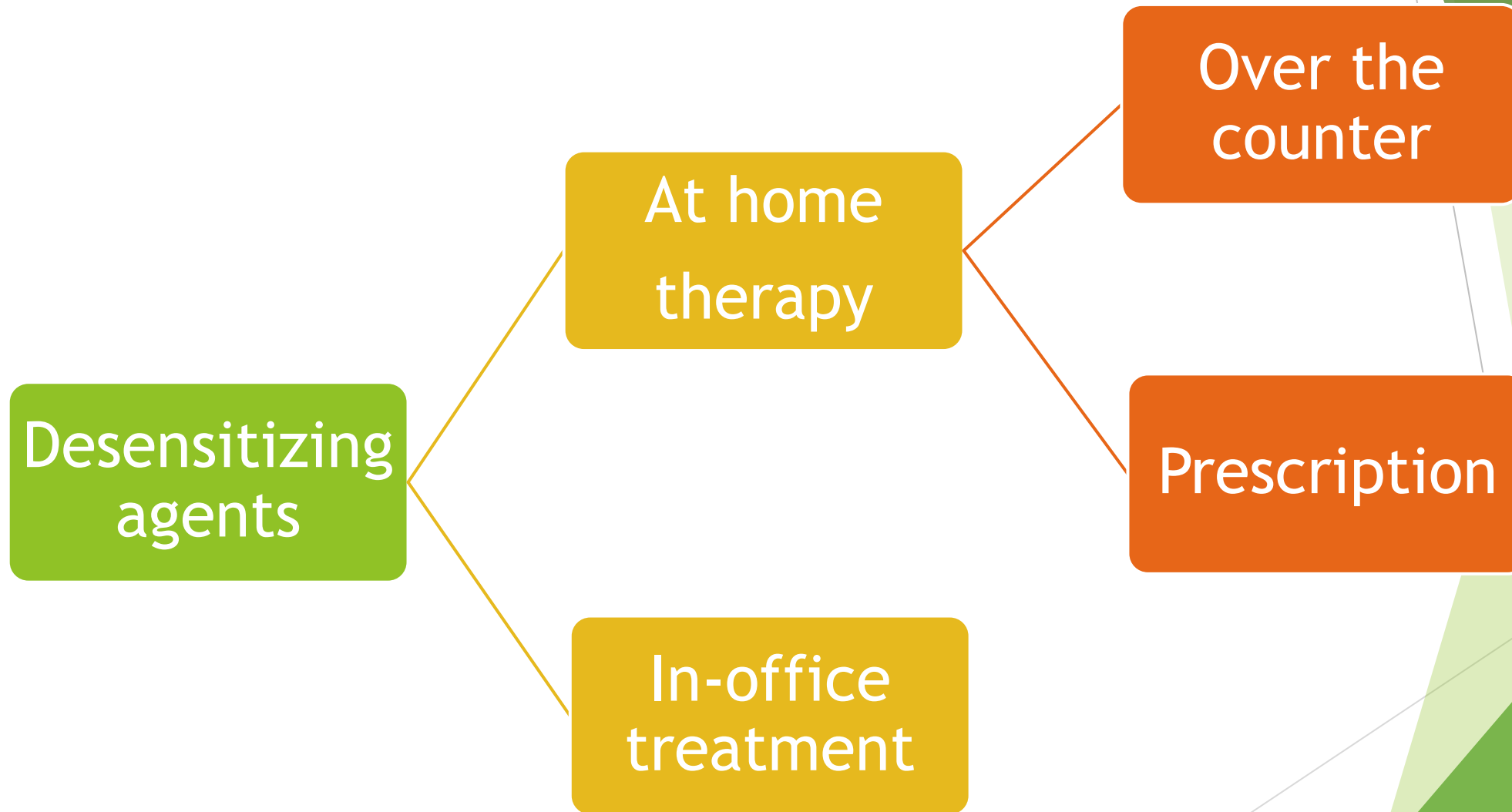




# Desensitizing agents characteristics

- ▶ Provide relief
- ▶ Non-irritating
- ▶ Biocompatible
- ▶ Painless
- ▶ Simple to apply
- ▶ Not stain

# Mode of administration



# At home therapy Over the counter toothpastes

Potassium  
nitrate 5%  
Sodium fluoride  
0.15-0.24%

Fluoride 0.10%  
Calcium sodium  
phosphosilicate  
5%

Fluoride free  
Arginine and  
Calcium  
carbonate

Ayad F, Berta R, De Vizio W et al. Comparative study of two dentifrices containing 5% potassium nitrate on dentinal sensitivity: a twelve week clinical study. J Clin Dent 1994 5: 97- 101.  
Schiff T, Dotson M, Cohen S et al. Efficacy of a dentifrice containing potassium nitrate, soluble pyrophosphate, PVM/MA copolymer, and sodium fluoride on dentinal hypersensitivity: a twelve-week clinical study. J Clin Dent 1994 5: 87- 92.

# At home therapy Over the counter mouthwashes

Alcohol free

Sodium Fluoride 0.02-0.05%

Oxalate

Arginine 0.8%

# Toothpastes studies

## ▶ Elias Boneta et al (2011)\*

8% Arginine and  
1450ppm sodium  
monofluorophosphate  
Calcium carbonated  
base

5% Potassium  
nitrate and  
1450ppm sodium  
fluoride  
Silica base

Negative control:  
1450ppm  
Fluoride  
di-calcium  
phosphate base

## ▶ West et al (2015): Efficacy of professionally and self-administered agents\*\*

\*Elias Boneta AR, Ramirez K, Naboja J, et al. Efficacy in reducing dentine hypersensitivity of a regimen using a toothpaste containing 8% arginine and calcium carbonate, a mouthwash containing 0.8% arginine, pyrophosphate and PVM/MA copolymer and a toothbrush compared to potassium and negative control regimens: an eight-week randomized clinical trial. *J Dent.* 2013;41 Suppl 1:S42-S49. doi:10.1016/j.jdent.2012.11.011

\*\*West NX, Seong J, Davies M. Management of dentine hypersensitivity: efficacy of professionally and self-administered agents. *J Clin Periodontol.* 2015;42 Suppl 16:S256-S302. doi:10.1111/jcpe.12336

# At home therapy Prescription toothpastes

CCP-ACP

Sodium Fluoride  
1.1%  
Potassium Nitrate  
5%

Miglani S, Aggarwal V, Ahuja B. Dentin hypersensitivity: Recent trends in management. J Conserv Dent. 2010;13(4):218-224. doi:10.4103/0972-0707.73385

Schiff T, Dotson M, Cohen S et al. Efficacy of a dentifrice containing potassium nitrate, soluble pyrophosphate, PVM/MA copolymer, and sodium fluoride on dentinal hypersensitivity: a twelve-week clinical study. J Clin Dent 1994 5: 87- 92.

# In-office treatment Non-invasive options

## Varnishes

Sodium fluoride  
5%

CCP-ACP

## Cavity varnishes

Strontium base  
desensitizing

Glutaraldehyde  
HEMA

# Invasive treatment for DH

- ▶ Glass ionomer cements
- ▶ Composites





# Invasive treatment for DH

- ▶ Mucogingival surgery

- ▶ Lasers



Bilichodmath R, Kumar R V, Bilichodmath S, Sameera U. Diode laser in the treatment of dentinal hypersensitivity: A reliable approach. J Dent Lasers [serial online] 2018 [cited 2020 May 16];12:56-62. Available from: <http://www.jdentlasers.org/text.asp?2018/12/2/56/248000>

Leybovich M, Bissada NF, Teich S et al. Treatment of noncarious cervical lesions by a subepithelial connective tissue graft versus a composite resin restoration. Int J Periodontics Restorative Dent 2014 34: 649- 654.

# Invasive treatment for DH

- ▶ Root Canal Treatment



Justin Felix, Aviv Ouanounou. Dentin hypersensitivity: Etiology, Diagnosis, and Management Compendium of Continuing Education in Dentistry. 2019; 40(10): 653- 657.

# Conclusions

- ▶ Dentin hypersensitivity is a prevalent problem among patients.
- ▶ The most common initial cause is gingival recession.
- ▶ To treat the condition properly, it is necessary to identify the risk factors and causes of the sensitivity.
- ▶ Dental professionals must be knowledgeable about signs and symptoms of dentin hypersensitivity in order to diagnose the problem, educate, and treat patients.
- ▶ There are many treatment modalities for dentine hypersensitivity, including self-administered agents and professionally applied agents. Arginine, stannous fluoride, calcium sodium phosphosilicate and strontium self-administered toothpastes are effective in pain reduction in dentine hypersensitivity.
- ▶ Professionally applied products appear effective in the treatment of dentin hypersensitivity but there are not enough studies that compare their effectiveness.

