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ΕΛΛΗΝΙΚΗ ΕΤΑΙΡΕΙΑ ΠΕΡΙΟΔΟΝΤΟΛΟΓΙΑΣ ΚΑΙ ΟΔΟΝΤΙΚΩΝ ΕΜΦΥΤΕΥΜΑΤΩΝ

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study

Effectiveness of surgical root coverage on dentin hypersensitivity

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Background

Dentin hypersensitivity is described as a short or transient sharp pain arising from exposed dentin in response to mechanical, thermal, chemical, or osmotic stimuli. It manifests itself on average in 11.5% of patients, although there is vast heterogeneity among studies.

The aetiology of dentin hypersensitivity is multifactorial and gingival recession is considered a major predisposing factor that leads to the exposure of cervical and root dentin.

Treatment approaches, including desensitizing agents (potassium nitrate, arginine) and laser therapy, aim at reducing the neural transmission and sealing the dental tubules. Surgical root-coverage techniques are also proposed to reduce dentin hypersensitivity, notably the coronally advanced flap (CAF) or the tunnel technique, with or without the adjunct of a connective tissue graft (CTG), xenogeneic collagen matrix (XCM), or acellular dermal matrix (ADM).

However, there is a lack of evidence on the existence of a threshold value between root exposure and dentin hypersensitivity, the effectiveness of surgical root-coverage procedures in suppressing hypersensitivity, and the association between surgical outcomes and a reduction in hypersensitivity.

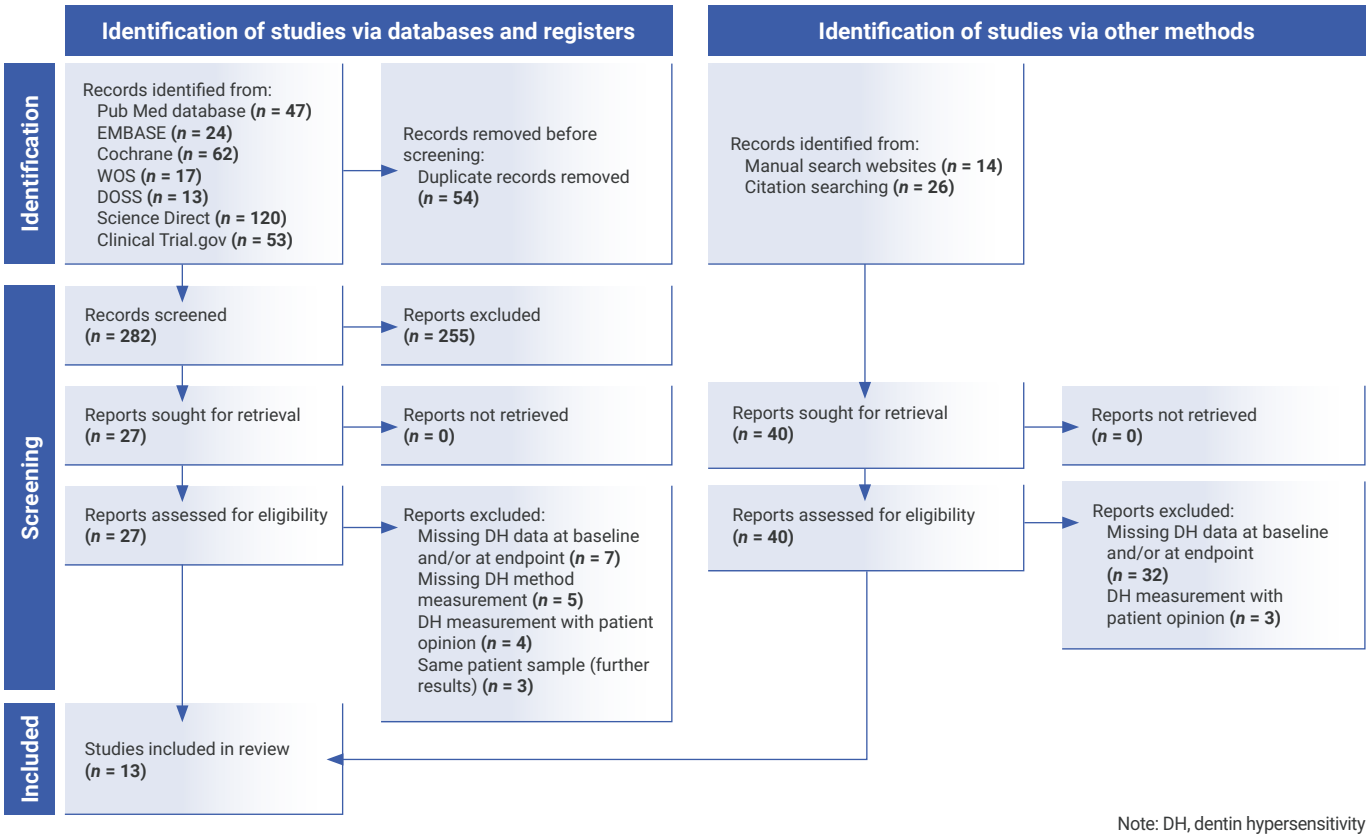
Aim

The aim of this systematic review and meta-analysis was to assess the effect of surgical root coverage on dentin hypersensitivity associated with gingival recession.

Materials & methods

- A systematic review/meta-analysis of randomised controlled trials (RCTs) was performed from January 2000 to March 2022, evaluating:
  - the proportion of patients who were free of dentin hypersensitivity after surgery; and
  - the association between the suppression of dentin hypersensitivity and different root-coverage variables: recession reduction (RecRed), percentage of root coverage, gain in keratinized-tissue width (KTW), and gain in thickness of keratinized tissue (TKT).
- In total, 701 patients aged over 18 years with dental hypersensitivity on one or more teeth associated with gingival recession (1,086 recessions) of class I, II (Miller) or RT1, RT2 were included.
- The presence or absence of dentin hypersensitivity per subject (evaluated by air-evaporation stimulus) was assessed before and after the surgical root-coverage procedure within the same group.
- The random-effects model and the inverse-variance method were used to perform the meta-analysis.
- In addition, the authors performed a quality analysis to assess risk of bias with a funnel plot and Peters' test. Meta-regressions of different variables (RecRed, percentage of root coverage, KWT gain and TKT gain), and subgroup analysis on different techniques were used to explain heterogeneity.

Figure: Flow chart of the searchprocess (Page et al., 2021).



Note: DH, dentin hypersensitivity

Results

- Thirteen clinical trials were included in the study.
- Several surgical root-coverage techniques were assessed for dental-hypersensitivity suppression, including the CAF technique – with or without CTG or another adjuvant (ACM, Emdogain, etc...) – and the tunnel technique with CTG.
- 70.8% of the patients were free of dentin hypersensitivity after root-coverage surgery.
- In univariate meta-regressions regarding the reduction in dentin hypersensitivity, a significant association was found for both RecRed (estimate = 0.66 [0.10–1.23], p = .022, R^2 = 14.45%) and percentage of root coverage (estimate = 0.04 [0.01–0.08], p = .012, R^2 = 29.54%), whereas none was observed for KTW and TKT gains.
- In sub-group meta-analysis, CAF+CTG (73.3% [65.6–79.8]) induced statistically better results in terms of the reduction of dentin hypersensitivity than CAF+XCM (61.4% [51.7–70.3]) (p = .048), while no significant differences were noticed in the sub-groups of CAF+CTG and CAF alone (p = .718), and CAF+XCM and CAF alone (p = .226).

Limitations

- Dentin hypersensitivity was evaluated as a secondary outcome in all the included RCTs. Moreover, the pre-surgical and post-surgical characteristics of hypersensitivity (intensity, duration) were not available.
- Only the type of recession was assessed, which excluded the presence of non-carious lesions and their concomitant treatment. In addition, a threshold value between root coverage and the reduction in dentin hypersensitivity and the long-term stability of the results was not mentioned.
- No consensus protocol to evaluate dentin hypersensitivity exists, so an inconsistency among the protocols of different studies was observed.

Conclusions & impact

- More than two thirds of the patients initially affected by dentin hypersensitivity were free of it after the root-coverage procedure.
- After root-coverage surgery, the remained exposed root surface was inversely proportional to the expected frequency of the suppression of dentin hypersensitivity.
- Root-coverage surgery seems to be an effective treatment for dentin hypersensitivity, after elimination of aetiological factors.
- Further research is needed to consider potential differences in terms of dentin-hypersensitivity reduction at recession sites, whether or not they are associated with non-carious cervical lesions.

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