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study

A novel surgical approach for combined intra-suprabony defects

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Background

Periodontal regeneration through new attachment is the ultimate goal in the regenerative treatment of advanced periodontal lesions. Initial approaches to surgical management of such lesions included the use of extensive open-flap-type procedures combined with barrier membranes. However, flap dehiscence and membrane exposure were common complications because of factors such as inadequate flap mobility and failure to achieve primary closure. To minimise the risk of membrane exposure and maintain interproximal tissue integrity, "minimally invasive" surgical procedures – including papillae-preservation flaps – have been advocated.

Recently, a novel approach – the non-incised papillae surgical approach (NIPSA) – has been investigated for the regenerative treatment of deep infra-bony defects. The advantages of NIPSA are papilla preservation, marginal-tissue adaptation promoting a space for the clot, wound stability, and primary healing.

Aims

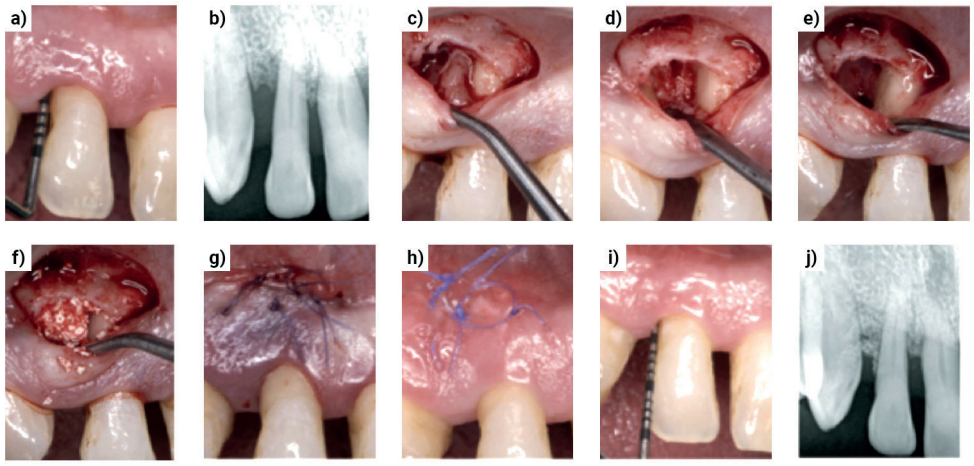
The aim of this study was to evaluate the effectiveness of the NIPSA procedure as a periodontal reconstructive technique in the management of combined intra-suprabony defects.

Materials & methods

- The study is a case series that evaluated the NIPSA surgical technique in a group of patients recruited over a four-year period from a private practice in Madrid (Spain).
- Inclusion criteria required: no relevant systemic conditions, a diagnosis of periodontitis, full-mouth plaque and bleeding scores <20%, non-surgical therapy and compliance with maintenance for at least one year, one residual interproximal pocket (PPD >5mm) with bleeding on probing, and horizontal bone loss plus an intrabony defect (bone crest-CEJ distance >4mm).
- Exclusion criteria included: third molars and teeth unsuitable for endodontic or restorative reasons.
- Clinical measurements including probing pocket depth, clinical attachment level, and recession were recorded prior to surgery and 12 months after. A measurement of supra-alveolar attachment gain (SUPRA-AG) was also derived. Wound closure was assessed one week after surgery and classified as complete or incomplete closure, or necrosis of the interproximal tissue.
- Steps of this surgical protocol (see figure) included:
  - pre-surgical micro-instrumentation of the superficial extent of the periodontal pocket;
  - an apical oblique/horizontal incision made in the buccal aspect of the alveolar mucosa on healthy cortical bone as separate from the papillae and marginal gingivae as possible;
  - coronal pulling of the papillae with a micro-papillae elevator to increase space provision;
  - hard-tissue grafting with a composite graft of enamel matrix derivative and bovine xenograft;
  - primary wound closure via the double-suturing technique.
- Clinical measurements at baseline and at the one-year-review were made by the same operator.

Figure

a) Pre-operative probing depth with firm marginal tissue following non-surgical therapy; (b) pre-operative peri-apical radiograph; (c) horizontal incision with flap reflected and papillae pulled coronally; (d) defect configuration following debridement; (e) enamel matrix derivative in situ; (f) composite graft EMD and xenograft; (g) primary closure with double sutures; (h) complete wound closure one week post-operation; (i,j) 12-month probing depth and peri-apical radiograph.



Results

- 20 patients (12 men, eight women) contributed one defect each. The age range of participants was 30-60 years. Five subjects were smokers, seven former smokers, and eight non-smokers. Teeth included were: 10 incisors, five canines, three premolars, and two molars.
- Baseline measurements of initial defects were:
  - probing pocket depths (8.15mm ± 2.48mm);
  - clinical attachment loss (9.25mm ± 2.71mm);
  - recession (1.1mm ± 0.85mm).
- The group demonstrated the following changes in clinical parameters between baseline and 12 months:
  - probing pocket depth reduction (5.6 ± 2.48mm; $p < 0.001$);
  - clinical attachment gain (5.9mm ± 2.38mm; $p < 0.001$);
  - recession reduction (0.25mm ± 0.44mm; $p < 0.05$).
- 90% of subjects had attachment gain of ≥4mm and 85% of subjects had pocket-depth reductions of ≥4mm. SUPRA-AG (1.9mm ± 1.74mm) demonstrated a positive tendency indicative of complete resolution of the intrabony defect.
- The NIPSA approach demonstrated complete wound closure in 85% of cases and between cases of complete and incomplete wound closure there was no statistically significant difference in measured clinical outcomes. In no cases were there any interproximal tissue necrosis.

Limitations

- The case-series design limits generalisability of findings to the wider population.
- The lack of a control group or comparison group also limits interpretations of findings.
- There was a limited description of patient recruitment/selection, so this may be a potential source of bias.
- The use of a radio-opaque bone substitute material and absence of histo-morphometric analysis limits the accurate assessment of defect changes.
- The lack of calibration or blinding of the examiner for the clinical measurements may have affected outcome measures.
- The findings of the study may not be applicable to the broad range of periodontal defects associated with periodontal disease because only one specific defect type was investigated.

Conclusions & impact

- **Within the limitations of this study, it can be concluded that the NIPSA technique may be a promising surgical technique in the management of combined intra-suprabony periodontal defects.**
- **The novel approach utilised in this study demonstrated positive results in all clinical parameters measured and favourable rates of primary closure.**
- **Randomised controlled clinical trials (RCTs) are required to investigate the efficacy of this novel technique in comparison with other established techniques in periodontal regenerative surgery.**

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