D. PERIODONTICS:

SYNTHETIC BONE GRAFTS
Periograf and Synthograft: Boom or Bust

Murray Arlin, D.D.S., Dip. Perio (1978)

Let's start with a position statement made by the Committee on Research in Periodontology developed in October 1983.

> Synthetic grafting materials have received significant publicity during the last few years. Alleged claims of success have been expressed regarding non-resorbable hydroxylapatite and resorbable beta-tricalcium phsophate periograf and synthograft implants. From the available literature it is evident that synthetic implant materials can be used as **fillers** of bony defects since they are well tolerated and seem to produce no foreign body reaction in short-term studies. However, any claims of increased bony regenerations, effectiveness in defect resolution, or predictability seem generally unsubstantiated at this time. The potential environment is questionable since most of the reports have shown only connective tissue encapsulation of the implanted particles. Furthermore, the objective of new attachment procedures is not only to regenerate alveolar bone, but also the attachment apparatus. Claims of regeneration of the periodontium cannot be substantiated from the reported literature at this time.
>
> Concern should be expressed about the use of synthetic graft materials by dental practitioners who have limited experience in periodontics. No currently available synthetic grafting material is a substitute for properly executed periodontal therapy., The synthetic materials deserve further investigation with long-term clinical and histological evaluations, but it is premature to present them to the general dental profession without reservations. Their use must be considered experimental since their effectiveness and predictability have not yet been substantiated. At the present time, synthetic grafting materials promoted for use in periodontics should only be considered as fillers in the treatment of intrabody defects. The potential value or drawbacks of such "fillers" is currently unknown.

I have been disturbed by the misleading marketing claims concerning the alleged efficacy of synthograft and periograf. For example, "clinical results with synthograft have been outstanding in studies conducted over five years". (To my knowledge, no such published studies exist.) (ii) ..... "if you haven't already... you will soon try synthograft and find that it can truly revolutionize important aspects of your practice". (Really? I'm not aware of anyone's practice that has been revolutionized.) The periograf group (Sterling-Winthrop Research Institute – distributors Cooke-Waite Laboratories) very carefully chose the wording used in their ads. For example: (i) "a valuable adjunct in the management of osseous defects" (ii) "restores periodontal defects and supports new bone growth" (Restores them to what?, certainly not the periodontal tissues that were there initially.) (iii) "success judged by (amongst other modalities) "mobility analysis". (Mobility analysis has never been published as being one of the measured parameters in any of the periograf studies I have seen.)

BIOLOGICAL CONSIDERATIONS:

Ideally, an osseous graft should be one that **"induces"** the host to produce its own new bone, periodontal ligament, cementum and gingiva while resorbing the graft material. However, by virtue of the composition of the synthetic grafts, this "induction principle" is not possible. At best, they are **"osteoconductive"**., That is the only function as a biologically acceptable scaffold upon which host bone may grow.

The "bone/graft" and "graft/root" interfaces have been investigated histologically. The periograf ad displays a histological section demonstrating a biologically tolerated graft particle at the "bone/graft" interface. Other independant histological studies have shown however that there is of tremendous significance.

To play the devil's advocate, I would hypothesise that the space between the graft and root is narrow enough to obstruct a periodontal probe but not the ingress of bacterial plaque. If this were true, then the plaque would be inaccessable to the currette by virtue of the graft obstruction. We might, therefore, be better off at least leaving ourselves access to the roots if we cannot achieve an attachment or "seal" at the graft/root interface.

CLINICAL CONSIDERATIONS:

It is disturbing to hear the widespread misconceptions amongst too many dentists concerning the indications and surgical techniques in utilizing these materials. A common mistake is to assume that the lost support associated with periodontally terminal teeth can be restored with these grafts. As an extreme illustration, I have heard on several occasions of dentists who thought the material was to be carried and condensed into the soft tissue pocket without having to raise a flap. Perhaps, these examples demonstrate what can happen when **"mighty media markets miracle materials"**.

The indications for considering these materials are:

(1) with defects not correctable by resection techniques due to esthetics and/or anatomical reasons

(2) where osseous resection may cause undue loss of support of adjacent teeth

(3) where there exists insufficient bone support on a strategic abutment

(4) where the osseous defect is amenable to graft containment (verticle defects).

This last point is important. A tooth with extensive horizontal bone loss is not amenable to a graft as "crestal opposition" is not generally possible (nor do furcations respond well).

A surgical protocol as outlined below should be strictly adhered to if performing an osseous grafting procedure.

- oral hygiene and effective plaque control
- removal of all etiological factors
- stabilization of teeth (if necessary)
- incision on healthy tissue away from defect
- complete removal of all pathologic tissue
- complete removal of all pathologic tissue
- do not overfill or underfill defect with grafting material
- place material in close proximity to the host bone
- encourage bleeding into the defect
- pack graft into the defect
- achieve good tissue coverage
- provide antibiotic coverage.

The following clinical cases demonstrate what I consider to be fairly good results within the limitations of what we can presently expect with synthetic grafts.

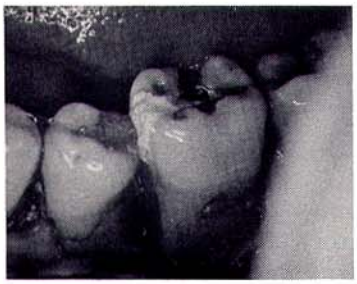

FIG.1. Case I - pre-op defect

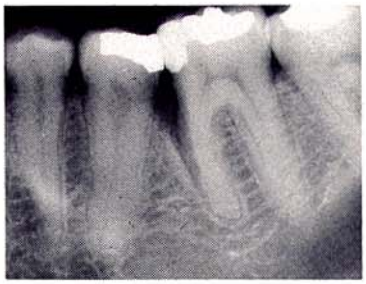

FIG.2. Case I - pre-op defect

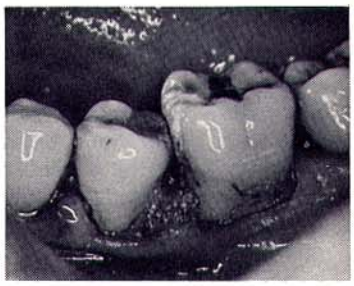

FIG.3. Case I - Immediate post implantation

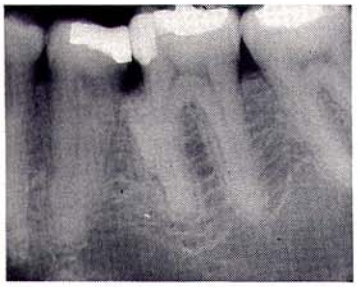

FIG.4. Case I - Immediate post implanation radiograph

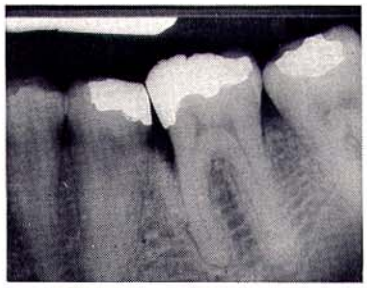

FIG.5. Case I - 6 weeks post implantation

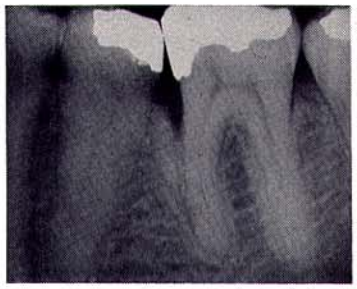

FIG.6. Case I - 11 months post implantation

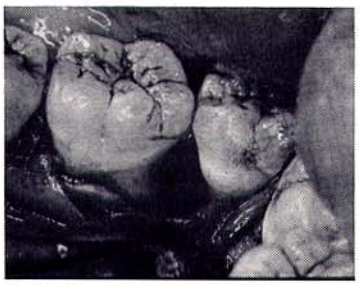

FIG.7. Case II - pre-op defect

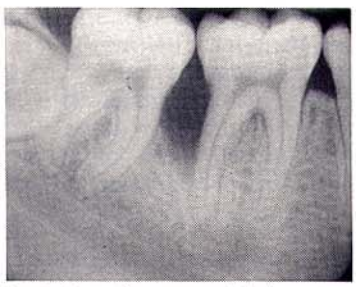

FIG.8. Case II - pre-op defect

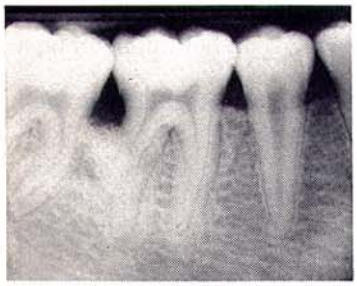

FIG.9. Case II - Immediate post implantation

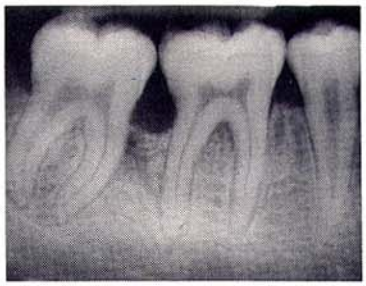

FIG.10. Case II - 2 weeks post implantation

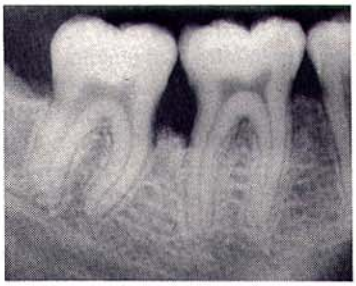

FIG.11. Case II - 6 months post implantation