

# Treatment of a periodontal intrabony pocket in man by a mucoperiostal free graft combined with a calcium phosphate implant

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## SUMMARY

A two-walled intrabony pocket was treated by a mucoperiostal free graft interposed between the curetted root surface and a calcium phosphate implant. The eighteen months follow up radiography showed complete healing of the bone defect, a normal periodontal ligament space, an uninterrupted lamina dura and a well-formed septum. The use of a mucoperiostal free graft may supply the wounded area with different cells such as fibroblasts, indifferenciated mesenchymal cells, periostal cells, intercelular fibers and biochemical substances such as glucoaminoglycans, proteoglycans etc...

## RÉSUMÉ

Une poche parodontale à trois murs a été traitée par l'interposition d'un greffon mucopériosté entre la surface radiculaire surfacée et un implant de phosphate de calcium. A dix-huit mois, la radiographie de contrôle a montré un comblement total du défaut osseux, un espace ligamentaire normal, une lamina dura continue et un septum interdentaire bien formé. Il est possible que le greffon mucopériosté agisse comme un réservoir de cellules (fibroblastes, cellules mésenchymateuses indifférenciées, cellules périostées), de fibres intercellulaires et de substances biochimiques (glycoaminoglycane, protéoglycane etc...).

## INTRODUCTION

Several allogenic and autogenous bone sources have been employed by periodontists to promote regeneration of alveolar bone (Hiatt et al., 1973; Dragoo and Sullivan, 1973; Schallhorn, 1977; Sepe et al., 1978). Data obtained from a clinical study comparing implanted (durapatite) and non-implanted intra-osseuse defects revealed greater filling of implanted sites at 6 month surgical reentry (Rabalais et al., 1981). During the last two decades, flap combination with techniques aimed at delaying or preventing apical migration of the dento-gingival epithelium during healing has been reported (Björn, 1961; Björn

et al., 1965; Ellegaard et al., 1974, 1976). Only the cells of the periodontal ligament allowed to repopulate the root surface after periodontal therapy by using Millipore filters or Gortex membranes, which were placed in such a way to prevent dento-gingival epithelium and gingival connective tissue participation in the healing process.

In the present case, a mucoperiostal free graft was interposed between the root surface and a calcium phosphate implant in order to promote new connective attachment by supplying the wounded area with different cells.

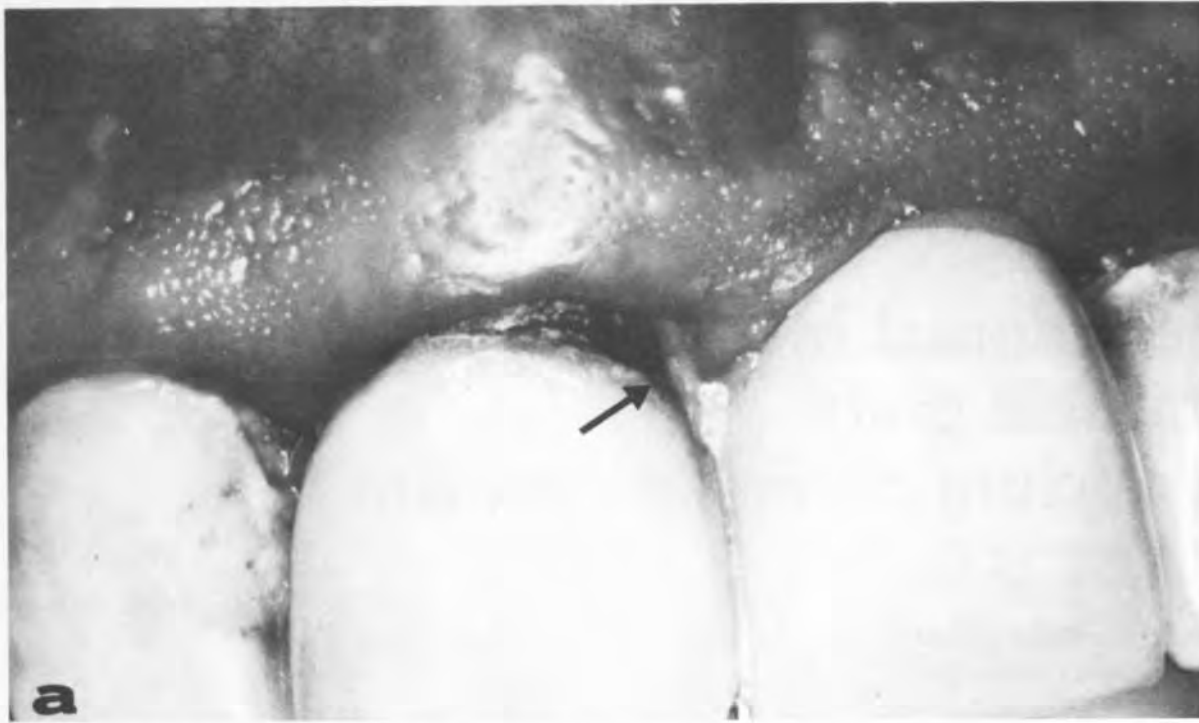
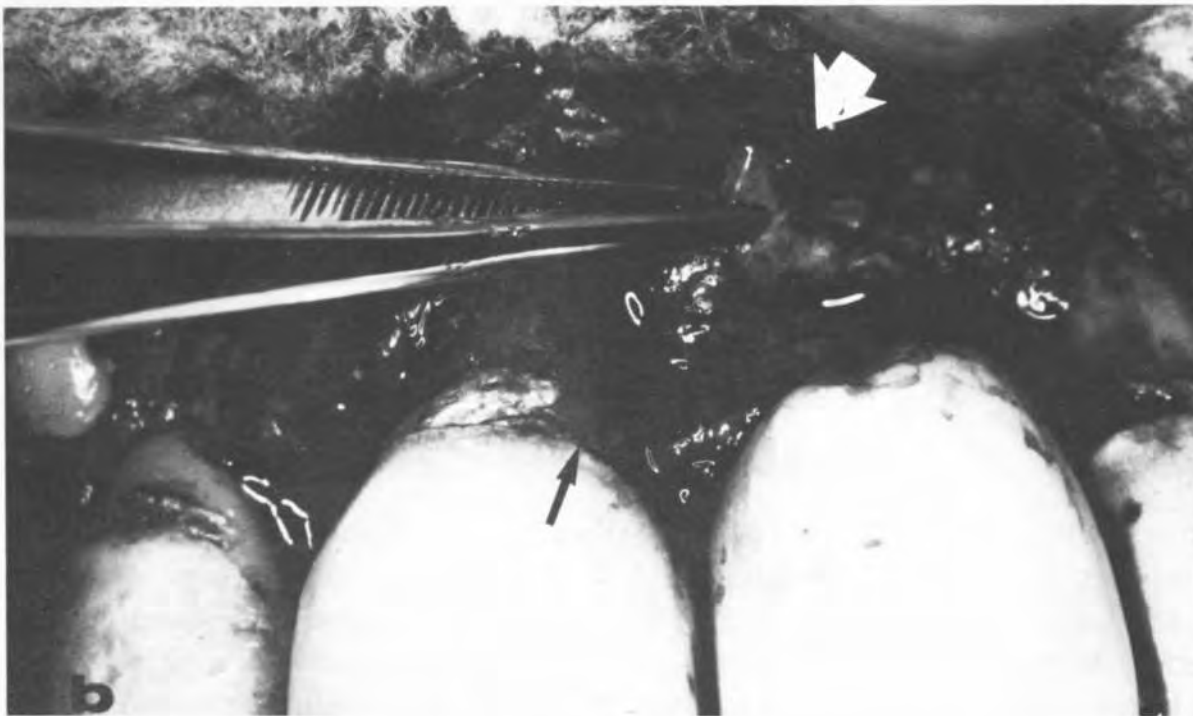


Fig. 1

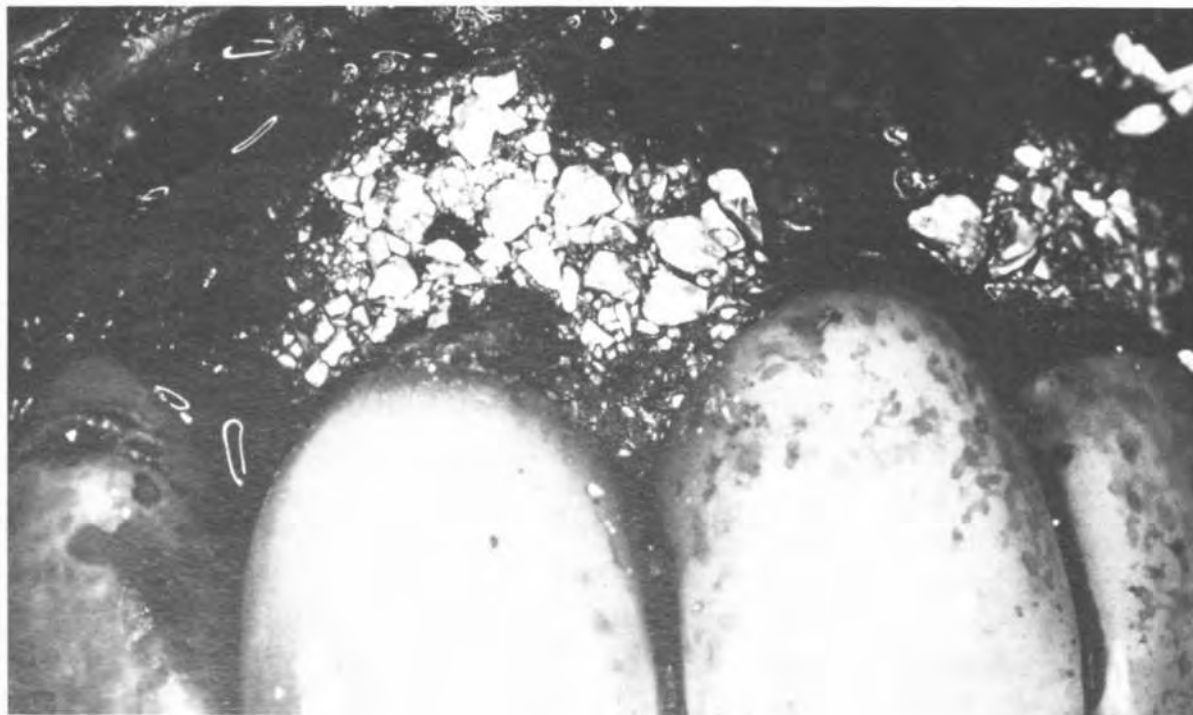
a — Clinical view. Suppuration on the mesial side of the right upper central incisor.

a — *Vue clinique. Suppuration au niveau de la face mésiale de l'incisive centrale supérieure.*



b — Bone resorption (arrow) Mucoperiosteal free graft removal (large arrow).

b — *Défaut osseux (flèche). Prélèvement du greffon mucopériosté (flèche large).*



c — Calcium phosphate implant packed in the osseous defect.

c — *Comblement du défaut osseux avec un implant de phosphate de calcium.*

## EXPERIMENTAL PROCEDURES

A 34-year old female presented in the department of periodontology at Nantes University Hospital. Clinical examination revealed a 7 mm probing depth on the mesial side of the right upper central incisor, supporting an anterior bridge. Suppuration was noted and gingiva was oedematous (Fig. 1a). Radiographic examination showed bone resorption on the mesial side of the right upper central incisor (Fig. 3a). The use of calcium phosphate implant was decided to attempt restoration of the lost supporting tissues. Interposition of a mucoperiosteal free graft between the root surface and the calcium phosphate implant was suggested on the basis of results obtained by Nyman et al. (1982) and Gottlow et al. (1984). The patient's consent was obtained after she had been informed that the experiment was a pilot one and that no prognosis could be proposed.

Surgical exploration of the affected area was thoroughly debrided and curetted. The root surface was planned and cleaned of plaque and calculus. Three weeks after the initial preparation, the involved area was surgically exposed by reflecting buccal thickness flap.

A partial thickness flap was performed on the neighbouring area. Vertical incisions were placed mesial to the right and left bicuspids (Fig. 2a). The intrabony aspect of the defect narrowed considerably at its base. A two wall intrabony pocket was present. The probing depth was 5 mm. The granulation tissues were removed and the osseous defect was curetted. A mucoperiosteal free graft was removed from the neighbouring site (Fig. 1b) and placed against the curetted root surface in such a way that the periosteal side of the graft was in contact with the calcium phosphate implant packed in the osseous wound (Figs. 1c, 2b). The operative site was closed with 0000 silk sutures and covered with non-eugenol surgical dressing. On the eighth post-operative day, the pack was changed and left for seven more days. 15 days after surgical procedures, good healing was noted and sutures were removed.

## RESULTS

At two month routine visit, radiographic examination showed expulsion of the whole calcium phosphate implant and new bone developing at the base of the initial osseous defect (Fig. 3b). At six month follow up visit, radiographic examination showed complete filling of the initial osseous defect with a periodontal

ligament space continuous with the initial ligament space which existed apically at the base of the initial bone resorption (Fig. 3c).

At eighteen month follow up visit, the probing depth was 1.5 mm and the gingiva presented a healthy aspect. Radiographic examination showed complete healing of the bone defect, a normal periodontal ligament space, an uninterrupted lamina dura and a well-formed septum (Fig. 3d).

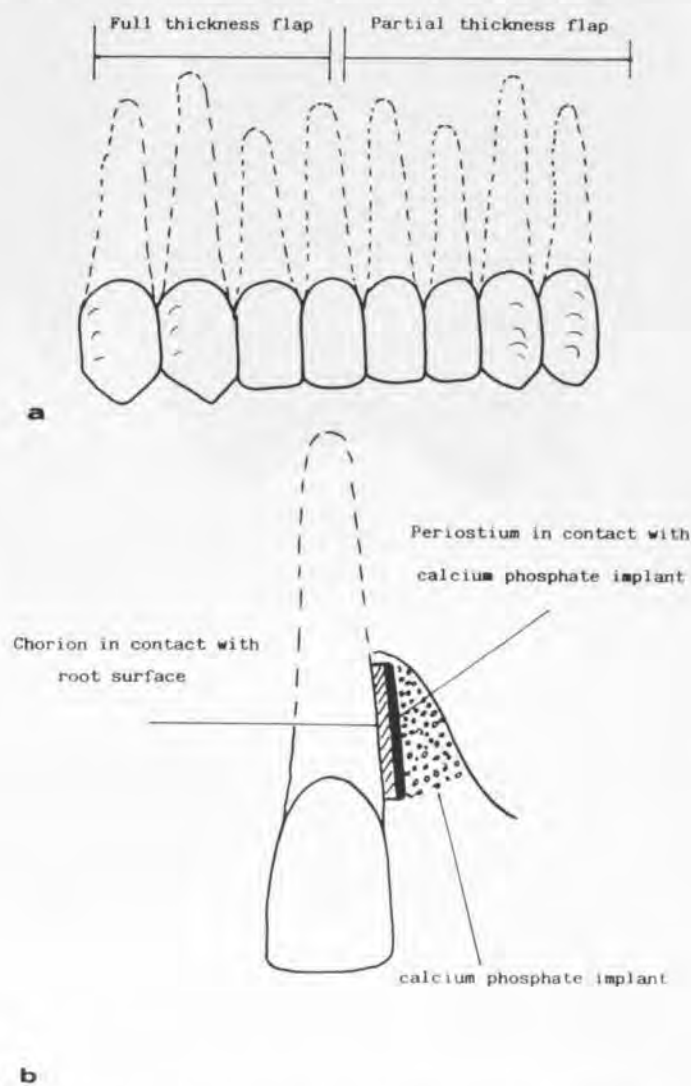


Fig. 2  
 a — Limits of full thickness flap and partial thickness flap.  
 a — Limites du lambeau mucopériosté et du lambeau d'épaisseur partiel.  
 b — Mucoperiosteal free graft interposition between root surface and calcium phosphate implant.  
 b — Interposition du greffon mucopériosté entre la surface radiculaire et l'implant de phosphate de calcium.

## DISCUSSION

Hydroxyapatite has been used to fill osseous defects resulting from periodontal disease. Biocompatibility and non-expulsion of the implanted material have been reported (Rabalais et al., 1981; Froum et al., 1982; Moskow and Lubar, 1983; Stahl et al., 1983; Yukna et al., 1984, 1985; Synder et al., 1984; Baldock et al., 1985; Benque et al., 1985; Kenney et al., 1985; Ganeless et al., 1986; Frank et al., 1987; Ogilvie et al., 1987).



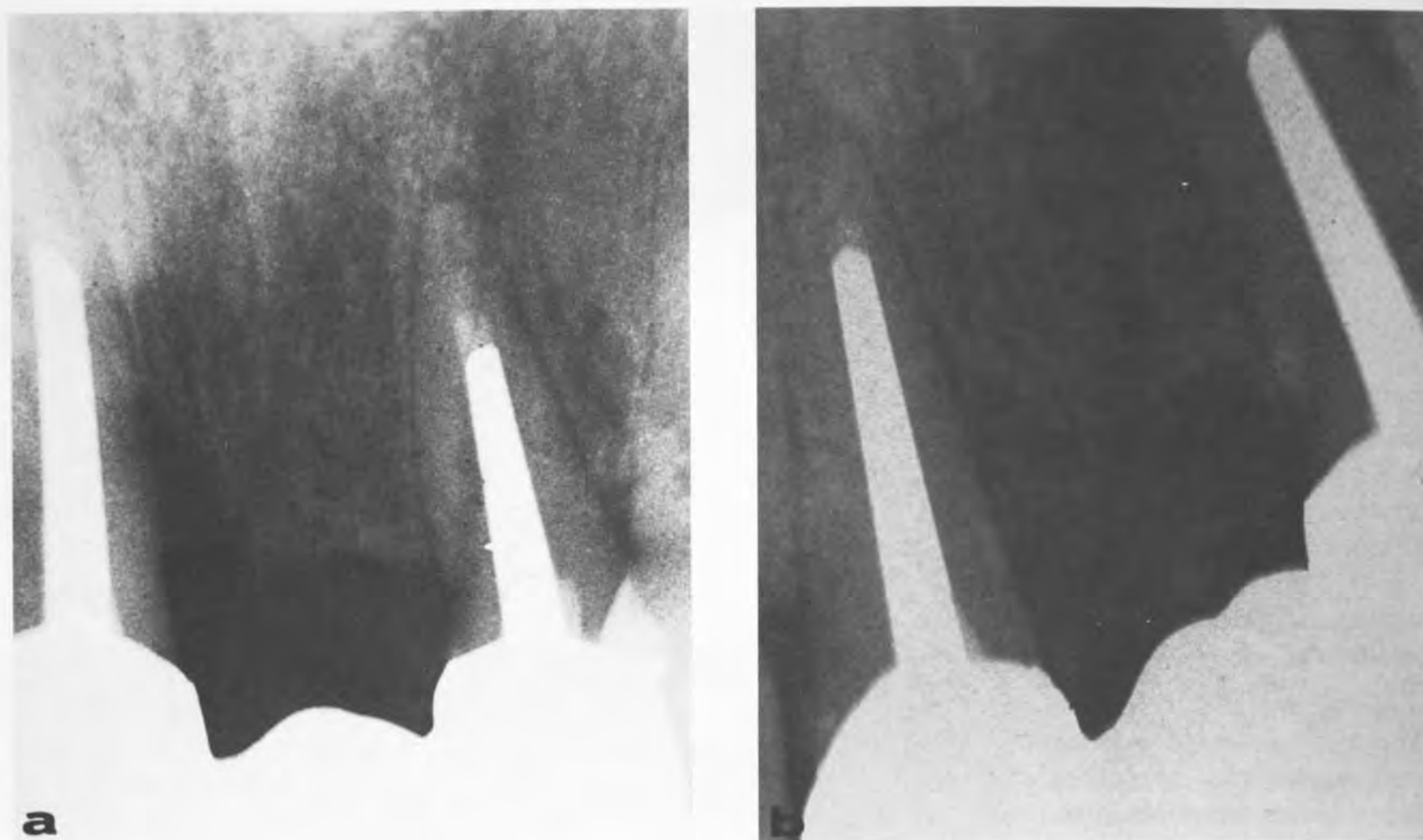


Fig. 3

Radiographic examination — *Examen radiographique*

New bone formation on and inbetween hydroxyapatite particles was demonstrated by surgical reentries (Sender et al., 1984), by histological investigations using light microscopy (Moskow and Lubar, 1983; Benque et al., 1985) and electron microscopy (Ganeless et al., 1986; Frank et al., 1987; Ogilvie et al., 1987).

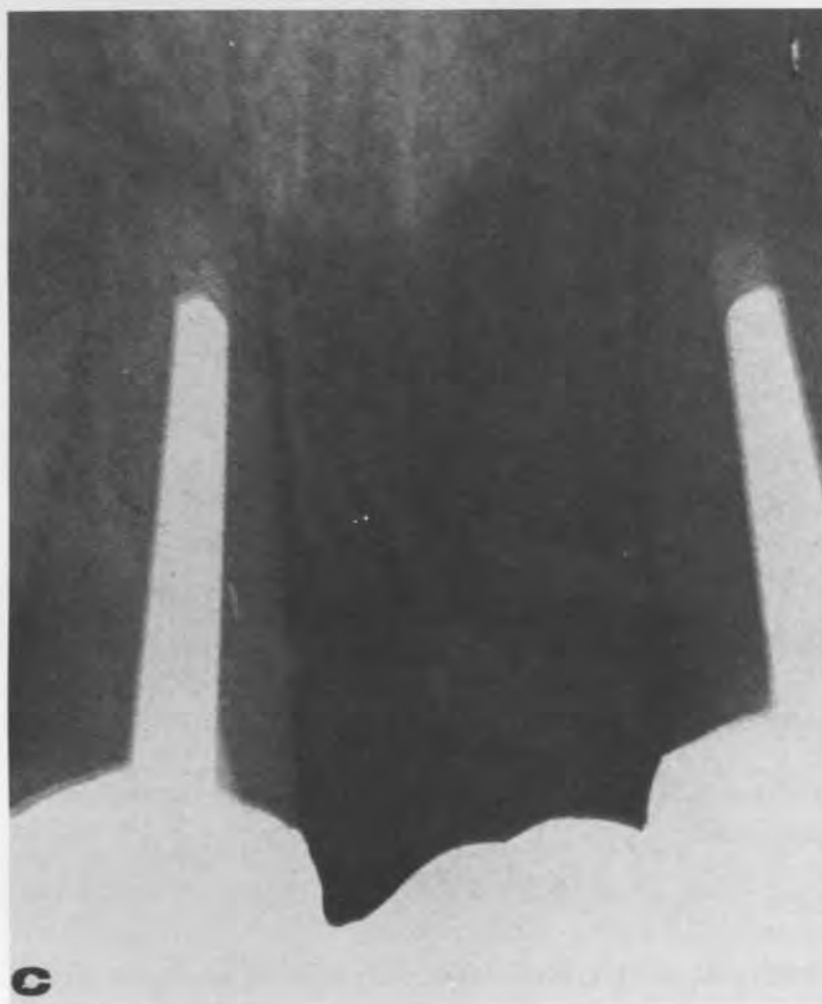
Histological studies of hydroxyapatite implanted sites demonstrated long junctional epithelium apical migration (Froum et al., 1982; Moskow and Lubar, 1983; Stahl et al., 1983; Baldock et al., 1985). In the present case, in spite of complete expulsion of the implanted calcium phosphate particles, new Bone formation, normal periodontal ligament space, uninterrupted lamina dura and well-formed septum occurred, which may indicate a new connective attachment.

New cementum formation and inserted connective fibers have been obtained using Millipore filters or Gortex membranes (Nyman et al., 1982; Gottlow et

al., 1984). The present data allow to suggest that the use of a mucoperiosteal free graft interposed between the curetted root surface and a calcium phosphate implant may supply the wounded area with different cells (fibroblasts, indifferenciated mesenchymal cells, periosteal cells), intercellular fibers and biochemical substances (Glycoaminoglycans, proteoglycans etc...).

An interesting point in this procedure is that it is not necessary to remove the graft as it is the case when Millipore filters or Gortex membranes are used.

Further human longitudinal studies will be necessary to confirm the reproductibility of the present data. Animal experiments will also be necessary to control histologically the regeneration of periodontal components and to bring information about the nature of these newly formed components.



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#### ▲ Fig. 3: Radiographic examination — Examen radiographique

- a — Initial osseous defect.  
a — Défaut osseux initial.
- b — Two months post surgery: Expulsion of calcium phosphate implant. New bone formation at the base of the bone defect.  
b — Deux mois après chirurgie: Expulsion de l'implant de phosphate de calcium. Osteogenèse à la base du défaut osseux.
- c — Six months post surgery: Complete healing of the osseous defect. Normal periodontal ligament space.  
c — Six mois après chirurgie: cicatrisation osseuse totale. Espace ligamentaire normal.
- d — Eighteen months post surgery: lamina dura and well formed septum.  
d — Dix-huit mois après chirurgie: lamina dura et septum interdentaire bien formé.

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