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*Bone regeneration through pH-guided
bone stimulation with the aid of an
osteoproliferative short-term implant*



Bone regeneration through pH-guided bone stimulation with the aid of an osteoproduktive short-term implant

Osteoinduktion ist die Konversion von undifferenzierten mesenchymalen Vorläuferzellen in Osteoprogenitorzellen, gefolgt von Desmal-Ossifikation. Das beschriebene Knochenersatzmaterial hat eine rein orthotopisch osteoinduktive Wirkung (das heißt, es wirkt ausschließlich in osseous Umgebungen, nicht in Muskel- oder Fettgewebe), und enthält keine knochenbildenden Proteine.

DR. ROLF BRIANT/COLOGNE

The calcium hydroxide powder and the oily phase of the claw oil that is added to it in Osteoinductal® provide for a gradual, hours-long rise in the alkalization in the tissue to a pH value of around 10.5. This brings about, on the one hand, the differentiation and the growth both of osteoblasts and of fibroblasts, thereby boosting bone regeneration. On the other hand, the alkaline milieu arrests the growth of most microorganisms of the oral flora. As an oily suspension, Osteoinductal® has a "depot effect". The calcium hydroxide can be released through the oil only at the phase limits. On account of this the compound has a long-lasting bacteriostatic effect. New calcium hydroxide is released at the rate at which the oily phase is reabsorbed by the body. The calcium hydroxide, for its part, boosts and stimulates bone induction. Alongside these properties, Osteoinductal® has, as has already been mentioned, extensive therapeutic effects that are a consequence of this gradual alkalization. It alleviates pain, inhibits swelling, and has a substantial bacteriostatic effect. For these reasons, massive edema prophylactic, pain therapeutic and antibiotic screening therapies can be dispensed with in most cases – even in cases of major surgical intervention. Against this background, bone reconstruction procedures no longer need be so laborious and complicated. The purpose of this article is to present to the practitioner an exceptionally effective tool for appositional bone induction, one that can be deployed quickly, safely and with unusual success in daily general practice just as easily as in the areas of implantology and mouth, jaw and face surgery. What now follows are descriptions of some of their standard uses in the dental surgical area.

The filling of extraction alveolae

- a) Osteoinductal® is applied generously with a syringe from the base of the alveola up to the soft tissue surrounding the wound.
- b) After this the wound is adaptively sewn up. If the wound can not be fully sealed against saliva through sewing, then before the sewing takes place a non-resorbable membrane (such as TefGen,

titanium foil) is clamped under the periosteum, yet only screwed or nailed on rare occasions. After about five weeks the membrane is removed under surface anesthetic – fresh osteoid will have formed, which will subsequently epithelialize.

The use of Osteoinductal Spezial® presents itself as a particularly simple alternative to the procedure described in point b). It is extracted from the piston syringe using a sterile spatula and then, with the Vaseline-covered tips of gloved fingers, molded into a band-aid shaped form. This form is then molded into place on the surface of the wound on top of the fresh stitches, covering the edges of the wound. It is self-adhesive. Under no circumstances should Osteoinductal Spezial® be forced or even allowed to seep into the depths of the alveola, since otherwise, because of the particularly high concentration of calcium hydroxide, the healing process could be significantly disrupted. The "band-aid" sits on the wound for between around three to seven days. It peels away on its own. During this time it turns a yellowish color, which under no circumstances should be mistaken for pus formation. A normal wound toilet once or twice a week makes sense. After this the wound begins to ossify – horizontal and vertical bone material is expelled. Because of the ease of administration and the impressive results, the filling of alveolae to avoid the loss of bone substance should become standard practice after tooth extractions. Horizontal and vertical tooth fractures after the loss of a tooth should, given the right further treatment, belong firmly in the past.

The insertion of implants into the local bone bed (even in cases of osteitis of the jaw)

After applying Osteoinductal® to the area of implantation, generously do the same from the fundus outward right up to the wound flaps. Then generously cover the implantation to be inserted with Osteoinductal® out of the syringe vial and, having done this, insert it into the area of implantation. Following this, generously cover the entire bone and soft surface of

Case I

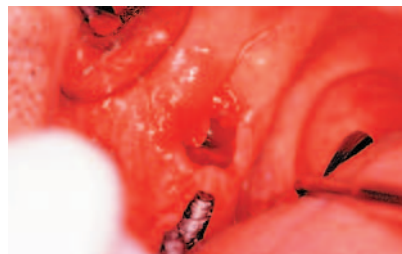
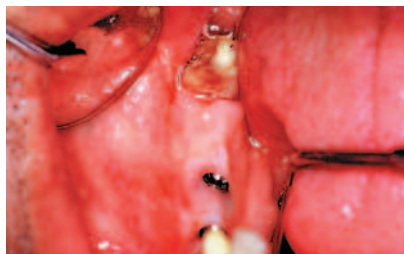


Image 1: Orthopantogram of the initial situation. Extraction regio 48. – Image 2: Clinical image. – Image 3: Preventive extraction regio 48.



Image 4: Thread as retention for Osteoinductal® Spezial (serves as membrane). – Image 5: The filling of the alveola from the fundus to the periphery with Osteoinductal®. – Image 6: Osteoinductal® Spezial serves to protect the wound (periodontal pack/membrane).

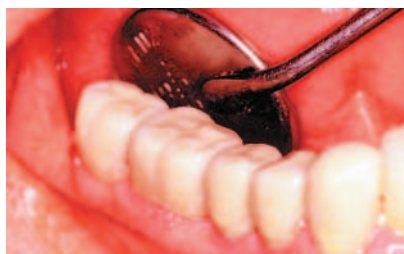


Image 7: With a glove moistened with saliva, Osteoinductal® Spezial molded onto the mucosa like a periodontal pack. NB: Don't press Osteoinductal® Spezial into the depths of the wound. – Image 8: Definitive implant system guided into place. – Image 9: 40 days post op. Optimal, complete healing of the operation site.

the wound. Sew up the wound tightly enough to keep saliva out of it, if possible. Otherwise use a non-resorbable membrane, leaving it in for around five weeks. After this remove the membrane under surface anesthetic. Rather than using a non-resorbable membrane, the “band-aid” method using Osteoinductal Spezial®, as described above, can be used, with the form being left over the wound for three to seven days. Yellowing must not be mistaken for pus formation.

Facial bone wall destruction, crestal alveolar ridge repair, sinus augmentation

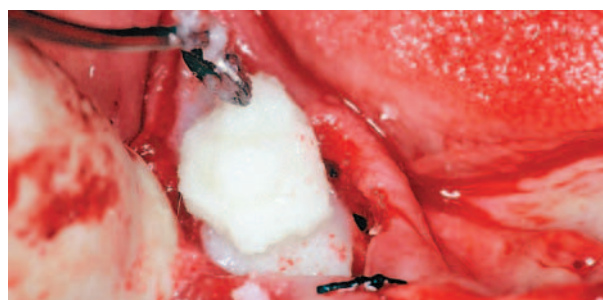
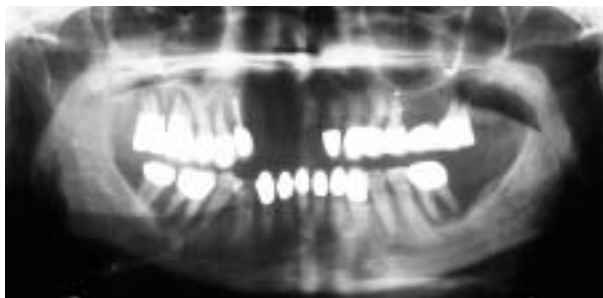
Osteoinductal® is paste-like, whereas three dimensional bone regeneration requires a dimensionally stable physical form for the material to be applied successfully. Osteoinductal® is compatible with all osteoconductive products currently on the market, and these can be mixed with it as spaceholders to create a plasticine, dimensionally stable consistency. For example, it can be mixed with α - or β -tricalcium phosphates, with bovine

or human osteoconductive products, and with active biomaterials, such as, for example, Collos/Targobone. First the Osteoinductal® is mixed in a sterile bowl with the designated osteoconductive material (in our practice, in special cases, the osteoconductive biomaterial Collos/Targobone is also added to the mix). Then sterile TCP powder (from a pharmacy) is added until the desired plasticine consistency is achieved. With the Vaseline-covered tips of gloved fingers the material is rolled into a



Image 10: Orthopantogram 40 days post op. No crestal bone loss.

Case II



*Image 1: Orthopantomogram of the initial situation.
Image 2: Extensive bone surgery and freshening of the wound.
Image 3: Extensive filling of the bone wound with Osteoinductal®, far into the surrounding soft tissue.
Image 4: Orthopantomogram 20 days post OP; notice the osteoid formation.
Image 5: Clinical image.*

sausage shape and is then, in adequately sized, smaller or larger portions, and after intensive freshening of the bone, brought into position. Then the wound must be sewn shut tightly enough to keep out saliva or, if this is not possible, shielded with Osteoinductal Spezial® or with a non-resorbable membrane (TefGen, titanium foil) for around five weeks. After this period remove the membrane under surface anesthetic. This results in mineralizing osteoids at the same time as pus is formed at the surface. After a further three months, implantations can be unproblematically inserted into the newly formed bone.

Periodontal therapy/Periimplantitis therapy (Case II, Images 1–5)

Same procedure as described under Facial bone wall destruction, crestal alveolar ridge repair, sinus augmentation. Extensive, aggressive curettage in the course of the periodontal therapy, laser surgery to remove the granules in the course of the periimplantitis therapy. The Osteoinductal®, after mixing with an osteoconductive, or rather, osteoinductive biomaterial, is now generously applied. Then the wound must be sewn shut tightly enough to keep out saliva. The Osteoinductal Spezial® can then be molded into place self-adhesively with the Vaseline-covered tips of gloved fingers.

Description of the essential steps of surgery (Case I, Images 1–10)

It is expected that the method of alveolar reconstruction presented here will become standard after every extraction. This is because, by this route, which involves few costs, the patient is spared the concave collapse of the alveolar process. During the regeneration of the bone- and soft part wound, the crestal area of the bone does not break and the option to carry out an implantation with optimal bone conditions presents itself as clearly as does the option of reconstructing the damage with a fixed or removable tooth replacement. This is of particular significance in the case of crown and bridge reconstruction in the front teeth area.

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