# IMPLANTATBETTAUFBEREITUNG – NUR MIT DEM ORIGINAL! MECTRON PIEZOSURGERY®

## NUR MECTRON IST PIEZOSURGERY®

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NEUE INSTRUMENTE!

PATENTIERTE TECHNOLOGIE!

### PIEZOSURGERY®

Implantatbettaufbereitung mit PIEZOSURGERY® – revolutionär, präzise und effizient

- weniger inflammatorische Zellen im Vergleich zur Implantatbettaufbereitung mit rotierenden Instrumenten
- aktivere Neo-Osteogenese
- signifikante Schonung des Knochens
- einfachere und präzisere Knochenperforation dank der neuen PILOT-Instrumente
- verwendbar für Implantate mit bis zu 5 mm Durchmesser

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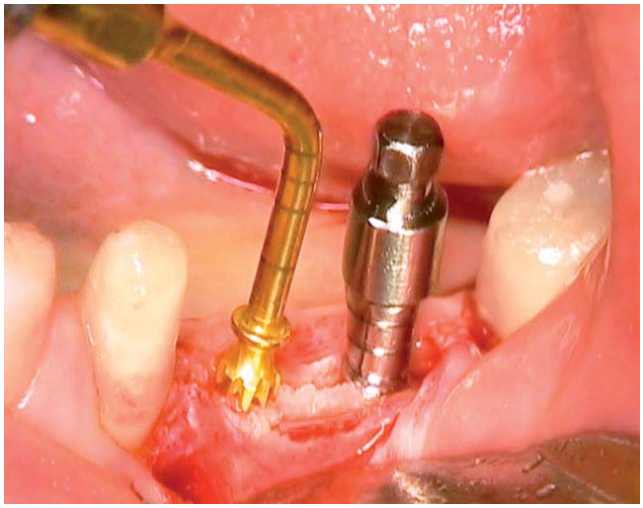
# DIE KLINIK





Volume 78 • Number 4

**Cytokines and Growth Factors Involved in the Osseointegration of Oral Titanium Implants Positioned Using Piezoelectric Bone Surgery Versus a Drill Technique: A Pilot Study in Minipigs**

Giulio Preti,* Germana Martinasso,† Bruno Peirone,‡ Roberto Navone,* Carlo Manzella,* Giuliana Muzio,† Crescenzo Russo,* Rosa A. Canuto,† and Gianmario Schierano*

**Background:** Most dental implants are positioned using a drilling surgery technique. However, dentistry recently experienced the implementation of piezoelectric surgery. This technique was introduced to overcome some of the limitations involving rotating instruments in bone surgery. This study used biomolecular and histologic analyses to compare the osseointegration of porous implants positioned using traditional drills versus the piezoelectric bone surgery technique.

**Methods:** Porous titanium implants were inserted into minipig tibias. Histomorphology and levels of bone morphogenetic protein (BMP)-4, transforming growth factor (TGF)-β2, tumor necrosis factor-alpha, and interleukin-1β and -10 were evaluated in the peri-implant osseous samples.

**Results:** Histomorphological analyses demonstrated that more inflammatory cells were present in samples from drilled sites. Also, neo-osteogenesis was consistently more active in bone samples from the implant sites that were prepared using piezoelectric bone surgery. Moreover, bone around the implants treated with the piezoelectric bone surgery technique showed an earlier increase in BMP-4 and TGF-β2 proteins as well as a reduction in proinflammatory cytokines.

**Conclusion:** Piezoelectric bone surgery appears to be more efficient in the first phases of bone healing; it induced an earlier increase in BMPs, controlled the inflammatory process better, and stimulated bone remodeling as early as 56 days post-treatment. *J Periodontol 2007;78:716-722.*

KEY WORDS

**Bone morphogenetic proteins; cytokines; dental implants.**

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‡ Department of Animal Pathology, University of Turin.

To enhance peri-implant osseogenesis and reduce the bone healing time after implant site preparation, the biologic factors that are involved in these processes must be evaluated. Literature supports the hypothesis that a porous implant surface is more effective in stimulating peri-implant osteogenesis than is a machined one using traditional drilling.[1-3] When bone formation was evaluated by histologic analysis,[4] levels of biologic factors, bone morphogenetic protein (BMP)-4 and transforming growth factor (TGF)-β, increased earlier around porous implants.

BMP-4 contains several proteins that have bone-inducing capacities. BMPs are key regulators of osteoblast and chondrocyte differentiation during skeletal development and of osteogenic differentiation in healing fractures.[5-7] TGF-β stimulated bone formation in vivo,[8-11] which may have resulted from the stimulated proliferation of osteoblast precursors rather than stimulated osteoblastic differentiation.[12] Thus, it may be postulated that TGF-β could stimulate BMP activity in the early phases of bone healing, just before the BMPs exert their effects.

Dental implants are positioned most commonly using a surgery technique

doi: 10.1902/jop.2007.060289



# DIE WISSENSCHAFT

## Cytokines and Growth Factors Involved in the Osseointegration of Oral Titanium Implants Positioned using Piezoelectric Bone Surgery Versus a Drill Technique: A Pilot Study in Minipigs.

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**CONCLUSION:** Piezoelectric bone surgery appears to be more efficient in the first phases of bone healing; it induced an earlier increase in BMPs, controlled the inflammatory process better, and stimulated bone remodeling as early as 56 days post-treatment.

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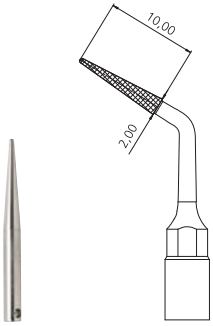
# STEP BY STEP

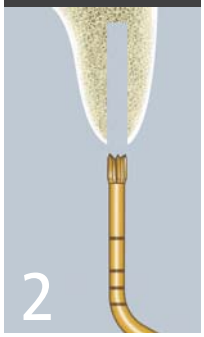
## IM1


initiale richtunggebende Osteotomie

OPTIONAL
Kontrolle der Präparationsachse mit Richtungsindikator PIN IM1

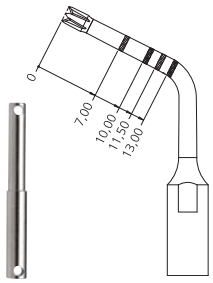



## IM2



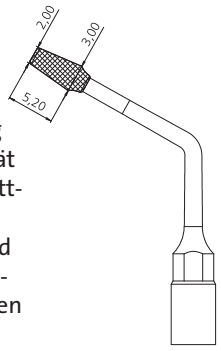

richtunggebende Osteotomie in anterioren oder posterioren Regionen

OPTIONAL
Kontrolle der Präparationsachse mit Richtungsindikator PIN 2-2.4

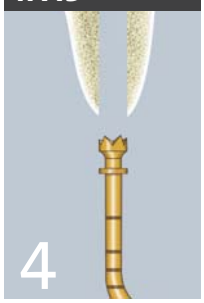



## IP2-3

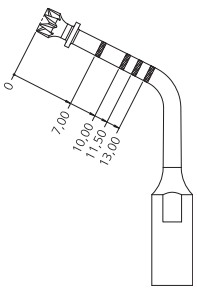

zur Optimierung der Konzentrizität der Implantatbettaufbereitung zwischen Ø 2 und Ø 3 mm, Präparation des kortikalen Knochen




## IM3

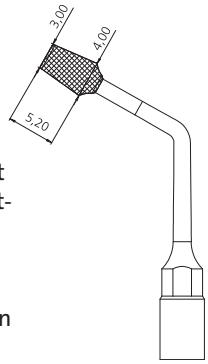



zum Erweitern oder Abschließen der Implantatbettaufbereitung; Instrument mit doppelter Kühlung



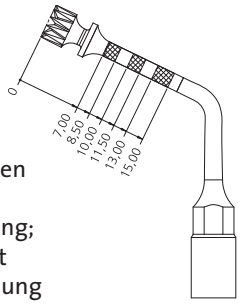

## IP3-4

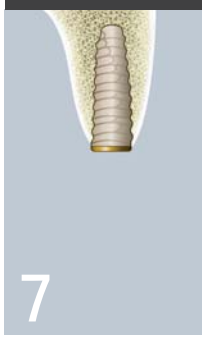

zur Optimierung der Konzentrizität der Implantatbettaufbereitung zwischen Ø 3 und Ø 4 mm, Präparation des kortikalen Knochen




## IM4


zum Abschließen der Implantatbettaufbereitung; Instrument mit doppelter Kühlung



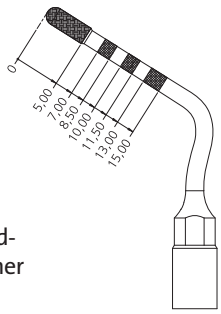




Setzen des Implantats

## OT4


zur Korrektur der richtunggebenden Achse, zur abschließenden Präparation (1-2 mm) des knöchernen Implantatlagers in der Nähe empfindlicher anatomischer Strukturen

OPTIONAL




Die Instrumente zur Implantatbettaufbereitung sind zum Einsatz in Knochen vergleichbarer Qualität des Oberkiefers bestimmt.

# IMPLANT PREP KITS

## IMPLANT PREP KIT PRO

Bestehend aus den Instrumenten:
- IM1, IM2A, IM2P, IM3A, IM3P, OT4, IM4A, IM4P, IP2-3, IP3-4, 3 PINS IM1, 3 PINS 2-2.4, 2 insert trays

## IMPLANT PREP KIT


Bestehend aus den Instrumenten:
- IM1, IM2A, IM2P, IM3A, IM3P, OT4, 2 insert trays

# IMPLANT PREP INSTRUMENTE

IM1 IM2A IM2P IM3A IM3P IP2-3 IP3-4 IM4A IM4P OT4 PIN IM1 PIN 2-2.4

| Artikel | Preis in €* | Anzahl |
|---|---|---|
| Implant prep kit pro | 1.980,00 | _____ |
| Implant prep kit | 1.380,00 | _____ |
| Instrument IM1 | 150,00 | _____ |
| Instrument IM2A | 272,00 | _____ |
| Instrument IM2P | 272,00 | _____ |
| Instrument IM3A | 290,00 | _____ |
| Instrument IM3P | 290,00 | _____ |
| Instrument IP2-3 | 168,00 | _____ |
| Instrument IP3-4 | 168,00 | _____ |
| Instrument IM4A | 295,00 | _____ |
| Instrument IM4P | 295,00 | _____ |
| Instrument OT4 | 155,00 | _____ |
| PIN IM1 | 25,00 | _____ |
| PIN 2-2.4 | 25,00 | _____ |

Ich bin bereits entschlossen, bitte liefern Sie mir zu den genannten Preisen die nebenstehende Auswahl.

Praxisstempel

Datum, Unterschrift

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*Alle Preise verstehen sich zzgl. gesetzlich gültiger Mehrwertsteuer.