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Radiographic Evaluation of Spontaneous Bone Regeneration and Adaptive Modelling Following Corticobasal® Implant Placement: A 6-Case Follow-Up Study of Panoramic X-Rays for 1 to 4 Years and Comparison to Available Results of Histology

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Radiographic Evaluation of Spontaneous Bone Regeneration and Adaptive Modelling Following Corticobasal® Implant Placement: A 6-Case Follow-Up Study of Panoramic X-Rays for 1 to 4 Years and Comparison to Available Results of Histology

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Abstract

Background: Marginal crestal bone loss remains a frequent and troubling complication in conventional implantology, often attributed to peri-implantitis or unfavourable load distribution. While various regenerative and bone-grafting modalities have been proposed to manage this loss, long-term outcomes are inconsistent, and documented evidence of spontaneous, load-induced bone regeneration around active implants remains sparse. This study evaluates the clinical and radiographic outcomes of full-mouth rehabilitations utilizing Corticobasal® implants, focusing on spontaneous and adaptive bone regeneration.

Keywords: Bone regeneration, Corticobasal® implants, crestal bone loss, mechanotransduction, Wolff's Law, Regional Acceleratory Phenomenon

Introduction

In conventional implantology, marginal crestal bone loss is frequently encountered and widely accepted as a standard, albeit pathological, clinical sequela. Etiological factors such as micro-gap bacterial colonization, poor oral hygiene, localized peri-implantitis, and occlusal overload are routinely implicated in this resorptive process. Despite advancements in guided bone regeneration (GBR), block grafting, and growth-factor applications, predictable, long-term regeneration of mature bone around a functionally loaded, compromised implant remains elusive in mainstream literature.

Conversely, Corticobasal® implantology presents an alternative biological and biomechanical paradigm. By bypassing the highly dynamic and resorptive alveolar process to engage the highly mineralized, stable, and basal cortical layers of the jaws, this system achieves profound primary stability. Emerging clinical evidence suggests that when these cortical fixtures are placed and loaded in accordance with strict orthopaedic protocols, they do not merely remain stable; they actively stimulate adaptive bone densification and spontaneous regional macro-regeneration. This paper presents a 6-case series demonstrating this regenerative phenomenon over an 8-to-12-month follow-up period.

Materials and Methods

- **Study Design**: A retrospective clinical audit of six patients requiring full-mouth rehabilitation between 2022 and 2025.
- **Surgical Protocol**: Flapless insertion of smooth-surface Corticobasal® implants to engage at least two cortical bone layers (e.g., the nasal floor, maxillary sinus floor, pterygoid plate, or the lower border/lingual cortex of the mandible).
- **Prosthetic Protocol**: Fabrication and definitive cementation of rigid, cross-arch splinted prostheses within 72 hours of surgical placement.
- **Occlusal Management**: Establishment of a highly balanced, bilateral, group-function or mutually protected occlusal scheme to distribute forces evenly and eliminate destructive lateral vectors.
- **Radiographic Assessment**: Panoramic radiographs (OPGs) were taken immediately post-operatively, at the final 12-month and later to review and monitor bone architectural changes, trabecular patterns, and density shifts around the implant threads.

Discussion : Biomechanical and Biological Mechanisms of Regeneration

The spontaneous bone regeneration observed across these six clinical cases is a reproducible biological response governed by predictable biomechanical principles, rather than an isolated, incidental occurrence.

1. Bicortical Anchorage and Secondary Stability

Unlike conventional root-form implants that depend on the spongy, highly vascularized trabecular alveolar bone for osseointegration, Corticobasal® implants utilize the dense, highly mineralized second and third cortical layers. This bicortical engagement provides immediate, rigid mechanical fixation akin to orthopaedic fracture plating. By eliminating micro-motion at the bone-implant interface during the vulnerable early healing phases, it establishes an optimal environment for undisturbed cellular differentiation and osteogenesis.

2. Mechanotransduction, Wolff's Law and Differences in the Implants' Incentive for Bone to Grow

Bone architecture is dynamically regulated by the mechanical demands imposed upon it, a phenomenon described by Wolff's Law. Mechanotransduction is the process by which osteocytes – acting as intraosseous mechanosensors – detect physical shear stress and fluid flow within the canalicular network. When Corticobasal® implants are rigidly splinted and subjected to immediate functional loading within 72 hours, masticatory forces are transferred directly into the deep basal bone. This physiological strain triggers a cascade of intracellular signals that downregulate sclerostin and upregulate osteoblast activity, resulting in targeted bone modelling and increased mineral density around the load-bearing cortical zones.

One major difference between osseointegrated implants and osseofixated implants (such as e.g. Corticobasal® implants) lies in the radically different approach to the integration of bone: while osseointegrated implants may attract the bone through their roughened surface more than by the biologic properties of the titanium, osseofixated implants (due to their elastic properties) attract endosseous bone to approximate towards the implants's surfaces simply by micro movements that are always present in immediately loaded BIPS®. Hence, osseointegrated implants will attract bone adhesion in implants sites that are not integrated by function, but under influences of surface derived effects.

Osseointegrated implants are functionally ankylosed. This is the treatment aim for these implants, although it is generally recognized in dentistry that ankylosis is a pathological state. Out of this pathology, named "osseointegration", later peri-implantitis develops. Hence, peri-implantitis is not an exception around 2-stage implants; it is a logical result of a wrong implant design with the rough surface playing an important role for its development.

3. The Role of Balanced Occlusion

Positive bone adaptation is strictly contingent upon a balanced occlusal scheme. By ensuring that masticatory forces are distributed symmetrically across the entire dental arch and directed parallel to the long axis of the implants, destructive lateral shear stresses are avoided.

Pathological overloading or eccentric interferences trigger osteoclastogenesis, culminating in osteolysis and peri-implant bone loss. In contrast, uniform, controlled physiological micro-strain acts as a potent anabolic signal, stimulating sustained bone apposition.
For a few years, the technology of monocusp lateral teeth has been used successfully. Such occlusal designs make it much easier to achieve "balance", compared to conventional teeth that are designed for tripodization.

4. Immediate Rigid Splinting Within 72 Hours

The delivery of a definitive, rigidly splinted framework within 72 hours is a critical biomechanical requirement. Cross-arch splinting transforms multiple individual implants into a unified structural framework. This collective configuration effectively dissipates localized forces, preventing localized overload on any single fixture and maintaining the microscopic inter-facial strain within the optimal therapeutic window for bone modelling.

The Cellular Transition: From Injury to Structural Integration

The tissue transformation around a placed cortical and basal implant transitions through highly coordinated healing stages:

- Regional Acceleratory Phenomenon (RAP): The surgical preparation of the osteotomy site (as often done in the field of 2-stage implantology) induces localized endosseous trauma. This triggers a Regional Acceleratory Phenomenon, which is characterized by changes in the pH inside the bone. These changes are created solely by the flap procedure. If the pH and the situation of nutrition of the bone changes, endosseous bone (spongeous bone) resorbs. It then has to be created new after the bone's nutrition and drainage has been re-established through "healing".
- Osseointegration: Woven Bone Deposition is assumed. During the initial post-operative weeks, the gap between the implant threads and the native cortical bone is rapidly populated by unorganized, hyper-vascularized woven bone.

This phase represents a rapid, modelling-like process where bone is deposited directly onto surfaces without prior resorptive preparation to ensure swift structural closure. So far, science has not shown from where the blood stems to form woven bone at the implant site. The theory regarding this is highly susceptible, especially for conical designs of 2-stage implants, which compress the bone to gain more stability and to suppress any bone activity close to the implant's surface.

- Osseofixation leads to coupled Remodelling: Woven bone possesses low mineral content and isotropic mechanical properties, making it ill-suited for sustained masticatory loading. Under the influence of early functional forces, basic multicellular units (BMUs) initiate coupled bone remodelling. Osteoclasts resorb the immature woven bone matrix, which is synchronously replaced by highly organized, parallel-arranged, load-resistant lamellar bone, completing long-term secondary osseointegration.

Comparative Analysis of Osseous Processes

Phenomenon	Primary Biological Mechanism	Biomechanical and Morphological Outcome
Skeletal Growth	Bone Modelling	Alters macroscopic bone volume, shape, and spatial position via independent osteoblast / osteoclast activity
Tori / Exostosis Formation	Bone Modelling	Localized, uncoupled hyper-osteoblastic surface apposition modifying original anatomical contours
Adult Skeletal Maintenance	Bone Remodelling	Microscopic structural renewal; balanced, coupled BMU activity replaces fatigued bone without changing gross morphology
Osseofixated Implant Integration[7] (see Figs. 1-3)	Second cortical engagement without biologic answer for initial stability Bone Modelling for secondary stability	Full healing and integration into the bone over time, guided by immediate functional loading

Inclusion of Results from Histology on Lateral-Basal Implants

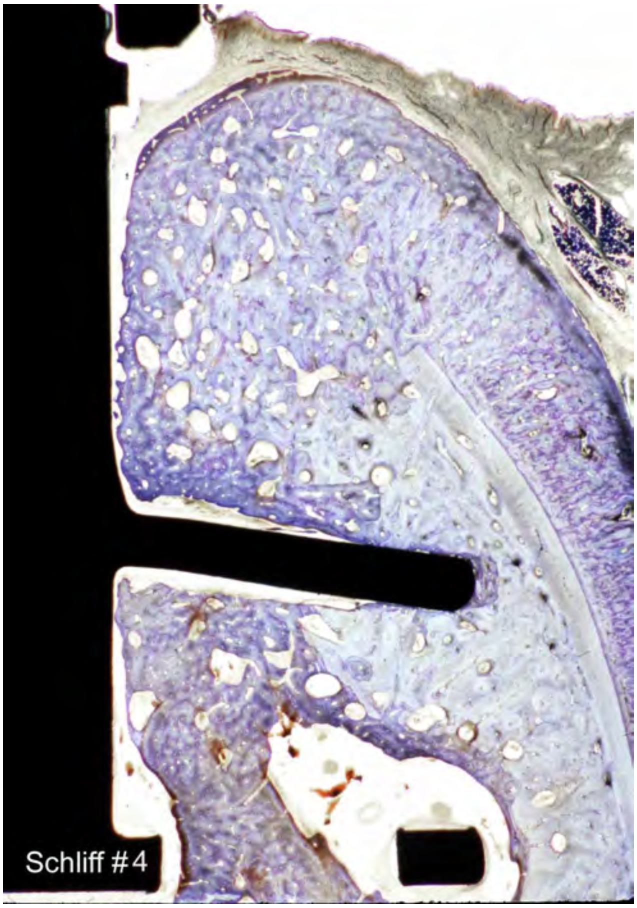


***Fig. 1**: Sectional cross-cut along a lateral-basal implant (BOI®) after 3.5 months. Right to the upper base plate, new osteonal bone is visible, which resulted out of trapped blood and subsequent woven bone formation. Above and below the base plate at this time, bone-to-implant contact is visible. Nevertheless, an endosteum has formed and the bone there will grow towards the base plate in a layered manner under functional loading. This process is known as "dual healing". Figs.1-3 were thankfully received from the collection of histologies done by Prof. Dr. Stefan Ihde (prof@ihde.com) during his research at the University of Belgrade / Serbia, 2001 to 2004.*

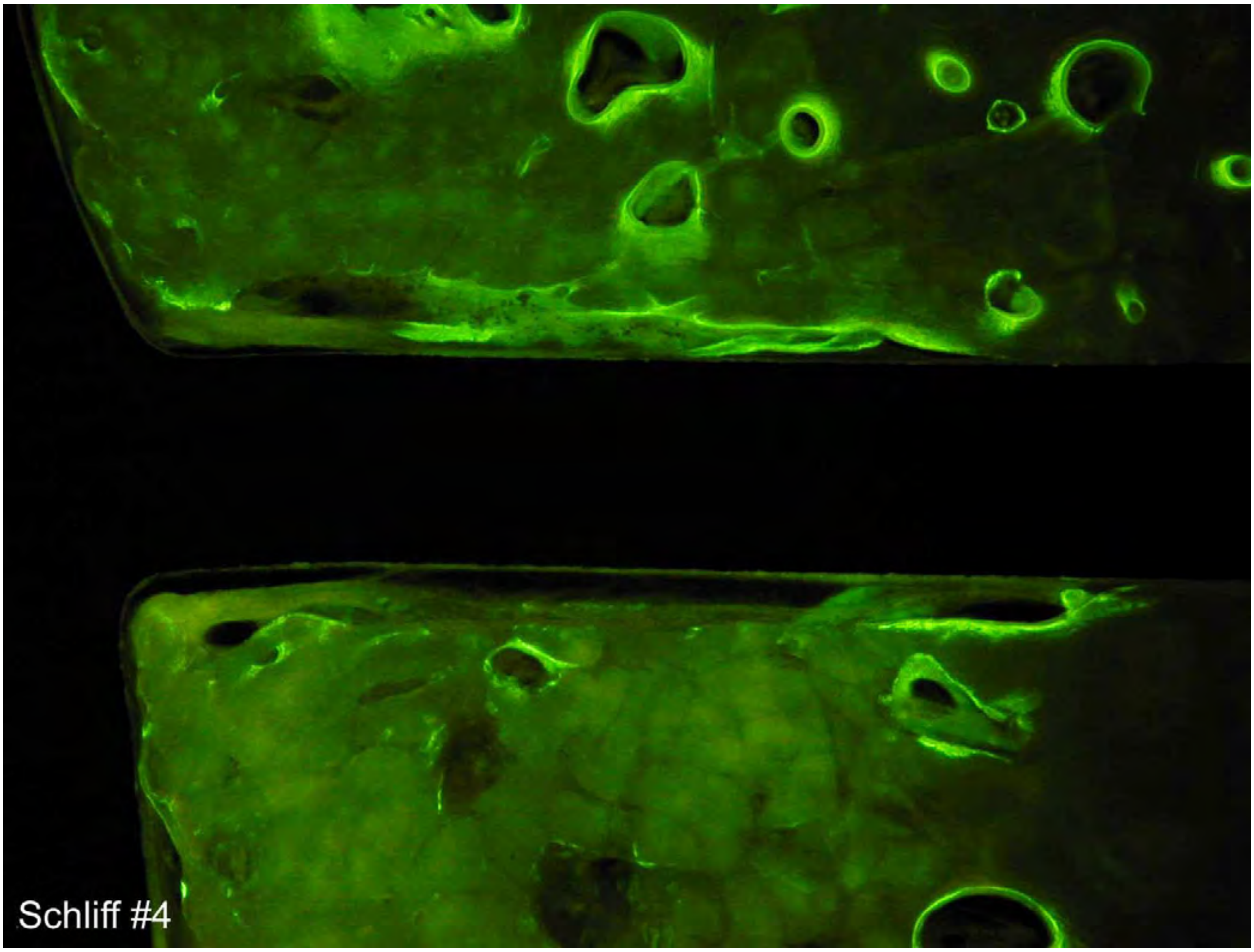


***Fig. 2**: Shows the same implant's tetracycline labelling. It is very well visible that layered bone is deposited above and below the centre of the base plate of the BOI® implant. The base plate and the vertical shaft of the implant are integrated through lamellar bone formation.*

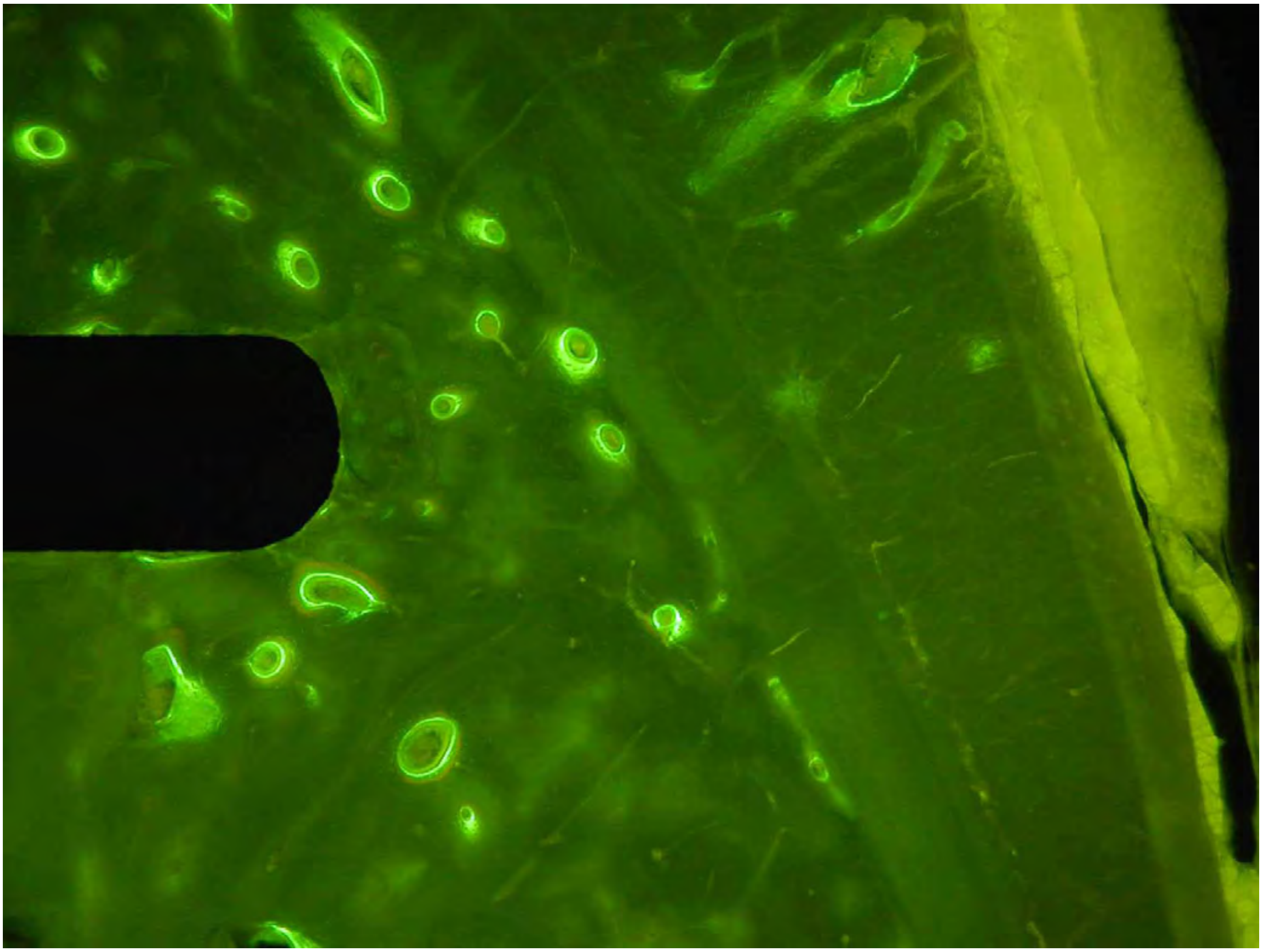


***Fig. 3**: Shows (through Tetracycline labelling) that no illuminated layered (laminate) bone is seen on this part of the endosseous implant surface, because no gap had to be filled. Instead of layered endosseous bone, we see fresh osteonal bone directly at and near the implant surface. Some bone right to the base plate and in contact with it seems to be crushed bone, which accumulated in the drill slot during implant insertion.*

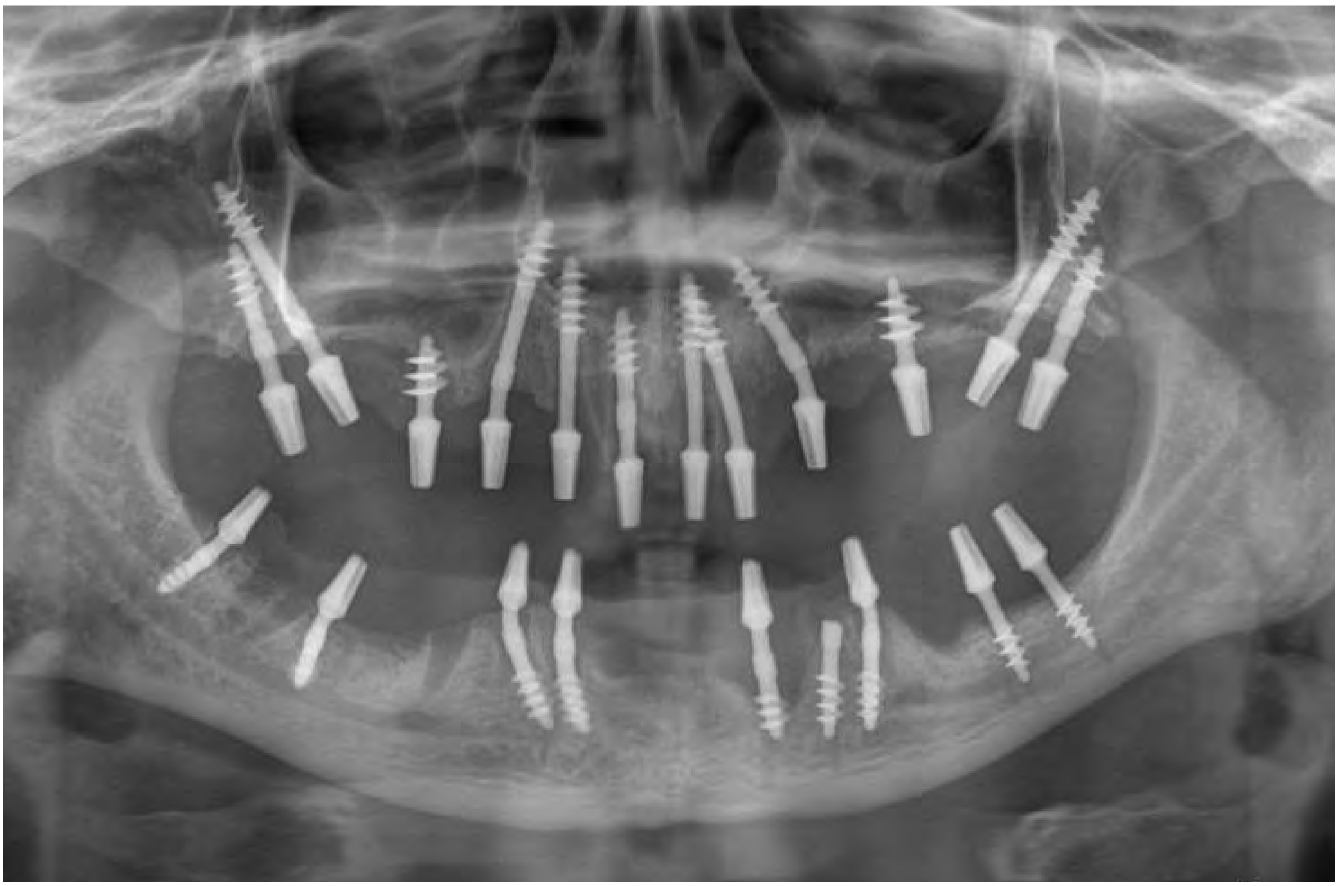
Results

Significant progressive bone regeneration and cortical densification were radiographically evident across all 6 cases at the 8-to-12-month follow-up. This adaptive bone modelling and remodelling phenomenon was most pronounced in the mandible, particularly in areas of previous severe alveolar resorption.

Case 1

32 years old male rehabilitated with basal implants and the post-4-year OPG shows bone regeneration.

***Case 1**: OPG 1*



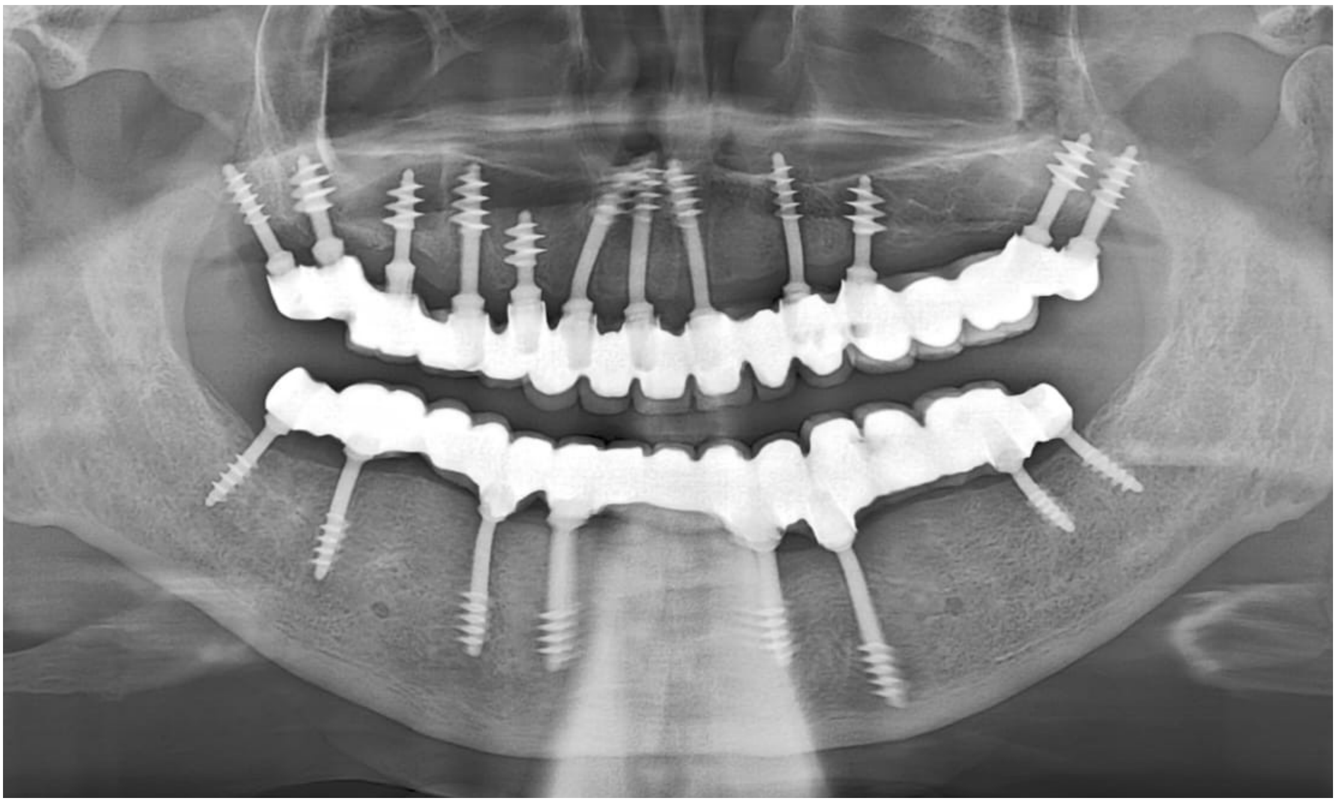
***Case 1**: OPG 2*

***Case 1**: OPG 3*

Case 2

63 years old man shows clear bone formation particularly in the lower jaw on post-16-month OPG.

***Case 2**: OPG 1*



***Case 2**: OPG 2*

Case 3

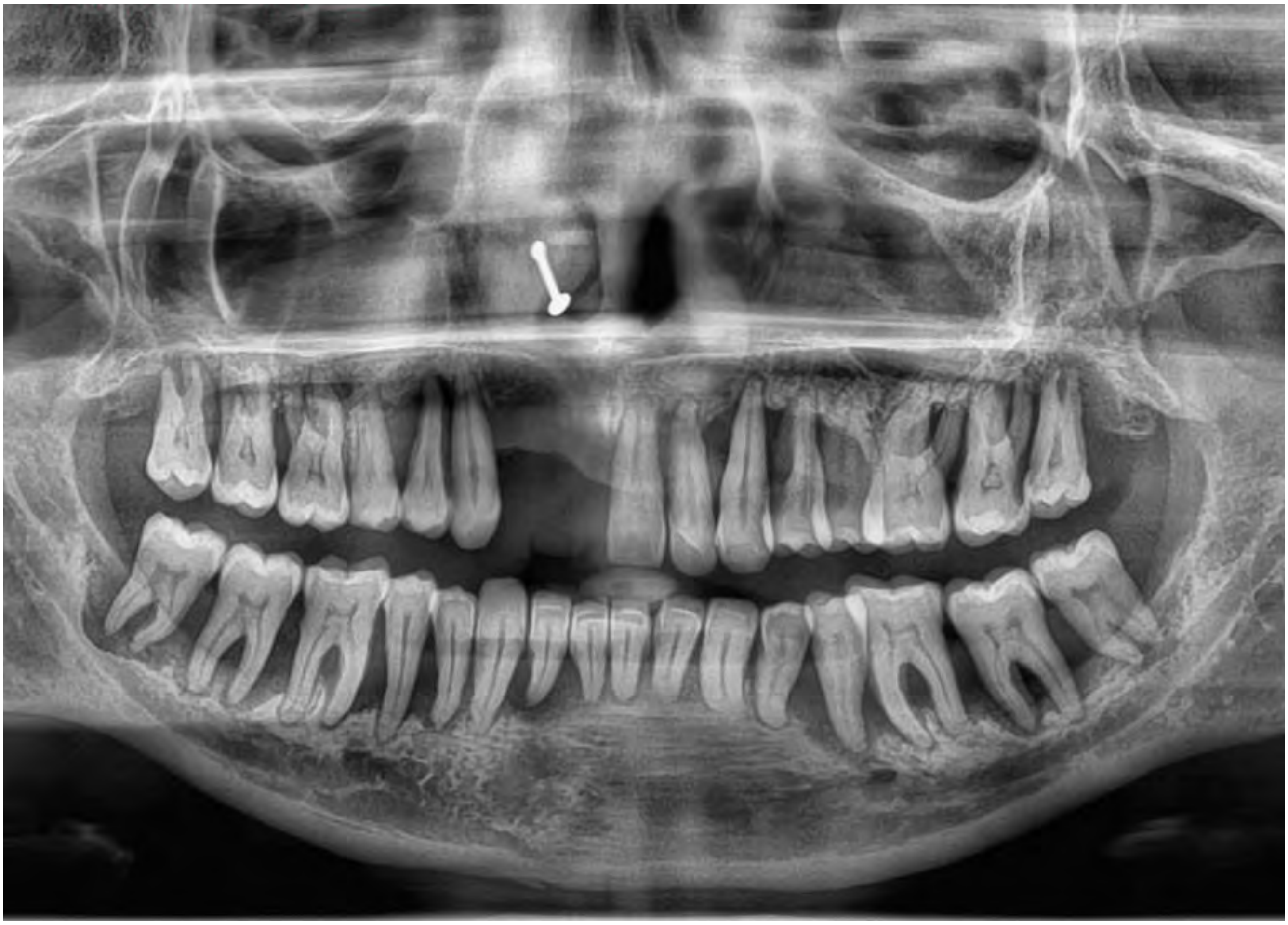
34 years old female with severe bone loss rehabilitated with Corticobasal® implants. 2-year follow-up OPG shows bone formation.

***Case 3**: OPG 1*

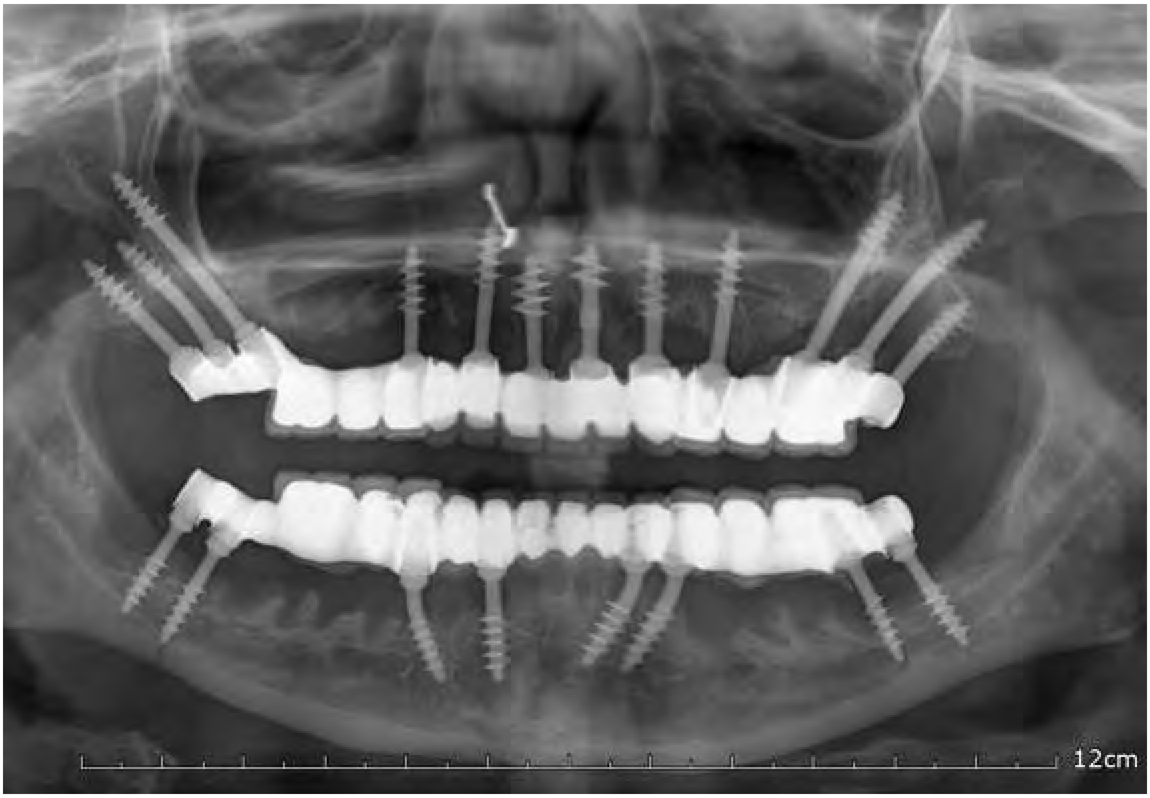
***Case 3**: OPG 2*

Case 4

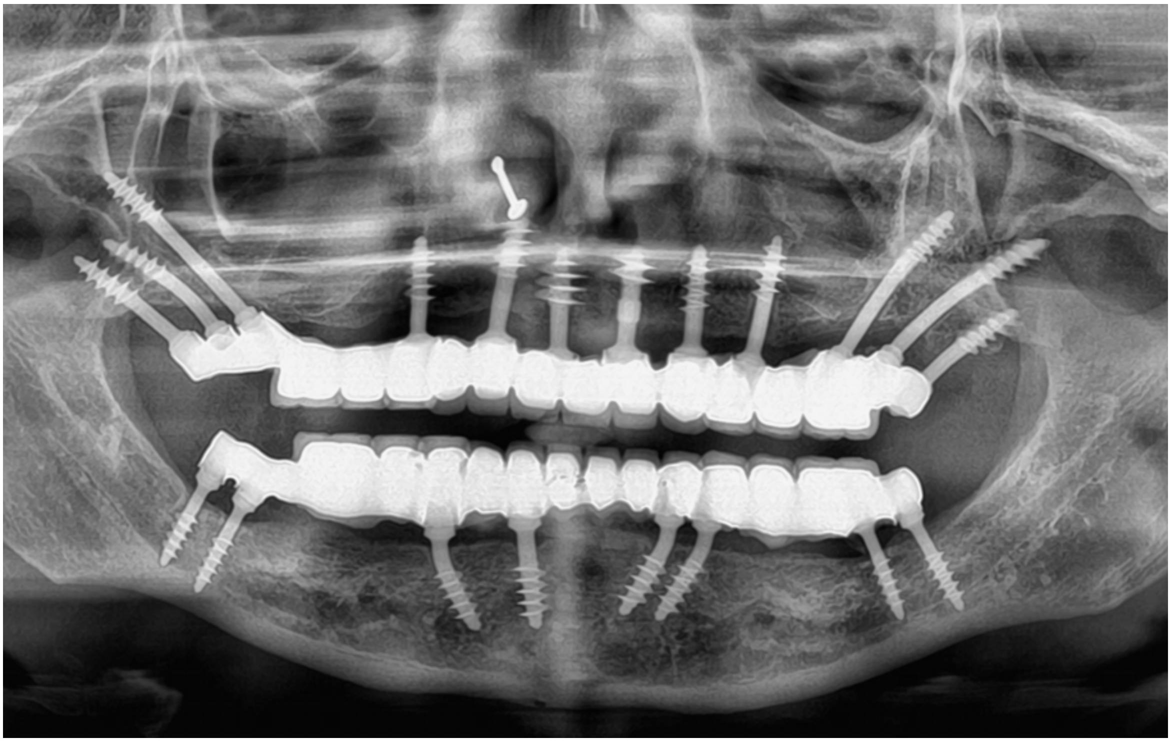
33 years old female with severe bone loss, treated with Corticobasal® implants immediate to extraction. The follow-up x-ray after 24 months shows significant bone densification and vertical height increase in OPG.



***Case 4**: OPG 1*



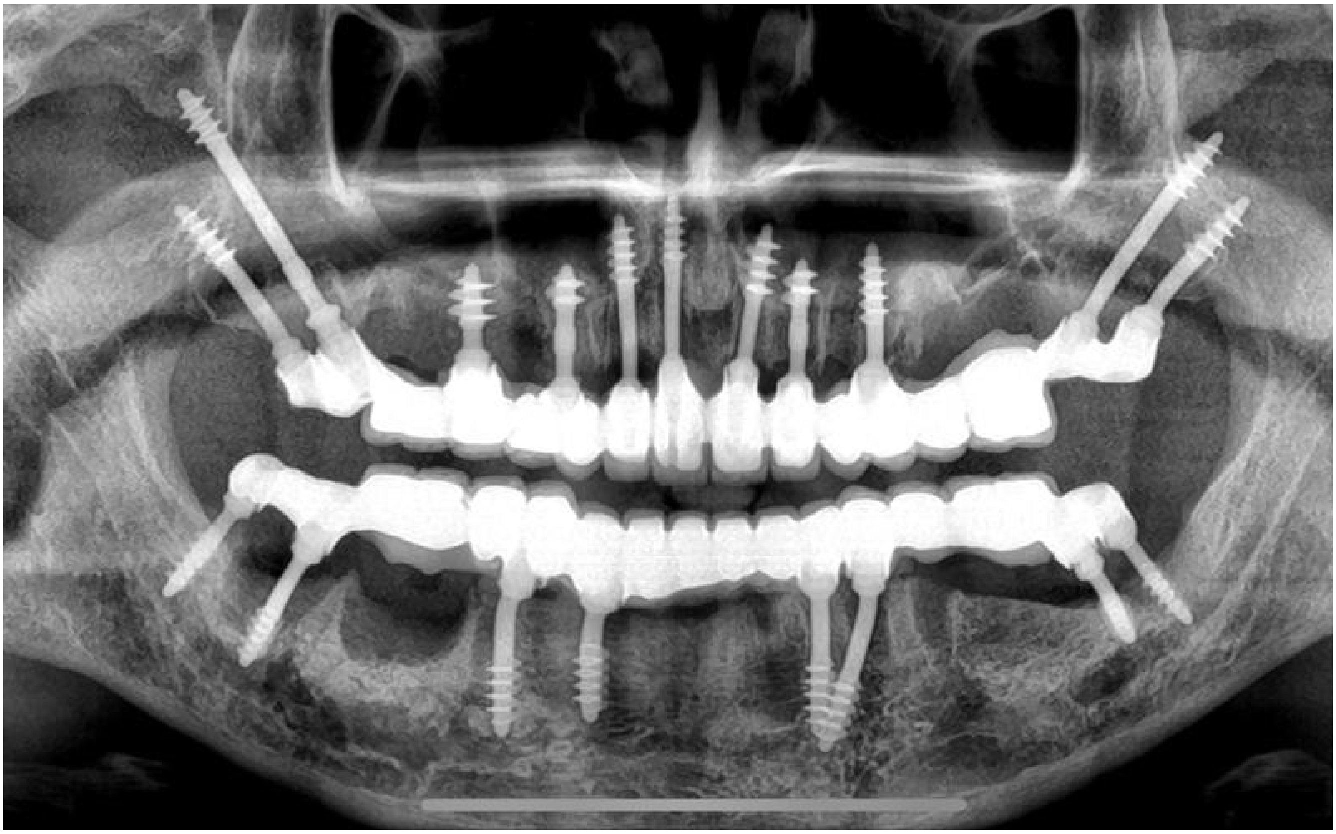
Case 4: *OPG 2*



***Case 4**: OPG 3*

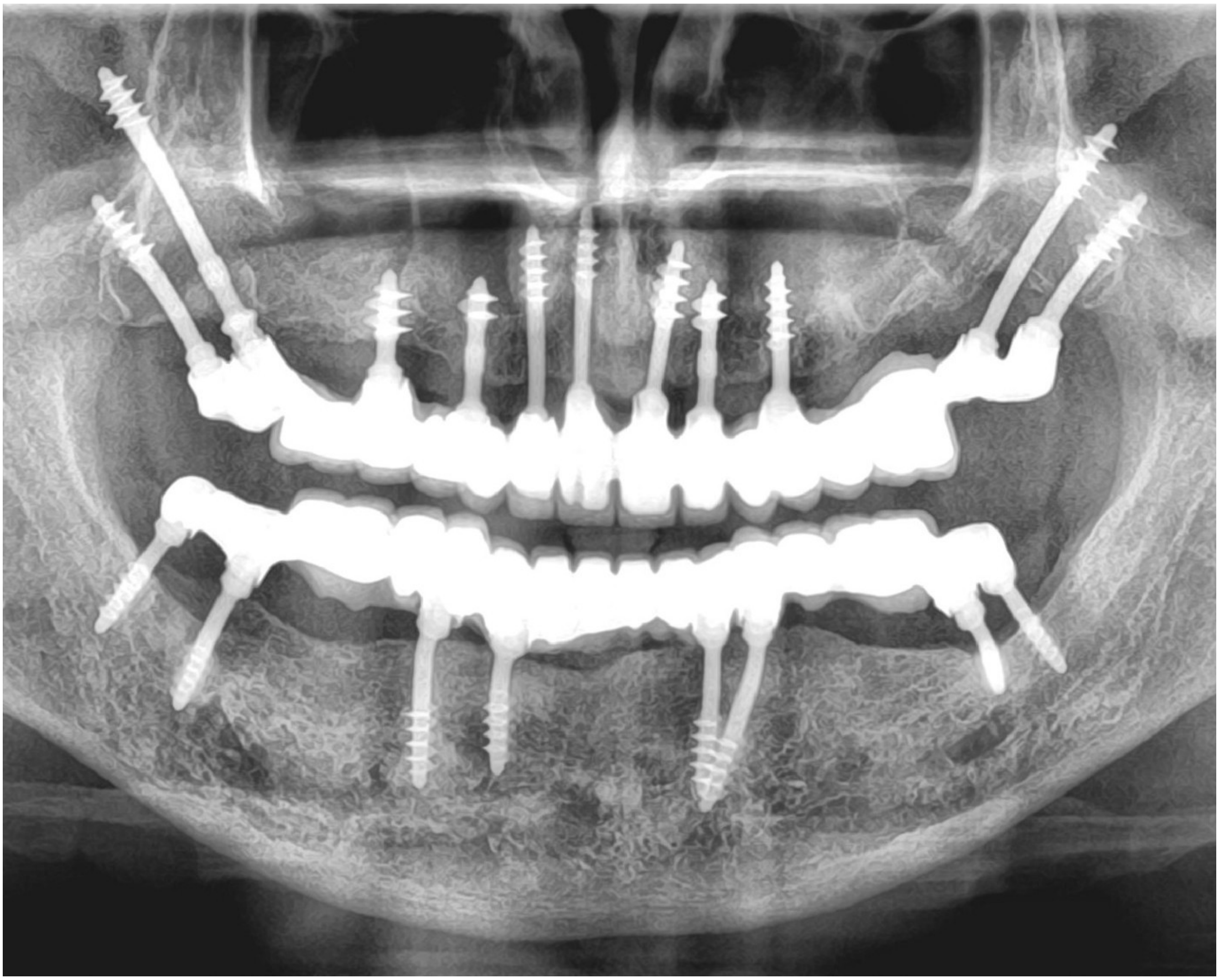
Case 5

53 years old male smoker lost his teeth due to periodontitis. Full-mouth rehabilitation done with Corticobasal® implants. 3-year follow-up OPG shows bone filling up around implants.



***Case 5**: OPG 1*

***Case 5**: OPG 2*

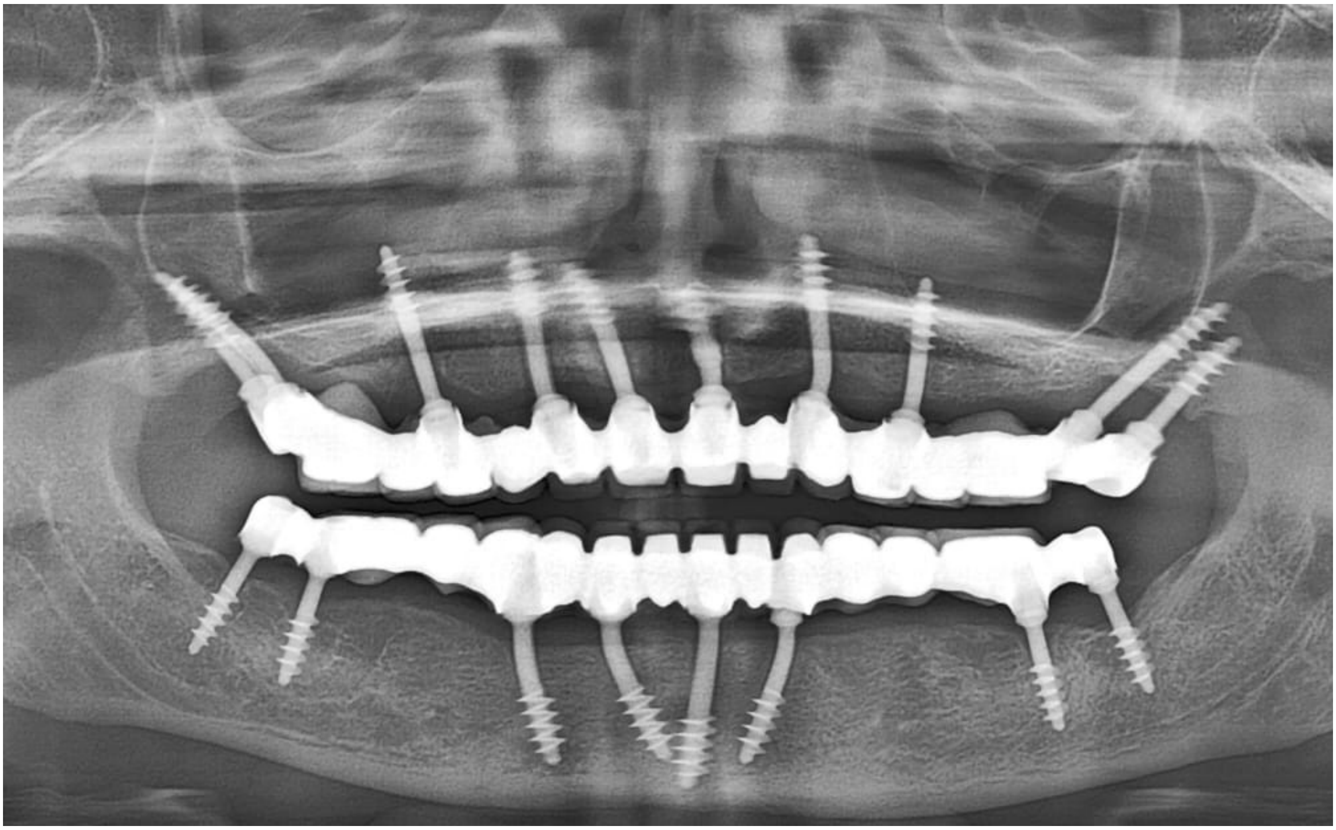


***Case 5**: OPG 3*

Case 6

36 years old female, teeth were extracted due to severe periodontitis and fixed prosthesis given with basal implants. Compared to immediate post-operative x-ray, May 2026 OPG shows remarkable bone build up around and in between implants.

***Case 6**: OPG 1*



***Case 6**: OPG 2*

Conclusion

This 6-case follow-up study demonstrates that spontaneous bone regeneration and progressive adaptive cortical densification around active dental implants are highly achievable clinical outcomes, without any bone grafting. The success of the Corticobasal® approach relies on strict adherence to a triad of interdependent clinical protocols:

1. **Surgical Precision**: Ensuring predictable engagement of the second or third cortical layers to secure uncompromising primary mechanical stability.
2. **Prosthetic Compliance**: Immediate rigid cross-arch splinting within a 72-hour window.
3. **Biomechanical Equilibrium**: Meticulous execution and maintenance of a balanced occlusal scheme.

When these criteria are met, the introduction of controlled functional loading transforms an artificial implant into an anabolic mechanical stimulus, prompting the host biology to predictably regenerate and reinforce its supporting structures.

Strategic mechanical loading under balanced occlusion serves as a primary physiological catalyst for positive bone modelling and remodelling.

A comparison with results from earlier animal histology carried out with polished lateral-basal implants (Figs. 1-3) supports the findings.

References

1 Gaur V. Bone density improvements after CorticoBasal® implants: 18-month follow-up data. Dr. Vivek Gaur Research Publications; 2026.

2 Motiwala M. Basal/cortical dental implants: Principles and advantages. Dr. Motiwala Dental Clinic & Implant Center; 2024.

3 Reddy KA. How immediate loading dental implants work even in severe bone loss cases. LBR Dental Implants; 2026.

4 Mastering occlusion: The key to implant success. International Journal of Oral Health Dentistry. 2024;10(3):185–191.

5 Ramadoss R, et al. Mechanotransduction and alveolar bone remodelling: A narrative review. Chinese Journal of Dental Research. 2026;29(1):12–21.

6 Clinical osseointegration dynamics in immediate load protocols. Complete Smiles Bella Vista Research Bulletin; 2026.

7 Ihde S. (Edt). Principles of BOI, Springer Heidelberg, New York, 2005. Hardcover ISBN 978-3-540-21665-0; eBook ISBN 978-3-540-26987-8

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2b **Surgery 2**
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(necessary in up to 80% of the cases)

2c **Surgery 3**
Implantplacement
(adequate bone healing provided)

2d **Surgery 4**
Placement of gingiva former

2e Impression taking

3 Trying of the bridge frame
(5-10 days after impression taking)

4 Delivery of bridge (***4-24 months***
after implant placement)

Total

Treatment duration: 4 - 24 Months
Number of appointments: 7 - 12

Strategic Implant®

1 Inspection
Diagnostic procedures
Treatment plan

2 Removal of teeth, Implant placement, Impression & Bite taking

*

**Step 1 and 2 may be done in the same (first) appointment.*

3 Trying of a sample bridge and aesthetic & functional corrections (if required) ***0 - 1 days*** after implant placement

4 Delivery of bridge (***1 - 3 days*** after implant placement)

5 Control of occlusion and mastication

Total

Treatment duration: 2 - 4 Days
Number of appointments: 4 - 5

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