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# SCIENTIFIC HIGHLIGHTS

Short overviews on recently published scientific evidence.

Issue 6/2025

*Edited by Dr. Marcin Maj*

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## EDITOR'S CHOICE

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J Prosthodont. 2025 Nov 9

## Reverse scan body: A retrospective clinical study with 30 edentulous jaws

*Panos Papaspyridakos, E Armand Bedrossian, Sindhu Kanikicharla, Panagiotis Ntovas, Abdul Basir Barmak, Konstantinos Chochlidakis*

### STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the accuracy of fit of full-arch zirconia prostheses fabricated using a fully digital workflow with extraoral scanning with the reverse scan body protocol. This retrospective study included 30 patients treated with zirconia full-arch implant-supported fixed complete dental prostheses (IFCDPs). Out of these 30 patients, 15 patients received IFCDPs supported by four implants, and the other 15 received IFCDPs supported by six implants. Each patient underwent full-arch implant rehabilitation with digital workflow using the reverse scan body protocol. Digitally designed verification jigs and prototypes were milled and used to confirm the accuracy of the scan, esthetics, and phonetics for each patient. Following the verification jig, monolithic zirconia IFCDPs were milled, assessed for fit, and delivered. Fit accuracy was evaluated through screw resistance test, visual examination, and radiographs.

### RESULTS

- All 30 milled prostheses (100%) achieved an accurate fit under clinical and radiographic assessment.

### CONCLUSIONS

Full-arch zirconia prostheses with an accurate fit can be fabricated using extraoral scanning with the reverse scan body protocol.

Adapted from P Papaspyridakos et al., J Prosthodont. 2025 Nov 9, for more info about this publication, click **HERE**

Cureus. 2025 Oct 13;17(10):e94469

## Immediate Implant Placement and Provisionalization Without Guided Bone Regeneration or Connective Tissue Grafting: A Case Report

*Nobuhiro Katahira, Hana Takegawa, Sumihiko NIkaido, Keisuke Seki*

FREE full text

### STUDY OBJECTIVES AND METHODS

This case report describes the successful immediate placement of an implant (Straumann BLX, 3.75 mm diameter, 12.0 mm length; Institut Straumann AG, Basel, Switzerland) in the maxillary right central incisor position following the atraumatic extraction of a vertically fractured tooth. A fully guided surgical approach was used without flap elevation or bone grafting. Immediate provisionalization was performed using a screw-retained provisional crown designed to support soft tissue healing and maintain esthetic outcome.

### RESULTS

- At the six-month follow-up, clinical and radiographic examinations demonstrated successful osseointegration, healthy peri-implant soft tissue, and spontaneous buccal bone regeneration without guided bone regeneration.
- The provisional restoration maintained excellent esthetic outcomes, with stable gingival contours and no complications.

### CONCLUSIONS

This case demonstrates that immediate implant placement and provisionalization in the maxillary esthetic zone can be successfully performed without bone grafting when appropriate case selection criteria are met, including intact buccal bone walls and adequate primary stability.

Adapted from Nobuhiro Katahira et al., Cureus. 2025 Oct 13;17(10):e94469, for more info about this publication, click **HERE**

Case Rep Dent. 2025 Oct 28:2025:4126848

## Full Mouth Rehabilitation of a Rare Case of Hypodontia: A Case Report

*Negin Aminianpour, Somayeh Zeighami*

FREE full text

### STUDY OBJECTIVES AND CONCLUSIONS

The current study presents a step-by-step procedure from diagnosis to full mouth rehabilitation of an 18-year-old man who suffered from hypodontia with 21 missing permanent teeth. A diagnostic work-up was carried out and mocked up in the mouth. Dental implants were inserted, and printed provisional restorations were evaluated in terms of esthetics, phonetics, and vertical dimension. Implant-supported and tooth-supported full ceramic restorations were made based on the treatment plan. Mutually protected occlusion was designed and implemented. At the end, an occlusal splint was made to care for the restorations. The main take-away lesson from this case is that in the treatment of hypodontia patients, all treatment options should be evaluated, and a multidisciplinary approach should be followed.

Adapted from Negin Aminianpour et al., Case Rep Dent. 2025 Oct 28:2025:4126848, for more info about this publication, click **HERE**

Clin Oral Implants Res. 2025 Nov 6

# Clinical and Radiographic Performance of Two Distinct Sandblasted, Large-Grit, Acid-Etched Implant Surfaces: A Split-Mouth Randomized Clinical Trial

*Blanca Vílchez, Leticia Caneiro, Cristina Lima, Ignacio Sanz-Sánchez, Eduardo Montero, Elena Figuero, Juan Blanco, Mariano Sanz*

FREE full text

## STUDY OBJECTIVES AND METHODS

The purpose of this study was to compare the clinical performance of two sandblasted, large-grit, acid-etched implant surfaces regarding changes in radiographic marginal bone level (MBL) 12 months after loading. In this randomized, split-mouth, dual-center clinical trial, each patient received one test (modified hydrophilic surface) implant and one control (conventional surface) implant. The primary endpoint was the change in MBL measured 12 months after loading. Secondary outcomes included the assessment of soft tissue wound healing index (WHI), adverse events, implant stability quotient (ISQ), peri-implant soft tissue parameters (probing pocket depth, bleeding on probing, keratinized mucosa width), and oral health-related quality of life (OHRQoL) measured with the Oral Health Impact Profile-14 (OHIP-14). Generalized linear models, paired Student's t-tests, and Wilcoxon tests were employed for data analysis.

## RESULTS

- The study included 68 subjects (136 implants). No statistically significant differences were found between groups for any of the clinical outcomes measured.
- The mean change in MBL from loading to 12 months was 0.04 mm (SD = 0.39) for the modified hydrophilic implants and 0.07 mm (SD = 0.22) for the conventional implants (p = 0.658), with no significant differences between the groups.

## CONCLUSIONS

Over a 12-month period of functional loading, both implant surfaces demonstrated comparable performance regarding peri-implant bone stability, safety, and clinical outcomes. Although a small but statistically significant difference between groups was observed in MBL changes from baseline to 12 months (MD = 0.15 mm), no significant differences were found in MBL changes from loading to 12 months (primary outcome), ISQ, soft tissue healing, or peri-implant health.

Adapted from Blanca Vílchez et al., Clin Oral Implants Res. 2025 Nov 6, for more info about this publication, click **HERE**

J Adv Prosthodont. 2025 Oct;17(5):259-268

# Health of peri-implant soft tissues adjacent to glazed or polished monolithic zirconia: a randomized clinical trial

*Douglas Blum Segalla, Eduardo Rolim Teixeira, Rosemary Sadami Arai Shinkai*

FREE full text

## STUDY OBJECTIVES AND METHODS

The purpose of this study was to assess whether the type of surface finish (glazed or polished) of monolithic zirconia single crowns impacts the health of peri-implant soft tissues during the first 6 months of clinical function. Infrared thermography was employed to assess soft tissue conditions. This was a prospective, randomized, intra-participant clinical trial. Twenty single crowns, supported by posterior implants, were fabricated in monolithic zirconia using computer-aided design/computer-aided manufacturing. For each crown, the mesial and distal surfaces were randomly allocated to receive either a glazed or a polished surface finish. Data were collected at 7 (T1) and 180 days (T2) following crown placement, using clinical examinations (assessing pain/discomfort, biofilm formation, bleeding, inflammation, and suppuration) and infrared thermography (to record thermogram values in Celsius). The data were analyzed using both descriptive and inferential statistics.

## RESULTS

- No significant clinical differences in peri-implant soft tissue health were identified between the glazed and polished surface treatments at T1, T2, or across the evaluation period.
- Infrared thermography revealed a significant decrease in temperature from T1 to T2 for some polished and/or glazed subgroups when comparing the peri-implant mucosal phenotype, dental arch, and tooth regions. However, no significant differences were observed between the polished and glazed groups.

## CONCLUSIONS

Both glazing and polishing are suitable surface treatments for monolithic zirconia and do not adversely affect peri-implant soft tissue health within 6 months after crown installation. Infrared thermography has the potential to be a complementary tool for the objective evaluation of soft tissue healing.

Adapted from Douglas Blum Segalla et al., J Adv Prosthodont. 2025 Oct;17(5):259-268, for more info about this publication, click **HERE**

Int J Implant Dent. 2025 Oct 22;11(1):66

# Evaluation of enamel matrix derivative used alone or added to collagen membrane for tissue repair: in vivo animal study using a rat dorsal wound model

*Julius Cezar Coelho Moraes, Filipe Rhuan Vieira de Sá Cruz, Lucas Novaes Teixeira, João Pedro Rangel-Coelho, Elizabeth Ferreira Martinez*


## STUDY OBJECTIVES AND METHODS

The purpose of this study was to evaluate the effect of enamel matrix derivative (EMD) and porcine collagen matrix, alone or combined, on wounds made on the rat dorsum. Wounds were created in the dorsum of 40 Wistar rats divided into 4 sample groups: G1 = clot, G2 = porcine collagen matrix (Straumann® Mucoderm®), G3 = enamel matrix derivative (EMD, Emdogain®), G4 = porcine collagen matrix (Straumann® Mucoderm®) and EMD (Emdogain®). The animals were euthanized on days 7 and 14, and their wound was evaluated histologically to assess wound closure and re-epithelialization, and to measure tissue inflammation.

## RESULTS

- At 7 days, groups treated with EMD (G3 and G4) exhibited significantly lower inflammation scores compared to G1 and G2 ($p < 0.05$).
- At 14 days, all groups showed complete wound closure with no significant differences in inflammatory scores. However, G3 demonstrated a markedly greater epithelial thickness, with epithelial projections into the underlying connective tissue and evidence of keratin formation.
- Collagen fiber organization was also more evident in G3 and G4.

## CONCLUSIONS

The porcine collagen matrix, whether alone or combined, promoted tissue regeneration, and the combination of these substitutes with EMD, resulted in less tissue inflammation and greater epithelial thickness. These advantages emphasize their use for soft tissue augmentation and improvement.

Adapted from Julius Cezar Coelho Moraes et al., Int J Implant Dent. 2025 Oct 22;11(1):66, for more info about this publication, click **HERE**

Clin Implant Dent Relat Res. 2025 Oct;27(5):e70083

# Peri-Implant Supracrestal Tissue Characteristics Related to Abutment Materials: A Comparative Histomorphometry Study

*Manon Borie, Dieter Bosshardt, Lemmy Liegeois, Geoffrey Lecloux, Håvard Jostein Haugen, Dorien Van Hede, France Lambert*

## STUDY OBJECTIVES AND METHODS

The purpose of this study was to characterize the peri-implant soft tissues (PIST) around experimental abutments made of titanium (Ti), dental resin (Re), and polyetheretherketone (PEEK). Thirty bone-level implants were placed, each receiving an experimental transmucosal healing abutment made of one of the three materials. After an 8-week healing period, the abutments and surrounding tissues were harvested and prepared for histological and histomorphometric analyses. Dimensions of sulcus depth, epithelial and connective tissue adhesion were measured. In addition, the abutment surface characteristics, levels of inflammation, plaque accumulation, and peri-implant bone level changes were evaluated.

## RESULTS

- The dimensions of the different components of the PIST were comparable across the three experimental groups.
- The mean overall dimensions of the PIST were 2.68 ± 0.51 mm for Ti, 2.66 ± 0.47 mm for Re, and 2.32 ± 0.55 mm for PEEK. Mean sulcus depth was 0.71 ± 0.69 mm for Ti, 0.74 ± 0.50 mm for Re, and 0.68 ± 0.63 mm for PEEK.
- Mean junctional epithelium was 1.82 ± 0.67 mm for Ti, 1.56 ± 0.47 mm for Re, and 1.53 ± 0.40 mm for PEEK.
- Mean harvested connective tissue (until abutment platform) was 0.30 ± 0.29 mm for Ti, 0.36 ± 0.38 mm for Re, and 0.09 ± 0.10 mm for PEEK. However, the resin group exhibited significantly more supramucosal biofilm adhesion ($p = 0.026$).

## CONCLUSIONS

The PIST around abutments made of PEEK, resin, or titanium tend to develop in a similar pattern. However, longer observation periods are required to evaluate the long-term effects.

Adapted from Manon Borie et al., Clin Implant Dent Relat Res. 2025 Oct;27(5):e70083, for more info about this publication, click **HERE**

Clin Oral Implants Res. 2025 Nov;36(11):1498-1514

# Bone Augmentation of Atrophic Alveolar Ridges Using a Synthetic Bone Substitute With Mesenchymal Stem Cells: A Randomized, Controlled Clinical Trial

*Mariano Sanz, Cecilie Gjerde, Bjørn Tore Gjertsen, Alberto Ortiz-Vigón, Nerea Sanchez, Alain Hoornaert, Jordi Caballe-Serrano, Maria Giralt-Hernando, Frederick Gaultier, Nicoleta Reinald, Else Marie Pinholt, Markus Rojewski, Helen Rouard, Nathalie Chevallier, Samih Mohamed-Ahmed, Xieqi Shi, Tie-Jun Shi, Hubert Schrezenmeier, Pierre Layrolle, Kamal Mustafa*

FREE full text

## STUDY OBJECTIVES AND METHODS

The purpose of this study was to assess the efficacy and safety of a cell-based therapy for 3D bone augmentation of severe alveolar bone defects prior to dental implant placement. A Phase 2 randomized controlled clinical trial evaluated the safety and efficacy of a cell therapy using expanded autologous iliac crest-derived mesenchymal cells seeded on a synthetic bioabsorbable bone substitute covered with a non-resorbable membrane. The control group received an autogenous bone block graft. After 5 months, CBCT scans were compared to measure the bone volume changes achieved after the regenerative surgery. Subsequently, dental implants were placed in the regenerated areas.

## RESULTS

- A total of 48 patients were included and randomized (36 patients in the test group and 12 in the control group). However, seven patients did not reach the minimum required number of expanded MSCs and were therefore unable to be treated.
- The tested intervention demonstrated significantly greater gains in bone volume, with a mean difference of 480.01 mm3 (p = 0.032).
- Similarly, the mean change in bone crest volume from baseline to 5 months was notably higher in the test group (1066.91 mm3) compared to the control group (586.9 mm3).
- Adverse reactions and patient morbidity were minor in both groups. Implants were placed on the regenerated bone, and all were integrated successfully in both groups.

## CONCLUSIONS

The cell-based therapy resulted in significant changes in bone volume compared to the control treatment, enabling dental implants in all patients. The procedure was associated with minimal adverse effects and patient morbidity.

Adapted from Mariano Sanz et al., Clin Oral Implants Res. 2025 Nov;36(11):1498-1514, for more info about this publication, click HERE

# REFERENCES

**P Papaspyridakos et al.,** J Prosthodont. 2025 Nov 9 | **Nobuhiro Katahira et al.,** Cureus. 2025 Oct 13;17(10):e94469 | **Negin Aminianpour et al.,** Case Rep Dent. 2025 Oct 28:2025:4126848 | **Blanca Vílchez et al.,** Clin Oral Implants Res. 2025 Nov 6 | **Douglas Blum Segalla et al.,** J Adv Prosthodont. 2025 Oct;17(5):259-268 | **Julius Cezar Coelho Moraes et al.,** Int J Implant Dent. 2025 Oct 22;11(1):66 | **Manon Borie et al.,** Clin Implant Dent Relat Res. 2025 Oct;27(5):e70083 | **Mariano Sanz et al.,** Clin Oral Implants Res. 2025 Nov;36(11):1498-1514 | source: **www.pubmed.gov** | **Dr. Marcin Maj** holds the position of Head of Global Scientific Affairs at Institute Straumann in Basel, Switzerland |