

From surgery to immediate function: fixed screw-retained corticobasal® implant-supported prostheses with multi-unit abutments: a case report

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Introduction: Edentulism remains a global oral health problem, compromising oral health and adversely affecting patient's esthetics, chewing, speech, and quality of life. Appropriate treatment planning and meticulous implant and prosthetic selection are vital to treatment success. Evidence has documented higher survival rates for Corticobasal® cement-retained implant-supported prosthetic designs. However, there is limited literature regarding screw-retained Corticobasal® implant-supported prostheses utilizing multi-unit abutments with longitudinal follow-up. This report describes two cases of immediately loaded, screw-retained Corticobasal® implant-supported prostheses with multi-unit abutments and a 24-month follow-up period.

Case presentation: We present a multidisciplinary treatment approach for two cases presenting with complete and partial edentulism, rehabilitated with immediately loaded, screw-retained, fixed single-piece Corticobasal® implant prostheses with multi-unit abutments and a 2-year follow-up period of 2 years. The reported cases showed 100% implant survival, along with healthy peri-implant soft tissues, improved speech, chewing ability, esthetics, self-esteem, and superior patient satisfaction.

Clinical discussion: The use of screw-retained multi-unit abutments highlighted the advantages of retrievability, facilitating easy removal for maintenance, repair, or access for hygiene, especially in full-arch replacement cases, which often favor multi-unit abutment systems. This treatment approach demonstrated favorable peri-implant soft-tissue conditions and satisfactory prosthetic outcomes during the observation period, in line with the literature.

Conclusion: Within the limitations of this two-patient case series, immediately loaded, screw-retained Corticobasal® implant-supported prostheses utilizing multi-unit abutments demonstrated favorable clinical and radiographic outcomes over a 24-month follow-up period. This treatment approach provided predictable function, stable peri-implant health, and significant improvements in mastication, speech, appearance, and overall satisfaction. Larger prospective studies with longer follow-up are required to validate these findings.

Keywords: Corticobasal® implants, dental implants, fixed implant prostheses, immediate loading, multi-unit abutments, screw-retained

Introduction

Edentulism remains a global oral health problem that compromises esthetics, chewing, speech, and quality of life^[1–4], resulting

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HIGHLIGHTS

- Corticobasal® implant-supported prostheses present a feasible treatment modality for completely and partially edentulous patients.
- Corticobasal® implant-supported prostheses significantly improve the patient's esthetic, function, and quality of life.
- The anticipation of a multidisciplinary approach improves implant treatment outcomes.
- Screw-retained, fixed, immediately loaded prostheses allow retrievability and maintenance.

in emotional distress, reduced self-esteem, social withdrawal, and depression, especially among younger females^[1,4,5].

Conventional dentures are frequently associated with dissatisfaction, limited retention and stability, particularly in younger patients with compromised ridge support^[6–8]. In contrast, implant-supported prostheses provide superior retention, stability, and greater satisfaction^[8–10].

Implant selection should consider the patient's systemic condition, bone quality and quantity, and expectations^[11–13].

Corticobasal® implants engage cortical and basal bone, providing high primary stability suitable for immediate loading. Their one-piece design may minimize implant-abutment interface complications^[14–21], while allowing either cement- or screw-retained restorations^[14–21]. Evidence has documented favorable survival rates for cement-retained Corticobasal® restorations, including a 100% survival rate over 18 months and 97.5% in large cohorts, with high functional and esthetic satisfaction^[15,16]. However, evidence on screw-retained designs remains limited. To the best of our knowledge, few reports have described immediately loaded screw-retained Corticobasal® implant-supported rehabilitation. These prospective single-center case reports describe the clinical and radiographic outcomes of two patients rehabilitated with immediately loaded screw-retained Corticobasal® implant-supported prostheses with multi-unit abutments over 24 months.

A multidisciplinary team comprising a maxillofacial surgeon and prosthodontists performed comprehensive clinical and radiographic assessments and discussed therapeutic options. Both medically fit patients sought fixed prostheses with immediate function while avoiding bone grafting and prolonged treatment. Consequently, immediately loaded, screw-retained Corticobasal®

implant-supported prostheses with multi-unit abutments were selected.

All surgical and prosthetic procedures were performed by the same experienced maxillofacial surgeon and prosthodontist, following the Corticobasal® implant protocol. The study complied in accordance with the Declaration of Helsinki and the SCARE Guidelines^[22].

Case 1

A 40-year-old woman presented to the prosthodontic department, seeking fixed prostheses after multiple unstable complete dentures, with no relevant family history or known allergies. Clinical and radiographic examinations revealed severely resorbed ridges (Fig. 1A–D). Implant surgery was performed under aseptic conditions, using a flapless technique and local anesthesia (2% lidocaine with epinephrine 1:100 000). Eighteen BECES® Corticobasal® implants (Simpladent GmbH, CH-8737 Gommiswald, Switzerland) of appropriate dimensions were placed and bent to achieve optimal prosthetic alignment (Fig. 1E–H). Digital impressions were obtained using an intraoral

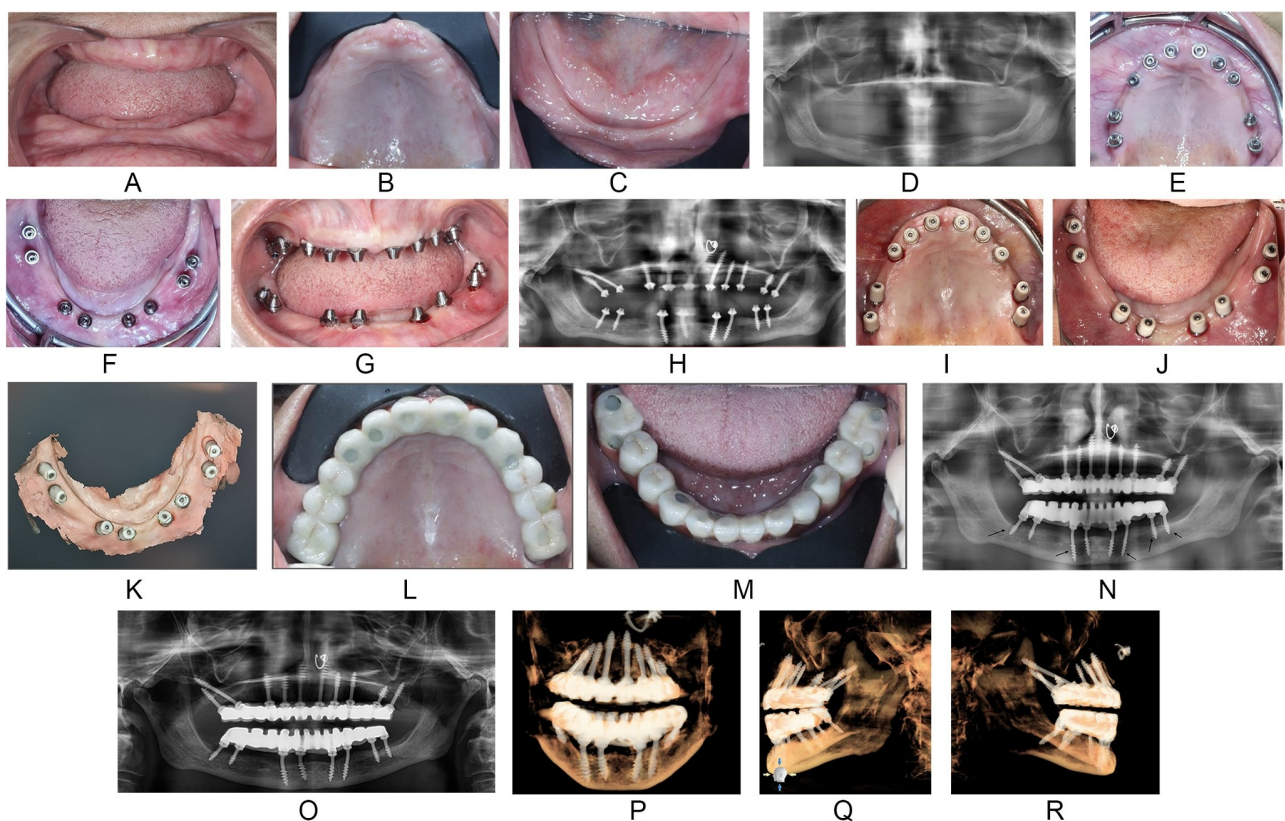


Figure 1. The patient's code 01 presentation. (A) Intraoral view showing maxillary and mandibular complete edentulous jaws. (B) Intraoral maxillary view of the patient at the presentation. (C) Intraoral mandibular view of the patient at the presentation. (D) Panoramic radiograph of the patient: note the resorption of the ridges. (E) Intraoral view presenting the maxillary implant's distribution. (F) Intraoral view showing the mandibular implant's distribution. (G) Intraoral view showing the maxillary and mandibular implants' distribution after bending. (H) Panoramic view showing the maxillary and mandibular implants' distribution. (I) Intraoral view presenting the digital scan body attached to the maxillary multi-unit abutments. (J) Intraoral view presenting the digital scan body attached to the multi-unit abutments. (K) The cast. (L) Intraoral view showing the final maxillary fixed, immediately loaded, screw-retained Corticobasal® implant-supported prosthesis. Note that the screw opening was covered with composite. (M) Intraoral view showing the final mandibular fixed, immediately loaded, screw-retained Corticobasal® implant-supported prosthesis. (N) Panoramic radiograph after prostheses insertion. Arrows indicate the cortical basal bone anchorage of the implants. (O) Panoramic radiograph at 2 years showing maintained peri-implant bone support without evidence of peri-implant radiolucency around the Corticobasal® implants. (P) 3D Cone-beam CT at 2 years' follow-up (frontal view). (Q) 3D Cone-beam CT at 2 years' follow-up (lateral view, left side). (R) 3D Cone-beam CT at 2 years' follow-up (lateral view, right side).

scanner (3Shape TRIOS 3, Denmark) and a polyetheretherketone (PEEK) scan body (Simpladent, India) (Fig. 1I–K) capturing the emergence profile and surrounding soft tissues. Postoperatively, amoxicillin (1 g) and metronidazole (500 mg), and diclofenac potassium (50 mg) were prescribed. A post-implant panoramic radiograph was acquired. A virtual model was generated (Exocad/3Shape Dental System) (Fig. 1K). A CAD/CAM-manufactured, screw-retained framework veneered with composite material was fabricated. Passive fit was verified before final insertion. Final prosthetic screws were tightened according to the manufacturer's recommendations at 25 N cm using a calibrated torque wrench. A hygienic space for saliva washing was ensured, and the occlusion was adjusted to eliminate premature contacts and establish bilateral balanced occlusion (Fig. 1L, M). The screw openings were sealed with Teflon and composite resin. Final radiographic and clinical evaluations confirmed satisfactory prosthetic fit and patient comfort (Fig. 1N). Oral hygiene instructions were provided, and follow-up visits were scheduled (Fig. 1O–R).

Case 2

A 37-year-old woman presented with pain, halitosis, poor esthetics, considerable psychological distress, and no relevant family history or allergies. Clinical examination revealed a maxillary fixed prosthesis replacing 11, with chipped porcelain on the 21 abutment. Teeth 21, 23, 24, 25, and 26 showed grade II mobility and extensive restorations. Tooth 31 showed occlusal wear, while teeth 15 and 17 were badly destroyed (Fig. 2A, B). In the mandible, tooth 38 had deep distal caries requiring root canal treatment. Teeth 34 and 43 exhibited grade I mobility, with gingival recession at 43, and teeth 44 and 45 were retained roots. Tooth 46 showed grade I mobility, and teeth 34 and 35 showed grade II mobility and bony overeruption (Fig. 2C). Panoramic radiography revealed generalized horizontal bone loss (Fig. 2D). All treatment options were discussed with the patient, who refused retention of teeth 22, 23, 34, and 43 and selected implant-supported prostheses.

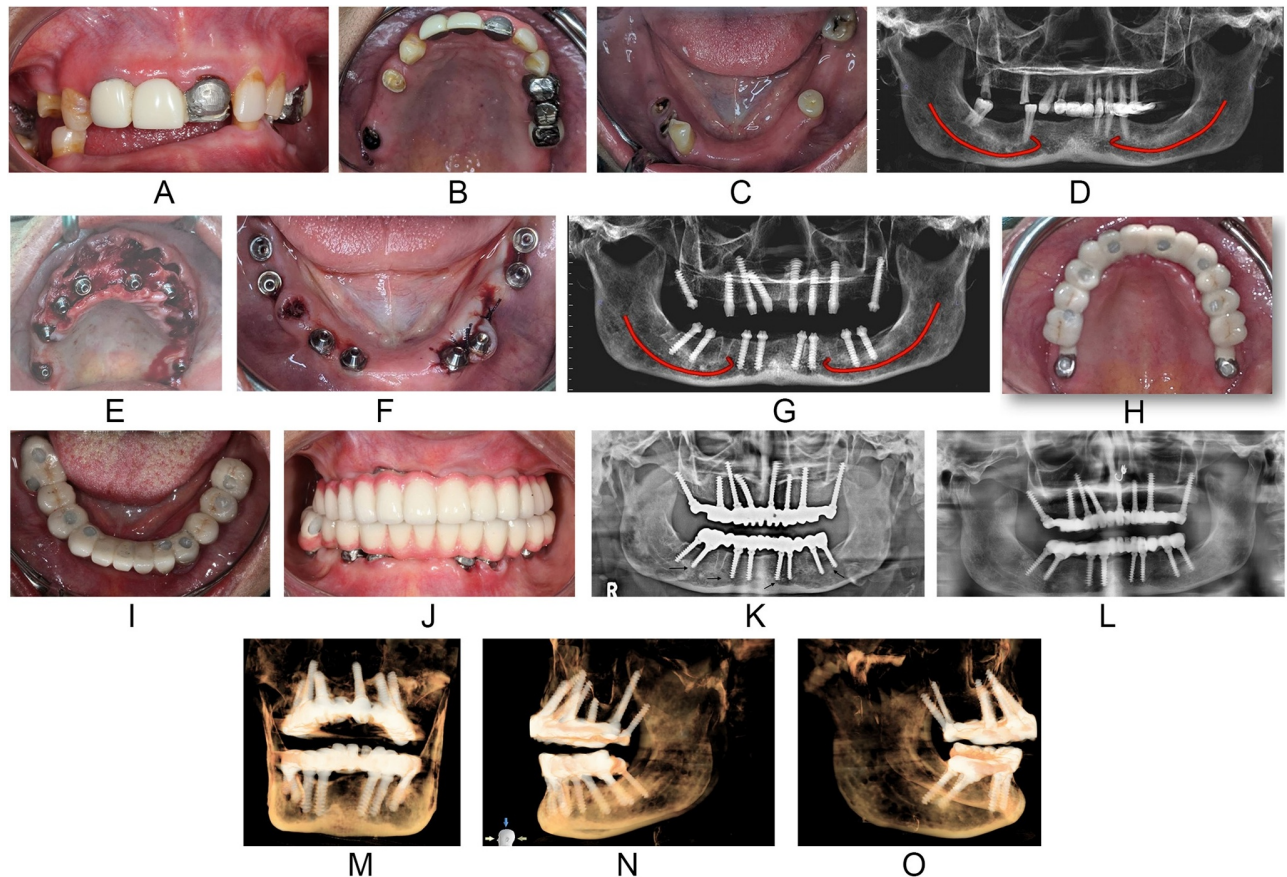


Figure 2. The patient's code 02 presentation. (A) Intraoral view showing maxillary and mandibular partial edentulism and a maxillary fixed prosthesis with chipped porcelain on 21. (B) Intraoral maxillary view of the patient at presentation. (C) Intraoral mandibular view of the patient at presentation. (D) Panoramic radiograph of the patient. (E) Intraoral view presenting the distribution of the maxillary implants and the mucoperiosteal flap. (F) Intraoral view showing the distribution of the mandibular implants. (G) Panoramic view showing the distribution of the maxillary and mandibular implants. (H) Intraoral view showing the final maxillary fixed, immediately loaded, screw-retained Corticobasal® implant-supported prosthesis (The screw opening was covered with composite). (I) Intraoral view showing the final mandibular fixed, immediately loaded, screw-retained Corticobasal® implant-supported prosthesis. (J) Intraoral view showing the prostheses in occlusion. (K) Post-insertion panoramic radiograph; Arrows indicate cortical basal bone anchorage of the implants. (L) Panoramic radiograph at the 2-year follow-up showing maintained peri-implant bone support without evidence of peri-implant radiolucency around the Corticobasal® implants. (M) 3D cone-beam CT at the 2-year follow-up (frontal view). (N) 3D Cone-beam CT at the 2-year follow-up (lateral view, left side). (O) 3D Cone-beam CT at the 2-year follow-up (lateral view, right side).

Under local anesthesia, a flap was raised, hopeless teeth were extracted, and eight Hexacone[®] implants (Simpladent GmbH, CH-8737 Gommiswald, Switzerland) of appropriate dimensions were placed (Fig. 2E, F). Eight mandibular implants were inserted using a flapless approach. Open-tray silicone impressions (VPS; Ivoclar Vivadent AG) were obtained after splinting the impression copings to enhance accuracy. A postoperative panoramic radiograph was acquired, and antibiotics and analgesics were prescribed (Fig. 2G).

Castable abutments with titanium bases were selected to minimize prosthetic inaccuracies. A metal framework try-in confirmed passive fit before delivery of the definitive prosthesis. Prosthetic screws were tightened to the recommended torque of 25 N cm, and occlusal adjustments were performed to achieve balanced functional loading (Fig. 2H–J). A postoperative panoramic radiograph confirmed satisfactory prosthetic fit. The patient reported her satisfaction with the esthetic and functional outcomes (Fig. 2K). Oral hygiene instructions were provided, and a follow-up was scheduled (Fig. 2L–N).

Follow-up and outcome assessment

Patients were examined at 1 week; 3, 6, 12, 18, and 24 months; and annually thereafter using standardized clinical and radiographic assessments^[15]. Throughout the 24-month follow-up, peri-implant soft tissues remained healthy, with Plaque Index and bleeding-on-probing scores ranging from 0 to 1, while probing depths remained between 1 and 2 mm around all implants. No implant mobility, implant loss, peri-implant radiolucency, screw loosening, screw fracture, prosthesis fracture, de-cementation, or composite chipping occurred.

Radiographs demonstrated stable peri-implant bone support without peri-implant radiolucency. Both patients reported sustained improvements in esthetics, mastication, speech, comfort, and overall quality of life.

Discussion

Despite advances in restorative and preventive dentistry, edentulism remains a significant global burden, particularly in younger populations in low- and middle-income countries^[4]. The considerable psychological impact of tooth loss, particularly among women, is well documented and was evident in the second patient^[4,5].

Despite meticulous clinical and laboratory procedures, conventional dentures may be associated with compromised retention, stability, masticatory efficiency, and patient satisfaction, especially with compromised ridge support^[6–8]. These limitations explain the increasing demand for fixed implant-supported rehabilitation with immediate function. Thus, the selected treatment option met the patient's demands and was consistent with available evidence^[8–10].

Treatment planning should consider bone availability, implant position, esthetic requirements, treatment duration, oral health, prosthetic design, financial considerations, and clinicians' expertise^[14–21].

In the present cases, treatment selection was based on patient preferences for fixed rehabilitation, available bone support, the need for immediate function, and multidisciplinary treatment planning. Corticobasal[®] implants utilize cortical and basal bone to achieve acceptable primary stability, enabling immediate loading while frequently eliminating grafting procedures^[14–21].

The treatment outcomes were consistent with previous reports^[16–18,21]. Awadalkreem *et al*^[18] highlighted survival rates of 90.3–100% for basal implants, while Doshi *et al*^[21] reported 100% survival of 380 Corticobasal[®] implants after 18 months. Likewise, the absence of implant failures and prosthetic complications over 2 years supports the favorable outcomes of immediate loading with appropriate case selection and meticulous treatment planning^[16–18,21].

Healthy peri-implant soft tissue conditions may reflect effective oral hygiene maintenance and appropriate prosthetic design. These findings are consistent with the observations of Awadalkreem *et al*^[15], who reported healthy peri-implant soft tissue around 174 BCS[®] implants in a cohort of 20 patients after 18 months, while Doshi *et al*^[21] demonstrated increased peri-implant bone density around Corticobasal[®] implants at 18 months, particularly posteriorly.

Postoperative antimicrobial therapy was prescribed according to institutional protocols to minimize the risk of infection during immediate implant rehabilitation^[18], although further research is needed to define optimal antibiotic regimens.

Compared with cement-retained restorations, screw-retained prostheses provide retrievability for maintenance and repair and avoid potential residual-cement complications. Multi-unit abutments contribute to prosthetic success by correcting implant angulation, improving passive fit, optimizing screw-access positioning, enhancing load distribution, and facilitating prosthesis retrievability for maintenance^[23–28]. Composite veneering and careful occlusal adjustment contribute to the absence of mechanical complications^[23,26,27].

Nevertheless, screw-retained rehabilitation has potential disadvantages, including unfavorable screw-access positioning, screw loosening or fracture, prosthetic complications, and technique sensitivity. Appropriate patient selection should consider systemic health, available cortical bone, oral hygiene and maintenance capability, occlusal conditions, prosthetically favorable implant positioning, patient expectations, and clinician experience.

The high level of patient satisfaction is in accordance with the findings of many investigators^[15–21] who reported significant improvements in esthetics, phonetics, mastication, and quality of life with fixed implant-supported Corticobasal[®] prostheses.

Some limitations should be acknowledged, including the small sample size, the absence of a control group, the lack of validated patient-reported outcome measures, and the absence of quantitative measurements of marginal bone-level and implant stability. Therefore, larger prospective studies with longer follow-up periods are required.

Conclusion

Within the limitations of these two-patient cases, including the lack of a comparison group and limited follow-up, immediately loaded, screw-retained Corticobasal[®] implant-supported prostheses using multi-unit abutments demonstrated favorable clinical and radiographic outcomes over 24-months. Both patients exhibited stable peri-implant tissues, maintained bone support, absence of biological or mechanical complications, and improvements in mastication, speech, esthetics, and overall quality of life. Longer prospective, comparative studies with quantitative marginal bone-level measurements, implant stability assessments, standardized outcome measures, and longer follow-up periods are required to support these findings.

Ethical approval

The research was approved by the research ethics committee of Sankalchand Patel University, Visnagar, Gujarat, India, IEC. No: NPDCH/IEC/2021/45 and was obtained from the first author's institute.

Consent

Written informed consent was obtained from the patients for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contributions

A.G.D. contributed to the conceptualization, treating the patient, writing, editing, finalization, and submission of the case. F. A. contributed to the conceptualization, treating the patient, writing, editing, finalization, and submission of the case. V. G. contributed to the conceptualization, treating the patient, writing, editing, finalization, and submission of the case.

Conflicts of interest disclosure

The authors declare no conflicts of interest in connection with this research and manuscript.

Research registration unique identifying number (UIN)

The research was registered at the Research Registry with the unique identifying number: researchregistry11882.

Guarantor

Fadia Awadalkreem.

Provenance and peer review

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Data availability statement

All data relevant to this case report are included in the article. No additional datasets were generated or analyzed during the preparation of this report.

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