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Case Report

Rehabilitation of a Severely Atrophic, Medically Compromised Patient Following Conventional Implant Failure: A Case Report

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ABSTRACT:
A 67-year-old female with controlled hyperthyroidism and hypertension presented with intolerance to a mandibular two-implant–supported canine-to-canine fixed bridge with a posterior removable partial denture, characterized by poor comfort and inability to chew. Clinical evaluation confirmed a severely resorbed mandibular ridge with functional failure of the prior restoration. A minimally invasive, flapless pinhole approach was selected to reduce morbidity in this medically compromised patient. Corticobasal rehabilitation was planned with 2.7 mm diameter implants targeting bicortical anchorage. Three lingual cortical implants were placed in each posterior quadrant behind the mental foramina, carefully bypassing the lingual nerve, and four straight 2.7 × 12 mm implants were positioned interforaminally. Abutments were bent to achieve parallelism and a common path of insertion. The same wax trial preceded definitive prosthesis fabrication. A lightweight Ivoclar shell-type mandibular prosthesis was delivered to limit mass on the highly resorbed ridge. At delivery, implant distribution and abutment parallelism enabled accurate seating and immediate function with improved comfort.
Keywords: Corticobasal implants, severely atrophic mandible, immediate loading, flapless surgery, mandibular prosthesis

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INTRODUCTION

Edentulism remains a significant public health challenge, particularly among older adults who face functional, psychosocial, and nutritional consequences when mandibular stability and chewing efficiency decline. As the alveolar process remodels after extractions, tissue support for conventional dentures progressively diminishes; the classic description of residual ridge resorption established it as a chronic, cumulative condition with major clinical implications for denture performance.[1] Continued longitudinal observations confirmed that this reduction proceeds for decades, altering vertical dimension and denture-bearing anatomy well beyond the immediate post-extraction period.[2] In severely atrophic mandibles, the diminished height and width of the residual ridge reduce the available surface for adhesion and friction, and mucosal tolerance to prosthesis movement becomes a limiting factor. Patients commonly report pain, instability during speech and mastication, ulceration, and a retreat from fibrous or tougher food items in favor of soft, carbohydrate-heavy diets—patterns that map directly to the biomechanics of a compromised lower prosthesis and the biology of ongoing resorption.[1,2]

Implant therapy transformed this landscape by offering rigid anchorage and cross-arch stabilization, but success is not uniform across all contexts. The biological substrate matters: bone quality and distribution, the cortical envelopes available for engagement, and the trajectory of resorption each shape the surgical pathway and prosthetic endpoint. Early clinical evidence warned that type IV bone carries elevated implant risk, including disproportionate fixture losses when primary stability is insufficient.[3] Broader epidemiologic analyses later underscored that multiple patient and site factors—such as anatomic location and systemic conditions—

aggregate to influence failure rates, reinforcing the need for risk-stratified planning in compromised jaws.[3,4] When conventional strategies (e.g., two-implant mandibular overdentures or limited-span implant-supported fixed bridges combined with distal-extension RPDs**)** fail to meet expectations for comfort or chewing efficiency, the reasons are multifactorial: limited primary stability in poor-quality bone, unfavorable positions dictated by anatomy, attachment-/connection-related maintenance burdens, or persistent prosthesis mass and leverage acting on a frail ridge—each magnified as resorption advances.[1–4] Within this reality, immediate-function protocols and cortical-anchorage concepts provide an alternative trajectory for the severely atrophic mandible. Pioneering fixedfull-arch frameworks demonstrated that, with strategic anterior–posterior spread and careful occlusal control, immediately loaded implants can restore stable function without extensive grafting in many edentulous mandibles.[5] The interforaminal region offers relatively dense cortical boundaries and a safer anatomic corridor, and posterior strategies that engage lingual cortex or buttress areas can expand the anchorage palette where ridge height or width is limited. Small-diameter, one-piece designs and bicortical engagement can achieve high insertion torques and mechanical stability suitable for early or immediate loading—provided trajectory, cross-arch splinting, and occlusal scheme are orchestrated to minimize cantilever forces during the vulnerable early period. Evidence syntheses of randomized trials further suggest that, when case selection and biomechanics are respected, immediate or early loading can deliver survival and marginal bone outcomes comparable to conventional timelines, with the added advantage of shorter rehabilitation and earlier return to function.[6]

Equally critical is the prosthetic philosophy. In a frail mandibular foundation, every gram matters: lighter frameworks and reduced prosthesis mass lower moment arms transmitted to the bone–implant complex during function. Abutment parallelism—achieved intraoperatively or via controlled post-placement bending in appropriate one-piece systems—simplifies path of insertion, improves passivity, and eases maintenance. Occlusal schemes that distribute contacts broadly, limit excursive interferences, and respect the patient's envelope of function help protect the system during adaptation. For medically stable but compromised patients, micro-invasive placement (e.g., flapless) can further reduce operative time, soft-tissue manipulation, and swelling—pragmatic benefits supported by randomized data in mandibular overdenture contexts showing that flapless protocols, paired with immediate or early loading, can achieve favorable clinical outcomes with reduced morbidity and efficient rehabilitation,[7] and these principles can be applied cautiously to fixed implant-supported bridges when comparable biomechanical controls are maintained.

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CASE PRESENTATION

The patient, Ms. Anita Sood, is a 67-year-old female with a medical history significant for controlled hyperthyroidism and hypertension, managed with regular maintenance medications. Her dental history includes multiple crowns and bridges completed a few years prior. She later received a mandibular implant-supported fixed bridge from canine to canine on two implants, with a posterior rod/bar retaining a removable partial denture (RPD) after being informed she was a "no-bone case," but she found this prosthesis very uncomfortable, could not wear the RPD throughout the day, and, most importantly, could not chew with it. Her chief concern was persistent discomfort and poor function with the existing implant-supported bridge and posterior RPD**.**

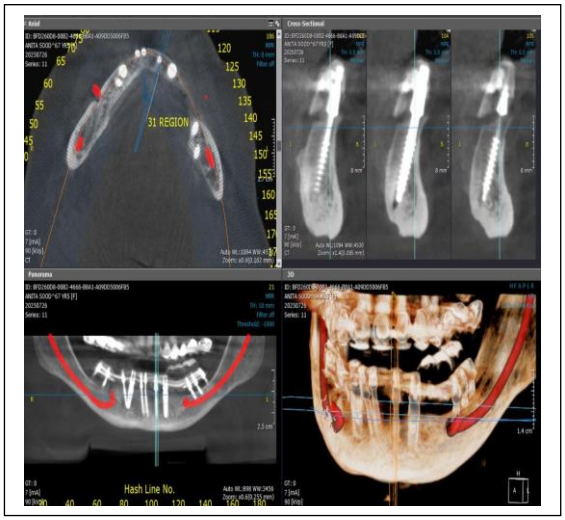
Diagnosis, Treatment Objectives, and Treatment Plan

Diagnosis: Clinical evaluation revealed a severely resorbed mandibular ridge with functional failure of the prior two-implant–supported canine-to-canine bridge with posterior RPD to provide acceptable comfort and mastication. **Treatment Objectives:** The goals were to achieve a stable, functional, and comfortable mandibular rehabilitation despite the severe ridge resorption and medical comorbidities, while minimizing surgical morbidity. **Treatment Plan:** A corticobasal implant rehabilitation was advised with 2.7 mm diameter implant planning, targeting bicortical anchorage to optimize stability in the atrophic mandible.

Surgical Protocol: A flapless pinhole approach was employed. Osteotomy preparation utilized a 2.0 mm single-drill system. Three lingual cortical implants were placed in both quadrants behind the mental foramen, with the lingual nerve bypassed. Abutments were bent to align the components in parallelism for a common path of insertion. Additionally, four straight implants (2.7 × 12 mm) were placed in the interforaminal region.

Prosthetic Protocol: A same wax trial was performed to verify esthetics, phonetics, and occlusion, followed by prosthetic delivery. Given the highly resorbed bone, a light-weight prosthesis, specifically an Ivoclar shell denture–type design, was selected to reduce prosthesis mass and enhance comfort.

Outcome at Delivery: Implant distribution and abutment parallelism provided stable multi-implant support to facilitate accurate seating of the prosthesis. The delivered light-weight mandibular prosthesis was designed to improve comfort and function relative to the previous implant-supported canine-to-canine bridge with posterior RPD**.**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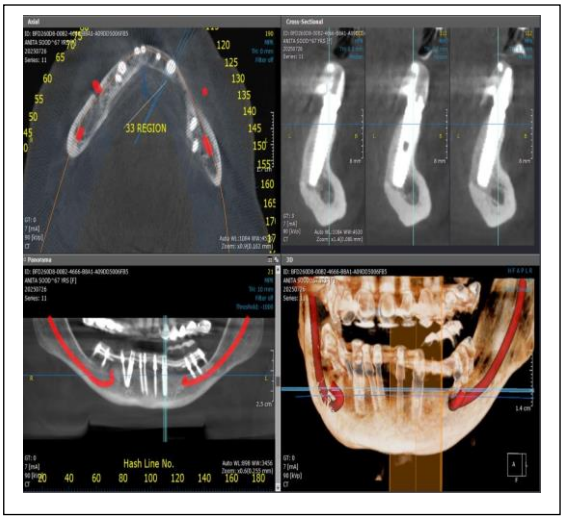
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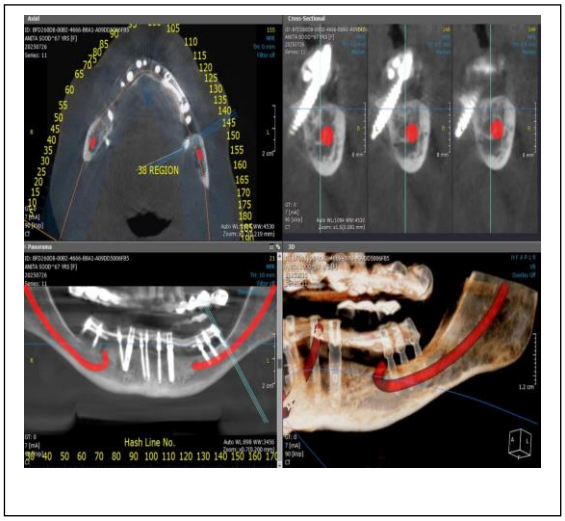
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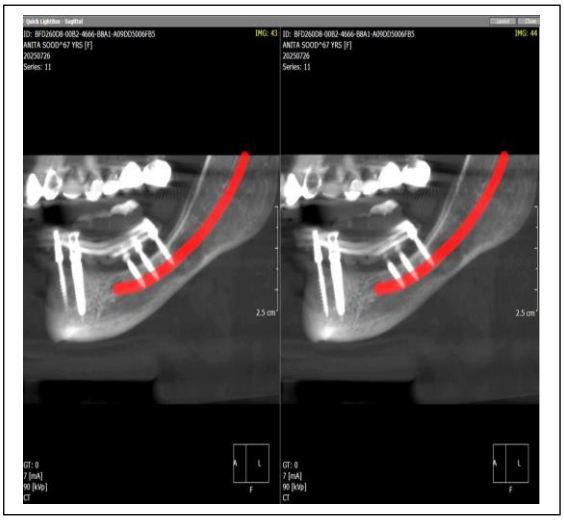

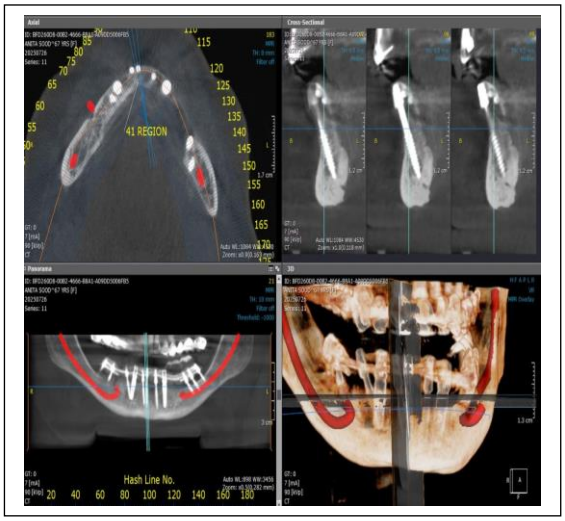
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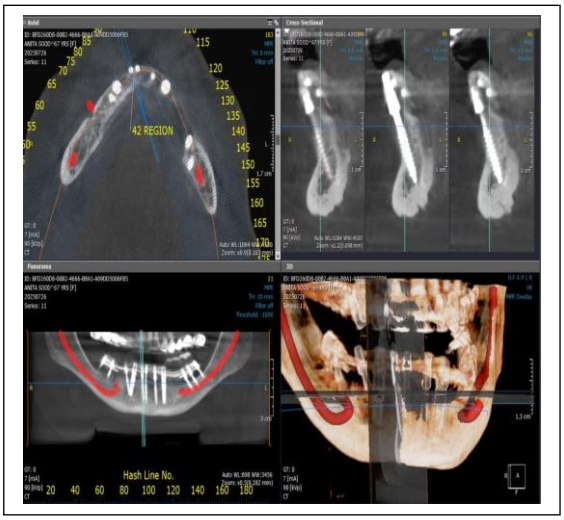
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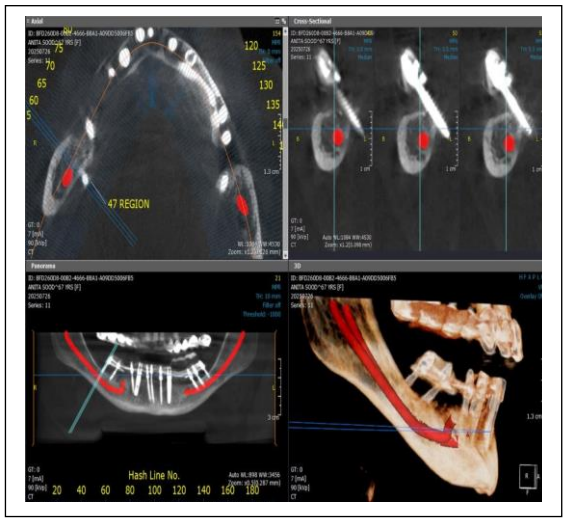

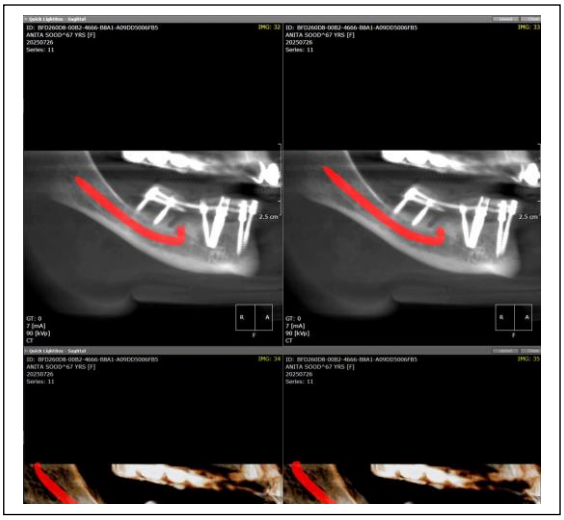

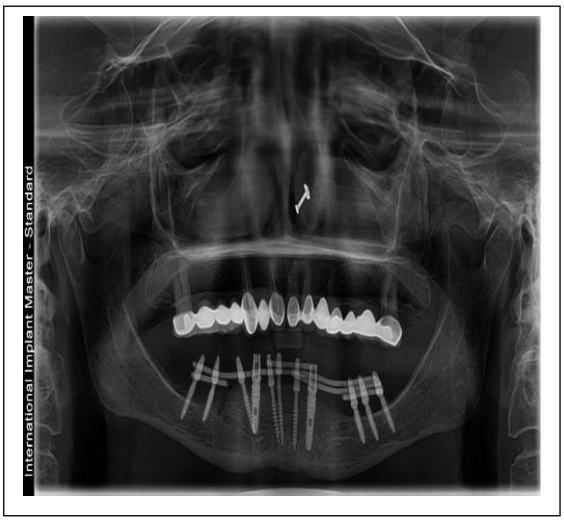

DISCUSSION

This medically compromised, severely atrophic mandibular case transitioned from an ill-tolerated two-implant–supported canine-to-canine fixed bridge with a posterior RPD to a multi-implant corticobasal, immediately loaded approach to meet stability and function goals with minimal morbidity. While the McGill Consensus positioned mandibular two-implant overdentures as a first-choice standard (Feine et al., 2002)[8]—and although this patient's initial restoration was not an overdenture, two-implant solutions remain a useful benchmark for comparison—individual response varies, as in Ms. Sood. For example, in a 5-year randomized trial of 36 edentulous patients, Naert et al. (1999) reported no implant failures across magnet, ball, and bar attachments, with bars showing higher retention but more mucositis/gingival hyperplasia, and similar patient satisfaction overall[9]. Bryant et al. (2015) randomized 86 participants to 1 vs 2 mandibular implants and found no 5-year difference in satisfaction, 0 implant failures in the single-implant group versus 5 pre-loading failures in the two-implant group, and comparable maintenance demands[10]. Systematic evidence also shows that, relative to conventional complete dentures, mandibular implant overdentures improve masticatory performance, comfort, stability, and oral-health–related quality of life (Kutkut et al., 2018)[11]. Given Ms. Sood's severely resorbed ridge, our choice to favor bicortical/lingual cortical anchorage with immediate function aligns with data from corticobasal/one-piece concepts: Lazarov (2019) observed ~98% survival across 5,100 immediately loaded one-piece Strategic Implants over 12–57 months, with no peri-implantitis and no adverse effect of hypertension or neck bending on success[14]. Focusing on the interforaminal region for extreme atrophy is likewise supported: Testori et al. (2022) reported 98.4% cumulative survival (231/235 implants) with immediately loaded 4–5 short implants in severely atrophic mandibles (follow-up to 14 years) and low biologic complications (mucositis 3.9%, peri-implantitis 1.3%) alongside manageable mechanical chipping (17%)[13]. Importantly for a 67-year-old on maintenance medications, our flapless pinhole protocol is consistent with long-term evidence

showing no significant differences versus flapped surgery in implant survival, marginal bone loss, or complications at ≥3 years (Cai et al., 2020)[12]. Result in this case at delivery: multiple lingual cortical implants posterior to the mental foramina plus four interforaminal straight implants achieved abutment parallelism, accurate seating, zero intraoperative complications, and delivery of a light-weight shell-type prosthesis designed to limit load on a highly resorbed ridge—an immediate outcome pattern congruent with the high survival and low biologic complication profiles reported in severe-atrophy immediate-load cohorts[13,14] and the morbidity-sparing equivalence of flapless placement[12], even though population-level overdenture benefits[11] do not guarantee individual tolerance, as underlined by Ms. Sood's prior experience with a limited-span, two-implant fixed bridge plus posterior RPD despite benchmarks from consensus and trials[8–10].

CONCLUSION

This medically compromised, severely atrophic mandibular case was successfully rehabilitated after intolerance to a two-implant–supported canine-to-canine fixed bridge with a posterior RPD. Flapless corticobasal placement—multiple lingual cortical implants posterior to the mental foramina with four interforaminal 2.7 × 12 mm implants—and abutment bending achieved parallelism and immediate function. A lightweight shell-type mandibular prosthesis improved comfort and chewing while minimizing surgical morbidity. This approach offers a practical, patient-centered alternative when conventional approaches fail in severely resorbed mandibles.

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