

Clinical performance of 4 to 14-unit CAD/CAM Zirconia implant bridges: A retrospective, multi-center study with up to 37.1 months follow-up.

Marcin Graboń¹, Jacques Lanners², Graham Carmichael³, Glen Liddelow³, Sik Hong Ching⁴, Ali Aghasadeh⁵, James Chow⁶, Tristan Staas⁷

1. Dental Med Clinic, Dr Marcin Graboń, Żmigrodzka 83, 51-130 Wrocław, Poland 2. Centre médico dentaire Mameranus 80 route d'Arlon, L-8210 Mamer Luxembourg 3. BC Prosthodontics, 143 Colin Street, West Perth, Western Australia 6005, Australia 4. Aesthetic Dental Implant Center, Unit 1101-02, 11/F, Sino Cheer Plaza, 23 Jordan Road, Jordan, Kowloon, Hong Kong 5. Praxis Dr. Med. Dent. A. Aghasadeh, Mäuerchen 7, 42103 Wuppertal, Germany 6. Dental Implant Maxillofacial Centre, Rm 1901-05, 19F, The Center, 99 Queen's Road Central, Central, Hong Kong 7. Staas & Bergmans, Schubertsingel 32, 5216 XA 's-Hertogenbosch, Netherlands

CLINICAL RELEVANCE

- The longevity, esthetic satisfaction, and biological compatibility of prosthetic materials are critical factors when considering the overall success of dental restorations.
- Selecting materials that remain reliable and complication-free over time, particularly as the span of the bridge increases (effectively full-arch restorations with greater functional demands), is essential.

BACKGROUND AND AIM

Prosthetic materials have advanced from traditional metal-ceramic bridges to zirconia-ceramic systems, and lately to monolithic zirconia. While zirconia-ceramic and metal-ceramic bridges perform similarly in the first five years, zirconia-ceramic frameworks tend to present higher complication rates over time¹. In contrast, monolithic zirconia bridges offer high survival rates and minimal complications^{2,3}. Their strength and esthetics make them a reliable option not only for short-span restorations but also for full-arch prostheses.



This study aims to evaluate the safety, performance, and clinical outcomes of industrially milled Individualized Zirconia Implant bridges (IZIBs).

METHODS AND MATERIALS

STUDY DESIGN Retrospective multi-center

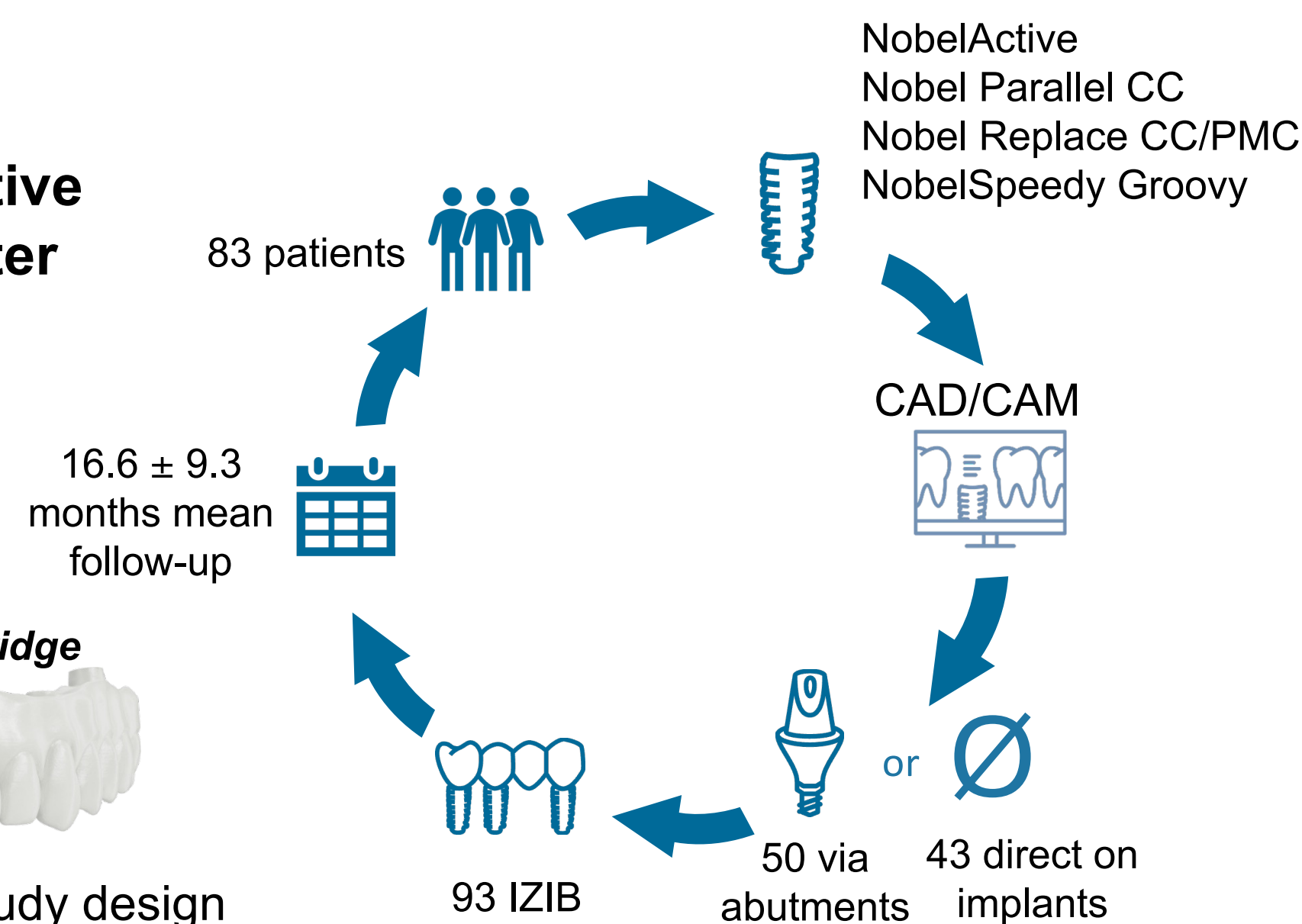


Figure 1. Study design

RESULTS

- Mean patient age was 63.4 ± 12.8 years, and 44 (53.0%) patients were female. Approximately a third were bruxers (34.5%) and former or current smokers (31.5%). Of the 81 patients with known periodontitis status, 18.5% had the history of treatment, and 7.4% were untreated.
- Majority (n=67) were placed in the maxilla. The soft tissue was reported healthy in 98.9% at the last visit, the survival rate was 93.5% (5 bridges fractured and 1 had major chipping rendering it a failure).

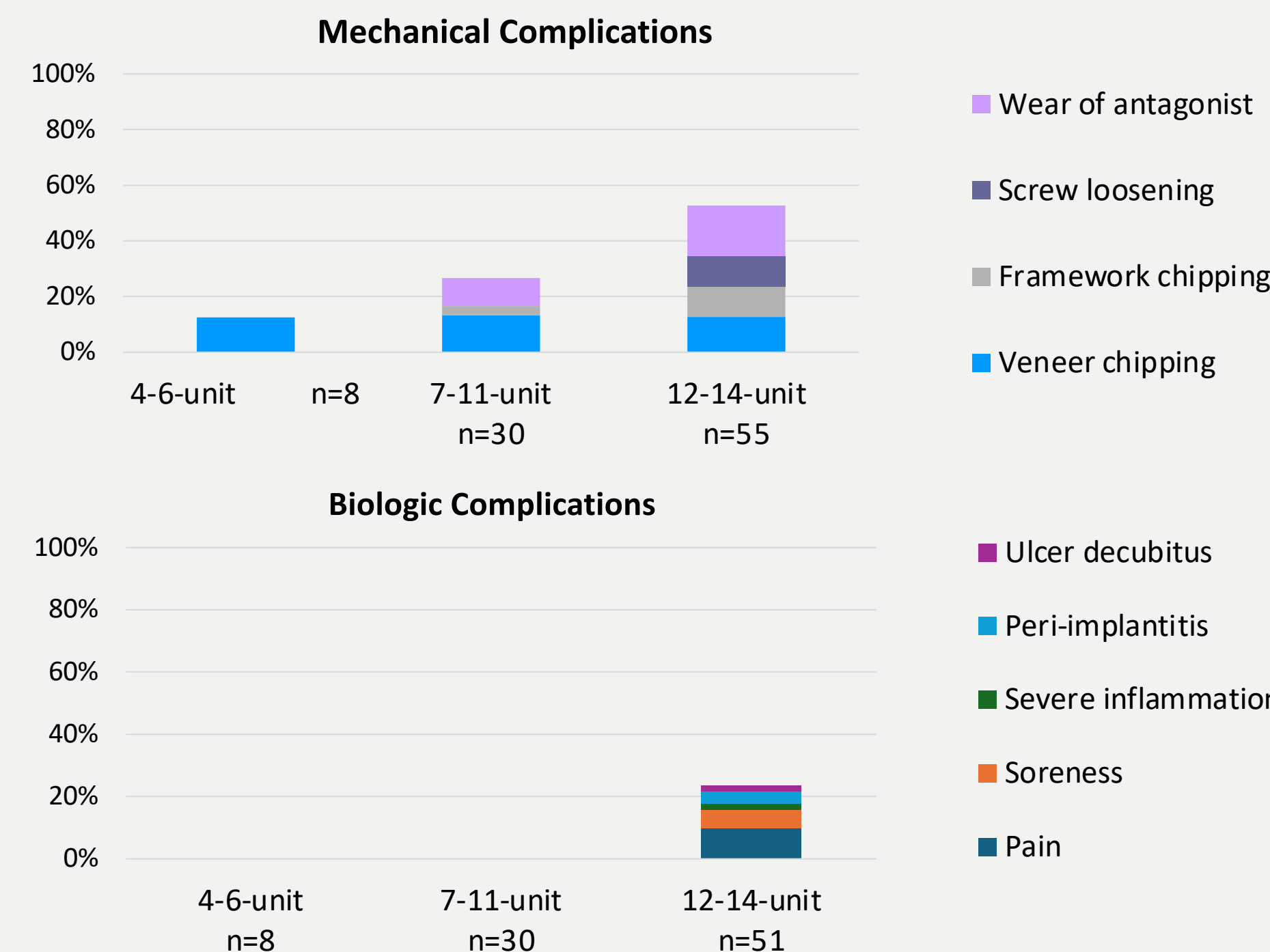


Figure 2. Mechanical and biologic complications

- In the overall population, mechanical complications included screw loosening (6.5%), chipping of veneer (13.0%) and of zirconia framework (7.6%). The wear of the antagonist (acrylic, ceramic, natural teeth, or mixed) occurred in 15.1% bridges. Figure 2 (left panel) illustrates complications per IZIB size category.
- Of the 89 bridges with a reported biological status, pain/soreness (4.4%), ulcer decubitus (1.1%), and peri-implantitis (2.2%) were observed at 7.9% of the documented restorations. Figure 2 (right panel) illustrates biologic complications per IZIB size category.
- Patients (93.3%) and clinicians (95.7%) were highly satisfied with the outcomes.

CLINICAL CASE(S)

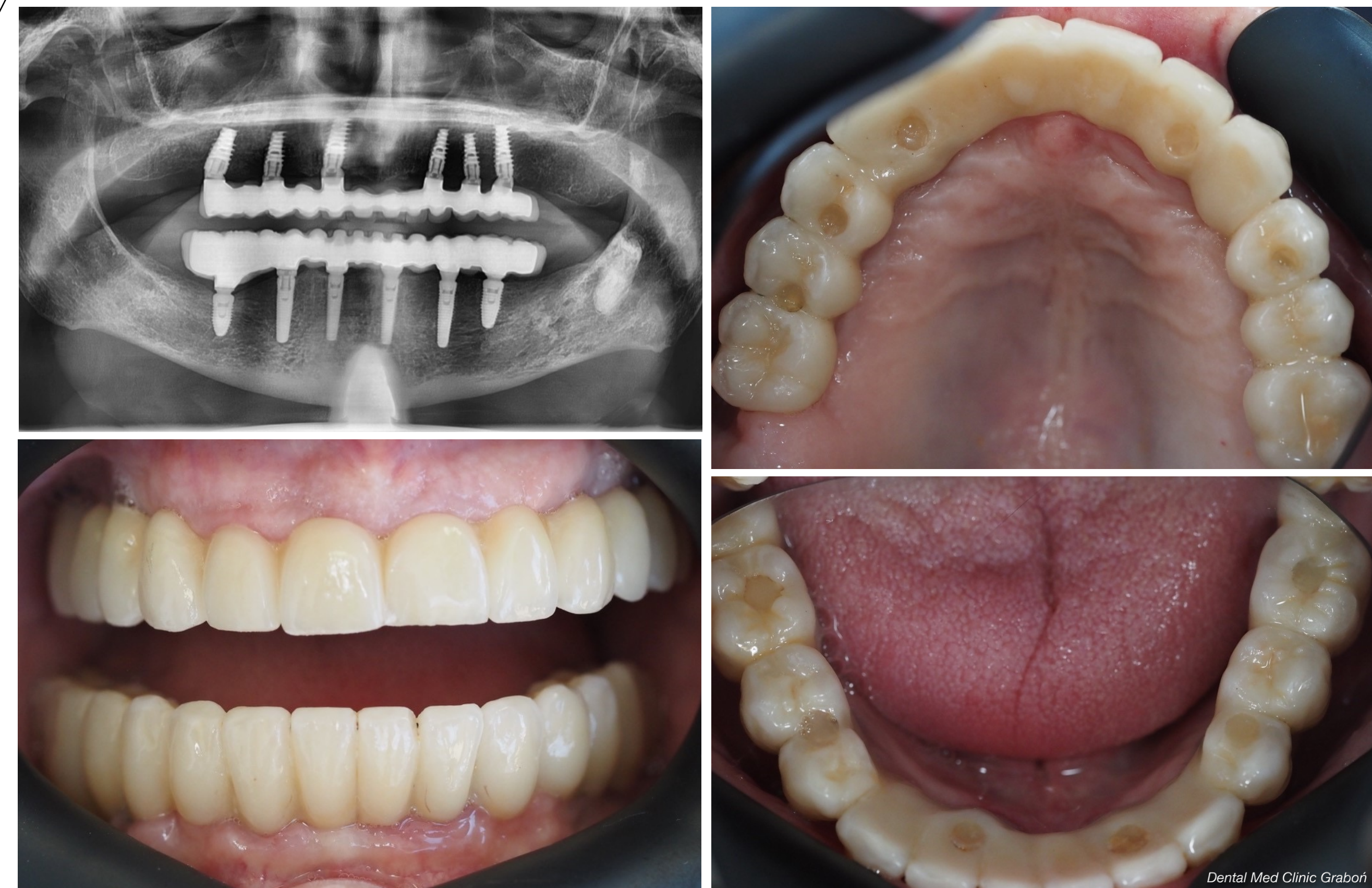


Figure 3. A clinical case of an 89-year-old male patient who presented with terminal dentition with no history of periodontitis or bruxism. He first received 6 NobelActive implants in maxilla inserted at FDI positions 12, 15, 16, 22, 24, and 26. Final prosthesis delivery (FPD) of a 12-unit bridge occurred 4.4 months later. Subsequently, his mandible was treated with 5 NobelReplace CC and 1 NobelActive implants at FDI positions 32, 34, 37, 42, 44, and 47. The FPD of a 14-unit bridge took place 5.5 months later. The radiograph and clinical images were taken at the last follow-up visit (4.3 and 3.6 years after maxilla and mandible bridge placement, respectively).

CONCLUSION

The study results indicated that IZIBs offered a safe and predictable solution to restore partially and fully edentulous patients. The outcomes were favorable and complications infrequent, despite a considerable fraction of patients with a history of periodontitis, smoking, and bruxism.

REFERENCES

1. Sailer, I. et al. A systematic review of the survival and complication rates of zirconia-ceramic and metal-ceramic multiple-unit fixed dental prostheses. *COIR*, 29 (16), 184-198 (2021).
 2. Worni et al. Monolithic zirconia reconstructions supported by teeth and implants: 1- to 3-year results of a case series. *Quintessence J.* 48(6):459-467 (2017)
 3. Vizcaya, F.R.. Retrospective 2- to 7-Year Follow-Up Study of 20 Double Full-Arch Implant-Supported Monolithic Zirconia Fixed Prostheses: Measurements and Recommendations for Optimal Design. *J Prosthodont* 27(6):501-508 (2018)
- This study was supported by the Nobel Biocare grant Nr. 2020-1690