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Efficacy of glycine air-powder abrasion for treatment of peri-implantitis



KEYWORDS

Dental implant;
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Glycine powder

The pathogenesis of peri-implantitis, which significantly impairs oral quality of life, is not fully identified, and function can be restored by cumulative interceptive supported therapy.¹ The rough surface structure of current implants is difficult to decontaminate following bacterial infection. Moreover, the complex thread morphology makes cleaning difficult, and nonsurgical procedures alone are ineffective and do not allow the bone tissue to heal.² Various methods have been used to decontaminate implant surfaces.³ Among them, the Er:YAG laser does not irradiate the implant surface evenly; implantoplasty reduces the strength of the implant body and increases the risk of fracture, and the effect of titanium particle fragments on the surrounding tissue cells is unknown. The application of air-powder abrasion is minimally invasive and advantageous to both the organism and the implant. In this report, we described a case of peri-implantitis treated with air-powder abrasion in which bone regeneration was achieved without bone grafting.

A 47-year-old female patient visited our hospital in 2013 with a chief complaint of discomfort on the right side of the mandible. She had no systemic diseases and smoking habit. Tooth #47 had been replaced with an implant (Brånemark System® Mk IV, 11.5 mm, Nobel Biocare, Zürich, Switzerland) 2 years previously (Fig. 1A). Peri-implantitis with surrounding mucosal swelling, a probing depth of 7 mm, and bleeding was diagnosed. A porcelain-fused-to-metal crown was temporarily cemented, with no cement residue observed. After several applications of local antibiotic therapy (minocycline

hydrochloride ointment), the symptoms did not improve and a surgical procedure was planned.¹ After local anesthesia, a full-thickness flap was elevated and four-wall bone resorption was confirmed. The granulation tissue was easily removed in a single mass. No calcification was observed on the surface, and air abrasion with glycine powder (AIR-FLOW SI® E.M.S. Electro Medical Systems S.A., Nyon, Switzerland) was performed (Fig. 1B and C). The spray was applied at a distance of 3–5 mm from the implant surface at an angle of 30–60° to the axial plane at 0.5 MPa air pressure for 1–2 min. The handpiece was angled carefully to avoid dead space (Fig. 1D). The base of the flap was not sprayed to avoid subcutaneous emphysema. The patient had no postoperative discomfort and continued regular maintenance (Fig. 1E), and a large gain in bone tissue was observed (Fig. 1F and G).

Glycine, an amino acid produced by the human body, is water-soluble and therefore generally harmless. It is more useful than chemical cleaning methods for removing biofilm from subgingival and implant surfaces,⁴ and its bone healing capacity is reported to be better than that of implantoplasty.⁵ Peri-implantitis, with various forms of bone defects, is associated with difficulties in instrument reachability and manipulation angles. However, the excellent therapeutic effect obtained in this study indicates that the treatment is sufficiently effective even on the complex TiUnite® surface structure. Air abrasion with glycine powder can achieve effective decontamination when used alone and it provides an environment that enhances bone regeneration even without bone grafting.

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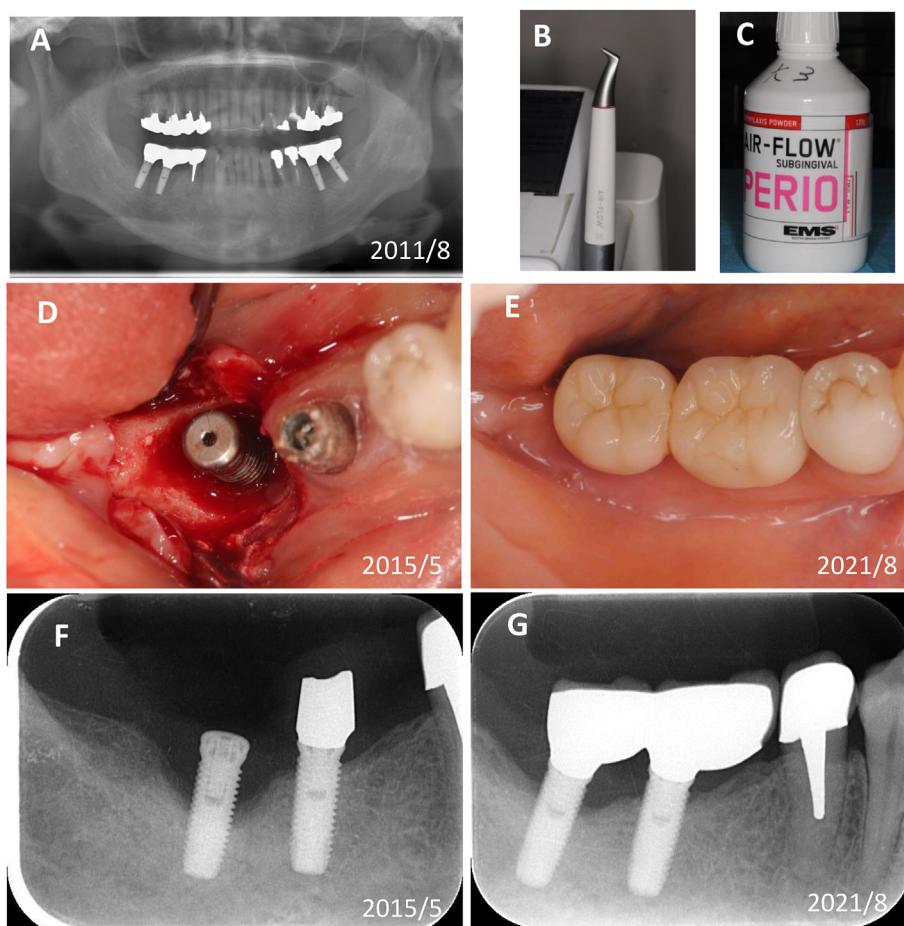


Figure 1 The radiographic and clinical photographs of our case. (A) Panoramic radiograph at the time of earlier prosthetic rehabilitation (2011). (B) Air-powder abrasion device (AIR-FLOW SI® E.M.S. Electro Medical Systems S.A., Nyon, Switzerland). (C) Glycine powder – average particle size is 25–150 μm , Mohs hardness is 2 (lower than that of dentin). (D) Clinical photograph after the air abrasion for peri-implantitis (2015). (E) Clinical photograph at maintenance (2021). (F) Periapical radiograph of #47 peri-implantitis (2015) showing bone resorption of about half of the implant length. (G) Periapical radiograph showing marked bone regeneration around the #47 implant.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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