Minimizing Periimplantitis with the New Method of Implantoprosthetic Treatment

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INTRODUCTION

Periimplantitis belongs to the common complications during implantoprosthetic treatment. One of the main reasons is the accumulation of plaque around the abutment. The consequences are the inflammation, the bone loss around the implant and the final loss of the implant. In 2010, Dr Awillo developed a method involving the use of biocompatible properties of zirconia. In vitro studies were conducted for two years, with the Department of Mikrobioanalytics of the University of Warsaw. These studies showed a high adaptive capacity of connective tissue cells fibroblasts to the surface of zirconia.

MATERIAL AND METHODS

Biological material

Balb/c 3T3 (mouse embryonic fibroblasts) cell line was initially used as model cells for experiments. In a further stage of the study, the experiments were performed on cells which were collected from connective tissue of patients at the stage of unveiling an implant in Implantology and Dental Care Center dr Awillo. Fibroblasts were subsequently derived from tissues at Medical University of Warsaw.

Cell culture

In order to explore the possibility of creating the bio-connection between an implant abutment surface and connective tissue, Balb/c 3T3 (mouse fibroblasts) cells were seeded onto zirconia plates.

Cells were seeded onto zirconia plates during passage. Density of cell suspension was measured using Countess System (Invitrogen/Life Technologies). Required portion of cell suspension was pipetted onto polystyrene petri dishes with zirconia plates and filled with proper amount of cell culture medium. Cell culture were incubated at 37° C for 24h. Image analysis was performed using an inverted fluorescent microscope (Olympus IX71).

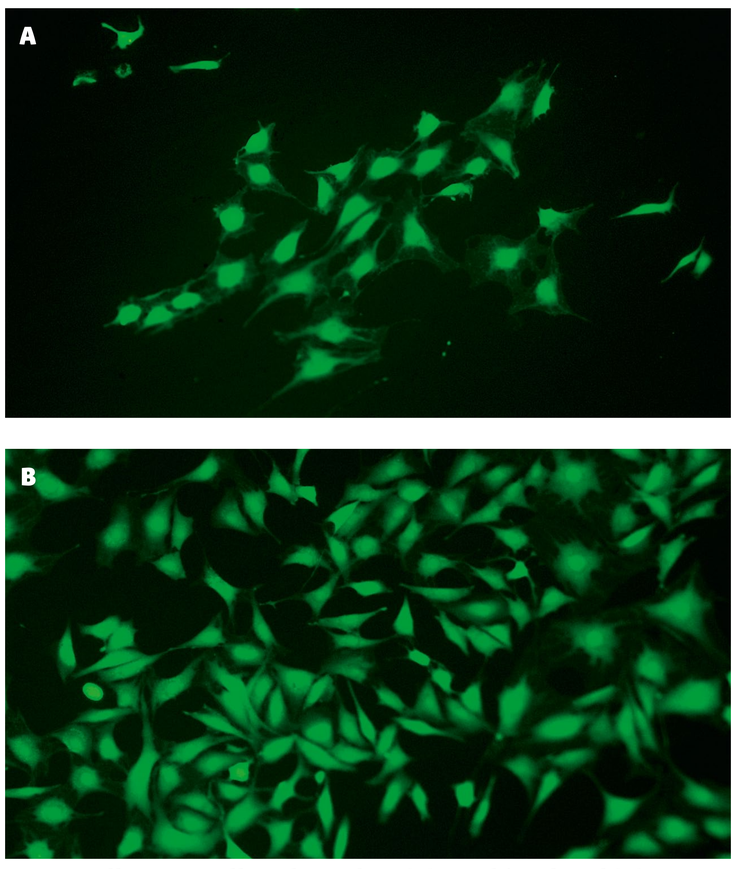

FIG.1 Balb/c 3T3 cells cultured on (A) machined and (B) polished zirconia plate; 200×.

Mouse fibroblasts (Balb/c 3T3) adopted a polygonal shape on both types of surfaces. Differences in the number or morphology of cells adhered to polished (**FIG.1 B**) and machined (**FIG.1 A**) plate were observed.

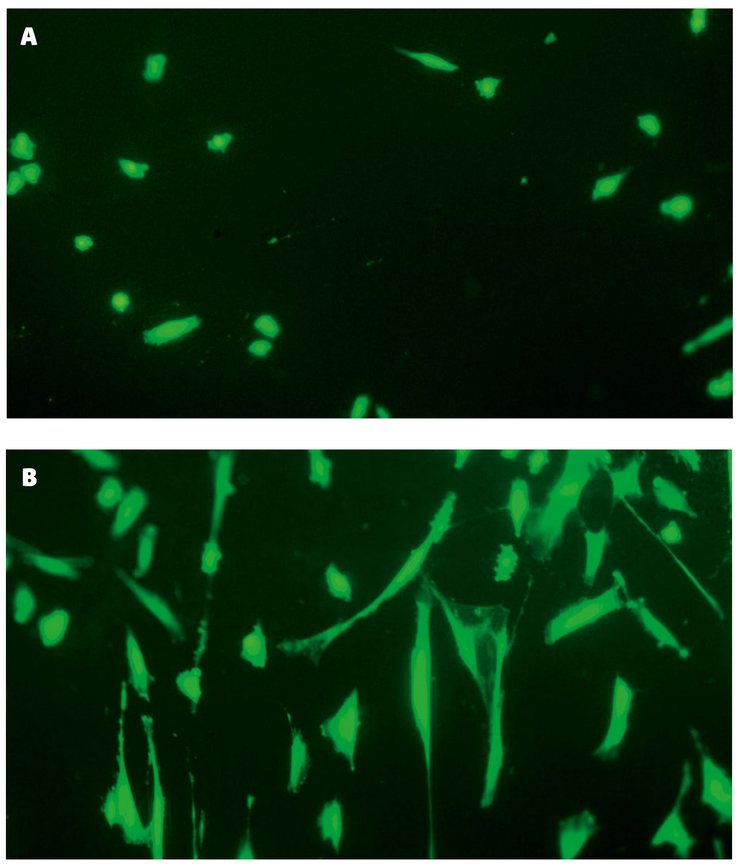

FIG.2 Patient 1 cells cultured on (A) machined and (B) polished zirconia plate; 200×.

Cells adhered to the polished plate adopted epithelioid shape (**FIG.2 B**), which could indicate their stronger adhesion in comparison to those seeded onto machined surface (**FIG.2 A**), where cells maintained spindle shape. In addition, both surfaces differ in the number of adherent cells. Definitely a more significant degree of confluence showed fibroblasts cultured on polished surface.

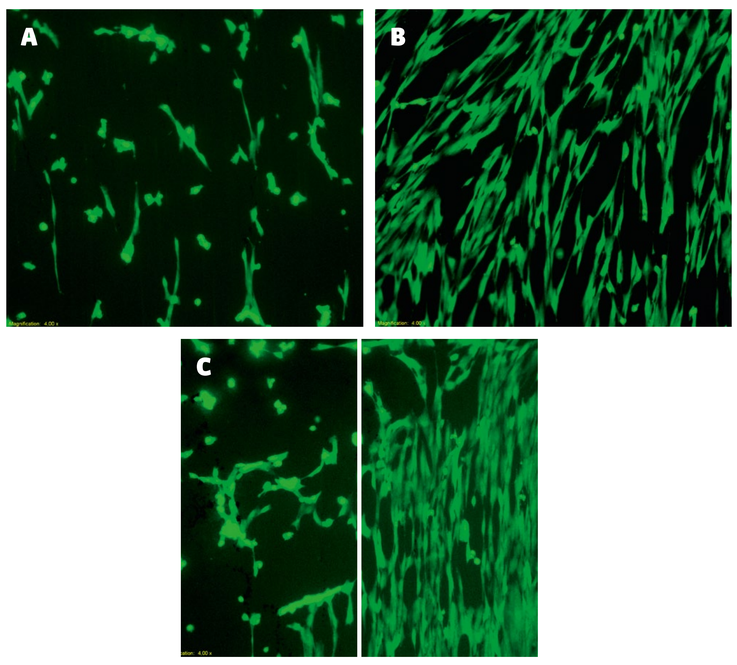

FIG.3 Patient 2 cells cultured on (A) machined and (B) polished zirconia plate, (C) border of zirconia plate (half machined and half polished respectively); 80×.

Similar observations could be made for Patient 2 cells (**FIG.3**). Interesting phenomenon occurs at the border of two types of plates, where cells grow along the surface wells, which might be explained by their partial delving into microgrooves and adhesion to the larger surface area compared to the flat surface of tested material.

AIM

To minimize the occurrence of periimplantitis by using a new method of preparing and mounting the zirconium abutment.

Method

Patient inclusion was based on clinical examination and diagnosis in the form of CBCT. Immediately after implant insertion, the impression at implant level was taken. After healing the level of soft tissue was assessed by CBCT diagnostic or via the analysis of model. The anatomically shaped hybrid abutment conforming to the conditions of the patient was created. After sterilization, the abutment was placed immediately after implant exposure, bypassing the stage of healing screws, allowing the connection of unhealed area of the soft tissue from the surface of zirconium.

Material

This method was used in 24 patients in the upper and the lower jaws in the anterior and posterior areas. In each case, hybrid abutments were installed and then crowns and bridges were placed either immediately after abutment insertion or after 2-3 weeks. In comparison 26 patients with traditional methods of exposing the implant, with the step of the healing screw were monitored.

Results:

In the described method, the gap was completely closed in 85% of the cases. In all cases, the fissure depth was lower than the depth from the surface of the implant to the edge of the gums. In all control cases the probe reached to the edge of the surface of an implant or the level of the bone in the case of implant insertion below the level of the bone.

Discussion:

This clinical evaluation with implantprosthetic treatment is being performed since 18 months. In none of the 24 cases there was any evidence of any signs of inflammation. The method proposed by Dr. Awillo seems effective to minimalize occurrence of periimplantitis. Further studies, conducted with researchers from University of Technology and Medical University of Warsaw, should finally confirm the effectiveness of this method.

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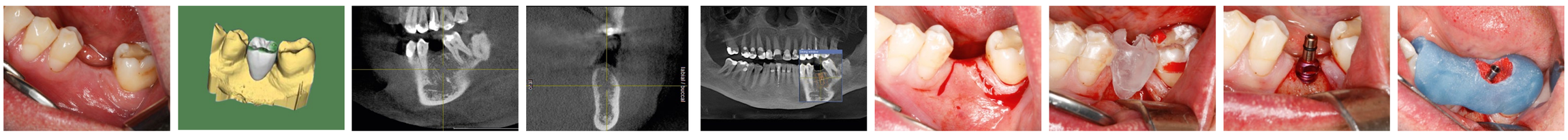

Fig.1 Lack of tooth 36

Fig.2 CAD CAM scan

Fig.3 CBCT scan

Fig.4 CBCT scan

Fig.5 Implant planning on the CBCT base

Fig.6 Flap design

Fig.7 Surgical guide

Fig.8 Implantation

Fig.9 Prosthodontic guide

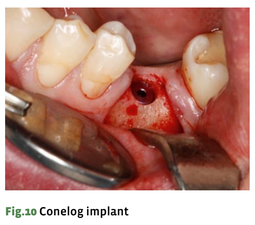

Fig.10 Conelog implant

Fig.11 3 months after implantation

Fig.12 CBCT scan

Fig.13 Implant opening

Fig.14 Immediate abutment installation

Fig.15 Temporary crown

Fig.16 4 weeks after abutment installation

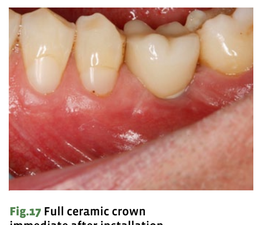

Fig.17 Full ceramic crown immediate after installation

Fig.18 One year after crown installation