AN ALTERNATIVE REINFORCEMENT METHOD FOR MANDIBULAR IMPLANT RETAINED OVERDENTURES WITH E-GLASS FIBERS: A CASE REPORT

ABSTRACT

Implant retained overdentures are the best treatment solutions for long time edentulism. However especially for unreinforced mandibular overdentures with locator attachments, if the natural dentition exists on the opposing arch, the most common failure is fracture of the acrylic denture base around the attachment clips. In this case report, acrylic base material of the fractured mandibular implant retained overdenture was reinforced with bidirectional e-glass fibers.

Key words: Reinforcement, Fiber, Overdenture

Submitted for Publication: 09.05.2013
Accepted for Publication: 04.03.2014
ALT ÇENE İMPLANT TUTUCULU OVERDENTURE PROTEZ İÇİN CAM-FİBER İLE ALTERNATİF GÜÇLENDİRME YÖNTEMİ: VAKA RAPORU

ÖZET


Anahtar Kelimeler: güçlendirme, fiber, overdenture

Yayın Başvuru Tarihi: 05.09.2013
Yayına Kabul Tarihi: 03.04.2014
INTRODUCTION

Conventional complete dentures pose some problems for edentulous patients with severely resorbed mandible or maxilla such as insufficient stability, retention, chewing ability and patient satisfaction. Implant supported overdentures has become the viable standard treatment solution for the care of edentulous patients to overcome these problems. However some technical complications such as acrylic resin denture base fracture might occur when the insufficient space exists between the denture teeth and attachment system or the implant retained overdenture opposes natural teeth or the implant supported prosthesis. Many attempts have been made to enhance the strength of acrylic denture bases such as addition of the metal wire or various types of fibers. Cast metal wire is particularly helpful for reinforcement, but they might be unaesthetic, expensive and prone to corrosion. Several mechanical laboratory studies demonstrated that adding glass fibers are useful for reinforcing the acrylic denture base materials. Reinforced acrylic denture base material can be achieved either adding the glass fibers to whole denture base or only to the weak region. In this case report acrylic base material of the fractured mandibular implant retained overdenture was reinforced with bidirectional glass fibers.

CASE REPORT

A 72 year-old man presented to the department of prosthodontics, Faculty of Dentistry, Hacettepe University, with a fractured mandibular implant retained overdenture (Figure 1). Intraoral examination showed that his opposing dentition was natural dentition and his mandibular implant retained overdenture was not reinforced with any material. The initial treatment plan was to repair of the fractured mandibular overdenture by rejoining pieces of a fractured denture base using an auto polymerizing resin. After this repair, 2 mm thickness of the denture base material was removed from the tissue side of the prosthesis to relining procedure and denture surface was roughened. Zinc oxide eugenol impression material (SS White Manufacturing, Gloucester, England) was placed directly on the tissue surface of denture base; afterwards the denture was inserted into the patient’s mouth. Thus, the old base was used as an impression tray. The denture with eugenol impression material was invested in the drag of the denture processing flasks using type II dental plaster (Snow white plaster; Kerr, Romulus, Mich). The undercuts in the investment were removed and the investment was allowed to set. Housing part of the attachment with black processing patrix was filled using condensation silicone material (Speedex, Coltene, Switzerland). A thin layer of separating medium (modern material separating Medium; HerausKulzer) was applied to the surfaces of the investment. The cope was positioned in place and a second mix of type II plaster was poured into the flask until the ring was filled completely and the top of the flask placed in position. The flask was placed in a boil tank for 10 min. to eliminate the impression material. The remaining impression material was rinsed with hot running water after separating the cope and drag. A layer of the separating medium was applied to the plaster of the investment in both portions. Bidirectional glass fibers were impregnated with powder-liquid mixture in an aluminum foil for about 10 min. until they became transparent (Figure 2A, 2B). Heat-polymerized polymethacrylate resin (Meliodent; HerausKulzer GmbH & Co. KG, Hanau, Germany) was mixed according to manufacturer’s instructions and packed in doughy stage at 200 Psi for 3 trial packs using 10x10 clear separating sheets. At the third trial the transparent bidirectional glass fibers were placed on the tension side of the mandibular overdenture (Figure 3). The flask was clamped and polymerized at 100 °C for 1 hour from the time of initial placement into the boiling water. Following the cooling process, the two parts of the flask was separated (Figure 4); afterwards the overdenture was finished and polished. The black processing attachments were replaced with blue matrices. The patient was followed up for 1-year period with recalls in every 4 month.
DISCUSSION

The presence of bidirectional e-glass fibers would significantly increase the fracture strength of the implant retained overdenture during the one year follow up. Not only in-vitro studies\textsuperscript{14, 15} but also clinical studies\textsuperscript{16, 17} revealed that adding glass fibers are efficient in reinforcing acrylic denture base resin. In this case report the glass-fiber reinforcement was placed to the tension side of the overdenture, between and around the locator housings. The placement of the e-glass fibers in the most expected tension area was consistent with other studies.\textsuperscript{18, 19} The increased modulus of elasticity from the embedded fibers themselves may play an important role on the mechanism of improved fracture resistance.\textsuperscript{20} The amount of fiber layers and the use of polymethyle-methacrylate impregnation may also have impacted the reinforcement. However, type of fibers or distribution of them remains as a question to provide the highest increase on the fracture strength. These aspects should be investigated in future laboratory studies.

CONCLUSION

Fractured mandibular implant retained overdentures may be reinforced by adding bidirectional glass fibers to the weak regions of the acrylic resin base.

REFERENCES


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