Diabetes mellitus is a metabolic disorder characterized by an increase in plasma glucose levels. This hyperglycaemia is the result of deficient insulin secretion, insulin action, or both. Chronic hyperglycaemia affects several tissues and organs, produces an inflammatory effect and has been shown to be a stimulus for bone resorption in vitro. Bone loss in diabetes does not seem to depend as much on an increase in osteoclastogenesis as on a reduction in bone formation [1]. It is known that hyperglycaemia inhibits osteoblastic differentiation and alters the response of the parathyroid hormone that regulates the metabolism of phosphorus and calcium [2], has a negative effect on the bone matrix and its components and also affects the adherence, growth and accumulation of extracellular matrix [3]. Periodontal disease is frequently present in patients with diabetes; it is considered one of the complications of this disease.

Analysis of the effect of diabetes on implants has revealed an alteration in bone remodelling processes and mineralization deficiencies, leading to less osseointegration. Some studies have shown that, although the amount of bone formed is similar when comparing animals induced with diabetes with controls, there is a reduction in the bone-implant contact in diabetics [4, 5].

This article covers twelve months of follow-up of the clinical and radiological implications of diabetes for the prognosis of immediately loaded dental implants for full-arch restorations.

Materials and methods

The study was performed in two clinical centres by two investigators who followed the same clinical protocol for immediate occlusal loading of implants. All patients received sandblasted/acid-etched Seven and Mistral screw implants (MIS, Schlomi, Israel). The surgical protocol provided for crestal implant placement was followed as described in the literature (Figs. 1 and 2) [6, 7].
All clinicians followed the implant manufacturer’s instructions for implant site preparation and implant insertion procedure. The initial primary stability was assessed by setting the insertion torque of the surgical unit and recorded according to the following classification: “tight” when torque was >32 Ncm, “firm” between 25 and 32 Ncm or ”loose” when <25 Ncm [8].

Prosthetic procedures

The design of the prosthesis was determined by a collaborative effort between the dental surgeon, the restorative dentist, the dental technician and the patient within the framework of with the study objectives.

A metal-reinforced acrylic provisional bridge was relined over provisional cylinders and immediately screwed onto the abutments (Figs. 3 and 4). The occlusion was carefully checked. No specific diet was recommended to the patients. Periapical radiographs were taken after three, six and twelve months of occlusal loading.

Results

Between January and October 2006, ten patients (seven men and three women) were enrolled in the study. The average age at the time of implant surgery was 45.5 years (range: 33 to 69 years). All patients were rehabilitated with a fixed prosthesis supported by Seven and Mistral implants. Six patients were smokers and reported consuming up to ten cigarettes per day.

A total of 74 implants were inserted. The lengths and diameters of all the implants are summarized in Table 1. Fifty-six implants (75-68%) were inserted into maxillary anterior and posterior areas in normal or soft bone at a torque of between 35 and 50 Ncm (“firm”). Eighteen implants (24.32%) were placed in the interforaminal and posterior area of the mandible in dense or normal bone, utilizing an insertion torque of > 32 Ncm (“tight”). No deviations from the protocol were reported.

Radiographic evaluation

All the periapical radiographs of the inserted implants were evaluated for marginal bone changes and bone densitometry. Assessment of radiographic change in bone level over time showed no statistically significant differences in marginal bone loss between the mesial and distal sides at each time frame.

Success rate

None of the patients dropped out from the study. All implants were clinically stable and met the success criteria. The overall implant success rate was 100 percent.
The fact that most failures occur after the second-phase surgery and during the first year of functional loading may indicate that microvascular complications are one of the factors implicated in implant failures in diabetic patients [11].

In view of the literature, the use of one-stage implants with cervical microthreads that were immediately loaded and did not require a second surgical step could be the principal reason for the clinical and radiological success seen in this study.

References