

## Impact of diabetes mellitus and glycemic control on the osseointegration of dental implants: a systematic literature review.

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### Abstract

**BACKGROUND:** Implant treatment is an attractive substitute to traditional fixed/removable prosthetic appliances. In patients with diabetes, dental implant therapy has been considered a contraindication. Hyperglycemia augments the severity of periodontal disease, and glycemic control is an essential variable in determining the success of dental implants in subjects with diabetes. Subjects with well-controlled diabetes may not be significantly compromised and can have high dental implant success rates compared to individuals with poorly controlled diabetes. The focused questions addressed in this systematic review were as follows: Can patients with diabetes be good candidates for dental implant therapy? And how does hyperglycemia and glycemic control influence osseointegration?

**METHODS:** A systematic literature search of MEDLINE/PubMed articles published from 1982 up to and including July 2009 was independently performed by two investigators. In addition, reference lists of original and review articles were searched. The search strategy was to use the following terms in different combinations: dental implants, immediate implants, osseointegration, periodontal disease, diabetes, hyperglycemia, metabolic control, and glycemic control. The search included studies on humans and diabetes-induced animal models. The selection criteria included all levels of available evidence. Suitable variables included the implant survival rate among individuals with diabetes, effects of hyperglycemia and glycemic control on bone, and maintenance of dental implants in subjects with diabetes. Articles published only in the English language were considered, and unpublished data were not sought.

**RESULTS:** We initially identified 33 studies. Fifteen studies, which did not fulfill the selection criteria, were excluded. The included studies reported that poorly controlled diabetes negatively affects implant osseointegration; however, under optimal serum glycemic control, osseointegration can successfully occur in patients with diabetes. Animal studies have confirmed that osseointegration can be successfully achieved in insulin-controlled rats with diabetes, whereas in uncontrolled rats with diabetes, the bone-to-implant contact appears to decrease with time. The use of antiseptic mouthrinses and oral-hygiene maintenance helps in achieving a successful dental implant osseointegration in subjects with diabetes.

**CONCLUSION:** A successful dental implant osseointegration can be accomplished in subjects with diabetes with good metabolic control (serum glycemic level and hemoglobin A1c in normal range) in a similar manner as in subjects without diabetes.

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