

Effects of Insulin on Osseointegration around Implant in Type 2 Diabetic and Non-Diabetic Rats

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Abstract : In patients with type 2 diabetes mellitus (DM) there is poorer quality osseointegration than in non-diabetic (n-DM) patients, and the success of dental implants is less. Recent studies have demonstrated that insulin could stimulate bone cells to produce and accelerate implant osseointegration in DM patients. This raised the question whether insulin could provide local bone anabolic effects in non-diabetic patients. In this study, 48 SD rats were divided into four groups randomly: DM group, DM+insulin group, n-DM group, n-DM + insulin group. All rats were implanted the titanium implant near the epiphyseal end of tibia, then the DM + insulin and n-DM + insulin group received twice-daily subcutaneous injections of insulin (10U/day). Two, four and eight weeks after implantation, rats were killed in batches. Histomorphometry and immunohistochemistry were used to evaluate bone formation and osseointegration. The amount of newly formed bone, Implant-bone contact and the expression of OCN, RUNX2 in the DM+insulin, n-DM and n-DM+insulin group were significantly more than in the DM group ($p < 0.05$). Compared with the n-DM group, the Implant-bone contact and expression of OCN, RUNX2 were significantly increased in n-DM+insulin group ($p < 0.05$). Taken together, these observations provide evidence that insulin has the potential to increase bone formation and osseointegration around implant not only in diabetic subjects but also in non-diabetic subject.

Keywords : insulin, diabetes mellitus, osseointegration, dental implants

Conference Title : ICS 2015 : International Conference on Stomatology

Conference Location : London, United Kingdom

Conference Dates : February 16-17, 2015