

Resveratrol may improve osseointegration of dental implants in type 2 diabetes mellitus patients

Sir,

Diabetes mellitus refers to a number of metabolic disorders, which are caused by an increase in the level of fasting plasma glucose. Type 2 diabetes mellitus (T2DM) can affect the bone, which causes osteopenia and impairs the healing of fractures.^[1]

Dental implants have been recognized as an acceptable treatment method for the replacement of missing teeth. This treatment is highly related to bone mass. Any changes in the rates of formation and resorption that result in bone resorption over-stepping bone formation can cause a decrease in this mass resulting in implant failure, which is the case in T2DM patients. Diabetes has become the most common factor contributing to dental implants failure.^[2]

Resveratrol (RSV) is a phytoalexin present in grapes, wines and peanuts, It has been reported to exhibit a wide range of biological and pharmacological properties that regulates several metabolic pathways.^[3] RSV has a direct effect on bone formation and increases osteogenesis.^[4,5] In addition RSV has anti-inflammatory and analgesic effects.^[6,7]

In T2DM patients, the rate of osseointegration around dental implant decreases remarkably due to negative effect on different stages of osseointegration such as formation of bone matrix, bone apposition mineralization (through reduction of osteoblasts and alkaline phosphates activity) and maintenance of osseointegration.^[8] Osteoblast maturation is assessed by these items including, alkaline phosphates activity, calcium deposition in the extracellular matrix, Osterix and Osteocalcin genes. RSV increases expression of these genes, which is associated with osteoblastic differentiation and also increases the expression of alkaline phosphates and prolyl hydroxylase in a dose-dependent manner.^[9] It also enhances the differentiation of osteoblasts from mesenchymal stem cells.^[4] RSV is a potent inhibitor of inflammatory molecules and has an inhibitory effect on the production of tumor necrosis factor α , IL-1, IL-6, IL-12 and Interferon (IFN) by macrophages and splenic lymphocytes.^[10]

Considering the effect of hyperglycemia causing negative effect on bone formation and inflammatory effects in T2DM patients, which may result in reduced osseointegration and higher failure rate of dental implants, we hypothesize that RSV may reduce dental implant failure rate by having stimulating bone formation and anti-inflammatory effects. It seems that induction of RSV either by systemic or local delivery can improve osseointegration of dental implant in T2DM patients, further studies are deserved to prove our hypothesis.

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