

# Implant success rate in patients with osteoporotic bone

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## ABSTRACT

**Background:** Osteoporosis, a quietly progressing metabolic bone disease that leads to minimizing of bone mass, is widely prevalent in India and fractures due to osteoporosis are a common cause of mortality and morbidity in adult Indian males and females. Low bone mass with microarchitectural deterioration of bone tissue is the main characteristic features of osteoporosis and are also the leading causes for increasing risk of fractures. Likelihood of developing osteoporosis in women is 4 times when compared to men. The maintenance of oral health in adults with osteoporosis is important. Studies revealed that osteoporosis is one of the risk factors for osseointegration process during dental implant healing. Hence, osteoporosis is considered a questionable condition for the placement of dental implants. However, literature states that osteoporosis patients are not contraindicated for dental implants. The aim of this study was to determine whether a diagnosis of osteoporosis shows its effect on the survival rate of osseointegrated dental implants. **Aim:** The aim is to evaluate the success rate of implants with osteoporotic bone. **Objectives:** (1) To evaluate the implant success rate in the patients with osteoporotic bone, (2) To assess various treatment options in the patients with osteoporotic bone. **Study and Design:** A review was done on the success rate of dental implants with osteoporotic bone. A wide evaluation of articles was done, and the data were collected from various search engines such as Google Scholar, PubMed, research gate, Scholars portal database, Medline, Embase, and few other hand search articles. The bibliographies were evaluated with the other electronically searched articles. The studies included were evaluated and analyzed. **Conclusion:** Based on the above literature search, dentists should perform a proper assessment of treatment planning while placing dental implants in osteoporotic patients for a better implant survival rate.

**KEY WORDS:** Bone density, Dental treatment, Dentistry, Implant dentistry, Osteoporosis, Osteoporotic bone

## INTRODUCTION

Osteoporosis also called “the bone-thinning disease” is a common condition that affects over 25 million people each year in India. Osteoporosis is a common disease which affects an estimated 300 million humans worldwide. Osteoporosis affects one in three women and one in five men over the age of 50 years and may not be detected until symptoms or fractures occur.<sup>[1]</sup> Women with osteoporosis are 3 times more likely to experience tooth loss than those who do not have the disease in the same age groups.<sup>[2]</sup> Osteoporosis is associated with several risk factors, and increasing evidence suggests that it may be associated with oral health conditions such as periodontal disease, reduced jaw bone density, and tooth loss.<sup>[3]</sup>

Implants in dentistry have become a common and frequent treatment option for replacing the missing tooth.<sup>[4]</sup> Before planning the treatment assessing, the patient’s medical condition is essential.<sup>[5]</sup> Dental implants success rate highly depends on the process of osseointegration. Osseointegration, which is measured by the percentage of contact between the implant surface and the bone, can be affected not only by the surgical procedures and characteristics of implants but also by the patient’s health conditions that can affect the quality and quantity of bone.<sup>[6]</sup> Implant prognosis mainly depends on those factors that interfere with the process of osseointegration. Thus, osteoporosis, characterized by alteration of bone microstructure, reduction in regenerative capacity of bone, and bone loss, has been considered a possible risk factor or contraindication for the placement of dental implants.<sup>[7]</sup> This paper represents a review on success rate of the dental implant in patients with osteoporosis.<sup>[8]</sup>

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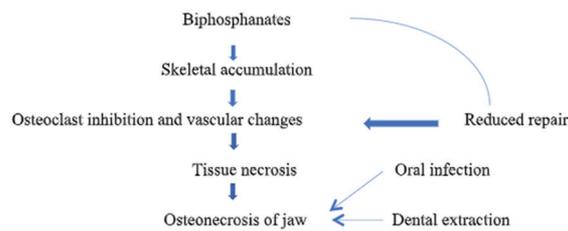
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## DISCUSSION



Osteoporosis is a systemic skeletal disorder characterized by a generalized reduction in mineral density of all bones, including jaw bone.<sup>[9]</sup> Replacing the missing teeth is highly important to the patient's general health along with oral health by helping to preserve bone structure. Dental implants replace the roots of the missing tooth. Implants are the best solution for simulating function, feel and look of natural teeth.<sup>[10,11]</sup> It is essential for a patient to have a healthy bone to support the implant. The placement of dental implant helps in generating bone growth in the area surrounding the implant, which not only supports the bone but also strengthens.<sup>[12]</sup> Repeated doses of bisphosphonates accumulate in the bone matrix and are taken up by the osteoclast leading to cell apoptosis. The osteoclasts lose its ruffled borders at Howship's lacunae and retract from the bone surface and die. The osteocyte is not an immortal cell; it eventually dies leaving dead bone behind. There is the process of osseointegration and is a productive benefit of implant placement, which helps in preventing future bone loss.<sup>[13]</sup> Dental implantology always has high predictability when both quality and quantity of jaw bone is in a state of good health.<sup>[14]</sup> Studies conducted by Qi *et al.* reported that proper adjustment of the techniques during surgery and a longer duration of healing period are required for a process of healthy osseointegration.<sup>[15]</sup> Bisphosphonates are the major drug of choice for treating both primary and secondary osteoporosis patients.<sup>[16]</sup> Studies have shown that patients who are receiving oral bisphosphonate therapy were more prone to implant loss, delayed healing, and osteonecrosis after the placement of implant.<sup>[17]</sup> A study conducted by Marco *et al.*, reported that a woman who had received alendronate for 10 years developed bone necrosis with unexplained clinical signs after routine placement of dental implants.<sup>[18]</sup> On the other hand, few studies also explaining that not all patients receiving bisphosphonate therapy will have implant failure, other systemic conditions such as periodontal diseases may have their effect on the longevity of dental implants.<sup>[19]</sup>

It has been hypothesized that osteoporosis affects the jaw bones in the same process as other bones of the skeleton, and also that the inadequate process of bone metabolism may reduce the scarring around the

implants.<sup>[20]</sup> The revised literature explains that the osteoporosis injected in experimental animal models, simultaneously, before or after with the placement of implants, changes the process of osseointegration, mostly in trabecular bone, and produces a major reduction in the implant contact.<sup>[21]</sup> Implant mobility is a characteristic feature of implant failure. Major reasons of implant failure include poor bone to implant surface contact, interruption of osseointegration due to overloading.<sup>[22]</sup> Along with these reasons, osteonecrosis caused by bisphosphonates (BRONJ) plays a major role in implant failure due to reduced bone turnover.<sup>[23]</sup>

Jaber *et al.* in their study stated that strontium ranelate increases the density of bone tissue and improves reparative processes in the site of the tooth extraction and dental implantation in comparison with control rats without pharmacotherapy. He also stated that the addition of sodium fluoride to this therapy is characterized by more intensive maturation of young bone tissue around implants.

## CONCLUSION

Studies that contraindicated the use of dental implants in patients with osteoporosis stated that the impaired metabolism of bone results in implant failure due to improper bone healing. Nevertheless, other authors believe that the osteoporosis is not an absolute contraindication for dental implant therapy. Based on the above literature search, dentists should perform a proper assessment of treatment planning while placing dental implants in osteoporotic patients for a better implant survival rate.

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