

“The Role of Systemic Drugs on Implants”- A Narrative Review

Dr.Swathi Devi Enaganti ¹, Dr. LakshmanaRao Bathala ², Dr. T.S.V. Satyanarayana ³, Dr.Sudheer Kondaka⁴,

Dr. Sathvika Ambati⁵, Dr.Kundanaveni ⁶ .

1.P.G.Student, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh,

2. Prof & HOD, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh,

3. Professor, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh,

4. Professor, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh,

5. P.G.Student, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh,

6. P.G.Student, Dept of Prosthodontics, Lenora Institute of Dental Sciences, Rajahmundry, AndhraPradesh

Abstract:

In dentistry, there is no systemic disease that would generally be an absolute contraindication to the placement of dental implants. However, certain systemic diseases can present significant challenges and increase the risks associated with implant surgery. Although these diseases are not always absolute contraindications, sometimes the medication which the patient is taking for the particular systemic disease may pose some complications for implant treatment. careful consideration, risk assessment and interdisciplinary collaboration are necessary to ensure patient safety and optimize treatment outcomes.

Introduction:

The general complications that can be expected after the placement of dental implants in systemic diseases can vary according to the specific causes. condition and its effect on healing, immune function and bone metabolism. Although not all systemic diseases can cause complications after implantation, some conditions can increase the risk of certain side effects. Here are some of the more common complications and related studies that support their occurrence in patients with systemic disease:

1).Delayed healing and wound complications: Patients with diseases such as diabetes, immunosuppression or haematological disorders may experience delayed wound healing after implant surgery, increased risk of infection and soft tissue complications. [1]

2). Peri-implantitis and implant failure: Patients with a history of periodontal disease, immunosuppression or impaired immune function may be at increased risk of peri-implantitis, which leads to inflammation, bone loss and implant failure.[2] 3.Osteonecrosis of the jaw (ONJ):Patients receiving intravenous bisphosphonate therapy for conditions such as cancer or osteoporosis may be at risk of developing drug-related osteonecrosis of the jaw (MRONJ) after dental implant surgery, especially if they have a history of it. of ONJ or long-term use of bisphosphonates. [3]

4. Impaired osseointegration:in patients with systemic diseases affecting bone metabolism, such as osteoporosis or chronic kidney disease, osseointegration may be impaired, reducing implant stability and increasing the risk of implant failure. [4]

5. Complications with Drugs: Patients taking medications such as corticosteroids, immunosuppressants, or antiresorptive agents may be at increased risk of side effects, drug interactions, or recovery from implant surgery.[5]

Systemic medications can potentially affect the osseointegration of dental implants either positively or negatively. These includes:

1. **Bisphosphonates:** These drugs are commonly used to treat osteoporosis and other bone diseases. Although they can increase bone density and strength, long-term use of certain bisphosphonates has been associated with impaired bone healing and delayed osseointegration of dental implants. This effect is seen more often with intravenous than oral administration. Bisphosphonates inhibit osteoclast-mediated bone resorption, which can increase bone density. However, they may also interfere with osteoblast function and angiogenesis, essential processes for bone healing and osseointegration. There are two main types of bisphosphonates: oral and intravenous. Intravenous bisphosphonates, such as zoledronic acid, are more strongly associated with impaired bone healing and delayed osseointegration compared to oral formulations. Prolonged use of bisphosphonates, particularly intravenous administration for conditions like cancer or osteoporosis, has been linked to a higher risk of medication-related osteonecrosis of the jaw (MRONJ), which can negatively impact implant success. Prolonged use of bisphosphonates, particularly intravenous administration for conditions like cancer or osteoporosis, has been linked to a higher risk of medication-related osteonecrosis of the jaw (MRONJ), which can negatively impact implant success. [6-8]

2. **Corticosteroids:** Corticosteroids have anti-inflammatory properties and are used to treat various inflammatory and autoimmune diseases. Long-term or high-dose corticosteroid therapy can suppress the immune system and inhibit bone healing, which can result in delayed skeletal integration.High doses or prolonged use of corticosteroids increase the risk of delayed wound healing and impaired bone regeneration, potentially affecting osseointegration. Dentists may need to coordinate with patients' healthcare providers to adjust corticosteroid dosages or schedules to minimize their impact on dental implant treatment. [9,10]

3. Immunosuppressants: Drugs used to suppress the immune system, such as those prescribed for transplants or autoimmune diseases such as rheumatoid arthritis, can interfere with the body's ability to make an appropriate immune response to the implant, affecting skeletal integration. Immunosuppressant drugs, such as calcineurin inhibitors (e.g., tacrolimus) or antimetabolites (e.g., mycophenolate mofetil), suppress the immune system to prevent rejection in organ transplant recipients or manage autoimmune diseases. Immunosuppression can impair the body's ability to mount an appropriate immune response to the implant, potentially leading to decreased bone healing and osseointegration. Close monitoring of patients on immunosuppressive therapy is crucial, and adjustments to medication regimens may be necessary in consultation with their healthcare providers. [11,12]

4. Chemotherapy drugs: Chemotherapy agents used in cancer treatment can have systemic effects on bone metabolism and healing. Some chemotherapy drugs can interfere with bone healing and bone integration. Chemotherapy agents target rapidly dividing cells, including cancer cells, but can also affect other cell types, including osteoblasts and osteoclasts involved in bone remodelling. Chemotherapy-induced bone marrow suppression decreased osteoblast activity, and compromised vascularity can all contribute to delayed bone healing and impaired osseointegration. Ideally, dental implant placement should be coordinated with the patient's oncologist to minimize the risk of complications and optimize treatment outcomes. [13,14]

5. Selective serotonin reuptake inhibitors (SSRIs): These drugs, often used as antidepressants, have been shown to affect bone metabolism. Some studies suggest that SSRIs may negatively affect bone density and possibly affect bone integration, although more research is needed in this area. SSRIs alter serotonin levels in the brain, but they may also affect bone metabolism by inhibiting osteoclast function and decreasing bone formation. Some studies suggest a potential association between long-term SSRI use and decreased bone mineral density, although the clinical significance regarding osseointegration of dental implants is not fully understood.[14,15]

6. Hormone replacement therapy (HRT): Estrogen and other hormones play a vital role in bone metabolism. Hormone replacement therapy, used to relieve symptoms of menopause or hormonal imbalance, can affect bone density and bone mass, which can indirectly affect skeletal integration. Estrogen plays a crucial role in bone metabolism, promoting osteoblast activity and inhibiting osteoclast-mediated bone resorption. Postmenopausal women receiving HRT may experience improved bone density and reduced risk of osteoporotic fractures, which could positively influence osseointegration of dental implants. HRT regimens should be individualized based on the patient's medical history, risk factors, and preferences, with consideration given to its potential effects on bone health and implant success.[15]

7. Antiresorptive medications: Medications such as denosumab, which inhibit bone resorption, can alter bone turnover and potentially affect bone integration. Anti-resorptive agents, such as denosumab (a monoclonal antibody against RANK ligand), inhibit osteoclast-mediated bone resorption. Prolonged use of anti-resorptive medications may lead to osteonecrosis of the jaw (ONJ) and impair bone healing, potentially affecting

osseointegration of dental implants. Dentists should collaborate with patients' healthcare providers to assess the risks and benefits of anti-resorptive therapy and develop appropriate management strategies for implant treatment.[1,15]

Conclusion:

It is important for dentists to be aware of systemic medications and patients' medical history to prevent potential effects on implant treatment outcomes. . Collaboration between dentists, physicians and specialists can help reduce risks and optimize outcomes for patients with systemic diseases or medications that can affect skeletal integration.

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