

Systemic Diseases of Concern to Prosthodontist

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ABSTRACT

The prosthodontic procedures should not be planned until the systemic status of the patient is evaluated. Treatment planning is a consideration of all the diagnostic findings, systemic and local which influence the surgical preparations of the mouth, impression making, maxilla-mandibular relation records, occlusion, form and material in the teeth. So the dentist must not only be aware of the systemic factors but also consider them in the treatment plan. Some systemic diseases have a direct relation to denture success even though no local manifestation is apparent. Many systemic diseases have a local manifestation with no apparent systemic symptoms and others have both local and systemic reactions. This paper deals with systemic diseases and their management during non surgical and surgical procedures.

KEYWORDS: Dental Implant, Systemic Diseases, Prosthodontic Management

INTRODUCTION

Various systemic diseases play a pivotal role in deciding treatment options in dentistry. Prosthodontic procedures need to be carefully judged and planned according to the systemic status of the patient.¹

There are various disease that of concern in Prosthodontics. These along with there management have been described as under:

CARDIOVASCULAR DISEASES

Angina pectoris:

Dental implant management: Patients with mild angina may undergo must non surgical dental procedures. The vital sign has to be monitored during the procedure and the patient in instructed to have nitroglycerine. The implant surgery is performed with nitrous oxide or oral reduction. The use of vasoconstrictors is limited to 0.04 to 0.05 mg epinephrine. Patient with moderate angina should be given nitroglycerine sublingually just before advanced operative or simple to moderate implant surgery. Antianxiety sedation with supplemental oxygen are also required. Patients with severe angina are limited to examination procedures. Elective implant surgical procedure is usually not performed on these patients. Medical consultation is required for any of the additional treatment. Consideration should also be given for administration of oxygen especially in patients with coexisting pulmonary disease in whom poor oxygen exchange lowers blood oxygen content.

Myocardial infarction:

Dental implant management: Patients with MIT in preceding 6 months can have dental examination, but treatment has to postpone if possible for 6 months². Longer procedures should be segmented into shorter appointments Elective implant procedures should be postponed for at least 12 months following MI. Hospitalization is an accepted modality for all advanced surgical procedures regardless of time elapsed after a MI.

(Table 1).

Risk		Impression	Implant procedures
Mild	> 12 mon	+	Physician hospitalization if general anesthesia require
Moderate	6-12 mon	+	Postponement of procedure
Severe	< 6 mon	+	Postponement of procedure

Table 1: Dental implant management for Myocardial infarction

Subacute Bacterial Endocarditis:

The Endocarditis prophylaxis are recommended for procedures like dental implant placement, sub gingival placement of antibiotic fibers or strips. The Endocarditis prophylaxis not recommended for the placement of removable prosthodontic appliances and making oral impressions.³

Dental implant management: The newly revised regime for prophylaxis may be administered orally or parentally.

- 2gm of amoxicillin 60 min before procedure 2gm of ampicillin (IM) or (IV) for patients unable to take oral medication.
- If the patient is allergic to penicilin.
- 600 mg clindamycin or 2gm cephalixin orally 1hr before procedure.

or

- 600mg clindamycin IV within 30min of 1.0gm of cefozalin (IM) or (IV) within 30min before procedures are the recommended regimes before oral procedure.

Erythromycin is no longer included because gastrointestinal upset.

Implants may be contraindicated for patients with a limited oral hygiene potential and for those with history of stroke. Intramucosal inserts are also contraindicated for many of these patients because a slight bleeding can occur on a routine basis for several weeks during the initial healing process. So, Endosteal implants with an adequate width of attached gingiva are the implants of choice for patients in this group need implant supported prosthesis.

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Congestive cardiac failure:

The patients with chronic heart failure may be at risk for acute exacerbation during dental procedure. If during a dental procedure a patient experiences acute dyspnea, certain actions must be taken. The dentist should administer oxygen and ask the patient to sit upright.

Medication prescribed for Congestive heart failure, are classified as three D's, digitalis diuretics and dilators. Digitalis increases the heart's pumping action, diuretics eliminate salt and water, vasodilator dilate the blood vessels so that pressure decreases and blood can flow more readily.

Dental implant management: The patients taking treatment for CHF are prone for digitalis toxicity because the lethal dose of digitalis is only twice the treatment dose so the dentist should be familiar with common side effect and should report them to the treating physician.

Gingival hyperplasia similar to caused by dilantin sodium has been reported to occur around teeth, implants, or superstructure bars of over denture especially with nifedipine.⁴

Hypertension:**Dental implant management:**

- A stress reducing protocol is indicated for anxiety patients by giving diazepam 5 to 10mg ,night before a procedure.
- Most of the patients undergoing anti hypertensive therapy use NSAID concomitantly. These drugs have shown to reduce the action of hypertensive agents. So it is recommended that NSAIDs be limited to short therapy and other analgesics be used (Table 2).⁵

Risk	Systolic	Diastolic	Impression	Implant procedure
Normal	130-139	85-89	+	Sedation
Stage I	140-159	90-99	+	Sedation
Stage II	160-179	100-109	+	Postponement of procedure
Stage III	180-209	110-119		Refer and postpone all procedures.
Stage IV	≥ 210	≥ 120		Refer and postpone all procedures.

Table 2: Dental implant management for Hypertension

ENDOCRINE DISORDERS**Diabetes mellitus:**

A proper medical history should be taken to know, which type of diabetes is the individual is suffering from and accordingly plan the treatment.

- The IDDM are more likely to develop glucose imbalance during treatment than those with NIDDM.
- Glucose drinks should be available if patient complains of symptoms of hypoglycemia.
- The operator should use an impression technique that will produce maximum physiologic compatibility of the denture base with supporting structure.
- Careful occlusal correction should be accomplished to remove all interferences.

- The food table should be small and the patient should be given detailed instructions on eating habits and oral hygiene
- Frequent evaluation of denture is necessary.
- Diabetic patients are prone to develop infections and vascular complication so an antibiotic prophylaxis before dental surgery to prevent subsequent infection is advised.

Dental implant management: The implant dentist discover diabetes by the presence of glucose levels above 120mg /dl. Implant dentistry is not contraindicated in most diabetic patient, however their medial care should be as controlled as possible. Specific questions should be asked to evaluate the diet, insulin dosage, oral medication, method used to monitor the blood glucose and recent glucose levels (Table 3).⁶

Risk	Impressions	Implant procedure
Mild ≤ 150 mg /dl	+	Sedation,premedication, Diet and insulin adjustment
Moderate ≤ 200mg/dl	+	Sedation,premedication, Diet and insulin adjustment, hospitalization
Severe > 250mg/dl	+	Postpone of elective procedure.

Table 3: Dental implant management for Diabetes Mellitus

THYROID DISORDERS**Dental implant management :**

- The most common thyroid disorder patient seen in implant dentist is one with known and treated thyroid disease. So these types of patients without any symptom can be considered as low risk and a normal protocol can be followed for implant surgery and prosthodontic appointments.
- The patients with thyroid disorder who has no symptoms but had recently thyroid function test is considered as moderate risk category. These patients may follow a normal protocol in addition with stress reduction. The use of epinephrine and CNS depressant drugs should be limited in moderate to advanced implant procedures and surgery.
- The patients with symptoms are considered at high risk. Such patients should have only examination procedures formed and all other treatment is defaced until the medical and laboratory evaluation confirms controls of disorder.

ADRENAL GLAND DISORDER:

Dental implant management: In the patients with known adrenal disorder, the physician should be contacted for consultation. The patients with high risk of adrenal suppression are those who are formerly on steroid therapy taken for 2 weeks period or more within 2yrs of dental treatment. So in these patients the steroid dose should be doubled the day before the surgery and the maintenance dose is returned to normal after surgery.^{7,8}

For patients with moderate to advanced implant surgery and anxious patients, the dose is doubled the day of the

procedure along with general anesthesia. After the surgery the dose is reduced to 50% each day over a period of 2 to 3 days.

Antibiotics: Patients with moderate risk of adrenal suppression are those who are formerly on steroid therapy for longer than 7 days within a one year of dental treatment. So in these patients for simple to advanced surgery the dose is doubled the day of surgery and then after surgery the dose is reduced to 50% each day for period of 3 days. In addition reduction and antibiotics for 3 to 5 days is given.

Patients with low risk of adrenal suppression are those with alternate dose of steroid therapy, which ended one year before the implant procedure.

In these patients also, the dose is doubled the day of procedure and after surgery the dose is reduced to 50%. Then after alternate day schedule of dose is maintained.

So, a history of dosage of steroids taken by the patients determines the treatment outcome during implant surgery.

PULMONARY DISEASES

Patient with difficulty in breathing upon exertion and using bronchodilator therapy should undergo medical examination. The use of epinephrine or vasoconstrictors in anesthetics or gingival retraction cord is not advised.

In patients with high risk like acute exacerbation and history of CO₂ retention, the moderate and advanced surgical or prosthetic procedures are contraindicated. The use of epinephrine, narcotics, sedatives and tranquilizers should be discussed with physician.

LIVER DISEASES

Cirrhosis

In these cases the two most commonly affected is synthesis of clotting factors and ability to detoxify drugs.

Dental Implant Management :

- Non-surgical and simple surgical procedures may follow normal protocol.
- Use of sedatives and tranquilizers need physician clearance.
- Strict attention to hemostasis is indicated.
- Moderate to advanced surgical procedure requires hospitalization.

HEMATOLOGIC DISEASES

Anemia:

Anemia is the most common hematologic disorder resulting from decreased production of erythrocytes.

Dental implant consideration:

- Bone maturation and development are often impaired in the long term anemic patient. There is a reduction in 25% to 40% trabecular pattern. Therefore the character of the bone needed to support the implant is significantly reduced. The time needed for a proper interface formation is longer in anemic patients.

- The abnormal bleeding in anemic patients, due to hemorrhage causes difficulty in placement of subperiosteal implants. The increased edema increases the risk of postoperative infection. This may affect long-term maintenance of the implant or abutment teeth.

The minimum baseline recommended is 10mg/dl especially for implant surgery. In majority of anemic patients, implant procedures are not contraindicated. However preoperative and postoperative antibiotics should be administered.⁹

Leukopenia

Leukopenia is the reduction of circulating WBC's to less than 5000/mm³. The common cause of Leukopenia is infection.

- Many complications of Leukopenia can compromise the success of implant prosthesis.
- Delayed healing is also consequence of WBC disorder. For most implant procedures the first few months are critical for long-term success. Delayed healing may increase the risk of secondary infection.
- Severe bleeding in these patients complicates the implant surgery.

In the either condition the implant placement is complicated with increased edema, bleeding, postoperative discomfort and secondary infection. So most implant procedures are contraindicated for the patient with acute or chronic leukemia.

BONE DISEASES

Osteoporosis

Osteoporosis shows a decrease in skeletal mass without alteration in the chemical composition of bone.

Management: Designing complete denture requires special consideration for these patients to preserve the underlying tissue structure as much as possible.

Prosthodontist are in a strategic position to intercept early evidence of osteoporosis and educate the geriatric patient towards good nutrition

Estrogen therapy can retard severe bone demineralization caused by osteoporosis in women. Adequate dietary calcium intake is essential. Recommended calcium intake of 800 mg / day for average person and 1500 mg for the postmenopausal women.

Dental implant management: Although osteoporosis is significant factor for bone volume and density, it is not a contraindication for dental implants. The bone density does affect the treatment plan, surgical approach, length of healing and loading. Implant designs should be greater in width and coated with hydroxyapatite to increase bone contact and density.

Fibrous dysplasia:

The implant placement is contraindicated in these disorders because of lack of bone and increased fibrous tissue, as it reduces rigid fixation of the implant. After the

excision of the fibrous dysplasia area, they may receive implant.

Osteitis deformans :

It is a slowly progressing chronic disease where osteoblasts and osteoclasts are involved with predominance of its osteoclastic activity.

The jaws are affected in 20% of the cases .The maxilla is more often involved than mandible. The remakes and adjustment of dentures are needed due to continual enlarging and changing of supporting structure especially of the maxillary tuberosity.

Oral implants are contraindicated in the regions, affected by this disorders.

NEUROLOGIC AND PSYCHIATRIC CONDITIONS

The neurologic emergencies like stroke, syncope and seizures require thorough history and list of medications. A consultation with physician is helpful in treating these patients.

Parkinson's disease:

Parkinson's disease is a degenerative CNS disorder which is primary or secondary.

Dental management: Tremor and rigidity may cause problems with getting into and out of the dental chair and interfere with patient ability to cooperate. To minimize these limitation, Patients with PD should be seen at a time of day when their medication produce their maximum effect.

- The patient with lack of salivary control should be positioned in a semi reclined position to avoid pooling of saliva, airway obstruction, and aspiration.
- The dental chair should be raised slowly and the patient should be allowed adequate time to adjust to upright sitting position before being instructed to rise slowly from chair.
- Orthostatic hypotension and balancing problems should be anticipated to minimize potential of fall.
- When dentist is providing replacement complete denture, duplication technique should be used in order to retain the learned muscle control of familiar denture.
- If planning to provide denture for first time, consideration should be given for implant or implant retained over dentures.

Burning mouth syndrome:

The Burning mouth syndrome appears to have a multifactorial cause. Psychogenic factors of depression and anxiety seem to be the most common attribute of patients afflicted with this syndrome. The presence of normal mucosa and oral pain offers a formidable task for definitive diagnosis.

- The various factors responsible BMS are systemic causes like nutritional deficiency of iron or vitamin B deficiency, postmenopausal women demonstrating estrogen deficiency and immunologically mediated diseases.

- Psychologic factors of depression and anxiety relates the problem of whether or not such patients should be treated prosthetically which is further complicated by the fact that patient claiming psychiatric disorder are due to poor dentures. Comprehensive prosthetic treatment like implant supported over denture should always be taken with help of patient psychiatrist.
- Error in denture design and function like lack of occlusal harmony, cross in the position of the teeth limiting tongue function are also contributing factor in the BMS.
- The intake of sedatives, antidepressive drugs which reduce salivary secretion may produce symptoms of BMS.
- Allergy to the denture base due to high level of residual acrylic is also a causative factor of BMS. It is characterized by severe inflammation .oedema which usually subsides after denture removal.

AUTOIMMUNE DISEASE

Rheumatoid arthritis:

The temporomandibular joints are frequently affected in this disease. The problem encountered in the prosthodontic rehabilitation of patients with Rheumatoid arthritis of TMJ is

- a. Changes in occlusion.
 - b. Jaw relation.
- a. **Changes in occlusion:** As the joint tissue are more susceptible to increased loading, the prosthetic reconstruction's should be aimed at giving unloading appliances and improve the distribution of occlusal force. The removable denture in the lower jaw was not only beneficial for chewing but also for unloading the diseased joints.
- Treatment should be primarily focused on antirheumatic medications as the prosthetic procedures do not cure the joint disease and are therefore secondary.
- b. **Jaw relation:** There is a difficulty in recording an acceptable jaw relationship because of the destruction of joint tissues. There is a large distance between the most returned and the intercuspal position i.e., CR-CO. In such situations a muscularly relaxed and comfortable jaw position should be chosen and tried in provisional constructions before the permanent rehabilitation is completed.

Since the disease commonly occurs between acute and chronic stages.

The irreversible treatment like fixed prosthesis should not be given until the disease is cured

SALIVARY DYSFUNCTION

This leads to xerostomia or dry mouth. The complaints of xerostomia necessitates the search for an underlying systemic disease. Many systemic disease cause salivary dysfunction, the most prominent is Sjogren's syndrome.

The drugs like antidepressants, antihypertensive antihistamines and diuretics also result in xerostomia. So a complete and detailed medical history of patient should be taken because of vast etiology of salivary dysfunction.

Management: It includes

1. Symptomatic treatment:
 - Where frequent intake of fluid is taken to hydrate the tissues.
 - Moisturizers, vitamin E, lanolin, oral rinses and gels may be used to wet the mouth.
 - Artificial saliva substitute like animal mucin and carboxymethyl cellulose are also used.
2. Topical means of salivary stimulation is obtained by gustatory masticatory stimulation from chewing gums.
3. Systemic stimulation of salivary function can be obtained by pilocarpine 5 mg three times a day. This is a potent drug used especially in Sjogrens syndrome where pronounced dysfunction of salivary gland is seen.
4. Disease specific therapy:

The treatment of underlying disorder to halt the gland damage, has to be considered.

Sjogrens syndrome which is the most common cause of xerostomia is treated with non steroid anti inflammatory drugs and antirheumatic agents.

Dental implant management HIV positive patients with AIDS: The distinction should be made between asymptomatic HIV positive patient and AIDS patient with varying degrees of immunosuppression with reduced T lymphocytes

- The change from health to disease or from asymptomatic HIV positive phase to AIDS is indicated by decreasing T cell lymphocyte counts and the onset of opportunistic infections.
- The individuals whose HIV- positive status is identified soon after infection, general dental care can often be provided for many years without particular concern regarding the patient overall health status along with rigid infection control guidelines.

AIDS clinics and specialist in the treatment of oral manifestation of AIDS like oral surgeons, periodontist and oral medicine specialist are needed for dental treatment of patient with significant compromised T-Cell lymphocyte levels.

Dental management of HIV positive patient without AIDS: This category of patients includes those with known positive test for antibody to HIV who are known to have T-Cell count greater than or equal to 200 cells.

The steps to be followed in these patients:

- A written confirmation has to be obtained from the physician, which gives opportunity for continued communication with the physician regarding the patient progress.
- Enquiry has to be made regarding syphilis test and evaluation for pulmonary tuberculosis. This is

because of concern over the possible transmission of mycobacterium tuberculosis in dental treatment facilities has increased with recognition of increased susceptibility of HIV antibody positive patient to mycobacterial infection.

- Detailed oral examination should be a part of the initial as well as periodic examination with particular attention to evidence of opportunistic infections or other lesions that may indicate immune compromise.
- Patient has to be informed about the AIDS complication and maintenance of regular oral hygiene that helps us for the early diagnosis of any oral change to the successfully management and perhaps prevention of some of these complications.

CONCLUSION

The above discussion shows the importance of systemic status of an individual. It also shows the impact of drugs taken for the diseases on the outcome of treatment. The successful management of patient begins right from the medical history to the treatment plan in which much consideration has to be given to the systemic status of individual. The practitioner neglecting the systemic status in the history will step into more serious complication at the cost of individual life.

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