

Periodontal management of medically compromised patients

Treating the medically compromised patient is a complex part of dentistry, requiring competent practitioners with many attributes: sound technical skills, insight into medicine, familiarity with pharmacotherapeutics, and the capability of analyzing findings from patient histories and signs and symptoms.

Many patients seeking dental care have significant medical conditions that may alter both the course of their oral disease and the therapy provided. The older age of the periodontal patient increases the likelihood of underlying disease. Therefore, the therapeutic responsibility of the clinician includes identification of the patient's medical problems to formulate proper treatment plans. Thorough medical histories are important and sometimes consultation with or referral of the patient to an appropriate physician may be indicated. This ensures correct patient management and provides medico-legal coverage to the clinician.

From the most common medical problems are the following: -

1. Cardio-vascular diseases: -

These diseases are the most prevalent category of systemic disease and more common with increasing age. They include hypertension, angina pectoris, myocardial infarction, previous cerebrovascular accident, congestive heart failure, presence of cardiac pacemakers and infective endocarditis. In most cases the patient's physician should be consulted, especially if stressful or prolonged treatment is anticipated. Short appointments and a calm, relaxing environment help to minimize stress.

a) Hypertension: -

It's the most common cardiovascular disease and it is defined as a systolic blood pressure of 140 mmHg or greater, or a diastolic blood pressure of 90 mmHg or greater, and it's not diagnosed on a single elevated blood pressure recording but it's based on the average value of three or more blood pressure readings taken at three or more appointments. If hypertension persists and increase in severity, it may lead to coronary heart disease, angina, congestive heart failure, cerebrovascular accident, or kidney failure.

Management of those patients will be as follows: -

- 1) No periodontal treatment should be given to a patient who is hypertensive and not under the medical management.
- 2) The dentist should inform the physician about the degree of stress, blood loss and length of the periodontal procedure so that to avoid excessive bleeding.
- 3) Local anesthesia without epinephrine may be used for short procedures (less than 30 minutes) or use local anesthesia with an epinephrine concentration not more than 1:100,000 to control pain and minimize stress (dental treatment for hypertensive patients is generally safe if stress is minimized).
- 4) Avoid sudden positional changes in the dental chair so that to reduce postural hypotension or syncope.

b) Angina pectoris: -

Angina occurs when myocardial oxygen demand exceeds supply, resulting in temporary myocardial ischemia. Patients with a history of unstable angina pectoris (angina that occurs irregularly or on multiple occasions without predisposing factors) should be treated for emergencies only and in consultation with the patient's physician. Patients with a history of stable (angina that is associated with stress and easily controlled with medication and rest)

can be treated with the following precautions: -

- 1) Premedication if needed as valium.
- 2) Morning and short appointments.
- 3) Nitroglycerine medication sublingually 5 minutes before the procedure.
- 4) If during the periodontal procedure, the patient become fatigued or uncomfortable, the procedure should be discontinued.

c) Myocardial infarction: -

Periodontal treatment should not be done for at least 6 months following myocardial infarction because the peak mortality rate occurs during this time. After 6 months, the patient can be usually using the similar precautions of stable angina patient.

d) Previous cerebrovascular accident (CVA): -

CVA or stroke occurs because of ischemic changes (e.g., cerebral thrombosis]. Hypertension and atherosclerosis are predisposing factors to a CVA. **The periodontal management include the following: -**

- 1) No periodontal therapy should be performed for 6 months after the stroke because of high risk of recurrence during this period.
- 2) After 6 months, periodontal therapy may be performed with short appointments and minimal stress.
- 3) Those patients usually are placed on oral anticoagulants so for procedures with significant bleeding as periodontal surgery, the anticoagulant drugs must be adjusted in consultation with the physician and to check the prothrombin time not more than 1.5 times normal (11-15 seconds normally).
- 4) Monitor the blood pressure because of recurrence rate of CVA is high.

e) Congestive heart failure: -

Is a condition in which the pump function of the heart is unable to supply enough oxygenated blood to meet the body's needs.

Patients with treated congestive heart failure should be **manages as follows: -**

- 1) The patients taking diuretics so watch for susceptibility to orthostatic hypotension.
- 2) The patients taking dicumarol which is anticoagulant so consult with the physician to check prothrombin time.
- 3) The procedures should be short with less stress.

f) Cardiac pacemakers: -

Some cardiac arrhythmias are treated with implantable pacemakers which usually implanted in the chest wall and enter the heart transvenous. These electrical devices are used to

regulate heart beats and on electro- physiologic problems may occur with such implanted device. **Management of such patients will be as follows: -**

- 1) Consult with the physician to get information about the underlying cardiac reason for pacing and to explain the periodontal treatment plan to him.
- 2) The patient should be positioned so that minimal pressure will be exerted on the implant site.
- 3) Limited use of electrical dental equipment that generates electromagnetic fields such as ultrasonic devices so that to avoid interference with the artificial pacemakers. Try to keep these devices at least 30 cm from the patient. However, most pacemakers are adequately shielded to prevent these changes.

g) Infective endocarditis: -

It's a disease in which microorganisms colonize the damaged endocardium or heart valve. It is a serious disease with poor prognosis. The term infective endocarditis is preferred to the previous term bacterial endocarditis because the disease can also be caused by fungi and viruses. The organisms most encountered in IE are a-hemolytic streptococci (e.g streptococcus viridans). Other microorganisms found in the periodontal pockets and associated with this disease are Eikenella corrodens, Aggrigatibacteractinomycetemcomitans, Capnocytophaga and Lactobacillus species. The practice of periodontics is intimately concerned with the prevention of IE. Any dental procedures that involve bleeding may induce a transient bacteremia, so prophylactic antibiotic should be recommended before the procedure which is associated with significant bleeding as periodontal surgery, scaling and root planning. However, bacteremia may occur even in the absence of dental procedures, especially in individuals with poor oral hygiene and significant periodontal inflammation. **The preventive measures to reduce the risk of IE should consist of the following: -**

- 1) Define the susceptible patient: Those patients at high risk to develop IE following dental treatment include those with rheumatic heart disease, congenital heart disease, cardiac surgery, prosthetic heart valves.
- 2) Provide oral hygiene instruction: in patients with significant gingival inflammation, oral hygiene should be initially limited to gentle procedures (i.e., oral rinses as chlorhexidine mouth rinse and gentle tooth brushing with soft brush). As gingival health improves, more aggressive oral hygiene may be initiated.
- 3) During periodontal treatment, recommended prophylactic antibiotic regimens should be practiced with all susceptible patients. The regiment used is the following: -

Regimen	Antibiotic	Dosage
Standard oral regimen	Amoxicillin	2 g 30-60 minutes before procedure
Alternate regimen for patients allergic to amoxicillin or penicillin	Clindamycin or	600 mg 30-60 minutes before procedure
	Azithromycin or	500 mg 30-60 minutes before procedure
	Cephalexin (Cephalosporins)	2.0 g 30-60 minutes before procedure
Patient unable to take oral medication	Ampicillin	2 g intramuscularly or intravenously within 30 minutes before procedure
Patients unable to take oral medications and allergic to penicillin	Clindamycin	600 mg intravenously within 30 minutes before procedure (must be diluted and injected slowly)
	Or Cefazolin	1.0 g intramuscularly or intravenously within 30 minutes before procedure

Patients with aggressive periodontitis often have high levels of *Aggratibacteractinomycetemcomitans* in the subgingival plaque. This organism has been associated with IE and is often resistant to penicillins, therefore in patients with aggressive periodontitis who are also at risk for IE, it has been suggested using tetracycline 250 mg four times daily for 14 days to eliminate or reduce A.a, followed by the conventional prophylaxis protocol at the time of dental treatment.

4) Periodontal treatment should be designed according to the degree of severity and involvement of periodontal tissues: - Periodontal therapy is a prolonged procedure, it is mostly not a one-day antibiotic regimen, multiple visits and easily elicit gingival bleeding, so periodontal treatment plans must be developed for patients susceptible to IE and as follows:

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- a. To reduce the wide range systemic effect of periodontal disease in these patients, teeth with severe periodontitis and poor prognosis must be extracted rather than retained and treated.
- b. All periodontal treatment procedures (including probing) require antibiotic prophylaxis. Pretreatment chlorhexidine mouth rinse is recommended before all procedures because it reduce the presence of bacteria on mucosal surfaces.
- c. Reduce the number of visits required so that to minimize the risk of developing resistant bacteria.
- d. It's preferably that the appointments allowed between 10-14 days, if it's not possible then select an alternative antibiotic regimen.
- e. The need for antibiotic prophylaxis before suture removal is controversial, when possible, use the resorbable sutures in such patients.
- f. Regular recall appointments are important with reinforcement on good oral hygiene to maintain periodontal health.

2. renal disease: -

Patients with chronic renal failure have a progressive disease that may require kidney transplantation or dialysis. The patients who are receiving hemodialysis require special precautions. Those patients have a high incidence of viral hepatitis, anemia, and prolonged hemorrhage. The risk of hemorrhage is related to anticoagulant during dialysis. Also, they have either an internal arteriovenous fistula or an external arteriovenous shunt. This shunt is often located in the arm and must be protected from trauma.

The management of those patients will be as follows: -

- 1) Consult with patient's physician.
- 2) Screen for hepatitis B surface antigen and antibodies prior to any treatment.
- 3) Avoid drugs that metabolized by the kidney ex. Tetracycline, streptomycin, aminoglycoside, aspirin ... etc.
- 4) Provide antibiotic prophylaxis to prevent infective endarteritis.
- 5) Screen for bleeding disorder (bleeding time and platelet count)
(Normally bleeding time = 1-6 seconds, platelet count = 140,000- 400,000/mm³).
- 6) Patients receive heparin anticoagulation on the day of hemodialysis, Periodontal treatment should be provided on the day *after* dialysis, when the effects of heparinization have subsided. Hemodialysis treatments are usually performed three or four times per week.
- 7) Monitor blood pressure because those patients usually hypertensive.

Patients with renal transplantation take immunosuppressive drugs that greatly reduce resistance to infection. Excessive bleeding can occur during or after periodontal treatment because of drug-induced thrombocytopenia or anticoagulation, or both. So, **management of those patients will be as follows: -**

- 1) Prophylactic antibiotic to prevent infection (prescribed by the physician).
- 2) May need supplemental corticosteroid.
- 3) Teeth with severe bone and attachment loss, furcation invasion, periodontal

abscesses, or extensive surgical requirements should be extracted, leaving an easily maintainable dentition before transplantation to reduce possibility of infection.

4) Surgical excision of the gingiva may be needed because of gingival overgrowth secondary to cyclosporine therapy (preferably in the hospital under the supervision of the physician to control excessive bleeding).

3) Endocrine disorders

a) Diabetes Mellitus: -

The diabetic patient requires special precautions before periodontal therapy. The two major types of diabetes are type 1 (formerly known as insulin-dependent diabetes) and type 2 (formerly called non-insulin dependent diabetes). Diabetic patients are managing their blood glucose levels (glycemia) through diet, oral agents, and insulin therapy. The classic signs of diabetes include polydipsia (excessive thirst), polyuria (excessive urination), and polyphagia (excessive hunger with unexplained weight loss). If the patient has any of these signs and symptoms, physician consultation is indicated for further investigation because periodontal therapy has limited success in the presence of undiagnosed or poorly controlled diabetes. If the patient is suspected of having undiagnosed diabetes, **the following procedures should be performed:**

1- Consult the patient's physician.

2- Analyze laboratory tests.

a) Fasting blood glucose ≥ 126 mg/dL. Fasting is defined as no caloric intake for at least 8 hours. (Normal fasting glucose is 70 – 100 mg/dL).

b) Symptoms of diabetes plus non fasting plasma glucose ≥ 200 mg/dL. Non fasting glucose may be drawn at any time of the day without regard to time since the last meal.

c) 2 hours postprandial glucose tolerance test. (The glucose level is measured immediately before and 2 hours after a person drinks a liquid containing 75 g of glucose dissolved in water). Normal 2 hours postprandial glucose is > 140 mg/dL.

3- Provide emergency periodontal treatment only for such patient like acute periodontal abscess until diagnosis is established.

If a patient is known to have diabetes, it is important to determine the level of glycemic control before initiating periodontal treatment. The primary test used to assess glycemic control in a known diabetic individual is the glycosylated or glycated hemoglobin test (HbA1c). HbA1c is a fraction of hemoglobin found in normal persons and it increases in the presence of hyperglycemia, and it reflects blood glucose concentration over the preceding 2 to 3 months and may provide an indication of the potential response to periodontal therapy. Normally, patient should have 6% to 8% HbA1c. In well-controlled diabetic patient, the level of HbA1c should stay below 7%. Those patients usually respond to therapy in a manner like non-diabetic individuals. The level of hyperglycemia as indicated by HbA1c may reach as high as 20% in some uncontrolled cases. Poorly controlled patients ($>8\%$) often have a poor response to treatment, with more postoperative complications. Patients do not have to fast before they undergo testing, which can be useful in monitoring the progress of the disease.

In diabetic patients taking insulin injections, the most common dental complication is hypoglycemia. The sign and symptoms of hypoglycemia are tremors, confusion, anxiety, sweating, tachycardia, unconsciousness. It is important to know the number of times per day the patient taking insulin and the time of the last dose. Periodontal treatment often can be timed to avoid peak insulin activity. If hypoglycemia occurs during periodontal treatment, therapy should be immediately terminated, and the patient should take juice or glass of water and sugar. As a general guideline, well-controlled diabetic patients having routine periodontal treatment may take their normal insulin doses as long as they also eat their normal meal. If the procedures are going to be long, the insulin dose before treatment may need to be reduced. Consultation with patient's physician is important to determine any modifications needed.

b) Thyroid disorders: - **Hyperthyroidism or thyrotoxicosis** may increase risk for hypertension, angina, congestive heart failure. So,

- 1) Avoid any periodontal treatment for patient with thyrotoxicosis until good medical control.
- 2) Avoid epinephrine and other pressor amines in incompletely treated patient.
- 3) Avoid stress and control periodontal infection to prevent the occurrence of thyrotoxic crisis in untreated patient.

4) Once under good medical management, patient may receive dental treatment. In **hypothyroidism**

- 1) Avoid stress and infection to prevent the occurrence of hypothyroid coma.
- 2) Avoid narcotics and tranquilizers in untreated hypothyroid patients because of inability to tolerate drugs.
- 3) In patient under good medical management, dental treatment may be performed.

c) Adrenal Insufficiency: - Most commonly, adrenal insufficiency is seen in persons who have received steroid therapy. The degree of suppression of adrenal gland depends on the drugs used, the dose, the duration of administration, the length of time elapsed since steroid therapy was terminated and the route of administration whether systemic or topical route. Doses of different corticosteroids include 25 mg cortisone equivalent to →20 mg hydrocortisone equivalent to →5 mg prednisolone. Those patients can't tolerate stress caused by dental anxiety, surgical procedure or infection and may develop adrenal crisis which characterized by severe hypotension. For patients who is currently receiving steroid therapy, **the following regimen is followed:** -

- 1) Patient taking low dose (less than 20 mg) or high dose (more than 20 mg) cortisol daily for less than one month → No supplementation is necessary.
- 2) Patients taking large dose (more than 20 mg cortisol daily) for extensive dental procedure: double the normal daily dose one hour before the procedure.
- 3) Patients on topical steroids like eye drops which used for a short time and small amount: supplementation is not required. For patient with a history of steroid therapy, it has been reported that full regeneration of cortical function may occur within 12 months or after 2 years. So, a minimum of 12 months should have passed since the

last dose was taken before normal periodontal therapy is performed. Otherwise, supplementation of steroid is required.

4)Pregnancy: -

The aim of periodontal therapy for pregnant women is to reduce the exaggerated inflammatory response of the periodontal tissues to local factor which related to hormonal changes associated with pregnancy. – The second trimester is the safest time for treatment (scaling, polishing, root planning) while surgical procedures should be postponed after delivery. – In the third trimester, treatment isn't advisable because of supine hypotension syndrome of pregnancy, loss of consciousness may occur due to pressure of the uterus on inferior vena cava.

_No medication is given that cross the placenta and affect the fetus.

– No radiographs unless necessary with precaution .

5)Hemorrhagic disorders: - Patients with a history of bleeding problems caused by disease or drug should be managed to minimize risks of hemorrhage. Identification of these patients via the health history, clinical examination and clinical laboratory tests is important. Health questioning should cover

1) History of bleeding after previous surgery or trauma. 2) past and present drug history 3) history of bleeding problems among relatives 4) illnesses associated with potential bleeding problems. Clinical examinations should detect the existence of jaundice, ecchymosis, petechiae, spontaneous gingival bleeding. Laboratory tests include bleeding time, prothrombin time, complete blood cell count, partial thromboplastin time and coagulation time. Bleeding disorders may include the following: -

1) Hemophilia A (result in a deficiency of coagulation factor VIII). 2) Hemophilia B (result in a deficiency of factor IX). 3) Von Wille brand's disease (results from a deficiency of Von Wille brand factor which mediates adhesion of platelets to the injured vessel wall). 4) Liver disease: Most coagulation factors are synthesized by the liver, or it is the site for production of the clotting factors. Long-term alcohol abusers or chronic hepatitis patients often demonstrate inadequate coagulation. 5) Patients taking anti-coagulation drugs: Patient with prosthetic heart valves, or histories of myocardial infarction, stroke or thromboembolism are frequently placed on anticoagulation therapy using dicumarol and warfarin. These drugs are vitamin K antagonists. Another drug is aspirin which interferes with normal platelet aggregation and can result in prolonged bleeding. For patients taking more than 325 mg of aspirin per day, the drug should be discontinued at least 7 to 10 days before periodontal therapy in consultation with the physician. 6) Thrombocytopenic Purpuras Thrombocytopenia is defined as a platelet count $< 100.000/mm^3$. The Purpuras could result from radiation, chemotherapy, leukemia or infections and it's characterized by extravasations of blood into the tissues under the skin or mucosa producing spontaneous petechiae (small red patches) or ecchymosis (bruises).

In general speaking for patients with bleeding disorders, never do any type of periodontal treatment unless consultation with the physician and it's preferable to do periodontal surgery if needed in the hospital.

6) Blood Dyscrasias: - It include disorders of red and white blood cells which may affect the course of periodontal therapy. Ex: leukemia. Leukemic patients having bleeding tendency and enhanced susceptibility to infections.

- Refer the patient for medical evaluation and keep consultation with the physician.
- Periodontal treatment as scaling and root planning can be performed if the patient condition allows (chronic leukemia). - Rinsing with 0.2% chlorhexidine twice daily is recommended. - Administer antibiotic coverage before periodontal treatment because infection is a major concern.
- Periodontal surgery is contraindicated in the dental office because of uncontrolled bleeding. It must be done in the hospital.

7) Liver diseases: -

Major causes of liver disease include drug toxicity, cirrhosis, viral infections (ex: hepatitis B and C), neoplasm. Because the liver is the site of production for most of the clotting factors, excessive bleeding during or after periodontal treatment may occur in patients with severe liver disease. **Management of such patient include the following:** -

- a) consultation with the physician.
- b) screening for hepatitis B and C.
- c) check prothrombin time and partial thromboplastin time

8) Neurologic Disorders

Several diseases affecting the nervous system are of clinical significance in dental practice. These diseases may vary in severity and consequences.

The more common and significant neurologic diseases are stroke, Parkinson disease, Alzheimer disease, epilepsy, and multiple sclerosis (MS).

EPILEPSY:

Epilepsy is not a specific diagnosis but rather a term that refers to a group of disorders characterized by chronic and recurrent, paroxysmal changes in neurologic function (seizures), altered consciousness, or involuntary movements caused by abnormal and spontaneous electrical activity in the brain.

Although seizures are required for the diagnosis of epilepsy, not all seizures imply presence of epilepsy. Seizures may occur during many medical or neurologic illnesses, including stress, sleep deprivation, fever, alcohol or drug withdrawal, and syncope.

Management of those patients include:

1- identification of the patient by the medical history and by discussion with the patient or family members.

The dental practitioner must learn as much as possible about the seizure history, including the type of seizures, age at onset, cause (if known), current and regular use of medications, frequency of physician visits, quality of seizure control, frequency of seizures, date of last seizure.

2- Well controlled patients with anticonvulsant drugs can receive normal routine dental care.

3- poorly controlled disease may require additional anticonvulsant or sedative medication, as directed by the physician. Clinicians should provide good pain control to avoid stress, which may precipitate a seizure.

4- Possibility of bleeding tendency in patients taking valproic acid (Depakene) or Carbamazepine (Tegretol) as the result of platelet interference (decrease platelet aggregation) so consult with the physician.

5- No contraindication has been identified to the use of local anesthetics with Epinephrine (1:100,000 and no more than two carpules) in these patients.

6- Preventive measures include scheduling the patient at a time within a few hours of taking the anticonvulsant medication, using a mouth prop, removing dentures.

7- **If a patient has a seizure while in the dental chair**, the primary task of management is to:

a- protect the patient and try to prevent injury.

b- no attempt should be made to move the patient to the floor.

c- the instruments and instrument tray should be cleared from the area

d- the chair should be placed in a supported supine position

e- the patient's airway should be maintained patent. Turn the patient to the side (to avoid aspiration).

f- if the mouth prop is used, it should be inserted at the beginning of the dental procedure not at the time of seizure.

8- **After a seizure:**

a- Examine for traumatic injuries.

b- Discontinue treatment; arrange for patient transport.



9- **gingival overgrowth** is associated with phenytoin administration is the most significant oral complication in patients with epilepsy, so every effort should be made to maintain a patient at an optimal level of oral hygiene. If gingival overgrowth is significant, surgical reduction will be necessary.



Note: Oral hygiene is important for preventing overgrowth and significantly decreasing its severity.

9) Infectious diseases: -

Because medical histories are often inaccurate or incomplete, all periodontal patients should be treated as they have an infectious disease. Protection of patients, clinicians and office staff requires use of universal (standard) precautions for each patient. Examples of these diseases are hepatitis, AIDS, and Tuberculosis.

Hepatitis: - Six distinct viruses causing viral hepatitis to have been identified A, B, C, D, E and G viruses. These forms differ in their virology, epidemiology, and prophylaxis. Hepatitis A and E are both self-limiting infections with no associated chronic liver disease and these viruses transmitted via fecal-oral route.

Hepatitis B infection may result in chronic liver disease, it transmitted mainly through hematogenous routes and through contaminated instruments or needles in the dental office. Hepatitis B vaccine is recommended for all care health workers.

Hepatitis D virus requires the presence of hepatitis B virus to survive and replicate because the virus genetic material is packaged within the hepatitis B virus surface antigen coating. So prevention of this virus depends strongly on hepatitis B virus vaccination.

Hepatitis C is the most serious infection due to high chronic infection rate. Only 15% of patients infected with this virus recover completely and 85% develop chronic infection which increases the risk for cirrhosis, carcinoma, and liver failure. No vaccine is available for this virus.

Hepatitis G is a newly discovered virus, and its virology is not clearly understood and its known to be transmitted via blood.

-If the disease is in the active stage, do not provide periodontal treatment.

-For patients with history of hepatitis, consult the physician to determine the type of hepatitis, course & length of the disease and mode of the transmission.

-For recovered type A or E hepatitis patients, perform routine periodontal care.

-For recovered type B and D hepatitis patients you must screen for HBsAg. if this test is positive, so the patient is infective.

-Patient with positive anti-HBs may be treated routinely.

-Patients with active hepatitis and need emergency treatment, we should do the following:

1- Using full barrier techniques including masks, gloves, and eyeglasses.

2-Do not use ultrasonic instrument or air syringe so that not to transfer the infection by the saliva.

3-Rinsing with chlorhexidine mouth wash is recommended.

4-When the procedure is complete; all instruments should be sterilized carefully.

AIDS: -

AIDS is characterized by impairment of the immune system. The human immunodeficiency virus (HIV) was isolated in 1984 as the causative agent or virus of AIDS. Most of the patients develop long lasting acute illness with flu-like symptom last for 10-14 days with enlarged lymph nodes, night sweat, weight loss, fever, malaise, and chronic diarrhea. Oral

manifestation characterized by oral hairy leukoplakia and oral candidacies, necrotizing ulcerative gingivitis or periodontitis (NUG or NUP). Periodontal management of AIDS patients involves:

- Using full barrier techniques.
- Care in use of all sharp instruments.
- proper sterilization.
- Do not use ultrasonic instrumentation.

Tuberculosis: -

The patient with tuberculosis should receive emergency care only. Physician should be consulted for the result of sputum cultures for mycobacterium tuberculosis. When the results are negative, the patient may be treated normally. When the results are positive, we must know that adequate treatment of tuberculosis requires a minimum of 18 months with a post treatment follow up. So periodontal treatment should include emergency only. In general, in case of infectious disease it is preferable to wear double gloves and double masks. The sterilization should be done in auto clave 120-130 °C for about one or two hours.