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Posterior teeth Extraction in Medically compromised patients: Clinical challenges and management Strategies

This research was organized and submitted to the Faculty of Dentistry Council at AL Mustaqbal University in the academic year 2025/2026 as a requirement for obtaining a Bachelor's degree in Oral and Dental Medicine and Surgery.

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Supervisor's Declaration

Certify that this research entitled " Posterior teeth Extraction in Medically compromised patients: Clinical challenges and management Strategies " was prepared

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((قُلْ هَلْ يَسْتَوِي الَّذِينَ يَعْلَمُونَ وَالَّذِينَ لا يَعْلَمُونَ إِنَّمَا يَتَذَكَّرُ أُولُو الْأَلْبَابِ))

صدق الله العظيم

(الزمر: ٩)

Dedication

To the one I prefer to myself,

and why not, for she is the one who is right from her origins.

And she has never been so slow in her efforts to make me happy.

(My beloved sister).

She walks the paths of life,

and she remains the one who controls our

thoughts in every path we take.

The one with the kind face and good deeds.

For he never withheld anything from me throughout his life.

(To my dear father).

To my friends and all those who stood by me and helped me with all they had and in all aspects, I present to you this research, hoping that it will meet with your approval.

Thanks and gratitude

I offer my sincere thanks and appreciation first to God,

and secondly to everyone who supported me after God,

for he who does not thank people does not thank God. After that,

I must not forget to offer my sincere respect, thanks,

and appreciation to our professors at AL Mustaqbal University , especially the Faculty of Dentistry,

and to Dr. Hussein Hatem Jawad for his great role in helping us complete this project.

You were and remain a wellspring of pure knowledge.

Congratulations to all who have learned from you.

Summary

Extraction of posterior teeth in patients with significant systemic comorbidities poses heightened clinical challenges. Posterior teeth (molars and large premolars) often present complex anatomy (e.g., multiple diverging roots, proximity to maxillary sinus or inferior alveolar canal) which increases procedural difficulty and the risk of surgical complications. Meanwhile, medically-compromised patients (e.g., on anticoagulants/antiplatelets, with diabetes, chronic kidney disease, osteoporosis on antiresorptive therapy, or history of head-and-neck radiotherapy) face increased risks of bleeding, impaired healing, infection, and osteonecrosis. Consequently, a tailored approach encompassing comprehensive medical assessment, appropriate timing, modified surgical technique, and enhanced perioperative management is essential.

The aim of this study is to evaluate the clinical challenges encountered during the extraction of posterior teeth in medically compromised patients and to identify effective management strategies that ensure patient safety, minimize postoperative complications, and optimize clinical outcomes. The study further seeks to analyze the impact of various systemic conditions—such as diabetes mellitus, hypertension, cardiovascular diseases, and bleeding disorders—on the surgical approach, healing process, and complication rates associated with posterior tooth extraction.

We collected data by reviewing cases at specialized dental centers in Babylon Governorate (Dr. Abbas Al-Muwaffaq Center). These cases numbered 120, comprising 60 males and 60 females, ranging in age from 6 to 74 years. Of these cases, 37 suffered from heart disease (hypertension and anemia), and 19 suffered from diabetes, The doctor encountered only one case of viral infection; this patient had hepatitis B.

We analyzed the data to find the percentage of the effect of clinical disease on the extraction of back teeth. We found that the percentage of their effect (43 cases) is 35.83%. We found that the highest clinical disease affecting extraction is blood pressure, and its percentage (37 cases) was 30.8% of the general effect on extraction and 86% of the clinical factors in general.

Following high blood pressure is diabetes, which is also common and one of the clinical diseases that affect tooth extraction in general. Therefore, it should be measured before any surgical procedure. The percentage of the effect of diabetes in general was 41.86% of the total clinical diseases that affect extraction.

The incidence of anemia was 6.97%, while the incidence of hemophilia was also 6.97%, among the clinical conditions affecting posterior tooth extractions. The incidence of viral hepatitis was 2.32% among the clinical conditions.

Posterior teeth extraction in medically compromised patients presents significant clinical challenges due to the complex anatomy of posterior teeth and the presence of systemic conditions that increase the risk of intra- and postoperative complications. Conditions such as cardiovascular disease, diabetes mellitus, bleeding disorders, renal and hepatic impairment, and immunosuppression can adversely affect healing, hemostasis, infection control, and patient tolerance to stress and medications.

List of constants

Main Headlines

No.	Main Headlines	Origin of the word
1	measuring b. p.	measuring blood pressure
2	measuring s. l.	Measuring sugar level
3	K. the p. of b. in the b.	Know the percentage in the blood
4	HIV	Hepatitis infection viruses

Chapter one

Introduction

Introduction

Extraction of posterior teeth in patients with significant systemic comorbidities poses heightened clinical challenges. Posterior teeth (molars and large premolars) often present complex anatomy (e.g., multiple diverging roots, proximity to maxillary sinus or inferior alveolar canal) which increases procedural difficulty and the risk of surgical complications. Meanwhile, medically-compromised patients (e.g., on anticoagulants/antiplatelets, with diabetes, chronic kidney disease, osteoporosis on antiresorptive therapy, or history of head-and-neck radiotherapy) face increased risks of bleeding, impaired healing, infection, and osteonecrosis. Consequently, a tailored approach encompassing comprehensive medical assessment, appropriate timing, modified surgical technique, and enhanced perioperative management is essential.[(1)]

Recent evidence highlights that in medically compromised cohorts undergoing extractions:

Patients on dual antiplatelet or anticoagulant therapy exhibit a significantly higher incidence of post-extraction hemorrhage compared to monotherapy patients.

Patients treated with antiresorptive or antiangiogenic medications for cancer or osteoporosis, when undergoing extractions, show radiographic pre-operative signs (e.g., lamina dura thickening, widened periodontal ligament, sequestra formation) that correlate with subsequent development of medication-related osteonecrosis of the jaw (MRONJ).

Broadly, the landscape of “medically compromised dental patients” has shifted, requiring that dentists revisit older paradigms and update protocols in light of modern systemic therapies, new antithrombotic medications (DOACs), and emerging evidence about complications.

Thus, this poster will synthesise the clinical challenges specific to posterior teeth extractions in medically-compromised patients, and propose management strategies designed to mitigate risk and improve outcomes.[2]

Key Clinical Challenges

Anatomical complexity & surgical risk:

Posterior teeth extractions inherently involve more challenging access, root morphology, and proximity to vital structures (e.g., sinus, nerve). In medically compromised patients the margin for error is smaller.

Bleeding/hemostasis issues:

Patients on anticoagulant or antiplatelet therapies (especially dual regimens) have elevated post-extraction bleeding risk; recent data show markedly higher incidence of hemorrhagic events in such cohorts.

Impaired healing & infection risk:

Conditions such as poorly controlled diabetes, renal failure, immunosuppression, or treatment with bisphosphonates/denosumab increase the risk of delayed socket healing, infection, or MRONJ. The radiographic study on MRONJ risk post-extraction (2023) underscores this.

Medication-related complications:

Newer antithrombotic regimes (e.g., DOACs) and antiresorptives require updated understanding of risk stratification and perioperative planning. A 2025 review emphasises the need to “not extract based on knowledge from 10 years ago”.

Systemic disease interplay & management logistics:

Coordination with medical specialists, modification of surgical timing (morning slots, inpatient vs outpatient), and appropriate anesthesia/analgesia plans become more complex. For example: the 2024 retrospective study noted that extractions in the medically compromised sometimes resulted in inpatient hospitalisation due to comorbidities rather than the dental procedure itself. [3]

Management Strategies:

Pre-operative medical assessment & liaising: Detailed history (systemic diseases, medications, INR/DOAC levels, renal/hepatic status), liaise with physician/cardiologist/haematologist as needed (e.g., for high thrombotic risk patients).

Risk stratification & scheduling: Classify patients by risk (low vs high) and extraction complexity (simple vs surgical). High-risk medically compromised + posterior surgical extraction → consider secondary care or hospital setting.

Hemostatic planning: For patients on antithrombotic therapy, consider local haemostatic adjuncts (e.g., tranexamic acid mouthwash/soaked gauze, oxidised cellulose, gelatin sponge, suturing). The 2024 study emphasised that dual therapy increased bleeding risk significantly so local haemostasis must be robust. [(4)]

Minimally traumatic surgical technique: Use flapless or minimal flap where feasible, section roots to reduce force, avoid unnecessary alveolotomy, ensure atraumatic handling to minimise bone trauma and preserve healing potential (especially in patients at risk for MRONJ). The 2023 MRONJ study points to anatomical factors pre-disposing to poor outcome.

Post-operative monitoring & instructions: Provide clear written and verbal instructions (pressure, soft diet, avoidance of spitting/sucking, tranexamic mouthwash if indicated), schedule a follow-up early, and ensure access to emergency contact for bleeding or infection. Some studies show medically compromised patients may require inpatient observation if comorbidities present.

Antibiotic and wound-healing considerations: While routine prophylactic antibiotics may not benefit all extraction patients, in medically compromised individuals (immunosuppressed, diabetic, antiresorptive therapy) a tailored prophylaxis protocol should be considered in consultation with medical colleagues. A 2024 large-scale VA study found that antibiotic premedication did not reduce complications in a largely older medically compromised cohort — emphasising that antibiotic use must be judicious.

Interdisciplinary coordination: For patients on antiresorptives/antiangiogenics, or with significant cardiac/renal disease, extraction planning should involve the patient's medical team and possibly referral to oral surgery specialist. The 2025 review on medically compromised dental care highlights the need for interdisciplinary collaboration. Posterior teeth extractions in medically compromised patients require heightened vigilance, modified technique, and integrated care pathways to reduce risk and optimise outcomes. With evolving systemic therapies and increasing medically complex patient populations, dental practitioners must stay current with latest evidence and tailor care accordingly.[5]

Aim of the Study:

The aim of this study is to evaluate the clinical challenges encountered during the extraction of posterior teeth in medically compromised patients and to identify effective management strategies that ensure patient safety, minimize postoperative complications, and optimize clinical outcomes. The study further seeks to analyze the impact of various systemic conditions—such as diabetes mellitus, hypertension, cardiovascular diseases, and bleeding disorders—on the surgical approach, healing process, and complication rates associated with posterior tooth extraction.

Chapter two

Literature Review

The review focuses on a few medical problems that dentists might encounter in daily practice that need extra knowledge and care to prevent complications causing otherwise unnecessary morbidity and mortality. The diseases & disorders include diabetes mellitus, cardiac abnormalities, bleeding disorders like hemophilia, renal system disorder, neurological disorders like epilepsy, respiratory problems, infectious diseases like HIV or hepatitis and many more disease including multiple drug interactions too.

The important points in managing the patient with medical problems is acquiring a thorough medical history and to fully understand the significance of the disease that may be endorsed by the patient & each identified medical condition can affect dental care in a unique manner. Knowing how to manage potential complications is also important and is presented below for few specific medical conditions.[(6)]

2.1. Diabetes mellitus:

DM is caused by an underproduction of insulin, a resistance of insulin receptors in end organs to the effects of insulin, or both. Diabetes is commonly divided into insulin-dependent(type 1) and non–insulin-dependent (type 2) diabetes. Type1 diabetes usually begins during childhood or adolescence. The main objective in managing the diabetic patient is to maintain the blood glucose at near normal level sand to avoid acute or chronic complications especially hypoglycemic attacks. Drugs like aspirin and steroids should be avoided and Orofacial infections should be treated. Routine non-surgical procedure treatment is best carried out just after breakfast and continuing with the routine antidiabetic medication. For the surgical procedures the desired blood glucose level is 120-180mg/dl and it should be regularly monitored. Hyperglycemia may be harmful because of delayed wound healing or dysfunction. To avoid Hypoglycemia, IV infusion with glucose which should be measured regularly so that soluble insulin can be added as required.2In case of moderate to severe dental infection it is better to administer antibiotic to diabetic patients prior to the dental extraction or surgery and also post

op antibiotic medication for 3 to 5 days due to compromised immune system in such patients. op antibiotic medication for 3 to 5 days due tocompromised immune system in such patients.[7]

2.2. Pulmonary disease:

COPD Chronic obstructive pulmonary disease (COPD) isa general term for pulmonary disorders characterized by chronic airflow limitation from the lungs that is not fully reversible and it encompasses two main diseases that are chronic bronchitis and emphysema. Most cases of COPD occur as a result of long-term exposure to lung irritants that damage the lungs and the airways.[8] The primary cause of COPD is cigarette smoking & Other contributory factors to COPD include recurrent respiratory tract infection, air pollution, cotton textile dust heredity and aging. The signs and symptoms of COPD include –An ongoing cough or a cough that produces large amounts of mucus often called smokers cough, Shortness of breath, especially with physical activity, Wheezing, Chest tightness. However, not everyone who has these symptoms hasCOPD.3Bronchodilators such as theophylline, inhaled beta agonists, or inhaled anticholinergics are usually prescribed for patients with significant COPD; in more severe cases, patients are given long acting agents and in haled corticosteroids or short courses of systemic corticosteroids. In the dental management of patients with COPD who are receiving steroids, the dentist should consider the use of additional supplementation before major surgery.[9] Sedatives, hypnotics, and narcotics that depress respiration should be avoided. Patients may need to be kept in an upright sitting position in the dental chair to enable them to better handle their commonly copious sputum/mucous. Supplemental oxygen greater than their usual rate should not be administered to patients with severe COPD during surgery unless the physician advises it.

2.2.1. Asthmalt :

is the medical condition characterized by the narrowing &swelling of airways of respiratory system making breathing difficult with cough production or wheezing sounds as clinical symptoms. The most common causes of asthma exacerbations are pollens, spores, house dust, and insect, viral infections of respiratory tract or smoking. The medical management of asthma depends upon its severity either mild, moderate or severe with pharmacological agents like bronchodilators, anti-mucolytic agents, anticholinergics or corticosteroids. The

supportive treatment of acute severe asthma include es supplemental oxygen, fluid and electrolyte maintenance, anxiety relief, and endotracheal intubation and, in extreme situations, mechanical ventilation.[10] Dental procedures can be done for asymptomatic or well-controlled asthmatic patients. A wheezing or poorly controlled patient should be reappointed later. The sittings should be of short duration with as possible as in upright position with less duration of sittings in supine positions. The following steps should be taken to manage an acute asthmatic attack in the dental office:

1. Discontinue the dental procedure and allow the patient to sit or lie down in a comfortable position.

2. Keep the airway open and administer ~2-agonists within haler or nebulizer.

3. Administer oxygen via face mask nasal hood, or cannula.

4. If no improvement takes place and the patient is worsening, administer epinephrine subcutaneously(1:1000 solution, 0.01 mg/kg of body weight to a maximum dose of 0.3 mg), and summon medical assistance.

2.3. Hemophilia:

Bleeding disorders can be classified as coagulation factor deficiencies, platelet disorders, vascular disorders, and fibrinolytic defects.[11] Among these, hemophilia A that occurs due to deficiency of clotting factor VIII, hemophilia Balso known as Christmas disease due to the deficiency of factor IX, hemophilia C or Rosenthal syndrome due to the deficiency of factor XI and von Willebrand's disease are the commonly encountered congenital coagulation defect disorders.[12]These hemophiliac patients can lead to prolonged clotting time and excessive bleeding tendencies that may be fatal. Management of hemophilia A among patients undergoing dental surgery consists of increasing factor VIII levels, replacing factor VIII and inhibiting fibrinolysis.[13]

Hemophilia B is managed by replacement therapy with highly purified, virally inactivated factor IX concentrates. Prothrombin complex concentrates can also be used for factor IX replacement.[13]

Von Willebrand's disease is not sex linked. For mild conditions in von Willebrand's disease, use of DDAVP maybe sufficient, but severe disease needs replacement with factor VIII.[13] The management of patients with bleeding disorders depends on the severity of the condition and thein vasiveness of dental procedure. If the procedure has limited invasiveness and the patient has a mild bleeding disorder, then only slight or no modification will be required but in patients with severe bleeding disorders, main aim is to restore the hemostatic system of the patient to acceptable levels and maintain hemostasis by local and adjunctive methods.[14] The patient's physician should be consulted before invasive treatment. In case of irreversible coagulopathies, replacement of missing factors is the need. In hemophiliac patient nerve block injections are contraindicated as the anesthetic solution is deposited in a highly vascularized area, which carries arisk of hematoma formation.9Extravasation of blood in the oropharyngeal area by an inferior alveolar block or in the pterygoid plexus can produce gross swelling, pain, dysphasia, respiratory obstruction and risk of death from asphyxia.[15] Anesthetic infiltration and intraligamenttary anesthesia are good alternatives to nerve block with a vasoconstrictor (when possible) in such patients. Non-surgical endodontic therapy is preferred over extraction when ever possible in hemophiliac patient.[16]

2.4. Thyroid patients:

The thyroid gland is an endocrine gland in the neck consisting of two connected lobes that secretes the thyroid hormones like thyroxine (T4) & triiodothyronine (T3).Thyroid hormones help with brain development and function, regulates the metabolic rate of the body. These hormones also regulate the metabolism of fat, proteins and carbohydrates, Thyroid hormones are integral in there gulation of many functions and aspects of the human body, such as temperature regulation, energy levels, weight and many more. Patients with thyroid dysfunction maybe classified as euthyroid, hypothyroid, or hyperthyroiddepending on normal, decreased or hyper activity of the thyroid. Characteristics of hypothyroidism include anemia, cardiomegaly, cold intolerance, constipation, cretinism (children), dry hair, elevated, creatine, goiter, hyperlipidemia, hypertelorism, hypotension, invertedT waves in electrocardiogram, lethargy, low-amplitudeQRS wave in electrocardiogram, myxedema, paresthesia, reduced cardiac output, reduced respiratory rate, seizures, bradycardia, weight gain, whereas the characteristics of hyperthyroidism

include abdominal pain, heart murmur, diplopia, dysrhythmias, elevated alkaline phosphatase, fatigue , fine hair, goiter, heat intolerance, hypercalcemia, increased appetite, increased cardiac output, increase dpulse, nervousness, palpitations, proptosis, psychosis, tachycardia, tremor, warm skin, weight loss.[17] The dental management in hypothyroid patients in untreated or poorly controlled cases include avoid surgical procedures, treat oral infection, avoid CNS depressants such as narcotics, barbiturates; in well controlled cases avoid oral infections, implementation of normal procedures and management; where in case of medical crisis i.e. rare include recognition and initial management of myxedematous coma, seek medical aid, hydrocortisone 100 mg, CPR. Dental management in case of hyperthyroidism include avoid the use of adrenaline and control the spread of infection. Treatment should be discontinued if signs or symptoms of a thyrotoxic crisis develop. Management of stress is important in such patients as stress, anxiety or surgery can trigger the thyrotoxic crisis. Anti-thyroid drugs like as propylthiouracil has anti-vitamin K activity and can cause hypoprothrombinemia and bleeding that poses a risk for hemorrhage and so patients taking PTU must be carefully evaluated before surgery or invasive dental treatment.[18]

2.5. Cardiac problems:

Hypertension is an important health problem due to its high incidence and prevalence in the general population and it is associated with increase in risk of suffering cardiovascular disease like angina, myocardial infarction and cerebrovascular events example stroke. The blood pressure values considered to be normal were established by consensus as under 90 mmHg in the case of diastolic pressure, and under 140 mmHg in the case of systolicpressure15 and National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) introduced the term “pre-hypertension” in reference to people with a systolic blood pressure of120-139 mmHg or with a diastolic blood pressure of 80-89 mmHg.16 A well control hypertensive patients does not pose a risk in clinical practice, hypertensive patient is to be instructed to take his or her medication as usual on the day of dental treatment. Prior to dental treatment, the patient blood pressure should be recorded, and the treatment should be postponed if the values are higher. Denta lvisits should be in morning time with shorter durations. Prescription of anxiolytic agents is required in anxious patients like 5-10 mg of diazepam the night before and1-2 hours before the appointment

before dental treatment. A good local anesthetic technique should be performed, avoiding intravascular injection and using a maximum of two anesthetic cartridges (1.8mlx2) with vasoconstrictor. If more anesthesia is needed, it should be provided without vasoconstrictor. Absorbable sutures are to be avoided with adrenaline. When the patient does not present good blood pressure control, it is best to refer him to the physician. In the case of emergency dental visits, treatment should be conservative, with the use of analgesics and antibiotics. Surgery is to be avoided until adequate blood pressure control has been secured.[19] Certain NSAIDs, such as ibuprofen, indomethacin or the naproxen, can interact with antihypertensive drugs (beta-blockers, diuretics, ACEIs),[20] thus lowers antihypertensive action of drugs. Normally more than five days of treatment with both types of drugs are required for interactions to occur; as a result, NSAIDs should not be prescribed for longer than this five-day period. In the case of a hypertensive emergency (>120/210 mmHg),furosemide should be administered (40 mg, via the oral route). If this proves insufficient to restore pressure control, captopril should be administered (25 mg via the oral or sublingual route). If the blood pressure fails to decrease within 30 minutes after these measures, the patient should be referred to the nearest hospital.20IHD ischemic heart diseases involves the reduction of blood flow to the heart muscle due to build-up of plaque in the arteries of the heart. IHD include stable angina, unstable angina, myocardial infarction, and sudden cardiac death. Dental management in IHD is given via table 2.20In case of patients taking anti-platelet or anti-coagulant therapy in case of MI or angina, there is the need to monitor the CT, BT, PT, pTT/INR in case when there is the requirement of surgical procedure or dental extractions. Also, the appointments should be of smaller duration with proper stress management.

2.6. Epilepsy Dental :

environment can provoke seizures even in well-controlled epileptics. Prophylactic anticonvulsants: Carbamazepine, Phenobarbitone, Sodium Valproate, Phenytoin, Lamotrigine, Vigabatrin and Gabapentin. The management of epileptic patient in dental operatory includes –Terminate dental procedure and place patient into a supine position, Protect the patient during attack, Seizures secondary to LA overdose- until cerebral level of LA falls below seizure threshold, maintain adequate airway and oxygen, IV anticonvulsants administration of diazepam 0.2–0.5mg / kg per dose IV, repeated at 3 – 5 min. [7]

2.7. Renal problems :

Kidney transplant dental treatment of transplant patient requires close consultation between the dentist and the treating nephrologist. After transplant the immunosuppressants are given to the patient to prevent organ rejection that include nowadays is a combination of tacrolimus, mycophenolate and prednisolone. Instead of this, some patients receive cyclosporine, sirolimus orazathioprine.[22] Even after the kidney transplantation, the renal function is not fully restored and this may result in hemorrhage and also in the rare occasion that the transplant patient is administered coumarin anticoagulants as large no. of patients suffers from cardiovascular diseases too, that is why a recent INR should be required before any dental work that may involve bleeding & INR should be less than or equal to 2.5 and if more here should be a consultation with the nephrologist so as to adjust the dose.21Renal failure (on dialysis) dental management inpatients with renal failure that are on dialysis need a close cooperation between medical and dental professionals in order to improve the oral and general health of the patient. Prior to any invasive dental treatment, a complete blood count together with coagulation tests is the need. It is essential to eliminate any infection in the oral cavity as soon as possible with the consideration of antibiotic prophylaxis when bleeding and/or a risk of septicemia is expected .B.P. should be monitored. Penicillins, clindamycin and cephalosporins can be administered at the usual doses, and are the antibiotics of choice although the dosing interval should be prolonged. PCM is the drug of choice in analgesics and aspirin should be avoided due to its antiplatelet activity. It is advisable to provide dental treatment on non-dialysis days, to ensure the absence of circulating heparin, which has a half-life of about four hours. Desmopressin has been proposed for the control of severe bleeding in patients with renal failure, Tranexamic acid in the form of a rinse or administered via the oral routeat a dose of 10-15 mg/kg body weight a day distributed in2-3 doses, may also prove useful.[22]

2.8. Infectious diseases:

AIDS acquired immunodeficiency syndrome that is caused by retrovirus named as HIV (human immunodeficiencyvirus). It can be transmitted during sexual intercoursefrom an infected to an uninfected partner, when sharingequipment used to inject drugs, during pregnancy, labor and delivery, and through breastfeeding. Infection can also occur during exposure to the blood of an infected patient via needlestick or a splash to exposed mucous membranes. CDC staging of HIV infection in adults (4) –Stage

1: Laboratory confirmation of HIV infection, no AIDS-defining conditions and CD4+ T lymphocyte count of≥500 cells/µL or CD4+ T lymphocyte percentage of total lymphocytes of ≥29.Stage.

2: Laboratory confirmation of HIV infection, no AIDS-defining condition, and laboratory confirmation of HIV infection and CD4+ T lymphocyte count of 200-499 cells/µL or CD4+ T lymphocyte percentage of totally mphocytes of 14-28.Stage.

3: (AIDS): Laboratory confirmation of HIV infection and CD4+ T lymphocyte count is <200 cells/µL.

or CD4+ T lymphocyte percentage of total lymphocytes is<14 or documentation of an AIDS-defining condition (see Box 18-1). Documentation of an AIDS-defining condition supersedes a CD4+ T lymphocyte count of ≥200 cells/µLand a CD4+ T lymphocyte percentage of total lymphocytes of ≥14.Treatment of AIDS often is organized into three major areas: (1) ART, (2) prophylaxis for opportunistic infections, and (3) treatment of HIV related Complications. Medical history, head and neck examination, intraoral soft tissue examination, and complete periodontal and dental examinations should be performed on all new patients before performing any dental procedures. As with other immunosuppressed patients, such as cancer patients, proper nutrition is important. Treating AIDS patients who have painful oral lesions with appropriate analgesics or medicines for oral lesions is especially important as immunosuppression is major factor for these oral lesions to occur.[23] A proper oral examination is of importance because many physicians do not perform thorough intraoral examinations at routine visits. It is the responsibility of the dental practitioner to screen for oral cancer and intraoral lesions that may be indicative of HIV, oral disease, or oral/perioral signs of other

systemic diseases. The oral manifestations of AIDS include Candidiasis, Angular chelitis, Histoplasmosis, Cryptococcosis linear gingival erythema, necrotizing ulcerative periodontitis, necrotizing stomatitis, actinomycosis, herpes simplex, hairy leukoplakia, oral warts, kaposi's sarcoma, facial palsy, trigeminal neuropathy, recurrent thrombocytopenic purpura, recurrent aphthous ulcers, salivary gland enlargement, xerostomia that may lead to dental caries, melanoticpigmentation.[24] Thus, proper oral screening and their management is the duty of dentist, besides this before doing invasive procedure its better to consult with patient's physician to know about the current viral load and CD4count of the patient. Also, dentist must follow the universal precautions for the prevention and if got exposed he should take chemo-prophylactic therapy. Universal precautions are –Washing your hands often. Using protective barriers such as gloves, gowns/aprons, masks for direct contact with blood and other body fluids.Safe collection and disposal of needles and sharps(sharps boxes required for this).Following the correct procedures for a needle–stick injury (the area should be washed out with soap and water, dispose the needle safely (in case you injure yourself again),go & get assessed for PEP. Covering all cuts and abrasions with waterproof dressings. Use of disposable instruments for examining and doing procedures as far as possible. Cleaning up spills of blood and other body fluids with bleach. Use a separate mop for body fluid spillages and dispose carefully of all equipment (cloths etc.) used to cleanup the spillage.

Chapter Three

Material and method

Material and method

We collected data by reviewing cases at specialized dental centers in Babylon Governorate (Dr. Abbas Al-Muwaffaq Center). These cases numbered 120, comprising 60 males and 60 females, ranging in age from 6 to 74 years. Of these cases, 37 suffered from heart disease (hypertension and anemia), and 19 suffered from diabetes, and 3 cases were pregnant. The doctor encountered only one case of viral infection; this patient had hepatitis B. All these cases are detailed in Table 1, 2.

No	Sex	Age	Medically compromised patients	Preventive measure
1	Male	51	Hypertension	measuring b. p.
2	Male	47	Hypertension	measuring b. p.
3	Male	62	Hypertension	measuring b. p.
4	Male	66	Hypertension	measuring b. p.
5	Male	59	Hypertension	measuring b. p.
6	Male	32	Hypertension	measuring b. p.
7	Male	47	Hypertension	measuring b. p.
8	Male	65	Hypertension	measuring b. p.
9	Male	53	Hypertension	measuring b. p.
10	Male	39	Hypertension	measuring b. p.
11	Male	72	Hypertension	measuring b. p.
12	Male	54	Hypertension	measuring b. p.
13	Male	38	Hypertension	measuring b. p.
14	Male	74	Hypertension, Diabetes type 1	measuring b. p. and s. l.
15	Male	66	Hypertension, Diabetes type 1	measuring b. p. and s. l.
16	Male	49	Hypertension, Diabetes type 2	measuring b. p. and s. l.
17	Male	53	Hypertension, Diabetes type 2	measuring b. p. and s. l.
18	Male	47	Hypertension, Diabetes type 2	measuring b. p. and s. l.
19	Male	67	Hypertension, Diabetes type 1	measuring b. p. and s. l.
20	Male	72	Hypertension, Diabetes type 1	measuring b. p. and s. l.

Table 1 Posterior teeth Extraction in Medically compromised patients

No	Age	Sex	Medically compromised patients	Preventive measure
21	Male	55	Hypertension, Diabetes type 1	measuring b. p. and s. l.
22	Male	53	Hypertension, Diabetes type 1	measuring b. p. and s. l.
23	Male	71	Hypertension, Diabetes type 1	measuring b. p. and s. l.
24	Female	64	Hypertension, Diabetes type 1	measuring b. p. and s. l.
25	Female	54	Hypertension, Diabetes type 1	measuring b. p. and s. l.
26	Female	36	Hypertension, Diabetes type 1	measuring b. p. and s. l.
27	Female	66	Hypertension, Diabetes type 1	measuring b. p. and s. l.
28	Female	58	Hypertension, Diabetes type 1	measuring b. p. and s. l.
29	Female	47	Hypertension, Diabetes type 2	measuring b. p. and s. l.
30	Female	42	Hypertension, Diabetes type 2	measuring b. p. and s. l.
31	Female	40	Hypertension	measuring b. p.
32	Female	44	Hypertension	measuring b. p.
33	Female	56	Hypertension	measuring b. p.
34	Female	52	Hypertension	measuring b. p.
35	Female	27	Anemia	K. the p. of b. in the b.
36	Female	34	Anemia	K. the p. of b. in the b.
37	Female	30	Anemia	K. the p. of b. in the b.
38	Female	6	Hemophilia	DNA analysis
39	Female	33	Hemophilia	DNA analysis
40	Female	29	Hemophilia	DNA analysis
41	Male	31	Diabetes type 1	measuring s. l.
42	Female	46	Diabetes type 2	measuring s. l.
43	Male	43	HIV B	Test HIV

Table 1 Posterior teeth Extraction in Medically compromised patients

We observed and studied all the above cases by finding an answer to the questions and explaining the impact caused by common health problems such as high blood pressure, anemia, diabetes, viral diseases such as viral hepatitis, and also general conditions such as pregnancy, the impact percentage of which we showed in the results:

The questions that are important for us to answer in this research are:

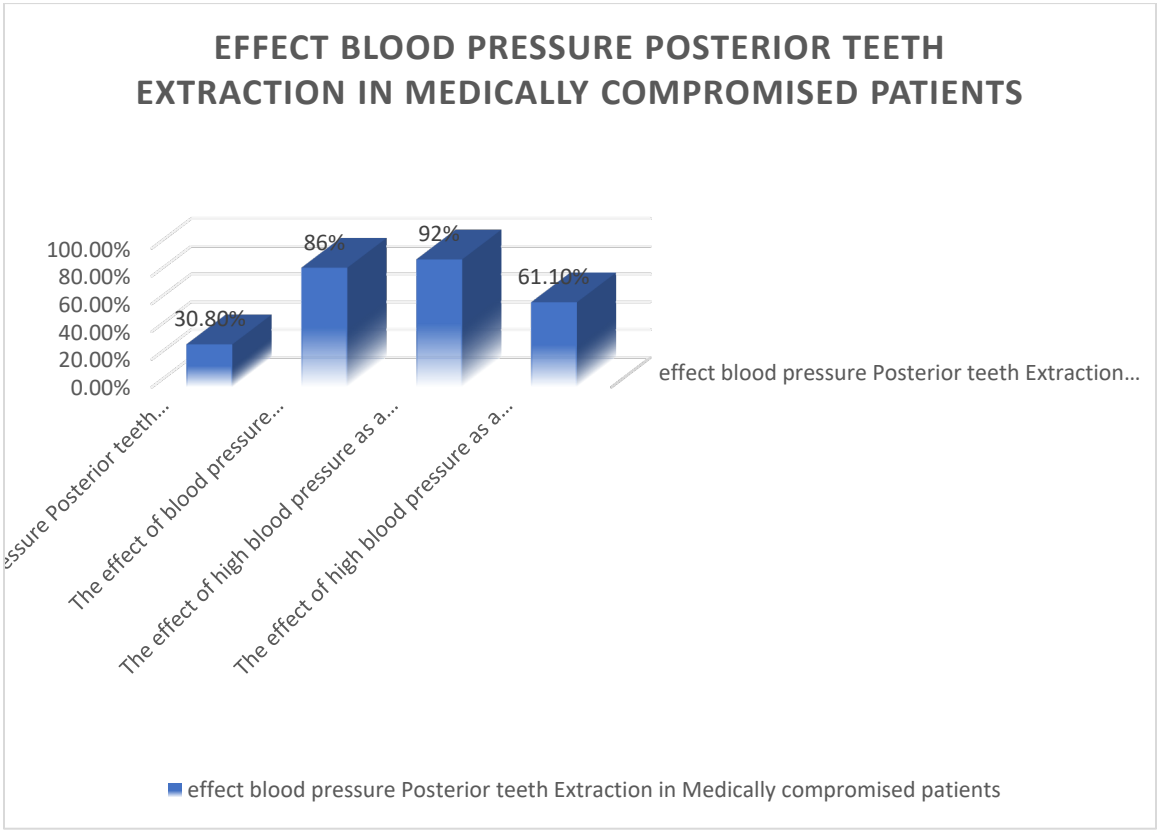
- What is the primary aim of this study regarding posterior teeth extraction in medically compromised patients?
- What criteria were used to define “medically compromised patients” in this study?
- How were patients medically evaluated before posterior teeth extraction?
- What pre-operative management strategies were applied for different medical conditions?
- What post-operative instructions were given to medically compromised patients?
- What primary and secondary outcome variables were assessed?.
- What statistical tests were used to analyze the data?

Chapter four

Result, Discussion

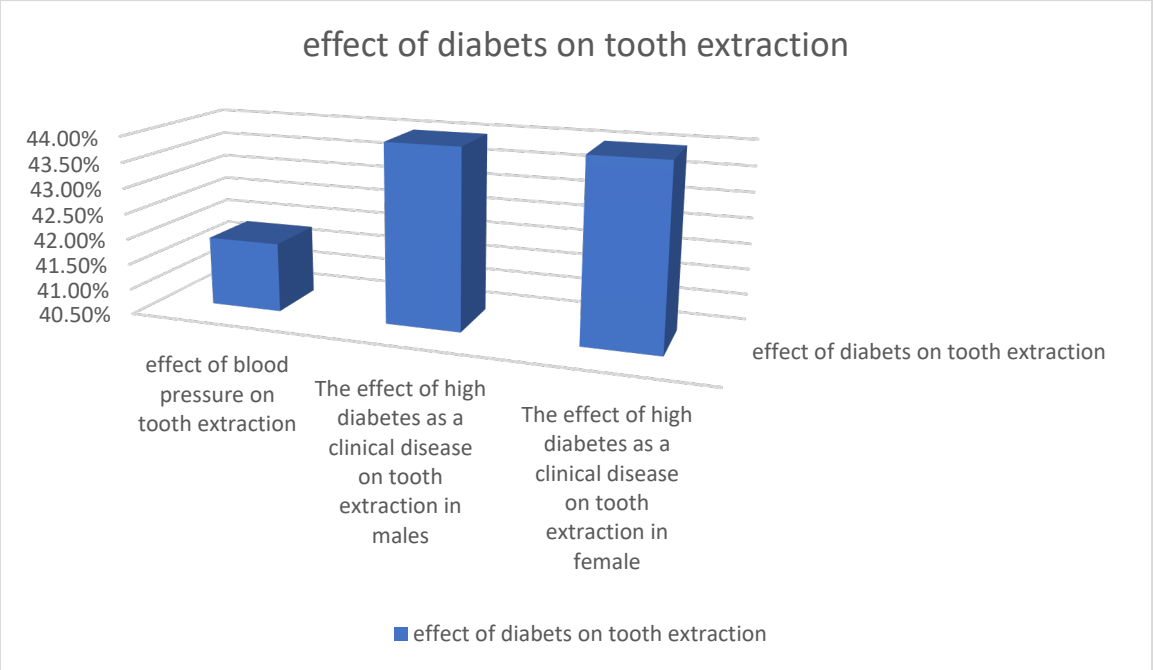
Result:

We analyzed the data to find the percentage of the effect of clinical disease on the extraction of back teeth. We found that the percentage of their effect (43 cases) is 35.83%. We found that the highest clinical disease affecting extraction is blood pressure, and its percentage (37 cases) was 30.8% of the general effect on extraction and 86% of the clinical factors in general. Its percentage for males was higher than for females, and for older people it was higher than for younger people. The percentage of the effect of blood pressure on the extraction of back teeth for males was 92% of the clinical diseases, and its percentage for females was 61.1% of the clinical diseases.



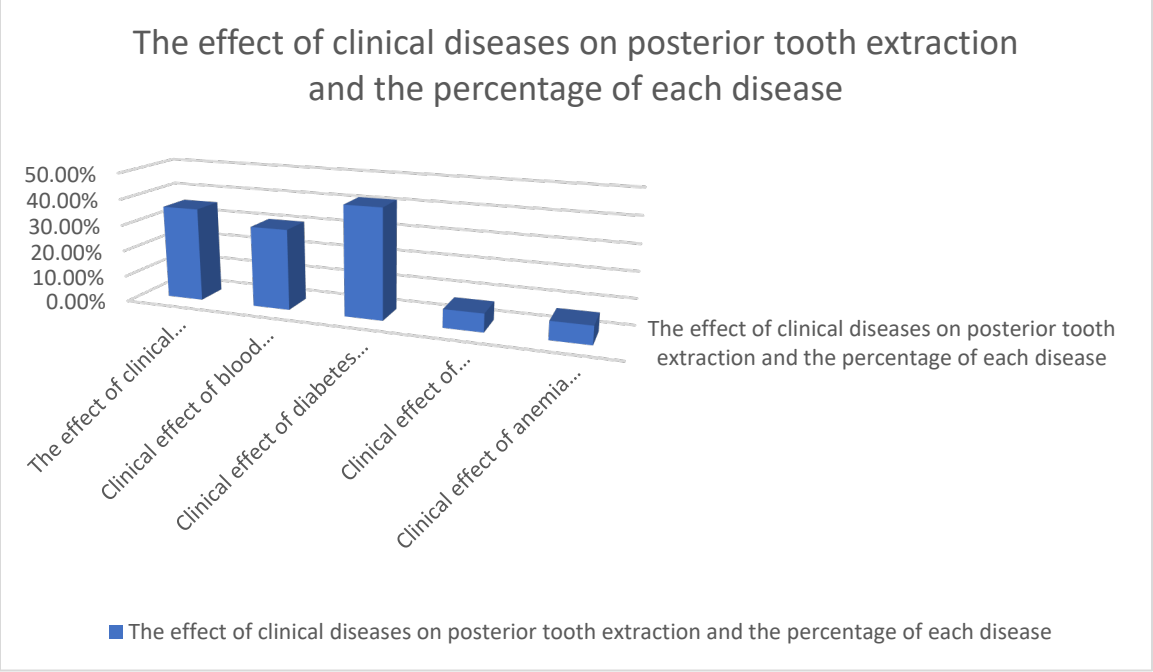
Figs 1 effect blood pressure teeth extraction

Following high blood pressure is diabetes, which is also common and one of the clinical diseases that affect tooth extraction in general. Therefore, it should be measured before any surgical procedure. The percentage of the effect of diabetes in general was 41.86% of the total clinical diseases that affect extraction. There were two types, type 1 and type 2, and both types were found in both sexes, females and males. The percentage of the effect of type 1 with respect to diabetes was 76.47% and the percentage of the effect of type 2 with respect to diabetes was 35.29% and the effect of diabetes in general with respect to the rest of the clinical diseases on males was 44% and its effect on females in general with respect to the rest of the clinical diseases was 44%.



Figs 2 Effect of diabetes on posterior tooth extraction

The incidence of anemia was 6.97%, while the incidence of hemophilia was also 6.97%, among the clinical conditions affecting posterior tooth extractions. The incidence of viral hepatitis was 2.32% among the clinical conditions.



Figs 3 The effect of clinical diseases on posterior tooth extraction and the percentage of each disease

Two cases of hemophilia were identified; the patient informed the dentist of his condition, while the other case was discovered recently due to excessively long bleeding episodes.

Discussion:

Our results suggest that it is difficult to predict patient returns due to complications using machine learning methods. Dental practitioners had better overall performance than the best model at predicting which patients did and did not require a follow-up appointment, suggesting clinical judgment outperforms data driven methods currently. For example, to achieve a recall of 0.53, the best model recommended a follow-up appointment for 46% of the population-this high false-positive rate would lead to greater financial costs and inefficiencies in clinical practice. The poor performance of risk prediction models may be due to a combination of an imbalanced dataset, small sample size with insufficient within-

class examples, unmeasured confounders, or a limitation in the way patient data is captured in EDRs.[27]

In comparison to similar studies predicting complications associated with dental extractions, we found that these studies predicted specific complications, including bisphosphonate-related osteonecrosis, cardiac event, paraesthesia, and oroantral communication, rather than all-cause complications as in the present study. [20-23] The recall scores in these studies ranged from 0.05 to 1.00, compared to 0.00 to 0.53 here. The sampled population ranged from 125 to 833 patients compared to 14,541 patients here, and the cohort with complications ranged from 21% to 33% of the sampled population compared to 3.4% of the sampled population here. These studies also had access to aspects of patient medical history and vital signs as structured data that we did not have access to, but may have been available in the clinical notes. For example, the type and duration of antiresorptive medication or blood pressure at the time of the dental extraction.[28]

The descriptive analysis findings for patients who returned due to complications aligned with the current evidence of risk factors for dental extraction complications. [1] Despite this, the secondary use of EDR data as the basis of this research to develop a risk prediction model presents challenges, as it is primarily collected for billing, clinical administration, and medicolegal documentation. Consequently, other risk factors in the literature that may have been important features were not captured as structured data and may have been inconsistently recorded in the clinical notes.

Examples include severity and duration of immunosuppression, oral hygiene assessment at the time of the dental extraction, extraction complexity measured by root morphology and degree of impaction, or procedure duration.

Much of what is currently known about complications from a dental extraction comes from observational studies. Observational studies have produced conflicting evidence for some patient factors associated with complications, such as sex, glycaemic control in diabetic patients, or oral contraceptive pills. [1] Novel methods to collect data in patient records may address the problem of lead to identification of new risk factors to include as features for improvement in model performance.

The complexity of case mix and teaching considerations may have contributed to the differences in performance between oral surgeons, general dentists, and dental

students for scheduling follow-up appointments. Oral surgeons are most likely to treat patients with higher case complexity and may have a practice of scheduling follow-up appointments for most of their patients as high complexity patients are more likely to experience complications.[27] Dental students typically treat relatively lower complexity patients, but may schedule follow-up appointments for most of their patients to learn to clinically differentiate normal wound healing without complications from a wound with complications. All types of dental practitioners performed better than the best model, indicating that a clinical decision support system to schedule follow-up to improve current clinical workflow efficiencies without predictor variables in EDRs. to the availability and granularity of improvements to the EINments is unlikely Based on our findings, we recommend additional research in developing and evaluating risk prediction models with larger datasets that include sufficient minority class examples. Future research should explore the use of pre-trained language models like Bidirectional Encoder Representations from Transformers, as the contextual embeddings may lead to improved performance.[29] Addressing class imbalance using alternative techniques, such as Synthetic Minority Over-sampling Technique, cost-sensitive learning, or hybrid methods, may yield marginal performance gains. [38-40] Clinically meaningful improvements in performance, however, are likely to come from methods to standardise how risk factors are captured in EDRs. Further, investigation of novel methods to capture new data in patient records may lead to identification of other risk factors not included in this study.

This study had several limitations. Pre-operative radiographic images of the teeth that were extracted were not included but may have been useful features. Feature selection and feature engineering was specific to the data available in the EDR systems in NBMLHD clinics.

Consequently, the results may not generalise to other public dental clinics or private practice dental clinics; external validation is essential before clinical deployment.

Conclusion:

Posterior teeth extraction in medically compromised patients presents significant clinical challenges due to the complex anatomy of posterior teeth and the presence of systemic conditions that increase the risk of intra- and postoperative complications. Conditions such as cardiovascular disease, diabetes mellitus, bleeding disorders, renal and hepatic impairment, and immunosuppression can adversely affect healing, hemostasis, infection control, and patient tolerance to stress and medications.

Successful management depends on a thorough preoperative assessment, including detailed medical history, consultation with the patient's physician when indicated, and appropriate laboratory investigations. Individualized treatment planning, stress-reduction protocols, careful selection and dosage of local anesthetics and medications, and meticulous surgical technique are essential to minimize complications. Intraoperative vigilance for bleeding, infection risk, and medical emergencies, combined with atraumatic extraction methods, can significantly improve outcomes.

Postoperative care is equally critical and should emphasize effective pain control, infection prevention, monitoring of systemic status, and clear patient instructions tailored to the underlying medical condition. With proper interdisciplinary collaboration, evidence-based protocols, and clinician awareness of systemic–oral interactions, posterior tooth extraction in medically compromised patients can be performed safely and predictably. Ultimately, a patient-centered, risk-oriented approach enhances both surgical success and overall patient safety.

Recommendation:

1. Obtain a detailed medical history, including current diagnoses, medications, allergies, and previous surgical or anesthetic complications.
2. Assess vital signs and request relevant laboratory investigations (e.g., INR for anticoagulated patients, HbA1c for diabetics, renal function tests when indicated).
3. Consult the patient's physician or specialist for risk stratification and optimization of systemic conditions prior to extraction.
4. Classify patients according to medical risk (e.g., ASA classification) and tailor the surgical approach accordingly.
5. Schedule short, stress-free appointments, preferably in the morning, and use stress-reduction protocols for anxious or cardiovascular patients.
6. Consider staged extractions rather than multiple posterior extractions in a single visit for high-risk individuals.
7. Review all medications for potential drug interactions and bleeding risks.
8. Adjust or avoid vasoconstrictors in patients with uncontrolled hypertension or significant cardiac disease.
9. Coordinate anticoagulant or antiplatelet therapy management with the treating physician rather than discontinuing medications indiscriminately.
10. Use antibiotics judiciously, reserving prophylaxis for patients with clear indications (e.g., high-risk cardiac conditions, severe immunosuppression).

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