# Dental Management of Patient with Anaemia

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# RED BLOOD CELL MORPHOLOGY

**Hypochromic**:

A descriptive term applied to a red blood cell with a decreased concentration of hemoglobin.

**Normochromic**:

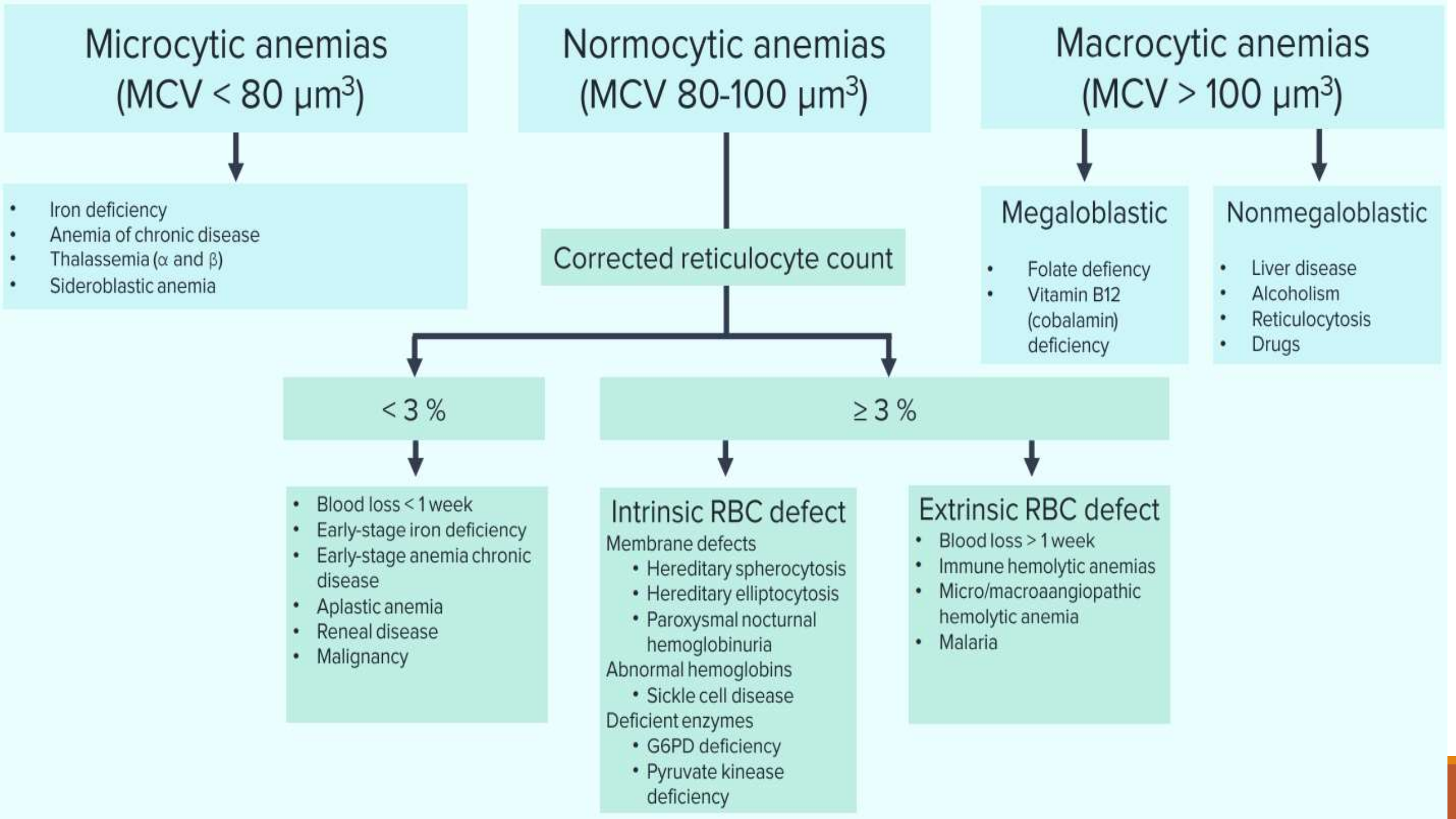
A descriptive term applied to a red blood cell with a normal concentration of hemoglobin.

**Normocytic**:

A descriptive term applied to normal size of RBC

**Macrocytic**:

A descriptive term applied to a larger than normal red blood cell.


Microcytic anemias
(MCV < 80 μm3)
Normocytic anemias
(MCV 80-100 μm3)
Macrocytic anemias
(MCV > 100 μm3)
Iron deficiency
Anemia of chronic disease
Thalassemia (α and β)
Sideroblastic anemia
Corrected reticulocyte count
Megaloblastic
Folate defiency
Vitamin B12 (cobalamin) deficiency
Nonmegaloblastic
Liver disease
Alcoholism
Reticulocytosis
Drugs
< 3 %
≥ 3 %
Blood loss < 1 week
Early-stage iron deficiency
Early-stage anemia chronic disease
Aplastic anemia
Reneal disease
Malignancy
Intrinsic RBC defect
Membrane defects
Hereditary spherocytosis
Hereditary elliptocytosis
Paroxysmal nocturnal hemoglobinuria
Abnormal hemoglobins
Sickle cell disease
Deficient enzymes
G6PD deficiency
Pyruvate kinease deficiency
Extrinsic RBC defect
Blood loss > 1 week
Immune hemolytic anemias
Micro/macroaangiopathic hemolytic anemia
Malaria

# Deficiency anaemias

## IRON DEFICIENCY

CAUSES :

- chronic blood loss (e.g. menorrhagia in premenopausal women; GI bleeding in older people).
- Poor iron intake and iron malabsorption are infrequent causes.

CLINICAL FEATURE:

- brittle nails and hair,
- koilonychia,
- atrophic glossitis,
- mouth ulcers and angular cheilitis.

MANAGEMENT

- depends largely on identification and treatment of the cause.
- Iron deficiency is corrected by giving enough iron to correct the anaemia (usually improvement of 1 gm/dL per week of treatment).

# Deficiency anaemias

## VITAMIN B 12 DEFICIENCY

**CAUSES**

- malabsorption due to lack of intrinsic factor (pernicious anaemia or gastrectomy),
- less frequently by dietary deficiency
- malabsorption in the terminal ileum (e.g. Crohn's disease).
- Chronic exposure to NO 2 may impair vitamin B 12 metabolism.

**CLINICAL FINDINGS**

- Neurological complications such as paranesthesia of extremities may occur if untreated.

**TREATMENT** is with vitamin B 12 (hydro-xocobalamin) 1 mg IM every 3 months.

# Deficiency anaemias

## FOLATE DEFICIENCY

**CAUSES**

intake (poor diet ± Abuse alcohol)
Other causes(e.g. pregnancy, malignant disease, haemolysis),
Malabsorption,
Folate antagonist drugs (e.g. methotrexate, trimethoprim).

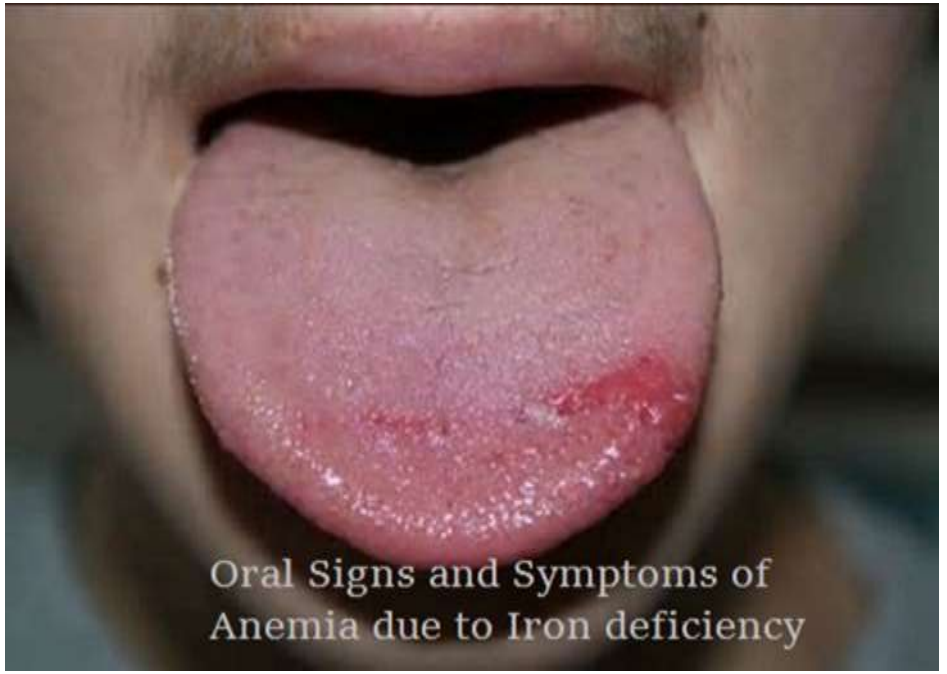
T**REATMENT** is folic acid 5 mg daily for 4 months.

# Oral manifestation of Deficiency anaemias

Associated with oral mucosal lesions, such as:

- Sore or burning tongue (smooth tongue no papilla; often normal Hb)
- Moeller's glossitis (a pattern of red lines; may resemble erythroplakia)
- Atrophic glossitis (red, glossy, smooth and sore; severe anaemia)
- Plummer Vinson syndrome (glossitis and dysphagia; risk of oral and post-cricoid cancer; mainly seen in northern European women)
- Candidiasis (especially chronic mucocutaneous; iron deficiency)
- Angular cheilitis (usually associated with Candida albicans)
- Ulcers (especially late onset; folate deficiency)


Anemia symptoms


Oral Signs and Symptoms of
Anemia due to Iron deficiency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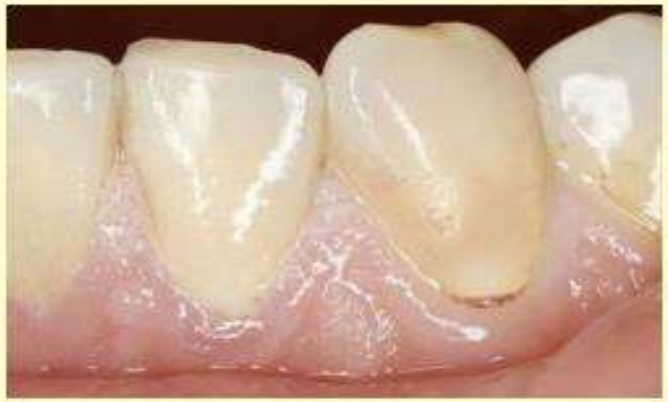
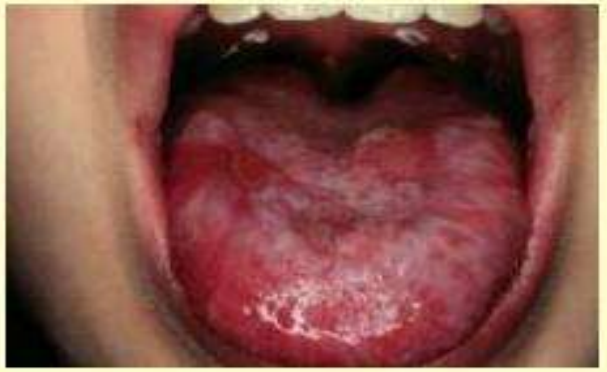
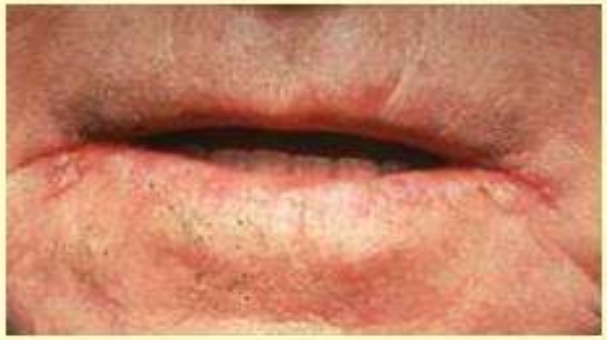
# Oral signs of anemia





Oral leukoplakia in aplastic anemia



Cheilosis

# Haemolytic anaemias

## Sickle cell anaemia

Sickle cell trait describes a condition in which a person **has one abnormal allele** [**allele: is a variant form of a given gene, meaning that it is one of two or more versions of a known mutation at the same place on a chromosome**] **of the hemoglobin beta gene (is HETEROZYGOUS),** but does not display the **severe symptoms of sickle cell disease that occur in a person who has two copies of that allele (is HOMOZYGOUS).**

Those who are heterozygous for the sickle cell allele produce both normal and abnormal hemoglobin (the two alleles are codominant with respect to the actual concentration of hemoglobin in the circulating cells).

# Haemolytic anaemias

## Sickle cell anaemia

is hereditary, found mainly in patients originating from Africa, Mediterranean countries and Asia. It is characterized by abnormal haemoglobin, HbS.

- Sickle cell anaemia: may be dangerous, particularly in the homozygous form (sickle cell disease), because at low oxygen tensions (about 45 mmHg), the red cells become inelastic, sickle-shaped cause blocking capillaries and causing infarcts (e.g. in bone marrow and brain), rupture, causing haemolysis.

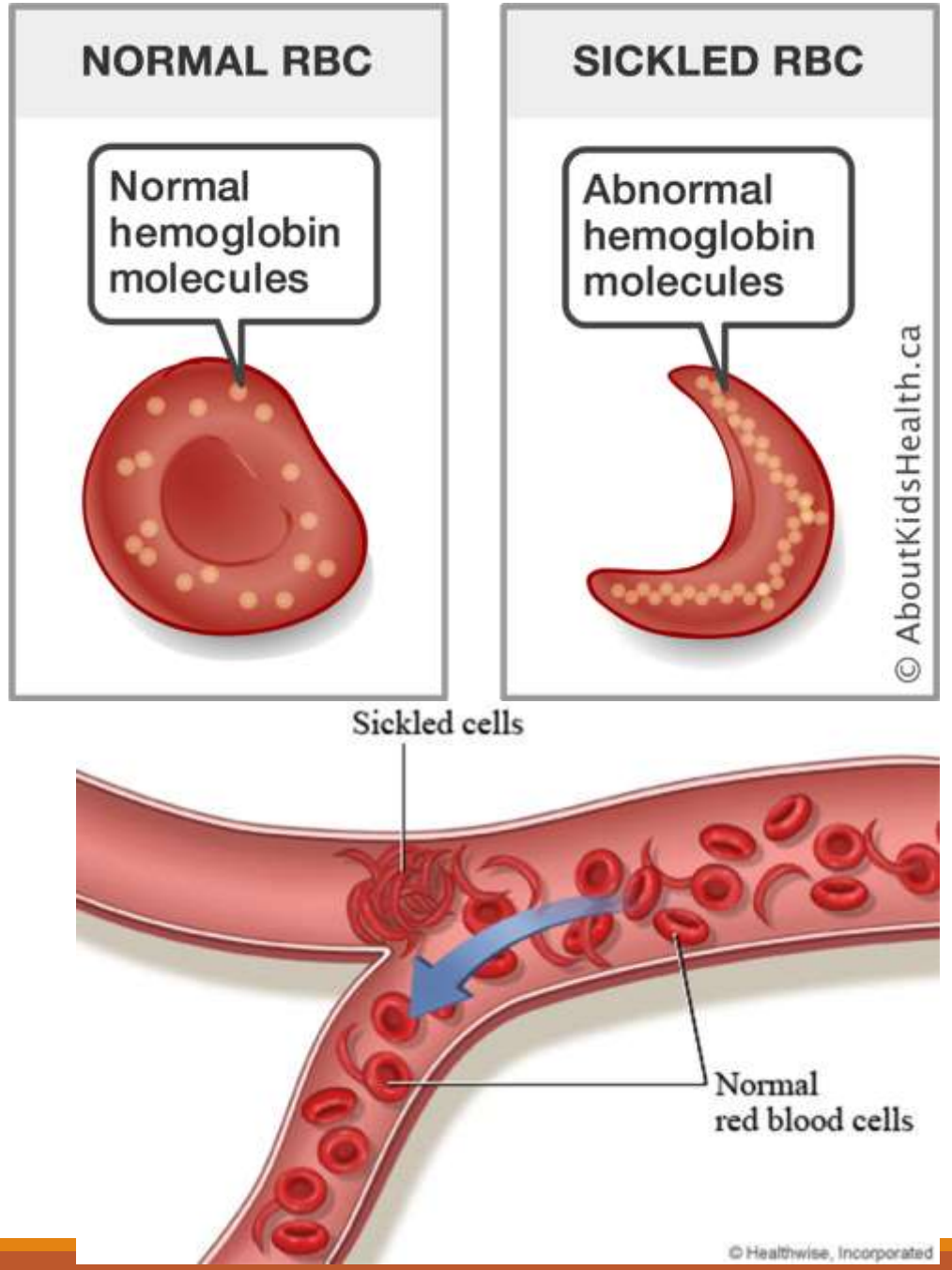
- A thrombotic sickle crisis (typically presenting with bone and abdominal pain) may be precipitated by: hypoxia, infection, cold or dehydration.

- A crisis is usually managed with strong analgesics, O 2 , IV fluids and antibiotics.
  Haemolysis presents with anaemia, jaundice and splenomegaly.

- Blood transfusions are occasionally needed.

- In the heterozygous form (sickle cell), where there is HbS along with normal Hb (HbA), sickling occurs only at much lower O 2 tensions (<20 mmHg), uncommon in normal clinical practice.


• Lethargy
• Fatigue
• Malaise/depression
• Angina
• impaired cognition
• impaired immune system
• Anorexia
• Intolerance to cold
• Endocrine/ metabolic abnormalities
• Cardiorespiratory disturbances
• Gastrointestinal disturbances
• Tendency toward bleeding
• Reduced exercise tolerance
• Weakness
• Shortness of breath
• Exertional chest pain
• Impaired concentration
• Impaired libido/ impotence
• Insomnia
• Headache
• Pallor
• Neuromuscular disturbances
• Cutaneous disturbances
• Musculoskeletal symptoms
• Pruritus


NORMAL RBC
Normal hemoglobin molecules
SICKLED RBC
Abnormal hemoglobin molecules
© AboutKidsHealth.ca
Sickled cells
Normal red blood cells
© Healthwise, Incorporated

# Haemolytic anaemias

**THALASSAEMIA**

- is a hereditary condition affecting mainly people from the Mediterranean and South Asia (thalassa: Greek for sea).

- Patients with homozygous thalassaemia present with severe anaemia from infancy, failure to thrive and expanded haemopoietic tissues (hepatomegaly, facial and skull bone enlargement).

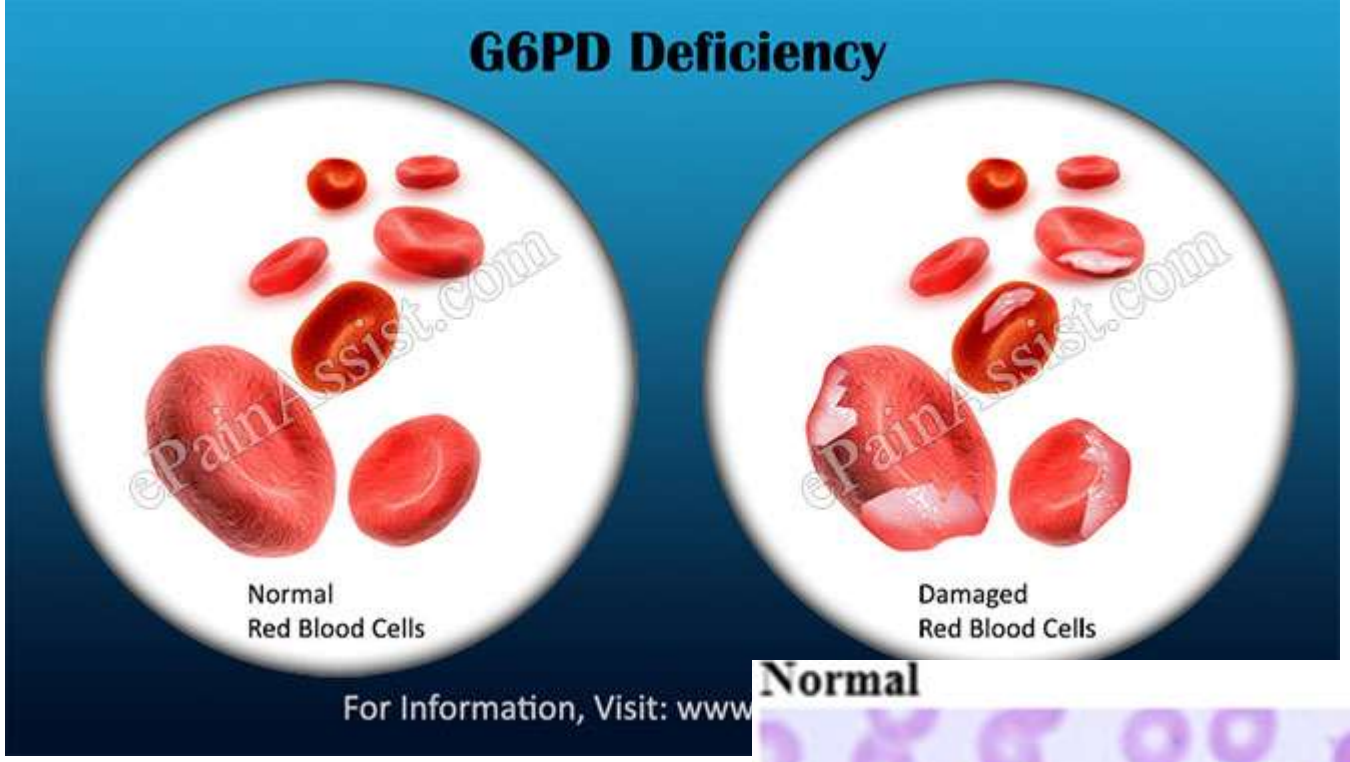
**MANAGEMENT** involves

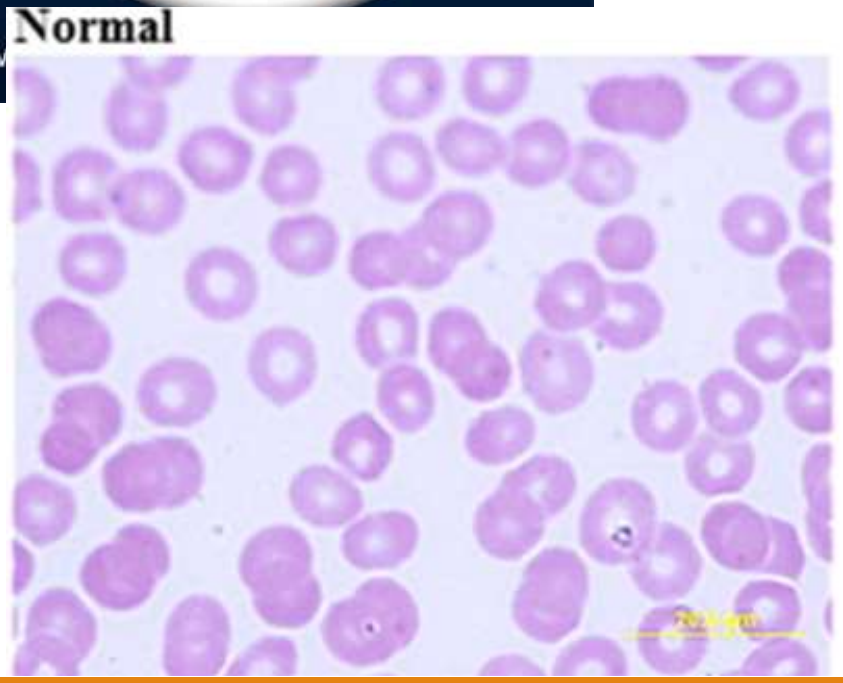
- Frequent transfusions,
- Iron-chelators (e.g. desferrioxamine mesilate or deferiprone, to delay damage from iron deposition
- Splenectomy.

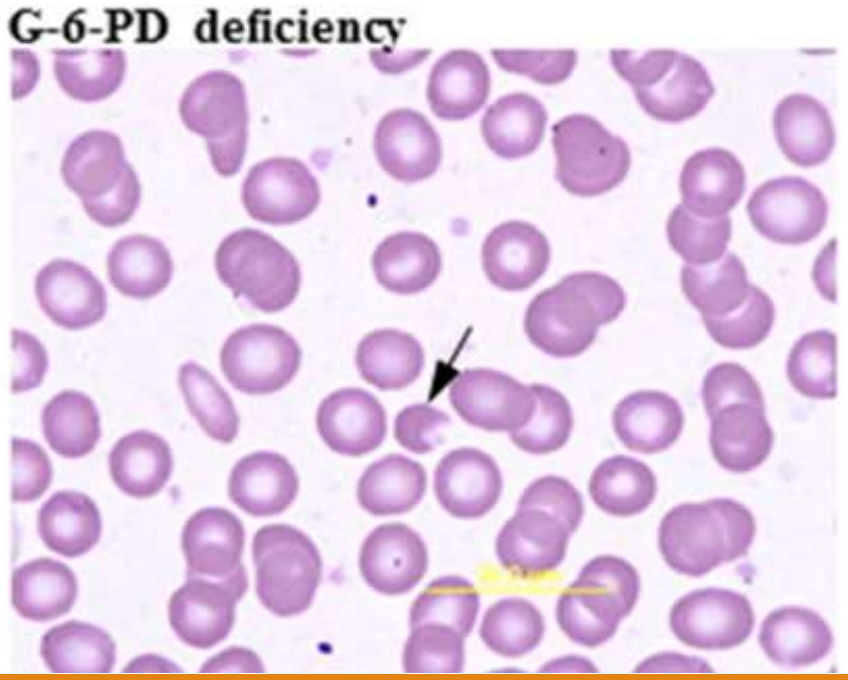
# Haemolytic anaemias

Other haemolytic anaemias include :

- malaria,
- glucose-6-phosphate dehydrogenase (G6PD) deficiency,
- hereditary spherocytosis,
- haemolytic anaemia of the newborn (maternal fetal blood group ABO or Rhesus incompatibility)
- autoimmune haemolytic anaemia.


G6PD Deficiency
Normal
Red Blood Cells
Damaged
Red Blood Cells
For Information, Visit: www


Normal


G-6-PD deficiency

# Aplastic anaemia

Aplastic anaemia is due to bone marrow failure, with RBC, WBC and Plt.

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**CAUSES** : It is usually idiopathic, but can be

- congenital,
- Secondary to cytotoxic druges , chloramphenicol , NSAIDs , immunosuppressants),
- chemicals,
- viruses or radiation.
- Pancytopenia may also be the feature of bone marrow infiltration (e.g. by leukaemia or myeloma).

**CLINICALY**

Anaemia, susceptibility to infections and bleeding tendency may manifest.

**MANAGEMENT** involves

- removal of any possible causes,
- protection from or treatment of bleeding or infection,
- bone marrow transplantation (haematopoietic stem cell transplantation; HSCT)

# Oral manifestation of Haemolytic & Aplastic anaemias

- Susceptibility to infection
- Bleeding tendency
- Effects of corticosteroid therapy
- Hepatitis B and other viral infections (from contaminated blood)
- Problems associated with bone marrow transplantation
- Painful mucositis, parotitis or sinusitis (complications of immunosuppression, cytotoxic treatment and radiotherapy)
- Lichenoid reactions or xerostomia
- Gingival swelling (from cyclosporine)

# Anaemia of systemic disease

Anaemia may be a feature of systemic diseases, such as

- malignancy,
- connective tissue diseases,
- chronic inflammatory diseases,
- liver disease,
- renal disease
- hypothyroidism,
- hypopituitarism

**TABLE 23-2 -- Laboratory Assessments to Aid in the Diagnosis of Anemia** [*]

| | Type | Tests to Discriminate Types of Anemia |
|---|---|---|
| Microcytic anemia | Iron deficiency | Serum iron, ferritin, total iron binding capacity (TIBC), transferrin saturation, bone marrow aspirate. Also, stool examination for occult blood |
| Macrocytic anemia | Folate deficiency | CBC, serum folate level |
| Macrocytic anemia | Pernicious anemia | CBC, serum vitamin $B_{12}$ (cobalamin) assay levels, Schilling's test, serum antiparietal cell, and intrinsic factor antibodies |
| Normocytic anemia | G-6-PD | Staining peripheral blood smear with methyl or crystal violet, cyanide-ascorbate assay, qualitative (fluorescent spot) test and quantitative test for G-6-PD, reticulocyte count, indirect bilirubin levels |
| Normocytic anemia | Sickle cell anemia | Sickledex, high-performance liquid chromatography, hemoglobin electrophoresis, reticulocyte count, indirect bilirubin levels |
| Normocytic anemia | Aplastic anemia | Erythropoietin levels, bone marrow aspirate |

# Treatment Planning for Dental procedures in Anaemic Patients:

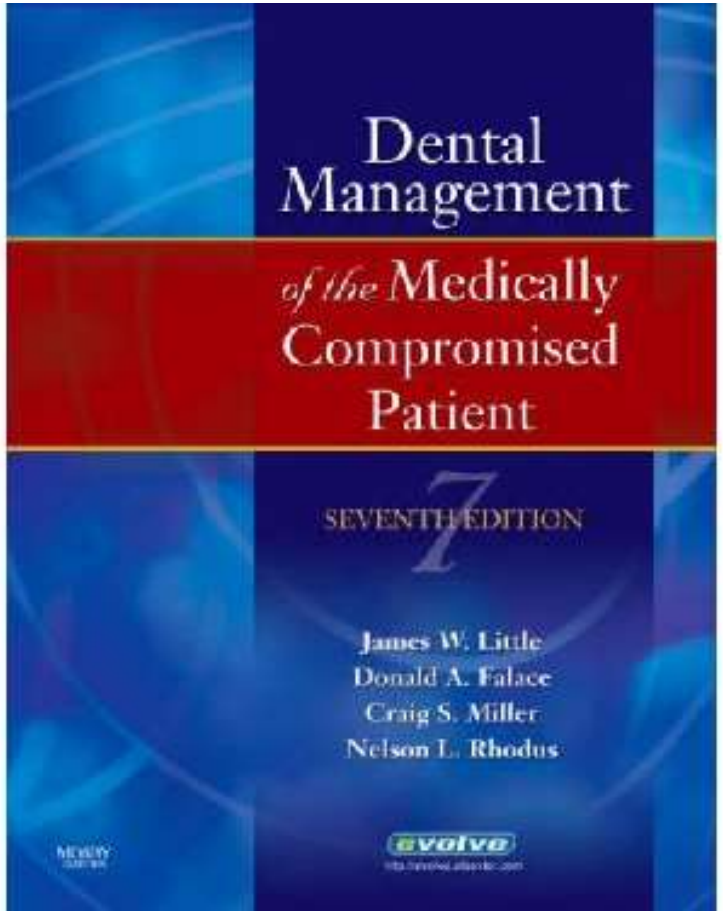
Any Dental procedures which involve Surgical approach should not be performed without making note of **CBC (Complete blood count) and Hemoglobin values**.

The **Haemoglobin values should be more than 10 g/dl** for the patient to undergo any Dental procedure which is Surgical in nature.

## Dental Management of the Patient With Sickle Cell Anemia

1. Confirm with patient's physician that the condition is stable.
2. Arrange short appointments.
3. Avoid long and complicated procedures.
4. Maintain good dental repair.
5. Institute aggressive preventive dental care.
    a. Oral hygiene instruction
    b. Diet control
    c. Toothbrushing and flossing
    d. Fluoride gel application
6. Avoid oral infection; treat aggressively when present.
7. Use pulse oximeter, maintain $O_2$ saturation above 95%.
8. Use local anesthetic without epinephrine for routine dental care. For surgical procedures, use 1:100,000 epinephrine in local anesthetic.
9. Avoid barbiturates and strong narcotics; sedation may be attained with diazepam (Valium).
10. Use prophylactic antibiotics for major surgical procedures.
11. Avoid liberal use of salicylates; control pain with acetaminophen and codeine.
12. Use nitrous oxide–oxygen with greater than 50% oxygen, high flow rate, and good ventilation.

# REFERENCE


Dental
Management
of the Medically
Compromised
Patient
SEVENTH EDITION
7
James W. Little
Donald A. Falace
Craig S. Miller
Nelson L. Rhodus
evolve

# THANK YOU