f. Translucency (transmission of light through swelling)
- Positive: Clear fluid and their transparent walls.
- Negative: Wall thick, turbid liquid (blood or pus or lymph)

g. Reducibility: Can disappear completely and reappears by straining or coughing.
- Hernia
- Varicocele

h. Compressibility (swelling on pressure reduces in size, but only partially. It does not disappear completely).
- Hemangiomas

i. Pulsatility

j. Fixity to skin
- Fixed to skin cannot be lifted.
- Skin moves over swelling.

3. Percussion

Not needed

4. Auscultation

Look for any bruit over pulsating swelling.

a. **Color**
- Arterial haemangioma: Bright red
- Venous haemangioma: Purple
- Malignant melanoma: Black
- Benign naevus: Black
- Ranula: Bluish

b. **Skin overlying swelling**
- Red and edematous: Inflammatory
- Black punctum: Sebaceous cyst
- Pigmentation: Moles, naevi
- Scar
- Ulcers

c. **Surface**
- Smooth: Cystic swelling
- Lobular: Lipoma
- Nodular: Multinodular
- Matted: Lymph nodes
- Irregular: Carcinoma

d. **Edge**
- Well-defined and irregular: Benign neoplasm
- Well-defined and irregular: Neoplasm
- Ill-defined and diffuse: Inflammatory swelling

e. **Consistency**
- Soft: Lipoma
- Cystic: Chronic abscess
- Firm: Fibroma
- Bony hard: Osteoma
- Variable consistency: Malignancy

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TABLE 2.1: Normal values for various blood component counts, hematological indices, and bleeding and clotting investigations and the conditions affecting them (*Contd.*)

Sr. no.	*Parameter*	*Normal value*	*Increased*	*Decreased*
5.	▪ Mean corpuscular hemoglobin (MCH)	▪ 27–32 pg/cell	▪ Macrocytic anemia	▪ Microcytic anemia
6.	▪ Mean corpuscular hemoglobin ▪ Concentration (MCHC)	▪ 31–37 gm/dl	▪ Macrocytic anemia	▪ Microcytic anemia
7.	Reticulocyte count	▪ Infants at birth: 2–6% ▪ Children up to 5 years: 0.2–5% ▪ Adults: 0.2–2%	▪ Iron supplementation ▪ Megaloblastic anemia ▪ Hemolytic anemia	▪ Myelosclerosis ▪ Aplastic anemia ▪ Thalassemia ▪ Erythroleukemia ▪ Sideroblastic anemia
8.	Erythrocyte sedimentation rate ▪ The rate at which red blood cells settle out when anticoagulated whole blood is allowed to stand ▪ It is a non specific measure of inflammation	*Westergren's method* ▪ Men under 50 years old: <15 mm/hr ▪ Men over 50 years old: <20 mm/hr ▪ Women under 50 years old: <20 mm/hr ▪ Women over 50 years old: <30 mm/hr *Children* ▪ Newborn: 0–2 mm/hr ▪ Newborn to puberty: 3–13 mm/hr	▪ Inflammation ▪ Pregnancy ▪ Anemia ▪ Autoimmune disorders (such as rheumatoid arthritis and lupus) ▪ Infections ▪ Malignancies such as lymphoma and multiple myeloma	▪ Polycythemia vera ▪ Sickle cell disease ▪ Congestive heart failure
9.	WBC	Total: 4000–11000/mm^3 Differential: ▪ Neutrophils: 35 to 73% ▪ Lymphocytes: 23 to 33% ▪ Monocytes: 2 to 6% ▪ Eosinophils: 1 to 3% ▪ Basophils: 0 to 1%	▪ Infection ▪ Inflammation ▪ Tissue damage from burns ▪ Myeloproliferative disorders ▪ Acute or chronic leukaemia	▪ Old age ▪ Low immunity states—HIV infection ▪ Autoimmune conditions ▪ Bone marrow depression ▪ Chemotherapy and radiotherapy ▪ Malnutrition.
10.	Platelet count	150,000–400,000/ mm^3	▪ Essential thrombocythemia (due to bone marrow hyperactivity)	▪ Leukemia ▪ Aplastic anemia ▪ Viral infections, such as hepatitis C or HIV

Contd.

cytology for the diagnosis of oral mucosal lesions. It is a quick, simple, painless and bloodless procedure.

Indications

- This technique is of utmost value in evaluation of suspected malignancies. (a Papanicolaou stained smear is used generally for this purpose).
- Follow-up detection of recurrent carcinoma in previously treated cases.
- In the diagnosis of certain specific cells in diseases like herpes simplex infection, herpes zoster, pemphigus vulgaris, benign familial pemphigus, keratosis follicularis, hereditary benign intraepithelial dyskeratosis, white sponge nevus, and pernicious and sickle cell anemia.
- Also, studies have been done to determine antioxidant levels and gender determination from exfoliated cells, recently.

Procedure

- The surface of oral lesion is cleaned of debris and mucus.
- The mucosa is stretched and the scraper (metal spatula, moistened tongue blade, cytobrush) is placed on the lesion, pressed firmly and the surface is scraped until a visible quantity of material is collected.
- The collected material is transferred onto a microscopic slide, spread evenly and fixed in a mixture of alcohol and ether before the specimen dries.
- The smear is then stained and examined under the microscope.

Interpretation

The cytologic smear will usually be reported by the cytologist as falling into one of five classes:

- **Class I (normal):** Indicates that only normal cells were observed
- **Class II (atypical):** Indicates the presence of minor atypia but no evidence of malignant changes
- **Class III (indeterminate):** This is an in between cytology that separates cancer from noncancer diagnosis. The cells display wider atypia that may be suggestive of cancer, but they are not clear-cut and may represent precancerous lesions or carcinoma *in situ*. Biopsy is recommended.
- **Class IV (suggestive of cancer):** A few cells with malignant characteristics or many cells with borderline characteristics. Biopsy is mandatory.
- **Class V (positive for cancer):** Cells that are obviously malignant. Biopsy is mandatory.

Aspiration/Fine Needle Aspiration Cytology

This is the procedure whereby small amount of tissue / cells / fluid (in case of cystic lesions) are aspirated from a lesion with the help of a small bore (usually 22 gauge) needle.

Advantages

- It is a safe, economical, outpatient procedure that does not require anesthesia.
- Less traumatic than the conventional biopsy.
- Results can be obtained within an hour
- The procedure is easier to repeat.

Disadvantages

- Not suitable in many non-neoplastic conditions where detailed examination of tissue architecture is necessary for the diagnosis.
- The procedure may produce complications, e.g. bleeding, infection, seeding of tumor cells.

Indications

- Cystic lesions
- Clinically suspicious lymph nodes
- Evaluation of salivary gland tumors.

Procedure

The skin / mucosa above the area is sterilised with an antiseptic solution. A needle of very fine diameter 22–25 gauges on a syringe

which is due to the presence of repetitive phosphate groups in the nucleic acids and is dependent on temperature and the pH. The recommended pH is 6.0–7.0. The temperature should not exceed 30°C above which the metachromatic property diminishes in strength. The TB solution can be prepared in the laboratory or it is also available commercially as ready to use kit, which consists of three component systems. One component is 1% TB solution and the other two are the pre- and post-rinse solutions consisting of 1% acetic acid.

Principle

- The dye attaches to phosphate bonds and the extent of binding depends on the amount of DNA, which is related to number and size of nuclei present in the superficial layers.
- Its use *in vivo* is based on the fact that dysplastic and anaplastic cells contain quantitatively more nucleic acids than normal tissues, shows loss of cell cohesion and increased mitosis.
- In addition, malignant epithelium may contain wider intracellular canals; a factor that enhances penetration of the dye.
- It stains to the depth of 2–10 cell layers, and hence just reflects only the epithelial changes, the invasion into the underlying connective tissue, or the changes in the submucosa cannot be appreciated.

TECHNIQUE OF STAINING

TB can be used in two forms. It is either applied to the site of the lesion with a cotton applicator or it is used as mouth rinse. The procedure of staining is as follows:

- Oral examination
- Rinsing the mouth twice with water for 20 s to remove the debris
- Application of 1% acetic acid for 20 s to remove any ropey saliva
- Application of 1% TB solution for 20 s either with cotton swab when a mucosal lesion is seen or given as a rinse when no obvious lesion is detected
- Application of 1% acetic acid to reduce the extent of mechanically retained stain
- Rinsing oral cavity with water
- Oral examination and recording of the stained areas.

Interpretation

A dark blue (royal or navy) stain of either the entire lesion or a portion of it is considered as positive stain, lack of color absorption by the lesion as negative stain, and light or pale blue staining as doubtful. These cases are usually due to mechanical surface retention or inadequate removal of the stain. False positive dye retention may occur in inflammatory and ulcerative lesions, but false negative retention is uncommon.

Advantages

- TB staining is a simple, quick, noninvasive, and highly cost effective procedure.
- It is used as an adjunctive aid in the detection of premalignant and malignant lesions.
- In selecting biopsy site and in the screening of second primaries of the oral cavity
- And multicentric tumors.
- In obtaining the marginal control of carcinoma, and during the follow-up of treated lesions.

Lugol's Iodine

Lugol's iodine is a solution of elemental iodine. Lugol's solution consists of iodine and potassium iodide.

Principle

- The basic principle with iodine staining is its affinity for carbohydrates and starch in the tissues.
- As the malignancy is associated with reduction in the glycogen content of the tissues, the malignant tissue remains unstained and on the contrary, the normal epithelium gets stained brown or black.

Contents

Section II

Oral Radiology