Normal Anatomy or Oral Pathology

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Introduction

When examining patients, dentists and dental students will encounter many different lumps, bumps, spots and patches. Some of these will be due to oral pathology, but others may be variations of normal anatomy. A systematic approach is key to determining if these are simply variations of normal anatomy or represent true pathology.

The steps in making this determination are to:

1. Accurately describe the area in question;
2. Rule out normal anatomy;
3. Determine if it is a minor condition that does not require treatment;
4. Determine a diagnosis, if it appears to be oral pathology.

Procedure

Step 1: Describing the Area in Question

The first step in differentiating normal anatomy from pathology is to accurately describe the area using the appropriate terminology. The following terms are used to describe the appearance of features that can be observed in oral examinations.

1(a): Shape

1. A macule is a spot. Macules are well circumscribed, flat, and have a different color than the surrounding tissue, such as brown, gray, black, white or red. The term macule is usually used if the area is less than 5 mm in diameter1.

2. A patch is a larger spot. This is also a pigmented area that is non-raised, and is generally greater than 5 mm diameter.
3. A plaque is a slightly raised plateau-like area, and can be pigmented or not.
4. A polyp is a mass of tissue that projects outward from the surface. This is usually on mucous membranes2.
5. A papule is a small slightly raised area less than 5 mm diameter1. It may be pigmented or may be the same color as the surrounding tissue.
6. A nodule is a lump larger than 5 mm. It may be visible or it may be detectable only by palpation (by feeling it).
7. A vesicle is a small blister less than 5 mm diameter. It is raised, well defined and filled with clear fluid.
8. A bulla is a vesicle larger than 5 mm.
9. An ulcer is usually a depressed or crater-like area on the mucosa where there is loss of the surface epithelium. Ulcers often have a yellow-white color due to a fibrinopurulent exudate.
10. An erosion is a shallow ulcer. The epithelium may only be partially destroyed. These often are red in color.
11. A petechia is a punctate haemorrhagic spot approximately 1 to 2 mm diameter. These are often multiple (petechiae).
12. An ecchymosis (bruise) is a flat area of haemorrhage larger than a petechia.
13. A hematoma is a localized collection of blood outside of a blood vessel that may appear raised.

Some of these shapes/appearances can be due to normal anatomy or pathology such as polyps, nodules, macules, or papules, while others are usually due to pathology such as: ulcers, vesicles, or bullae.

1(b): Adding Descriptors to the Shape

The next step is to add descriptors to the shape. You want to accurately describe and record the area so that someone else could picture it without seeing the patient.
Record the:

1. Size – accurately in 2 or 3 dimensions
2. Colour
3. Location
4. Surface texture
5. Consistency (feel)

Step 2: Rule Out Normal Anatomy

2(a). Normal Anatomy

The next step is to know or look up the normal anatomy of the oral cavity and oral pharynx. To call something in the mouth a “lesion” or “oral pathology” you must first ensure that it is not normal anatomy. For instance, there are many polyps in the mouth that are not pathology.

Some examples include:

1. Stensen’s duct and parotid papilla. The Stensen’s duct is the duct of the parotid gland. This opens into the mouth at the parotid papilla. The opening can be flat or polyp-shaped and is located on the posterior buccal mucosa, usually opposite the 2nd maxillary molar3. Milking saliva from this duct confirms that this is the Stensen’s duct.

2. Wharton’s duct is the duct of the submandibular gland. These ducts open into the floor of the mouth via bilateral small papillae on either side of the lingual frenulum (also known as frenum) on the sublingual caruncles.
3. The sublingual glands open into the floor of the mouth in the fold of tissue called the plica sublingualis3.
4. Papillae of the tongue
    1. Filiform papillae are hair-like or thread-like projections on the anterior 2/3 of the dorsum of the tongue. They are usually pink or white in colour. Filiform means “shaped like a thread or filament”3. Fungiform papillae also occur on the dorsum of the tongue, with a higher concentration near the tip. They are mushroom-shaped, and deep red in colour and contain a few taste buds. The fungiform papillae are shorter and less numerous than the filiform papillae.
    2. Fungiform means “shaped like fungi or mushrooms”3. Circumvallate (or vallate) papillae are 8 to 12 mushroom-shaped bumps, each surrounded with a circular trough. They are located in a V shape at the junction of the anterior 2/3 of the tongue (oral tongue) and the posterior 1/3 or the tongue (base of tongue). The walls contain taste buds.
    3. Circumvallate means "around a valley or trench"3.
    4. Foliate papillae appear as 3 to 4 small folds on the lateral border of the posterior oral tongue (at the junction of the anterior two thirds and the posterior third of the tongue). They are pink-red, soft, and contain taste buds. They may also contain lymphoid tissue which appears yellow-beige.

5. Lymphoid tissue
    1. Lingual tonsils are polypoid yellow-beige areas on the posterior dorsum of the tongue posterior to the circumvallate papillae and may sometimes be seen as well on the lateral borders of the tongue1 in or near the foliate papillae. These collections of lymphoid tissue can vary in size, and may enlarge when the patient has a cold. These are considered normal when they are soft and covered with intact mucosa, and appear symmetrical. If one side is larger than the other side, or if one is firm or ulcerated, then this should be further evaluated (reassessed, referred, or sometimes biopsied by an oral surgeon, oral pathologist or otolaryngologist).
    2. Pharyngeal tonsils are normal masses of lymphoid tissue in the pharynx situated between the anterior tonsillar pillar (anterior palatoglossal arch) and the posterior tonsillar pillar (posterior palatopharyngeal arch)4. These tonsils may be small or large. Normal tonsils are usually, soft, symmetrical, non-ulcerated, and asymptomatic. They may be smooth or lobulated. They often have a slightly yellow-beige appearance due to the lymphoid tissue. There may be necrotic material lodged in the tonsillar crypts (indentations in the tonsils). This material is called tonsillar concretion and is made up of desquamated keratin, bacteria, and foreign material5. This generally extrudes on its own and does not need treatment, however, it also may smell, and cause halitosis. If this material calcifies, it is called a tonsillolith. If the patient has had a tonsillectomy, you may see a scar in this area. The scar usually appears as pale lines.

2b. Variations of Normal

There are other normal conditions that some people have and others do not. These are called “variations of normal." These conditions should be described, recorded, and when correctly diagnosed, do not need treatment. You will see these conditions on oral examinations.
These include:

1. Fordyce granules are ectopic sebaceous glands that occur on the oral mucosa. They are commonly seen on the buccal mucosa or the lateral vermillion of the upper lip. They appear as groups of slightly raised, yellowish-beige papules measuring 1 to 3 mm in diameter.
2. Fissured tongue is a common condition characterized by the presence of multiple grooves on the dorsum or occasionally on the lateral tongue, reported in 2% to 5% of the population5.
3. Crenations are indentations on the lateral borders of the tongue that are a result of the impressions from the teeth. Many patients have mild crenations. These may be more obvious in patients who press their tongue against their teeth as a habit.

4. Varicosities are dilated veins often seen on the ventral surface of the tongue, particularly in older patients. They are purple in colour and blanch when pressed. They may also occur in other locations, such as the buccal mucosa, or lips.
5. Plica Fimbriata are the fringe-like folds of mucosa on the ventral surface of the tongue on either side of the lingual frenulum.
6. Ankyloglossia or tongue tied, is an uncommon condition where the lingual frenulum is shorter than average. The patient cannot protrude or lift his/her tongue as much as the average person. This condition can be surgically corrected by cutting the lingual frenulum.
7. Leukoedema is a milky, white-gray translucent appearance of the bilateral buccal mucosa when the tissue is at rest. There may appear to be white streaks, due to the folding of the mucosa. This appearance disappears when the mucosa is stretched. Leukoedema is more common in black patients5.
8. Tori and Exostoses
    1. Palatal torus (torus - singular, tori - plural) occurs in the midline of the hard palate. The bony swelling is rounded and usually symmetrical. It may be lobulated. Palatal tori do not need treatment unless they will interfere with a denture.
    2. Mandibular tori are seen on the lingual surfaces of the mandible in the premolar region. They are typically bilateral, rounded mucosa-covered bony swellings. They are usually, but not always bilateral and symmetrical1.
    3. Exostoses are localized, rounded protuberances (swellings) of bone in other areas. They are usually seen on the buccal surfaces of the alveolar processes.
9. Retrocuspid papillae are firm, pink papules on the mandibular lingual attached gingiva of the lower canines. These are usually bilateral, but occasionally unilateral. They are more common in children, and may regress with age6.

Step 3: Determine if it is a Condition That Does Not Require Treatment (Minor Oral Pathologies)

There are other conditions (minor oral pathologies) that are commonly seen on oral examination. They are classified as pathology, but are not worrisome, and do not need treatment. The appearance should be recorded and followed at regular check-ups.

These include:

1. Linea alba or white line, appears as a white (hyperkeratotic) horizontal line along the buccal mucosa at the level of the occlusal plane. This is a common condition and is often bilateral. It is due to frictional irritation or sucking trauma.

2. Scars – examples
    1. Scars on the lower labial mucosa, frequently due to trauma as a child. An example would be a child hitting falling on the edge of a coffee table and cutting their labial mucosa with a lower tooth. This can be diagnosed clinically as a scar if it has the appearance of pale line and the patient remembers trauma in the past.
    2. Scars from tonsillectomy may be seen between the anterior and posterior tonsillar pillar (or arch). Usually no tonsil tissue is seen, and instead, several pale lines or scars can be seen. Occasionally residual tonsillar (lymphoid) tissue is seen as well.
3. Mucosal tags are the oral equivalent of a skin tag. These are commonly seen on the maxillary anterior labial frenulum. It may be the result of healing after trauma to the frenulum. These appear as a small polyp, usually small, soft, pink, and mucosa-covered.
4. Gingival grafts appear as thicker, lighter pink mucosa often on the mandibular buccal attached gingiva of the anterior or premolar teeth. On questioning, the patient usually remembers having mucosa taken from the hard palate.
5. Papillitis or transient lingual papillitis6 is inflammation of one or several of the fungiform papillae on the tongue, commonly on the anterior dorsal tongue. They appear slightly enlarged, and are usually white in color. They are occasionally red or yellow7. The papule or papules are painful, out of proportion to the minor appearance. The papillitis resolves in several days without treatment. The etiology is unknown, but patients may report trauma to the area6.
6. Acute trauma from cheek biting is commonly seen along the occlusal line. If the patient has bitten their cheek recently, you may see two areas of bruising corresponding to the indentation of the teeth. You may see a ragged white area where the mucosa has been torn. The patient will often recall the painful event.
7. Chronic cheek biting is called morsicatio buccarum. In patients that habitually chew on their buccal mucosa, the area has a white, ragged slightly translucent appearance. Usually there is no underlying erythema. This habit is often increased with anxiety or stress5. Most patients will admit that they chew on the mucosa when asked. When present on the labial mucosa, this is called morsicatio labiorum, and if present on tongue, this is called and morsicatio linguarum.
8. Geographic tongue (also called erythema migrans or migratory glossitis) appears as multiple circular or semicircular erythematous areas on the tongue. There is usually, but not always a slightly raised yellow-white semicircular rim or border. The erythematous areas may move around with time, thus the name erythema migrans. Geographic tongue is easily diagnosed if there are obvious areas with a classic appearance. It is harder to diagnose if there are only 1 or 2 small circular erythematous areas with a faint yellow-white raised rim. Geographic tongue is seen in approximately 2% of the population, and is more common in patients with fissured tongue8.

9. Hairy tongue is a benign condition of unknown cause where the filiform papillae become elongated, and hair-like. The extra keratin of the filiform papillae may pick up stain from tobacco, coffee, tea or pigment-producing bacteria. If the color is black, then this is called black hairy tongue. Patients may be quite concerned. Hairy tongue is more common after oral radiation treatment, and in patients that smoke5. This is a very difficult condition to cure, but patients can (or may be advised to) gently scrape or brush their tongue to help clean it.

Step 4: Consult if it is Oral Pathology Requiring Treatment

If you identify an area in the mouth that seems abnormal, the appearance should be accurately recorded, and then follow-up should be arranged to determine a definitive diagnosis. This may mean a reassessment, or consultation with a more experienced clinician (e.g. instructor), or a referral to a specialist (e.g. oral pathologist or oral surgeon).

Conclusion

You will encounter many different lumps, bumps, spots and patches when examining patients. Some of these will be due to oral pathology, but others may be variations of normal anatomy. The first step in determining if an area is oral pathology is to describe it accurately. The next step is to rule out normal anatomy. A good knowledge of normal structures and variations of normal is essential. Patients may be concerned about a lump or a bump in their mouth. If this is a normal anatomical structure, you need to be able to identify it, and discuss this with the patient. If you identify an area in the mouth that seems abnormal, the appearance should be recorded, and then follow-up should be arranged to determine a diagnosis. This may mean a reassessment, or consultation with a more experienced clinician (e.g. instructor), or a referral to a specialist (e.g. oral pathologist or oral surgeon).

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