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Case Report
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Dermoid Cysts in the Floor of Mouth and Neck: A Case Series and Review of the Literature

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Abstract
This case series reviewed two patients treated for dermoid cysts in the neck. The first patient was a 24-year-old male presenting with a five-year history of slowly expanding and asymptomatic mass in his submental and left submandibular region with esthetic concerns. The second patient was a 48-year-old male presenting with a decade's long history of a neck and floor of mouth mass with progressively worsening difficulty in speech, mastication, and deglutination over the previous two years. The cases are reviewed in this article along with a current review of the literature.

Keywords: *Dermoid Cyst, Ranula, Thyroglossal Duct Cyst, Floor of Mouth, Pathology, Oral Pathology, Benign Pathology, Cyst.*

Case 1:

A 24-year-old-male presented to our institution referred for pathology. He reported no medical conditions, did not take any medications, and did not use tobacco or alcohol. His chief complaint was a having a lump under his chin for several years that he was esthetically concerned about. He denied any history of pain, paresthesia, or difficulty swallowing, and thought it had been there and slowly enlarging over the last five years.

On examination, the patient had a large 2-3 cm firm lesion present in the submental region, about 5 mm below the inferior border of the mandible, with extension left and posterior into the submandibular region. The mass was palpable intraorally and non-tender to palpation and manipulation. The patient had full cranial nerve function with no deficits, and there were no enlarged lymph nodes in the cervicofacial region.

A contrast CT scan was obtained and demonstrated a 30x20x17mm radiolucent lesion within the left submental soft tissue (Figure 1). The lesion appeared well encapsulated with distinct borders, multiple loculations, and no effect on adjacent structures. The differential diagnosis favored a dermoid cyst, plunging ranula, or mesenchymal tumor. A plan was formulated with the patient for excision with frozen sections in the operating room.

Figure 1A-C: (A) Preoperative computed tomography (CT) scan with contrast in the sagittal view demonstrating the lesion. Several loculations with a septae are noted. (B) Measurements of the lesion. (C) Coronal slices with measurements.

Per institutional protocol, the patient was brought to the operating room where anesthesia was induced, and the patient was intubated with a nasotracheal tube, using a short acting depolarizing paralytic to allow for nerve testing during the procedure. After prepping and draping, a 4 cm incision was made and the anterior and inferior aspect of the lesion was exposed (Figure 2).

Figure 2: Exposure through the neck with the lesion exposed. Note the distinct capsule.

Then, the lesion was entered and 1x1 cm piece of the capsule was cut out and sent for frozen histopathologic examination (Figure 3). As demonstrated in Figure 3, a thick, cheese-like substance was encountered filling the lesion, and the histopathologic examination revealed a cystic lining. The combination of histopathologic results and clinical picture led the team to decide to proceed with complete excision.

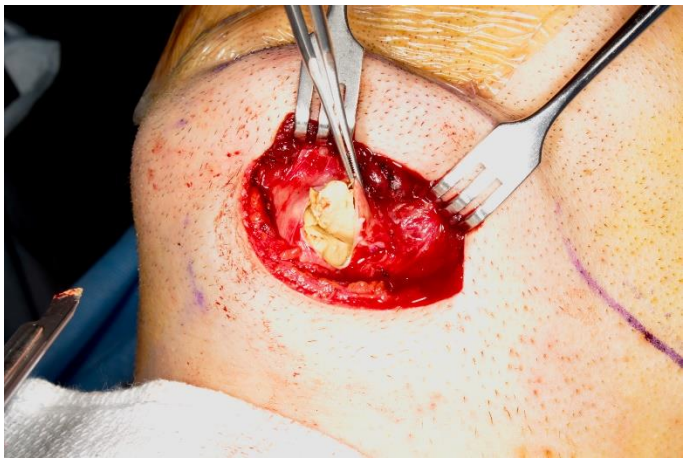

Figure 3: Lesion entered with a piece of capsule sent for frozen histopathological analysis. Note the thick, yellow/white material present, typical for thicker keratinous debris.

To facilitate this, the team then sutured the site where the lesion was entered with silk sutures to preserve the integrity of the lesion and allow for easier dissection and extirpation (Figure 4).

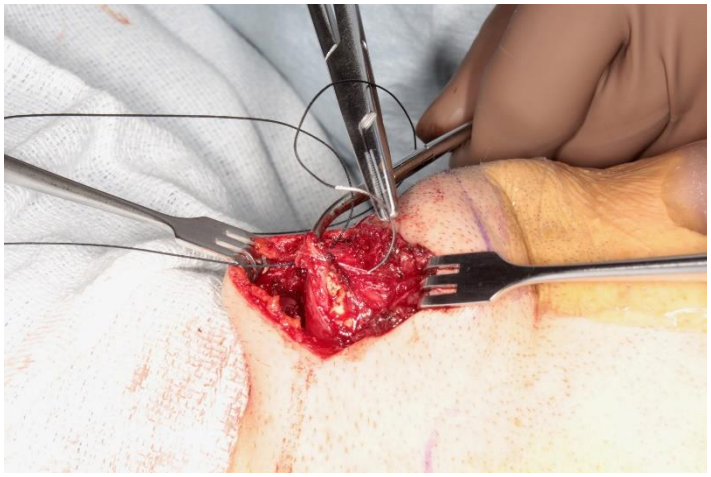

Figure 4: Suturing of the capsule back together after the specimen taken. This helps preserve the integrity of the rest of the lesion for complete surgical excision.

The lesion was bluntly dissected circumferentially posteriorly and superiorly using Allis clamps to carefully control the mass without violating the capsule (Figure 5).

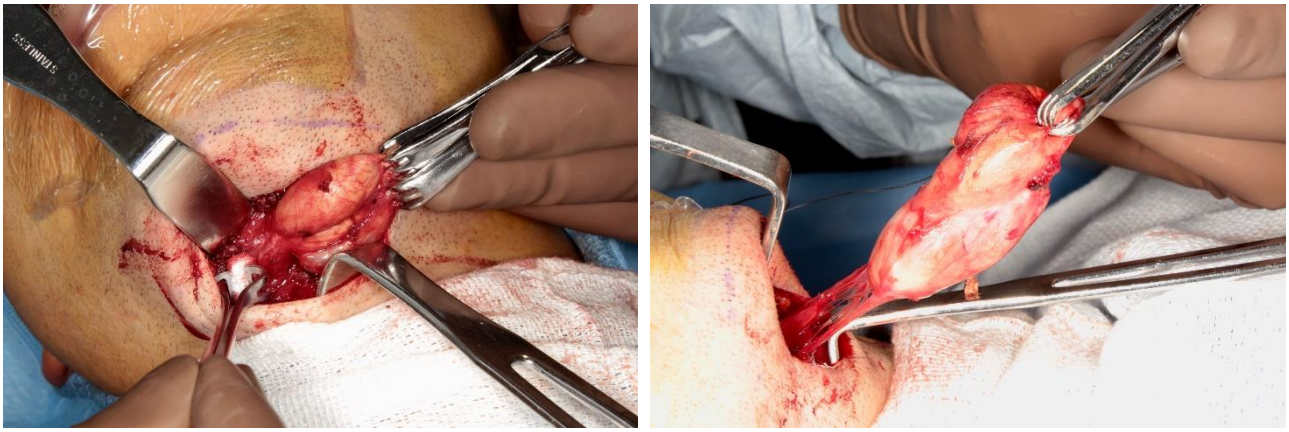

Figure 5A-B: (A) The lesion being dissected a further exposed. (B) The process of final removal with the capsule fully intact (sans specimen site).

Once removed, the internal anatomy was evaluated with no damage noted. Hemostasis was achieved, hemostatic agents placed, a bulb suction drain placed due to the larger volume of tissue removed and resulting dead space, and layered closure of the incision was completed with a running subcuticular suture of the superficial skin (Figure 6).

Figure 6: Closure with a running subcuticular suture and drain placement.

The patient did well in his postoperative course with resolution of his esthetic complaint and had no resulting cranial nerve deficits. The final pathology confirmed the frozen histopathological examination and clinical suspicion of a dermoid cyst.

Case 2:

A 48-year-old-male presented with a chief complaint of a decade's long history of a slow growing mass under his chin and in his neck. He reported developing difficulty with speech, masticating, and deglutination over the past two years. His medical history was unremarkable, he did not take any medications, and he had no history of tobacco use, but endorsed social alcohol use.

On examination, a large, firm, and non-tender mass was palpable in the submental region down to the superior aspect of the thyroid cartilage. The mass clinically measured 5 cm vertically, and 4-5 cm horizontally. It was palpable in the floor of the mouth and relatively symmetric. There were no cranial nerve deficits present, nor enlarged cervicofacial lymph nodes.

A contrast CT scan was obtained and it demonstrated an 84x53x47mm radiolucent lesion in the floor of the mouth and anterior neck residing in the midline. The lesion was bilateral and roughly symmetric with no destruction of normal structures (Figure 7). The differential diagnosis favored an epidermoid cyst, dermoid cyst, plunging ranula, or thyroglossal duct cyst. A plan was formulated with the patient for excision of the pathology in the operating room.

Figure 7A-C: (A) Preoperative computed tomography (CT) scan with contrast in the sagittal view demonstrating the lesion. The lesion fills the entire floor of mouth and extends inferiorly into the neck. (B) Axial view of the CT scan. (C) Coronal view of the CT scan with the lesion appearing midline and separating the mylohyoid muscles.

Per institutional protocol, the patient was brought to the operating room where anesthesia was induced, and the patient was intubated with a nasotracheal tube, using a short acting depolarizing paralytic to allow for nerve testing during the procedure. Figure 8 demonstrates the patient from a lateral view, with the mass clearly appreciable. After prepping and draping, an apron style incision was marked on the neck, 2 cm below the inferior border of the mandible.

Figure 8: Preoperative view, note the fullness of the neck.

The hyoid bone was also identified and marked (Figure 9).

Figure 9: Incision marked, inferior border of the mandible marked with dotted line, and hyoid bone marked.

Dissection proceeded through the skin, subcutaneous tissue, and platysma, exposing the anterior digastric muscles, which were displaced laterally due to the mass. The submandibular glands were exposed bilaterally (Figure 10).

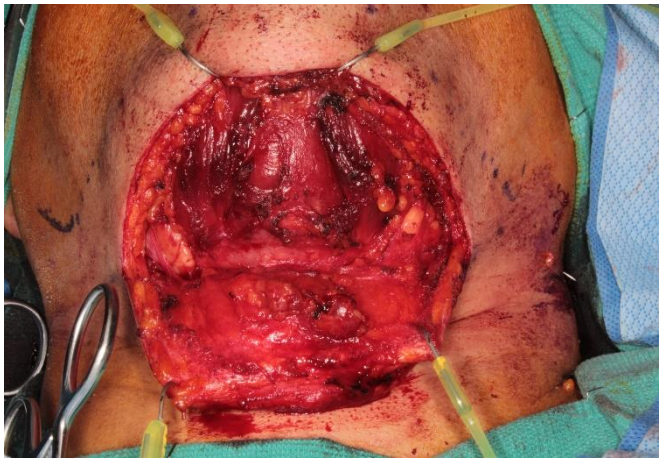

Figure 10: The neck is opened, note the anterior digastric muscles and the anterior aspects of the submandibular glands bilaterally.

Then, the mylohyoid muscle was divided in the midline and the lesion exposed (Figure 11).

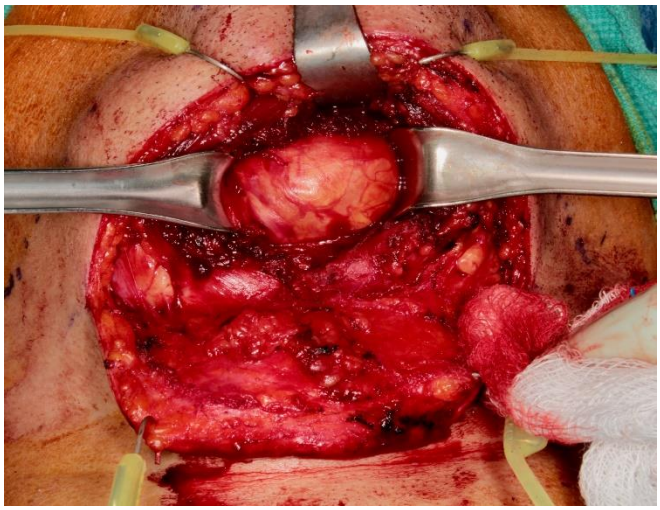

Figure 11: With further dissection, the lesion is encountered.

Dissection proceeded circumferentially with a plane easily identified between the capsule and normal anatomy (Figure 12). The lesion was not attached to the hyoid bone, clinically decreasing the likelihood of a thyroglossal duct cyst. The lesion tracked midline up into the floor of the mouth.

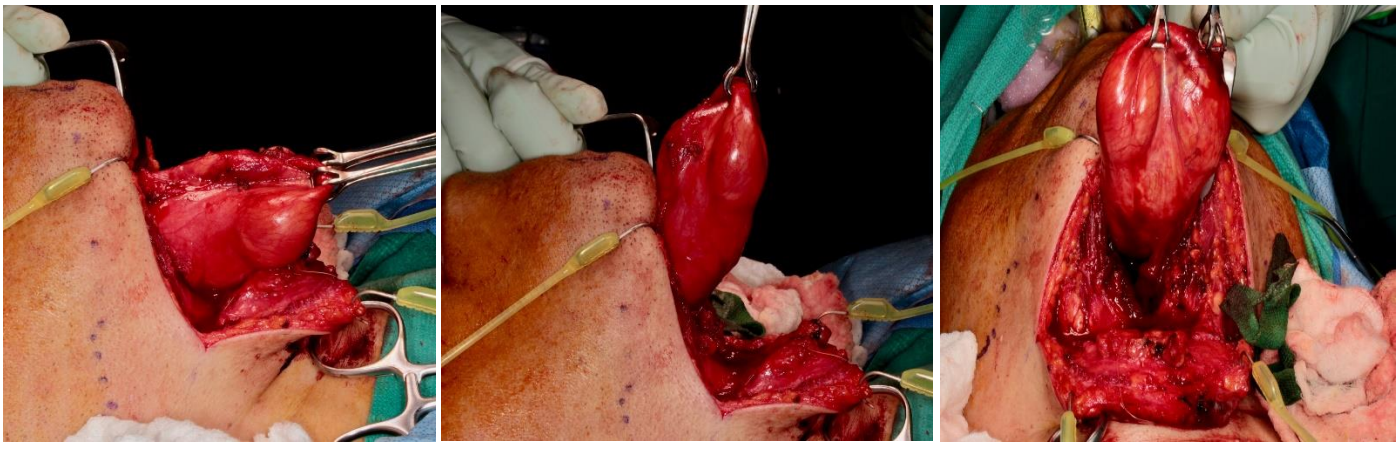

Figure 12A-C: Lesion clamped and traction applied demonstrating the large size.

As dissection continued superiorly, the lesion ruptured, releasing a viscous yellow material (Figure 13).

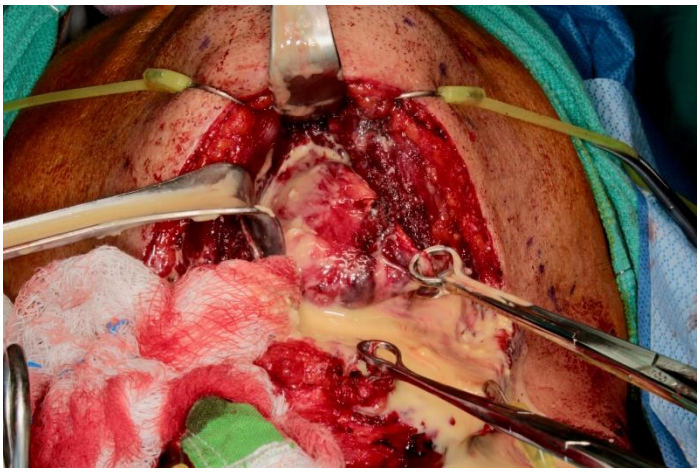

Figure 13: Lesion bursting releasing a viscous yellow/white fluid and material.

Silk sutures were placed to close the perforation and aid in the completion of the removal, and the lesion was dissected free. The final specimen measured 9 cm in length (Figure 14).

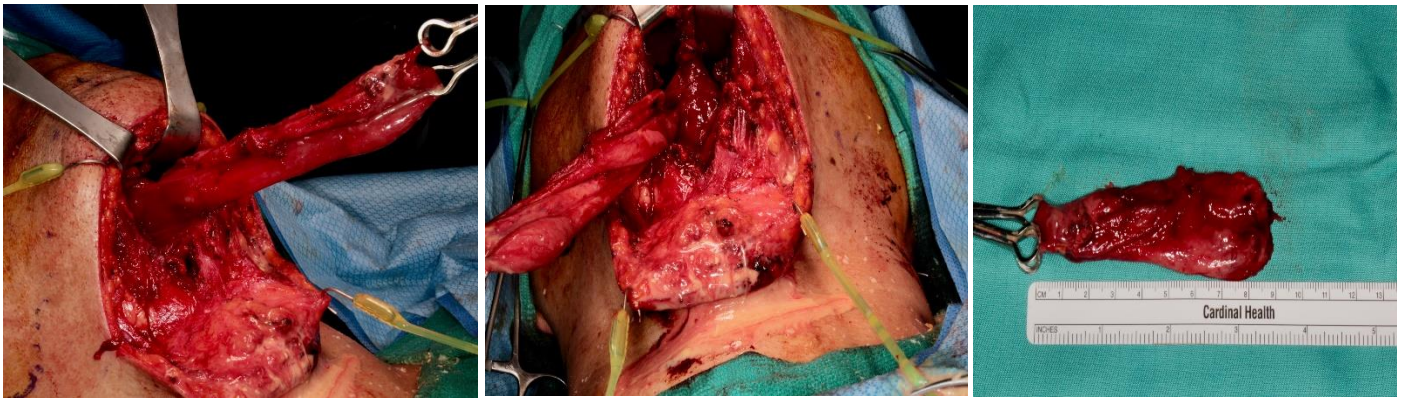

Figure 14A-B: A, Lesion sutured closed to maintain viability of the capsule, sutures can be seen in B, and further dissection to remove superiorly.

The surgical site was irrigated, inspected, and hemostasis was achieved, with no damage noted to anatomic structures (Figure 15).

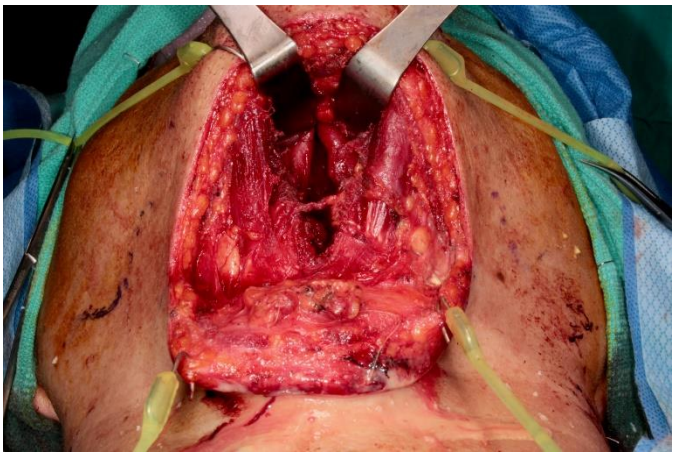

Figure 15: Lesion fully removed.

A bulb suction drain was placed and the incision closed in a layered fashion (Figure 16).

Figure 16: Closure and drain placement.

A final photo was taken from lateral profile, illustrating the obvious decrease in size compared with the preoperative appearance (Figure 17).

Figure 17: Immediate postoperative photo, note the substantial decrease in size compared to Figure 8.

The patient did well in his postoperative course with resolution of his chief complaint and dramatic improvement in swallowing and chewing. No resulting cranial nerve deficits were noted. The final pathology confirmed the mass as a dermoid cyst.

Discussion

Dermoid cysts are epithelial lined cavities that have hair follicles within the cyst wall, as well as sweat and sebum glands, and produce keratin. Histologically the keratinization derives from the stratified squamous epithelial lining and reflects the ectodermal inclusion during embryological development.[1] Two related entities are the epidermoid cyst and the teratoma. However, the epidermoid cyst lacks adnexal aspects and has a simple squamous epithelium surrounded by a fibrous wall.[1,2] Conversely, teratomas contain all three germ cell layer derivates -ectoderm, mesoderm, and endoderm- and can sustain varied properties of their contents. Interestingly, dermoid cysts, epidermoid cysts, and teratomas can all exhibit some degree of keratinization, making it a less clinically useful finding intraoperatively.[2]

Dermoid cysts occur mostly in the head and neck region, accounting for about 93-99% of reported lesions, with the largest published study to date being a retrospective review done at the Children's Hospital of Philadelphia, reviewing 2,350 cases over 23 years and published in 2025.[3] The literature concurs with this finding, however it is worth noting that a preponderance of evidence is reported in pediatric populations.[4-10] This is likely due to the embryological distribution pattern as the head and neck region contain many confluences of embryonic fusion planes, creating the ideal environment for ectodermal sequestration and cyst development. The orbital region also represents a high preponderance of dermoid cyst development for likely the same reasons. [7,11]

Dermoid cysts behave as benign slow growing painless masses, due to the keratin produced. They are typically diagnosed as a 1-5 cm palpable mass that is often asymptomatic, unless the mass effect of the growth causes issues via pressure on nearby anatomic structures.[12,13] However, there are some serious complications that can occur including intracranial extension and rupture of the cyst which has been reported to lead to infection, osteomyelitis, and meningitis.[3,14]

Dermoid cysts in the oral and neck regions make for a diagnostic challenge as there are many entities that can present in a similar manner. Besides the epidermoid cysts and teratomas, they can mimic salivary lesions, ranulas, branchial cleft cysts and fistulas, thyroglossal duct cysts, or vascular or lymphatic abnormalities like lymphangiomas.[15,16] History and location play a large part in differentiation, as lesions in the midline tend to favor dermoid or epidermoid cysts, thyroglossal duct cysts, and ranulas, whereas brachial cleft abnormalities tend to be more laterally positioned. Computed tomography (CT) imaging with contrast is the preferred imaging modality to assess the lesion, though particularly if cranial extension is suspected, additional magnetic resonance imaging (MRI) is recommended, with ultrasound being an excellent recommended adjuct.[17,18]

The crux of the diagnostic challenge for surgical subspecialists is usually between differentiating between a dermoid cyst, thyroglossal duct cyst, and a ranula, which have quite different treatment modalities. Dermoid, and epidermoid cysts, as independent masses, do not move during swallowing. Thyroglossal duct cysts, commonly presenting with a similar painless midline mass, conversely do move during swallow function and tongue protrusion because of their embryological connection to the foramen cecum.[19,20] Thyroglossal duct cysts more commonly have an association with tenderness and infection, on examination or in the history review, with current literature noting up to 62% chance of infection before surgical treatment.[21,22] Ranulas, or salivary retention cysts from the sublingual or submandibular glands, more typically present in the floor of the mouth, though if they penetrate inferiorly through the mylohyoid muscle, they are termed 'plunging' or 'diving' ranulas. They often have a blueish hue, do not contain keratin, tend to be more fluctuant, and do not move with swallowing.

Imaging modalities can play a large part in further differentiating between these various lesions. In 2015, Oyewumi et al. proposed a new scoring system of ultrasounds to help differentiate thyroglossal duct cysts from dermoid cysts, known at the SIST criteria (septae, irregular walls, and solid components), with follow on studies and further criteria since demonstrating a range of inconsistent results from no statistical significance to up to 84% accuracy in some studies, with the ultimate conclusion that it has not been validated yet, though has potential.[23-26] MRI with diffusion weighted imaging (DWI) has shown more promising results of differentiating between the two in several recent studies based on adjusted diffusion coefficient values, suggesting a 90% or better accuracy, with more research indicated.[27,28]

The differentiation between these three similar lesions is important due to the differences in treatment. Dermoid cysts are generally treated with complete surgical removal with historic and recent evidence demonstrating high success rates and low recurrence.[5,7,11,14,29,30] Ranulas can be treated with removal, of either the lesion and/or the responsible gland, though a common alternative is marsupialization, surgically opening the contained space and suturing the edges of the cyst or process to normal tissue and allowing shrinkage via decompression with a less invasive second surgery needed. There are scattered reports of

marsupialization as a method for treating dermoid cysts more centrally located or focused within the oral cavity.[31,32] Thyroglossal duct cysts are typically treated with a surgical procedure known as a Sistrunk with en bloc resection of the cyst, thyroglossal duct tract, tissue of the base of the tongue, and central portion of the hyoid bone, with some modifications and deviations.[33,34] So, having an incorrect diagnosis can lead to over -or undertreatment of a given condition.

Dermoid cysts are an uncommon but encountered clinical entity for the head and neck surgical subspecialists. Being aware of the epidemiology, presentation, work up, and treatment can help improve outcomes and mitigate confusion and improper surgeries for these lesions.

Disclaimer

The views expressed herein are those of the authors and do not reflect the official policy of the Department of the Army, Department of Defense, or the U.S. government. Informed consent was obtained from the presented patients.

Disclosure

None of the authors reported any disclosures.

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