



# Cervical dermoid cysts



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## KEYWORDS

Congenital neck mass;  
 Pediatric neck mass;  
 Dermoid cyst

Cervical dermoid cysts are a common midline congenital neck mass found in the pediatric population. Embryologically, they contain germ cells of ectoderm and mesoderm origin. Dermoids are slow growing, painless, and rarely cause symptoms. Diagnosis is typically clinical; however ultrasound can help to differentiate cystic and solid neck masses. Ultimately, complete surgical excision is curative and recurrences are rare. Operative management of these cysts is a mainstay for the pediatric head and neck surgeon.

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## Introduction

Dermoid cysts are the second most common congenital midline malformation after thyroglossal duct cysts<sup>1</sup> and account for 25% of midline cervical anomalies.<sup>2</sup> The estimated incidence is 1 in 4,000.<sup>3</sup> In all, 30% are noticed shortly after birth and 70% are diagnosed by age 5 years.<sup>4</sup> A slight female predominance has been suggested by some authors<sup>5,6</sup>; however, many studies report no differences between sexes.<sup>3,4</sup>

Approximately 7% of all dermoid cysts occur in the head and neck.<sup>3,6,7</sup> They are most commonly seen along the outer third of the eyebrow.<sup>4</sup> Other locations include the neck, nose, floor of mouth,<sup>8</sup> scalp, temporal bone,<sup>3,9,10</sup> and nasopharynx.<sup>6</sup> Among head and neck dermoids, 20% are midline anterior neck masses.<sup>11</sup> Included in the differential diagnosis are thyroglossal duct cysts, thyroid nodules, lymphatic malformations, lymphadenopathy, bronchogenic cysts, lipomas, and ranulas.<sup>3,6</sup>

## Anatomy and embryology

Classified as benign germ cell tumors, dermoid cysts are composed of ectodermal and mesodermal structures.<sup>8</sup> This is in contrast to epidermoid cysts or teratomas. An epidermoid cyst contains only ectodermally derived tissue and is located more superficially in subcutaneous tissues. The rarer teratoma will contain all 3 germ layers and will grow in a rapid, less predictable manner with possible airway compromise.<sup>12</sup>

Dermoid cysts result from a defect in midline closure<sup>1</sup> along embryonic fusion planes and are unrelated to development of the branchial apparatus. In the neck, they are either found in the parahyoid region, similar to thyroglossal duct cysts, or suprasternally, located on the trachea between the strap muscles<sup>13</sup> in a median or paramedian position.<sup>6,14</sup> Lateral cysts are usually found in the submandibular region between the hyoglossus and mylohyoid muscles.<sup>3,10</sup>

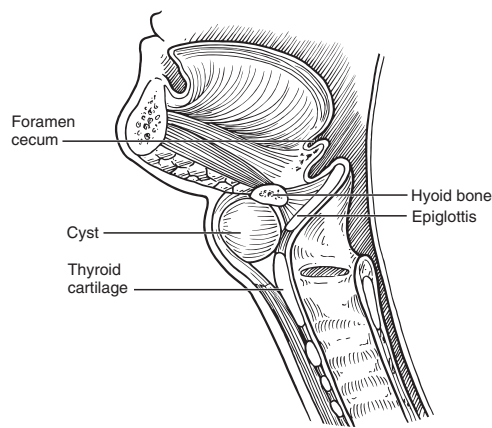
Dermoids arise from totipotent rests of ectodermal and mesodermal cells, which become isolated and exhibit benign, disorganized growth.<sup>10</sup> Sequestration of these cells within deeper tissue folds, typically result in cysts without organized sinus tracts. However, dermoids can be attached

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**Figure 1** Sagittal view of dermoid cyst in close proximity to hyoid bone.

by fibrous tissue to underlying periosteum.<sup>12</sup> Dermoids involving the head and neck have been historically divided into 4 groups. Group 1 cysts are the most common and are found in the periorbital region along the naso-optic groove. Group 2 are found along the dorsum of nose, developing during ossification of the frontonasal plate. Group 3 are located in the submental region and floor of mouth, where the first and second branchial arches meet. Finally, Group 4 lesions are formed at the midventral and middorsal fusion plane in the suprasternal, thyroidal, and suboccipital regions (Figure 1).<sup>6</sup>

## Histology

Dermoid cysts are lined with stratified squamous epithelium<sup>9</sup> and contain adnexal structures, such as sebaceous and nonsebaceous sweat glands, hair follicles, and connective tissue.<sup>3,9,11</sup> They may be cystic, containing keratinized debris, or solid.<sup>3</sup> The collection of sebaceous debris gives the gross appearance of cheesy keratinous material.<sup>11</sup> Typically, there is no evidence of infection, but in the case of a ruptured cyst, granulomatous inflammation may be present.<sup>14</sup>

## Presentation

Dermoid cysts are mobile, midline neck masses,<sup>11</sup> that exhibit slow growth during the first few years of life.<sup>4</sup> They tend to be between 10 and 12 mm in diameter but have been reported up to 17 cm.<sup>10</sup> The gradual increase in size over time due to accumulation of sebaceous contents is often the cause for presentation to the otolaryngologist.<sup>14</sup> It is uncommon for cervical dermoids to interfere with speech, limit mastication, impair tongue mobility, or result in airway obstruction.<sup>11</sup>

Increase in cyst size during an upper respiratory infection is less pronounced than that of a thyroglossal duct cyst.<sup>1</sup> As dermoid cysts have no connection to the oropharynx, infection is rare. Rupture may occur due to trauma or

enlargement.<sup>2</sup> In the setting of an acutely infected cyst, the patient will present with a painful mass, overlying skin erythema, and possibly a fistulous tract.<sup>11</sup>

## Evaluation

The evaluation of cervical dermoid cysts begins with a history and physical examination. Keys to the diagnosis are slow growth, lack of size variation, and stability in character during upper respiratory tract infection. They can be in close association with the hyoid and travel with swallowing or tongue protrusion due to underlying fibrous attachments, hence their frequent confusion with thyroglossal duct cysts.<sup>11,14</sup> Palpation demonstrates an incompressible mass usually located superficial to or between the strap musculature.<sup>1</sup>

Transcervical ultrasound is the imaging modality of choice. Ultrasound can differentiate solid midline structures like lymphadenopathy or lipomas from cystic structures such as dermoid and thyroglossal duct cysts.<sup>8,15</sup> In general, a computed tomography scan is not necessary to diagnose midline cervical masses but can be helpful in the case of recurrence.<sup>12</sup> The presence of septae, irregular wall, and solid components on ultrasound has been shown to be predictive of thyroglossal duct cyst over a dermoid.<sup>15</sup> These features are helpful for surgical planning and patient counseling, especially if a Sistrunk procedure is under consideration.

## Treatment options

Surgical excision is considered curative and first-line therapy. Excision prevents future infection, establishes diagnosis, and addresses cosmetic or functional concerns.<sup>10,11</sup> Aspiration should be avoided due to spillage of cyst contents with consequent infection and distortion of surgical landmarks, complicating future surgical resection.<sup>16</sup> Ultimately, if left untreated, a dermoid cyst may continue to grow, become infected, and drain through the skin.<sup>17</sup>

When planning for excision, lesions near or attached to the hyoid periosteum may be difficult to differentiate from a thyroglossal duct cyst.<sup>18</sup> As such, many surgeons advocate a Sistrunk procedure for all midline neck masses of unclear origin once in the operating room.<sup>2,16,18</sup> It is important to have this discussion with the family before excision in diagnostically challenging cases. Most dermoids can be removed using a direct approach.

## Surgical technique

The patient is placed in the supine position after general endotracheal intubation, and a shoulder roll is placed for neck extension. Administration of perioperative antibiotics, such as a first-generation cephalosporin, is recommended. A horizontal incision is marked over the cyst within a natural

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