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Novel Discovery of Ectopic Salivary Tissue in Thyroid and Parathyroid Absence: A Case Report with Clinicopathological and Developmental Insights

Hallazgo Novedoso de Tejido Salival Ectópico en Ausencia de Glándulas Tiroides y Paratiroides: Reporte de un Caso con Perspectivas Clinicopatológicas y del Desarrollo

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KIM, J.; CHO, H. J.; CHO, Y. S.; LEE, K. H. & NAM, K. Il. Novel discovery of ectopic salivary tissue in thyroid and parathyroid absence: A case report with clinicopathological and developmental insights. *Int. J. Morphol., 44(1)*:32-37, 2026.

SUMMARY: Ectopic salivary tissue is salivary gland tissue located outside its normal anatomical sites, either as a complete gland or unorganized tissue. This report presents a rare case of ectopic salivary gland tissue found deep in the neck adjacent to the trachea, notably without thyroid and parathyroid tissues at their usual anatomical locations. During the cadaveric dissection of a 96-year-old Korean female, a butterfly-shaped, hemi-lobed mass measuring 4.7 × 2.2 cm was observed on the right side of the trachea, encircling the cricoid cartilage and tracheal rings. Macroscopically, the mass exhibited a smooth, red-brown surface, while histological analysis revealed well-developed serous acini, ductal structures, and significant adipose tissue infiltration. Immunohistochemical staining with specific thyroid and parathyroid tissue markers—thyroglobulin, thyroid transcription factor-1, calcitonin, and parathyroid hormone—demonstrated no reactivity, confirming their absence. This case study shows that ectopic salivary tissue should be recognized as a rare anatomical variant in order to ensure accurate diagnosis in anatomical studies and clinical practice.

KEY WORDS: Cadaver; Case report; Ectopic salivary tissue; Parathyroid; Thyroid.

INTRODUCTION

Salivary glands, which are distributed throughout the submucosa of the oral cavity, pharynx, and upper airways, play a crucial role in digestion and maintaining oral health by controlling bacterial flora. Saliva is primarily secreted by the parotid, submandibular, and sublingual glands, whose activity is typically triggered by specific stimuli (Sternberg, 1997).

Salivary gland development is a complex process that relies on coordinated interactions between epithelial and mesenchymal tissues, which drive branching morphogenesis. The process begins with epithelial thickening in the oral cavity, followed by the migration of bud-like structures into the underlying mesenchyme. Next, neural crest-derived precursors encapsulate the epithelial stalks, forming extensive ductal and glandular structures through continued branching morphogenesis. Apoptosis facilitates lumen formation by clearing epithelial cells from the centers of these solid epithelial stalks (de Paula *et al*., 2017).

Ectopic salivary tissue, which is defined as salivary gland tissue located outside its typical anatomical sites, can occur in various forms, ranging from organized glandular structures to scattered non-organized tissue. Reported locations include the lymph nodes, mandible, ear, palatine tonsils, mylohyoid muscle, pituitary gland, cerebellopontine angle, cervical region, sternoclavicular joint, and thyroid capsule (Batsakis *et al*., 1986; Sternberg, 1997). Other studies have identified ectopic salivary tissue in additional, unexpected sites including the pancreas (Martens *et al*., 2023), rectum (Weitzner, 1983), and gastroesophageal junction (Abdul Karim *et al*., 2018). However, the most commonly reported site is the cervical lymph nodes near the parotid gland. Occurrences of heterotrophic salivary tissues in extra-lymphatic regions are considerably rarer (Sternberg, 1997).

Thyroid gland is located in the neck region, producing thyroid hormones and calcitonin in the thyroid follicular cells

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and the parafollicular cells. During its development, much genetic abnormalities and defects in cell development and migration have been reported to result in thyroid dysgenesis, including thyroid agenesis and ectopia, often resulting in congenital hypothyroidism (de Felice & Di Lauro, 2004; Stoupa *et al*., 2022). Organogenesis of parathyroid gland is normally independent with thyroid dysgenesis, but a synchronous anomaly of thyroid and parathyroid has been reported in a rare case (Palot Manzil *et al*., 2023). This report presents a rare case of ectopic salivary gland tissue located deep in the neck, along the right side of the trachea, with thyroid and parathyroid abnormalities, suggesting possible agenesis or ectopia. Notably, the ectopic salivary tissue was discovered at the anatomical location typically occupied by the thyroid and parathyroid glands, which raises questions about developmental anomalies and their implications for regional tissue differentiation. The coexistence of congenital thyroid and parathyroid anomalies is extremely rare, and total substitution of their normal anatomical location by ectopic salivary gland tissue has not been previously reported. This case therefore represents a clinically and embryologically significant observation, highlighting its rarity and developmental implications.

CASE REPORT

This study examined a 96-year-old Korean female cadaver during an educational dissection conducted at Chonnam National University Medical School. The authors state that every effort was made to follow all local and international ethical guidelines and laws that pertain to the use of human cadaveric donors in anatomical research (Iwanaga *et al*., 2022). The present study was performed in accordance with the requirements of the Declaration of Helsinki (64th WMA General Assembly, Fortaleza, Brazil, October 2013). During the standard dissection procedure, after the skin, superficial fascia, adipose tissue, and neck muscles were removed, a butterfly-shaped mass of ectopic salivary gland was identified on the right side of the trachea, encircling the cricoid cartilage and tracheal rings with the thyroid and parathyroid glands absent from their normal anatomical location. The mass measured 4.7 × 2.2 cm and had a smooth red-brown surface. Its vascular supply came from the right superior thyroid artery, branching from the external carotid artery along the upper margin, and the right inferior thyroid artery, supplying the posterior surface (Fig. 1). Given its anatomical location and vascular supply, the

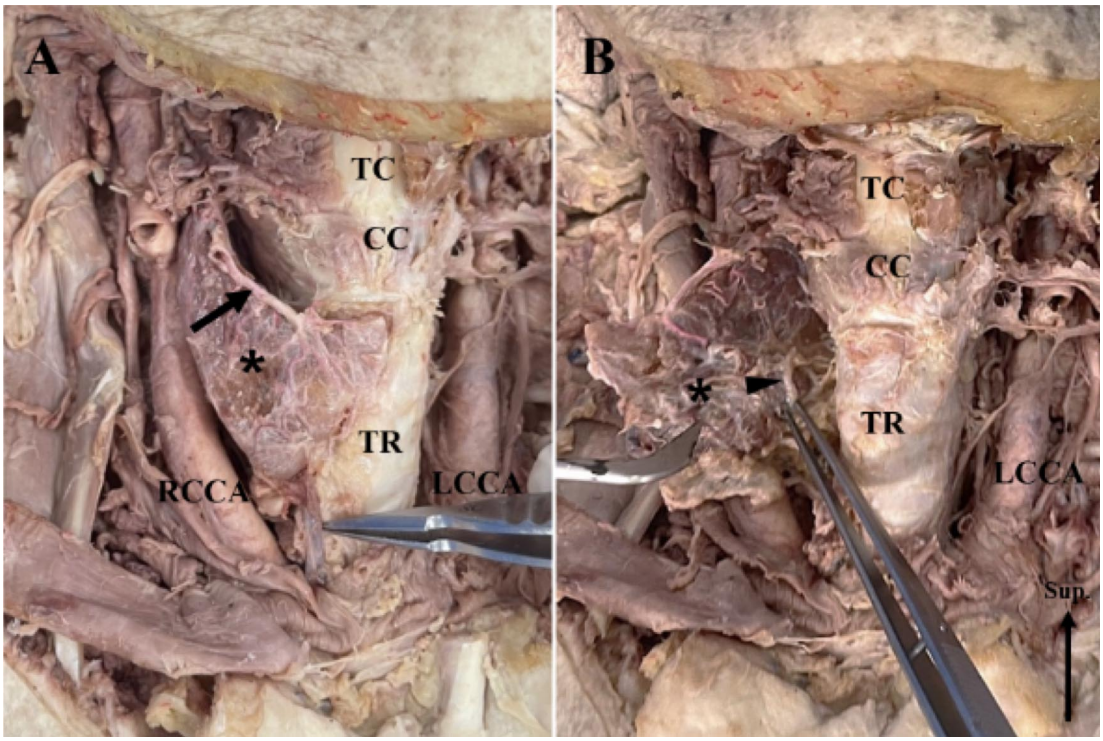

Fig. 1. Anterior and posterior views of the ectopic salivary gland located in the neck. (A) Anterior view displaying the ectopic salivary gland (*) in relation to adjacent structures. The gland received blood supply from the right superior thyroid artery (arrow). (B) Posterior view illustrating the extent of the ectopic salivary gland (*) on the posterior aspect. The gland is shown in relation to the right inferior thyroid artery (arrowhead), which supplied its posterior surface. TC: thyroid cartilage; CC: cricoid cartilage; TR: tracheal ring; RCCA: right common carotid artery; LCCA: left common carotid artery.

mass was initially presumed to represent a right thyroid lobe with possible left thyroid hemiagenesis. It was excised and four sections were evaluated histologically and immunohistochemically.

Microscopic and pathological examination revealed typical salivary gland structures, characterized by numerous serous acini with a well-developed ductal system. No evidence of thyroid or parathyroid tissue was found in any of the specimens. The serous acini contained densely packed secretory granules, and the ductal epithelium ranged from simple squamous to pseudostratified columnar types, although the existence of an excretory duct could not be confirmed. The gland was extensively infiltrated by adipose tissue, and focal areas displayed acinar cell shrinkage and degranulation, predominantly at the periphery (Figs. 2A,B). These features were consistent across all specimens. No inflammation, lymphocytic infiltration, or metaplastic changes were observed.

To confirm the absence of thyroid and parathyroid tissue components, immunohistochemical staining was performed in the department of pathology. Serial sections (6 μm) were cut from each paraffin block, deparaffinized, rehydrated in a graded alcohol series, heated in 10mM sodium citrate (pH6.0) using microwave for 5 min to retrieve antigens. The sections were then incubated with blocking solution and incubated overnight at 4°C with thyroid transcription factor-1 (TTF-1; Dako, M3575, 1:100), thyroglobulin (TG; Dako, IS509, 1:100), calcitonin (CT; Dako, A0576, 1:100), and parathyroid hormone (PTH; Dako, M7070, 1:100) antibodies. After incubation with secondary antibodies (1:400) at room temperature for 1hr, the sections were visualized with ABC kit (Vector Laboratories, CA, USA) and DAB kit (Dako Cytomation, Glostrup, Denmark). All markers demonstrated negative immunoreactivity in the tissue samples (Figs. 2C-F) conclusively ruling out the presence of thyroid or parathyroid tissue within the mass. Appropriate positive controls were identified for each antibody (data not shown). The results supported the identification of the mass as ectopic salivary gland tissue.

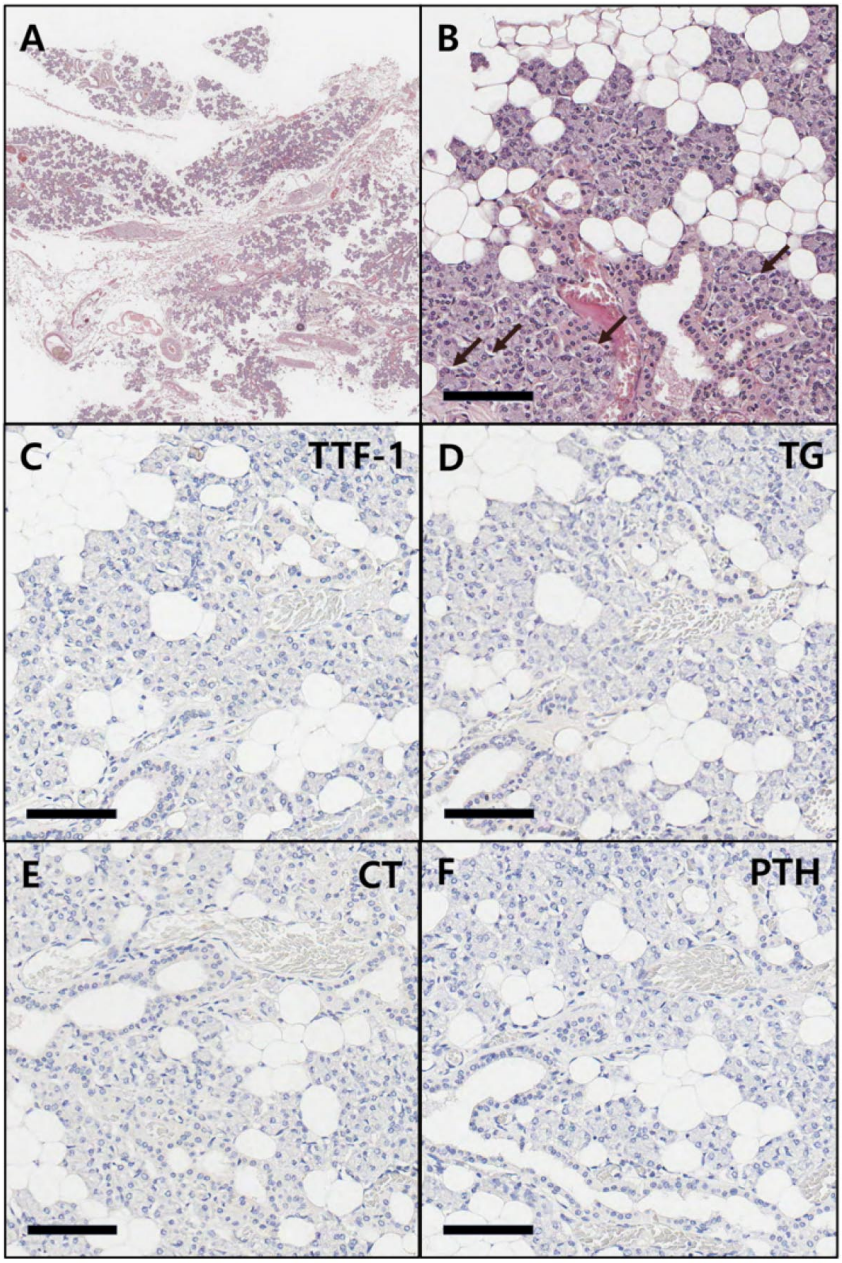

Fig. 2. Histological and immunohistochemical analysis of the ectopic salivary gland tissue. (A) Hematoxylin and eosin (H&E) staining at low magnification (×20) reveals a well-organized glandular structure with prominent blood vessels and fibrous septa. (B) H&E staining at high magnification shows serous acini interspersed with extensive adipose tissue infiltration. Acinar cell shrinkage at the peripheral margins is indicated by arrows. (C–F) Immunohistochemical staining demonstrates negative reactivity for thyroid transcription factor-1 (TTF-1), thyroglobulin (TG), calcitonin (CT), and parathyroid hormone (PTH), confirming the absence of thyroid or parathyroid tissue. Scale bar = 100 μm (applies to panels B–F).

DISCUSSION

Ectopic salivary tissue has been reported in various anatomical locations, but the complete replacement of thyroid tissue with ectopic salivary tissue, as observed in this case, is exceptionally rare. While prior studies have documented ectopic salivary tissue within or adjacent to the thyroid gland (Pesavento & Ferlito, 1976; Cameselle-Teijeiro & Varela-Durán, 1994), we believe our case is unique in demonstrating a well-developed salivary gland structure completely replacing thyroid tissue.

The embryological origins of ectopic salivary tissue can be attributed to aberrant migration or differentiation during development. Salivary gland formation involves epithelial-mesenchymal interactions and branching morphogenesis, processes that may deviate from their normal pathways. In the neck, ectopic salivary tissue commonly presents as a sinus or asymptomatic nodule (Singer *et al*., 1979; Haemel *et al*., 2008). A 1967 study proposed that incomplete obliteration of branchial sinus structures, such as the sinus of His, could lead to the formation of ectopic salivary tissue. This theory is supported by reports of ectopic salivary tissue in related areas, such as the external auditory canal, branchial cleft cysts, and parathyroid gland capsules (Youngs & Scofield, 1967).

Previous report on thyroid dysgenesis, including dual ectopia, single ectopia, and agenesis, revealed failure of complete maturation of ectopic thyroid and requirement of similar dose of thyroid hormone replacement (Tucker *et al*., 2016). In contrast, a retrospective report involving 49 ectopic thyroid patients, 61.9 % of had hypothyroidism, while 38.1 % had euthyroidism, suggesting a possibility of normal thyroid function of ectopic thyroid (Yoon *et al*., 2007). In addition, a retrospective study of scyntigraphic detection of dual ectopic thyroid tissue involving 11905 patients, 2 of 6 dual ectopic thyroid patients were detected (Meng *et al*., 2014). These reports suggest that the presence of an ectopic thyroid with preserved function may present and an alternative site cannot be excluded.

Parathyroid follows an independent embryologic development separate from thyroid. Consequently, in most cases parathyroid gland with thyroid dysgenesis most often maintain normal parathyroid structure and function, although rare reports document hyperplastic or adenomatous change (Mydlarz *et al*., 2010; Oruci *et al*., 2012). However, a rare case of synchronous ectopia of thyroid and parathyroid has been reported (Palot Manzil *et al*., 2023), suggesting a possibility of abnormal embryological development of pharyngeal pouches. Interestingly, both the thyroid and salivary glands originate from the primitive foregut endoderm, with additional ectodermal contributions in certain salivary glands (e.g., the parotid). This shared developmental origin suggests a link between the two, possibly explaining the rare phenomenon of salivary heterotopia in cases of thyroid replacement. Analogous examples include ectopic pancreatic tissue in Meckel's diverticulum, resulting from incomplete obliteration of the vitelline duct (Youngs & Scofield, 1967). Other documented associations between salivary tissue and endoderm-derived organs further support this theory (Mysorekar *et al*., 2004; Martens *et al*., 2023).

The vascular supply of the ectopic tissue in this case is particularly significant. The tissue received blood from both the superior and inferior thyroid arteries, which typically supply the thyroid gland. This vascular pattern implies that the ectopic salivary tissue incorporated the existing vascular network during its development, despite its distinct histological identity.

Histological analysis revealed well-preserved salivary gland architecture, with serous acini, ductal structures, and significant adipose infiltration. Similar histological changes, such as increased adipose cells and acinar atrophy, have also been documented in aging salivary glands (Scott *et al*., 1987). The observed acinar cell shrinkage and degranulation likely reflect age-related alterations rather than pathological processes, as no inflammation or metaplasia was detected.

Immunohistochemical and pathological analysis ruled out the presence of thyroid or parathyroid tissue, as evidenced by the absence of reactivity for TTF-1, TG, CT, and PTH markers. This contrasts with reports of ectopic salivary tissue coexisting with normal thyroid tissue (Cameselle-Teijeiro & Varela-Durán, 1994). The complete absence of normal thyroid tissue in this case prompts consideration of the donor’s thyroid function during life. In the absence of any history of thyroidectomy or treatment for thyroid disease, it is presumed that thyroid tissue may have been present in an ectopic or dispersed form at an alternative anatomical site. However, no thyroid tissue was identified on macroscopic or histological examination of the cervical region.

This case has important implications for developmental biology and clinical practice. Clinically, it highlights the importance of considering ectopic salivary tissue in the differential diagnosis of neck masses, especially when thyroid tissue is absent from its usual location. Accurate identification through detailed histological and immunohistochemical analysis is crucial, given the

prevalence of embryological anomalies in this region (e.g., branchial cleft cysts and thyroglossal duct cysts). Additionally, ectopic salivary tissue may have a propensity for neoplastic transformation, as noted in a review of salivary gland heterotopia (Ferlito *et al*., 1999), emphasizing the importance of early detection and monitoring.

From a developmental standpoint, this case provides new insights into tissue plasticity and the complexity of signaling interactions in the anterior neck region during embryogenesis. The replacement of thyroid tissue by salivary tissue suggests that local factors might influence tissue differentiation and migration in ways that are not currently understood. Future research should aim to uncover the molecular and genetic mechanisms underlying such anomalies, while systematic reviews of similar case studies could help determine whether this phenomenon represents a distinct developmental disorder or an exceptionally rare anatomical variant.

This study has certain limitations. Because it was based on cadaveric dissection, access to detailed clinical information was inherently limited, and the excretory function of the ectopic salivary gland could not be assessed. As a result, evaluation of potential ectopic thyroid and parathyroid gland activity was not possible. In addition, the evaluation of salivary gland was restricted to light microscopic examination of structural features, as salivary gland-specific immunohistochemical markers such as KRT7 or CAM5.2 were not employed (Martens *et al*., 2023; Zhang *et al*., 2024).

Nevertheless, this study reports a rare case of ectopic salivary gland tissue in the anterior neck, at the typical anatomical location of the thyroid and parathyroid glands. Notably, thyroid and parathyroid tissues were absent from their usual locations, as confirmed by detailed histological and immunohistochemical analyses. These findings emphasize the importance of considering developmental anomalies, such as ectopic salivary tissue, in the differential diagnosis of neck masses. The case also underscores the need for further research into the embryological mechanisms that lead to such anomalies and their potential clinical implications.

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KIM, J.; CHO, H. J.; CHO, Y. S.; LEE, K. H. & NAM, K. Il. Hallazgo novedoso de tejido salival ectópico en ausencia de glándulas tiroide y paratiroides: Reporte de un caso con perspectivas clinicopatológicas y del desarrollo. *Int. J. Morphol., 44(1)*:32-37, 2026.

RESUMEN: El tejido salival ectópico es tejido de glándula salival localizado fuera de sus ubicaciones anatómicas normales, ya sea como glándula completa o como tejido desorganizado. Este reporte presenta un caso raro de tejido de glándula salival ectópico localizado en la profundidad del cuello, adyacente a la tráquea, notablemente sin tejido tiroideo ni paratiroideo en sus ubicaciones anatómicas habituales. Durante la disección cadavérica de una mujer coreana de 96 años, se observó una masa hemilobulada en forma de mariposa de 4,7 × 2,2 cm en el lado derecho de la tráquea, que rodeaba el cartílago cricoides y los anillos traqueales. Macroscópicamente, la masa presentaba una superficie lisa de color marrón rojizo, mientras que el análisis histológico reveló acinos serosos bien desarrollados, estructuras ductales y una infiltración significativa de tejido adiposo. La tinción inmunohistoquímica con marcadores tisulares tiroideos y paratiroideos específicos (tiroglobulina, factor de transcripción tiroideo-1, calcitonina y hormona paratiroidea) no mostró reactividad, lo que confirmó su ausencia. Este estudio de caso demuestra que el tejido salival ectópico debe reconocerse como una variante anatómica poco frecuente para garantizar un diagnóstico preciso en los estudios anatómicos y la práctica clínica.

PALABRAS CLAVE: Cadáver; Informe de caso; Tejido salival ectópico; Paratiroides; Tiroides.

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