

Goiter^{1,2}

Narrative Section

HISTORICAL VIGNETTE - Although the thyroid goiter was first described as far back as 3600BC China, it was only during the early part of the 19th century, that iodine was discovered. Derived from the Greek word *ioedes* (translation: purple), French chemist Bernard Courtois accidentally discovered the element when he saw a violet-colored vapor emerge as a by product of the materials needed to produce gunpowder. Several decades later, Adolphe Chatin and Eugen Baumann linked iodine deficiency to the thyroid goiter. Despite this discovery, efforts to introduce iodine into the population's diet proved difficult. By the 1920's, endemic iodine deficiency was found to be prevalent in certain areas of the US coined "the goiter belt" which comprised of the Great Lakes, Appalachians and Northwestern regions of the country. At the time, one in three children was diagnosed with a goiter, and many suffered from impaired physical and mental development, termed cretinism. It wasn't until 1924 that the fortification of salt with iodine was officially introduced. This simple and inexpensive intervention led to a marked decline in childhood goiter disease in many countries throughout the world.

CONTEXT AND USEFULNESS - Thyroid disease is very common, and more than 10% of the world's population has a goiter. Early recognition of an enlarged thyroid can lead to earlier treatment and prevention of the fatal consequences of untreated thyroid disease such as myxedema coma and thyroid storm. Despite advancements made in the fortification of salt with iodine, there are regions of the world where endemic goiters continue to afflict children and adults.



¹ Chi J *et. al.* "The Five Minute Moment." *Am J Med.* 2016 Aug; 129 (8): 792-795.

²McGee, Steven. *Evidence-Based Physical Diagnosis, 4th ed.* Philadelphia, PA: Elsevier; 2018.

Physical Manuever

Model Proper (And Improper) Technique - To properly assess the thyroid gland, it is important to recognize its location in relation to the surrounding structures. The thyroid gland has a constant relationship with the laryngeal prominence and cricoid cartilage, that are usually 3 cm apart. Examination requires three steps. First, to properly inspect the gland (you may ask the patient to extend their neck), which helps stretch the skin over the thyroid. You may choose to inspect the patient's neck from the side. Palpation occurs with the clinician standing in front of or behind the patient with the neck slightly flexed. Features such as size, consistency and texture should then be noted. Finally, observe the patient while they swallow. During a normal swallow, the thyroid and trachea both initially move upwards, then hesitate for up to 0.7 seconds before moving back down. If a neck mass is immobile during swallow, does not hesitate before it descends or returns to its original position before complete descent of the thyroid cartilage, then it is unlikely to be the thyroid gland.

INTERPRETATION - A physical exam that does not reveal a goiter by inspection and palpation decreases the probability of an enlarged thyroid (LR=0.4), whereas a gland that is enlarged by palpation and is visible on inspection significantly increases this probability (LR = 26.3). Physical exam findings most suggestive of hypothyroidism include hypothyroid speech (LR = 5.4), which is seen in 33% of patients and is described as a low pitched and hypo-nasal sound, cool and dry skin (LR = 4.7) and a slow pulse rate (LR = 4.2). As for hyperthyroidism, the findings that increases the probability of the disease the most include lid retraction (LR = 33.2) and presence of a lid lag (LR = 18.6). A normal thyroid size decreases the probability of hyperthyroidism the most (LR=0.1).

CAVEAT AND COMMON ERRORS - It is important to note that unlike in hyperthyroidism, an enlarged thyroid is not always seen in patients with hypothyroidism (LR = 2.8). Also, while lid lag and retraction can be seen with all causes of hyperthyroidism, Graves ophthalmopathy (which is characterized by lid edema, limitation of eye movements and exophthalmos) is seen exclusively in those with Graves disease.

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