



# Dental Management of the Patient with Thyroid Disease



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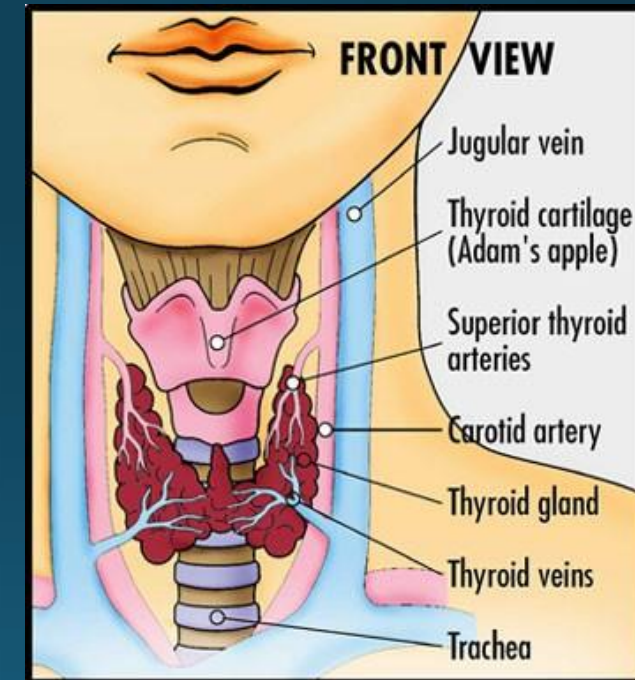
# Thyroid Disease

Over or underactivity of the thyroid gland is one of the most common endocrine disorders

- Abnormalities of the thyroid gland are common and affect 2-9% of the population
- **Thyroid disorders are much more common in women than in men**
- ~ 12% of the population will develop a thyroid disorder during their lifetime
- In an average dental practice of 2000 patients, an estimated 40-180 patients will have a thyroid disorder

**The 4 main categories of thyroid disease are:**

- hyperfunction
- hypofunction
- thyroiditis
- neoplasia



# Clinical Presentation

## Hypothyroidism

- Weight gain
- Lethargy
- Cognitive impairment
- Depression
- Constipation
- Goitre
- Dry skin
- Cold intolerance

## Hyperthyroidism

- Weight loss
- Nervousness and tremor
- Hypertension
- Palpitations / Tachycardia
- Atrial fibrillation
- Muscular weakness
- Goitre
- Diaphoresis, clammy hands
- Heat intolerance

# Hypothyroidism - oral manifestations

- Salivary gland enlargement
- Macroglossia
- **Periodontal disease**
- Delayed wound healing
- Xerostomia (Hashimoto's Thyroiditis)
- Dysgeusia
- Burning mouth syndrome
- **Myxedema** of the orofacial complex
- Delayed dental eruption



**Myxedema** is the increased accumulation of subcutaneous mucopolysaccharides due to decreased degradation of these substances

- found in advanced hypothyroidism

## **Responsible for:**

- puffy appearance
- thickened features
- macroglossia
- salivary gland enlargement

# Hyperthyroidism - oral manifestations

- Glossodynia
- Exacerbation of pain response and dental anxiety
- **Periodontal disease**
- Macroglossia
- Dysphagia due to enlargement of the thyroid
- Maxillary/mandibular osteoporosis
  - accelerated bone remodeling
  - increased fracture rate
  - bone density changes may or may not be reversible with therapy
  - changes in bone metabolism are associated with negative calcium balance, hypercalciuria
- Accelerated dental eruption



# How to Examine the Thyroid

It is located at the base of the neck, just superior to the sternal notch

- The thyroid gland may be palpated from in front or behind the patient

**The thyroid gland is palpated, noting:**

- size
- shape
- symmetry
- tenderness
- presence of nodules

1) Feel below the cricoid cartilage for the thyroid isthmus

2) Ask the patient to swallow

3) Feel for the isthmus rising upward under your fingers

4) Then move your fingers laterally and deep to the anterior border of the sternocleidomastoid. Feel for each lateral lobe before and while the patient swallows

5) Ask the patient to flex their neck slightly forward and to their right. Feel for the lower portion of the thyroid cartilage and displace it to the patient's right. Palpate deep to and behind the sternocleidomastoid. Your fingers should be positioned below the level of the thyroid cartilage

6) Ask the patient to swallow

7) Reverse the procedure for the other side



# Thyroid Disorders - Dental Management

- The first concern in treating the patient with thyroid disease is the level of metabolic control
- Well controlled hyper/hypothyroidism does not present any major risks with routine dental care
- If the patient **doesn't have any CV risks** than there are **no restrictions to dental treatment**, including the use of local anaesthetics with vasoconstrictors
- Chronic oral infections (caries, periodontal disease) may be managed as in any other healthy patient but medical consultation is recommended for treatment of acute oral infections

# Hyperthyroidism and Hypothyroidism = Hypertension

Patients with hyperthyroidism present with increased HR, increased stroke volume, and **increased cardiac output by up to 300%**

- leading to increased systolic BP
- **arterial stiffness is also increased in hyperthyroidism** due to the effect of thyroxin on vascular smooth muscle and endothelial cells

Elevated diastolic blood pressure is present in ~30% of patients with hypothyroidism

- hypothyroidism leads to hypercholesterolemia (due to their impaired metabolism of lipids)
  - Increased LDL, non-HDL cholesterol and triglycerides and decreased HDL are the lipid profile of these patients
- atherosclerosis develops in patients with hypothyroidism as a consequence of hyperlipidemia, and a hypercoagulable state with endothelial dysfunction found in these patients
  - there are also associations between hypothyroidism and defects in the secretion of endothelium-dependent dilation factors



# Hyperthyroidism

A hypermetabolic state with increased sympathetic nervous system activity

- increased beta adrenergic activity

## Cardiac manifestations:

- Earliest and most common symptoms
- thyroid hormones have positive inotropic and chronotropic effects
  - increased cardiac contractility and output
    - response to  $T_4/T_3$  and increased peripheral oxygen requirements
  - tachycardia
  - cardiomegaly
- Atrial fibrillation
  - occurs in approximately 20% of diagnosed patients over 50 years old
- Congestive heart failure may develop in patients with previous cardiovascular disease
  - Hyperthyroid cardiomyopathy: left ventricular dysfunction and “low output” heart failure
- Myocardial changes:
  - focal lymphocytic and eosinophilic infiltrates, fibrosis, increased size and number of mitochondria

# Thyroid Disorders - Dental Management

If the thyroid disorder is untreated or unstable the patient's physician should be consulted to determine possible risks associated with:

- the use of local anesthetics
- infection
- bleeding
  - **Propylthiouracil can increase the anticoagulant effects of warfarin**
- wound healing
  - in hypothyroidism there is decreased metabolic activity of the fibroblasts

CBC to evaluate whether the patient is leukopenic (hyperthyroidism)

- **hyperthyroid medications can cause agranulocytosis/leukopenia**
- methimazole and carbimazole can cause agranulocytosis or leukopenia
  - increased susceptibility to infection

Aspirin and NSAIDs may cause increased levels of circulating  $T_4$  leading to thyrotoxicosis

Prescribing medications to thyroid disease patients is another concern:

- **Drug actions may be altered due to the increased metabolic rate associated with hyperthyroidism or the decreased rate in hypothyroidism**

# Hypothyroidism - Dental Management

Hypothyroidism patients have an exaggerated response to CNS depressants:

- Sedatives
- Narcotic analgesics

Hypothyroidism, especially if uncontrolled, can lead to respiratory depression, so patient positioning should be carefully considered when treating such patients

- Consider treating in a semi-upright position, with oxygen supplementation via nasal prongs

**Myxedematous coma** can be precipitated by:

- CNS depressants
- Infection
- Surgical procedures

# Myxedema Coma

Severe, long-standing hypothyroidism with organ dysfunction and mental status deterioration

- does not require myxedema (swelling of skin and soft tissue) or coma for diagnosis

**Myxedema coma is hypothyroidism presenting with:**

- stupor, confusion, or coma
- hypothermia
- low serum  $FT_4$  and  $FT_3$

**Myxedematous coma can be precipitated by:**

- CNS depressants
- Infection
- Surgical procedures



# Hyperthyroidism

## signs and symptoms evident during a dental examination

The symptoms of hyperthyroidism are an exaggeration of thyroid hormone's normal effects, **affecting virtually every organ system**

- Protrusion of the eyes
- Excessive sweating
- Enlargement of the thyroid
- Dysphagia
- Tachycardia with irregular pulse
- Nervousness
- Resting tremor - hands and tongue
- Smooth, warm, moist skin



# Thyroid disease - bleeding

- Patients with long-standing thyroid disease may experience **increased bleeding** after trauma or surgery
- The presence of excess subcutaneous mucopolysaccharides may **impair the ability of small vessels to constrict if severed** or traumatized, resulting in increased postoperative hemorrhage
- The extended application of firm local pressure should control the bleeding
- Patients with hypothyroidism may also have delayed wound healing due to decreased metabolic activity of the fibroblasts

# Dental Management – Uncontrolled Hyperthyroidism

Patients who have unstable hyperthyroidism are highly susceptible to cardiovascular diseases:

- **tachycardia**
- **hypertension**
- **atrial arrhythmias**
- **congestive heart failure**

Inquiry about cardiovascular status, coagulation factors, level of disease control, and a history of other disease complications should be discussed with the patient's physician

- **patients with atrial fibrillation may be taking anticoagulants**

The use of epinephrine-containing local anesthetics is not contraindicated if the patient's hyperthyroidism is well controlled, but in patients with CV disease or who have uncertain control of their thyroid disease, a medical consult is required

# Thyrotoxic Crisis = Thyroid Storm

Dental treatment may destabilize a patient, so it is imperative that a dentist recognizes the difference between:

- life-threatening thyrotoxic crisis /thyroid storm
- stress/anxiety

**Thyroid storm** is an acute medical emergency that may be precipitated by:

- surgical procedures
- acute infections (including oral)
- trauma
- extreme stress and anxiety
- withdrawal of anti-thyroid drugs
- an acute iodine load - radioactive iodine therapy

Usually caused by an **infection** in an undiagnosed or uncontrolled patient



# Thyroid Storm - signs and symptoms

Exaggeration of the usual symptoms of hyperthyroidism:

- palpitations
  - especially atrial fibrillation
- severe tachycardia
- hyperpyrexia of  $40^{\circ}\text{C}$  to  $41^{\circ}\text{C}$
- tremor
- extreme irritability
- dysphagia
- CHF
- dyspnea and tachypnea
- delirium
- hypotension
- nausea and vomiting
- diarrhea
- dehydration  $\rightarrow$  hypotension
- psychosis, stupor, or coma are common
- hepatic failure with jaundice can also occur

# Thyroid storm - dental Management

In office:

- Immediately stop all dental treatment and take vital signs
- **Positioning:** place the patient in their most comfortable position and activate EMS
- **Circulation:** monitor pulse to check for sufficient circulation and begin CPR if necessary
- **Airway:** confirm that the airway is open and administer O<sub>2</sub> at 6 L/min via a non-rebreather mask
- **Breathing:** if the patient is not breathing, provide assisted ventilation via a bag-valve-mask system
- Administer IM or IV hydrocortisone 100-300 mg
- if trained, the patient may be started on IV isotonic saline IV
- Attempt to cool patient with ice packs, cold towels, etc. until emergency personnel arrive

**Mortality is ~ 10% despite early recognition and treatment**

# Thyroid storm - hospital management

## Management involves:

- Full supportive therapy of the patient in ICU unit
- Immediate treatment to decrease the levels of thyroid hormones
  - large doses of antithyroid drugs (thioamides) - Methimazole and propylthiouracil
  - glucocorticoids – eg. Dexamethasone (2mg orally for q6h)
  - Dexamethasone → inhibits release of hormones from gland and peripheral conversion of  $T_4$  to  $T_3$
- Hyperpyrexia should be aggressively corrected with anti-pyretics and cold baths
- Rehydration (isotonic saline IV)
- Propranolol (oral or IV) - to antagonize beta adrenoceptors
- Sodium ipodate = restores serum  $T_3$  to normal levels within 48-72 hours
  - This is a radioactive contrast medium that inhibits release of thyroid hormones and reduces the conversion of  $T_4$  to  $T_3$
  - amiodarone (antiarrhythmic medication) can be given as alternatives to sodium ipodate
- Oral carbimazole should be given to inhibit synthesis of new thyroid hormone
- Treatment of precipitating cause (**infection usually**)

After 10-14 days, patient can be maintained on carbimazole alone

# Lingual Thyroid

Lingual thyroid is caused by a rare developmental disorder

- due to abnormal caudal migration during the descent of thyroid gland to the neck
- **Lingual thyroid is the most frequent ectopic location of thyroid gland**

Many patients are asymptomatic and the diagnosis is made incidentally by:

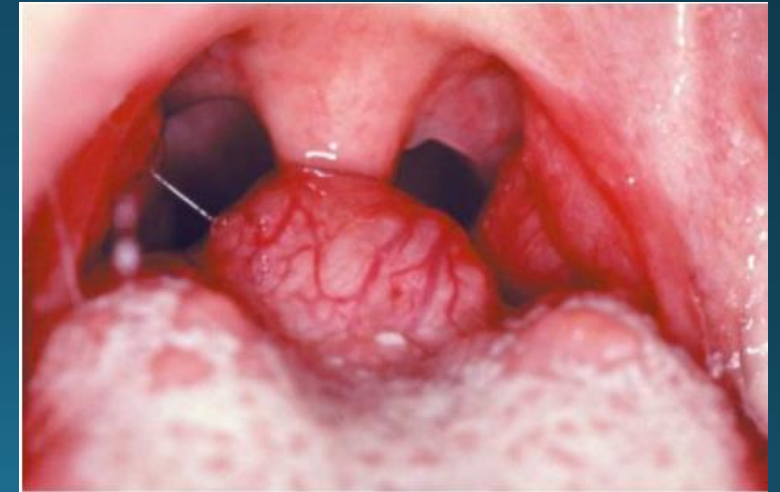
- imaging the tongue or
- imaging the thyroid and noting that it is absent

Direct examination may reveal a nodular red mass of variable size, ranging from:

- a few millimetres
- to 3-4 cm

**The lingual mass may result in:**

- dysphagia
- bleeding from mucosal ulceration
- airway obstruction



Lingual thyroid nodule  
in a 4-year-old girl

# Resources

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