

Risks of Oral and Maxillofacial Surgery in Patients with Thyroid Dysfunction: Proper Management Strategies

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Abstract

Oral and maxillofacial surgery encompasses procedures for correcting mouth, jaw, and facial issues, posing challenges in patients with thyroid dysfunction due to its impact on the coagulation system. Many authors noted a rise in thyroid disease among younger adults, affecting surgeries traditionally performed in this demographic. Thyroid dysfunction alters hemostasis, with hyperthyroidism increasing thromboembolic risks and hypothyroidism impairing wound healing and causing bleeding tendencies. In OMF surgery, hyperthyroid patients face thromboembolic risks, requiring preoperative assessment, thyroid normalization, and anticoagulant prophylaxis. Hypothyroid patients need optimized hormone therapy, careful hemostasis, and postoperative monitoring. Multidisciplinary collaboration among endocrinologists, surgeons, and hematologists is crucial for tailored management strategies. In conclusion, understanding thyroid dysfunction's hemostatic impact is vital for safe OMF surgery, necessitating personalized perioperative care strategies.

Keywords: Oral and maxillofacial surgery; thyroid dysfunction; hyperthyroidism; hypothyroidism; coagulation system

Dear Editor,

Oral and maxillofacial surgery encompasses a range of procedures aimed at correcting structural abnormalities, injuries, or aesthetic concerns in the mouth, jaw, and face. While these surgeries are generally safe, patients with thyroid dysfunction, including hyperthyroidism and hypothyroidism, present unique challenges due to the intricate interplay between thyroid hormones and the coagulation system.

Zhang *et al.* [1] provides insight into the prevalence and trends of thyroid disease among adults from 1999 to 2018. Over this period, there has been a notable shift in demographic characteristics, with an observed increase in the incidence of thyroid disease among younger adults. This shift is particularly significant as thyroid disorders were traditionally more prevalent in older age groups. Factors such as changes in lifestyle, environmental exposures, and diagnostic practices may contribute to this trend. Traditionally, procedures such as orthognathic surgery, third molar surgery and aesthetic surgery are performed in young adults, raising a “red flag” for OMF surgeons [2].

The information presented in this article was compiled through a comprehensive examination of existing literature. A specific search strategy was employed by two independent reviewers (BL and RG), who conducted searches in online databases, including PubMed, Scopus, and Web of Science (WoS). This search strategy incorporated the use of keywords such as “Oral and maxillofacial surgery”; “thyroid dysfunction”; “hyperthyroidism”; “hypothyroidism”; “coagulation system”.

The titles and abstracts of the search results were carefully assessed to determine their relevance to the study. Subsequently, selected articles underwent a full-text screening, during which the authors thoroughly examined and extracted pertinent data.

This study involved a critical review of publicly available electronic sources and did not entail the use of specific patient information. Consequently, it was granted exemption from institutional review board approval.

Thyroid Dysfunction and Hemostasis

Thyroid dysfunction has long been recognized for its impact on hemostasis. Studies such as those by Franchini *et al.* [3] and Elbers *et al.* [4] have highlighted the complex relationship between thyroid function and the coagulation system. Hyperthyroidism is associated with a prothrombotic state, characterized by increased levels of coagulation factors and platelet activation, predisposing patients to thromboembolic events. Conversely, hypothyroidism can lead to impaired platelet function and decreased levels of coagulation factors, resulting in a bleeding diathesis.

Specific Considerations in Oral and maxillofacial Surgery

Reconstructive surgery and orthognathic surgery are a few examples of surgical procedures with great potential for

bleeding, since the usage of osteotomies may cause rupture of vessels, that in a compromised thyroid imbalance, would cause trouble for both patient and surgeon.

In the context of oral and maxillofacial surgery, these alterations in hemostasis pose significant challenges. Patients with hyperthyroidism undergoing surgical procedures are at an increased risk of thromboembolic complications such as deep vein thrombosis and pulmonary embolism. Therefore, meticulous preoperative assessment and prophylactic measures, including the use of anticoagulants, may be warranted to mitigate these risks.

On the other hand, patients with hypothyroidism may present with impaired wound healing and an increased tendency for postoperative bleeding. Hoffmann *et al.* [5] demonstrated that hypothyroid metabolic status could lead to the acquired von Willebrand syndrome, further complicating hemostasis in these individuals. Thus, careful intraoperative hemostasis and postoperative monitoring are essential to prevent excessive bleeding and facilitate optimal wound healing.

Management Strategies

Proper management of patients with thyroid dysfunction undergoing OMF surgery requires a multidisciplinary approach involving endocrinologists, surgeons, and hematologists. Preoperative evaluation should include a thorough assessment of thyroid function, coagulation profile, and bleeding risk. Close collaboration between healthcare providers is essential to tailor perioperative management strategies to individual patient needs [4].

In hyperthyroid patients, normalization of thyroid function through pharmacological or radioiodine therapy should be considered prior to elective surgery whenever feasible. Additionally, perioperative prophylaxis with anticoagulants such as low-molecular-weight heparin may be indicated to reduce the risk of thromboembolic events [4].

For patients with hypothyroidism, optimization of thyroid hormone replacement therapy is crucial to ensure adequate hemostasis and wound healing. Intraoperative hemostatic agents and meticulous surgical technique should be employed to minimize bleeding complications. Postoperatively, close monitoring for signs of bleeding or hematoma formation is imperative, with prompt intervention as needed [4].

Normal hormonal levels and therapeutics for each thyroid dysfunction are displayed in Table 1.

Table 1. Hormonal normal range, correct supplementation and substance used for each of the thyroid dysfunction. TSH - thyroid stimulating hormone; T3- triiodothyronine; T4 – thyroxine

Hormone	Normal Range	Correct Supplementation
TSH	0.4 - 4.0 mIU/L	- Hyperthyroidism: < 0.1 mIU/L - Hypothyroidism: > 4.0 mIU/L
T3	80 - 200 ng/dL	- Hyperthyroidism: Normal or elevated - Hypothyroidism: Low
T4	5.0 - 12.0 µg/dL	- Hyperthyroidism: Normal or elevated - Hypothyroidism: Low
Levothyroxine	-	- Hypothyroidism: T4 replacement, adjusted according to TSH and free T4 levels.
Methimazole	-	- Hyperthyroidism: Inhibitor of thyroid hormone synthesis. Dosage adjusted according to T3 and T4 levels.

Thyroid dysfunction exerts profound effects on hemostasis, posing unique challenges in the context of OMF surgery. While hyperthyroidism predisposes patients to thromboembolic complications, hypothyroidism is associated with impaired wound healing and increased bleeding risk. Proper management of these patients requires a comprehensive understanding of the underlying pathophysiology and a tailored approach to perioperative care.

Yours Sincerely,

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REFERENCES

- [1] Zhang X, Wang X, Hu H, Qu H, Xu Y, Li Q (2023) Prevalence and Trends of Thyroid Disease Among Adults, 1999-2018. *Endocr Pract.* 29(11):875-880. <https://doi.org/10.1016/j.eprac.2023.08.006>
- [2] Kautto A, Vehkalahti MM, Ventä I (2018) Age of patient at the extraction of the third molar. *Int J Oral Maxillofac Surg.* 47(7):947-951 <https://doi.org/10.1016/j.ijom.2018.03.020>
- [3] Franchini M, Montagnana M, Manzato F, Vescovi PP (2009) Thyroid dysfunction and hemostasis: an issue still unresolved. *Semin Thromb Hemost.* 35(3):288-94. <https://doi.org/10.1055/s-0029-1222607>
- [4] Elbers LPB, Fliers E, Cannegieter SC (2018) The influence of thyroid function on the coagulation system and its clinical consequences. *J Thromb Haemost.* 16(4):634-645. <https://doi.org/10.1111/jth.13970>
- [5] Hoffmann MA, Knoll SN, Baqué PE, Rosar F, Scharrer I, Reuss S, Schreckenberger M (2023) The Influence of Hypothyroid Metabolic Status on Blood Coagulation and the Acquired von Willebrand Syndrome. *J Clin Med.* 11;12(18):5905. <https://doi.org/10.3390/jcm12185905>

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