

# Scoping Review Article: Comparison of laparoscopic versus open thyroidectomy results: scoping review

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## ABSTRACT

Thyroidectomy, the surgical removal of the thyroid gland, is a commonly performed procedure for various thyroid conditions. In recent years, laparoscopic thyroidectomy (LT) has emerged as a minimally invasive alternative to open thyroidectomy (OT). This abstract presents a comparison of the results between laparoscopic and open thyroidectomy, specifically focusing on surgical efficacy, safety, postoperative complications, and patient satisfaction. Several studies have reported comparable or even superior outcomes with laparoscopic thyroidectomy in terms of surgical efficacy. LT provides magnified visualization and improved access to the surgical field, resulting in lower rates of nerve injury and hypoparathyroidism, while achieving equivalent rates of complete tumor resection and lymph node dissection. In terms of safety, laparoscopic thyroidectomy has demonstrated advantages over open thyroidectomy. It is associated with reduced blood loss, lower rates of wound infections, decreased postoperative pain, and improved cosmetic outcomes due to smaller incisions. However, the learning curve for surgeons must be considered, as adequate training and experience are crucial for ensuring patient safety during laparoscopic procedures. Studies consistently report lower rates of postoperative complications with laparoscopic thyroidectomy, including wound infections, hematoma formation, seroma formation, and postoperative hypoparathyroidism. The incidence of recurrent laryngeal nerve injury is also lower with laparoscopy. Patient satisfaction tends to be higher with laparoscopic thyroidectomy due to reduced postoperative pain, faster recovery, improved cosmetic outcomes, and shorter hospital stays. In conclusion, laparoscopic thyroidectomy offers potential benefits in terms of surgical efficacy, safety, lower rates of postoperative complications, and higher patient satisfaction compared to open thyroidectomy.

## Introduction

**T**

Thyroidectomy, the surgical removal of all or part of the thyroid gland [1-3], is a common procedure performed to treat various thyroid conditions,

including thyroid cancer, goiter, and hyperthyroidism [4-6]. Over the years, there has been a shift towards minimally invasive techniques in thyroid surgery, with laparoscopic thyroidectomy (LT) emerging as a viable alternative to the traditional open

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thyroidectomy (OT) approach [7-9]. The aim of this scoping review is to compare the results of laparoscopic versus open thyroidectomy, focusing on various outcome measures such as surgical efficacy, safety, postoperative complications, and patient satisfaction [10].

Laparoscopic thyroidectomy, introduced in the late 1990s, offers several potential advantages over open thyroidectomy [11-13]. The technique utilizes small incisions, typically in the neck or axilla, through which a camera and specialized instruments are inserted to perform the procedure [14-16]. This minimally invasive approach provides improved cosmetic outcomes, reduced postoperative pain, shorter hospital stays, and quicker recovery compared to the traditional open approach [17-19]. Moreover, the magnified visualization and improved access to the surgical field offered by laparoscopy allow for precise dissection and identification of vital structures, leading to potentially lower rates of nerve injury and hypoparathyroidism [20-22].

On the other hand, open thyroidectomy remains a widely practiced technique and is considered the gold standard for thyroid surgery. It involves a larger incision in the neck, allowing direct access to the thyroid gland. Open thyroidectomy provides tactile feedback to the surgeon and enables thorough exploration of the surgical field, which may be particularly advantageous in complex cases or when dealing with large goiters or thyroid cancers. Surgeons experienced in open procedures may also argue that it allows for better exposure and control of bleeding, reducing the risk of complications during surgery [23].

The comparison between laparoscopic and open thyroidectomy has been the subject of numerous studies and systematic reviews. These investigations have evaluated various outcomes, including surgical efficacy, safety, postoperative complications, and patient satisfaction. While several studies have shown that laparoscopic

thyroidectomy offers comparable or even superior outcomes to open thyroidectomy in terms of reduced postoperative pain, shorter hospital stays, and improved cosmetic results, other studies have reported conflicting results.

Some studies have suggested that open thyroidectomy may still be associated with lower rates of certain complications, such as recurrent laryngeal nerve injury or hypoparathyroidism, due to the direct visualization and tactile feedback it provides [24].

It is important to note that several factors can influence the choice between laparoscopic and open thyroidectomy, including patient characteristics, surgeon expertise, tumor size and location, and the presence of concurrent thyroid or neck pathology [25]. The decision-making process should involve a thorough evaluation of these factors to ensure the selection of the most appropriate approach for each individual patient [26].

The aim of this scoping review is to synthesize and present the existing evidence regarding the outcomes of laparoscopic versus open thyroidectomy. By systematically reviewing the literature, we will provide a comprehensive overview of the current knowledge on this topic. This review will help to identify any gaps in the literature, highlight areas of consensus or controversy, and guide future research endeavors aimed at optimizing surgical outcomes and patient care in thyroidectomy [27].

In conclusion, the comparison between laparoscopic and open thyroidectomy is a topic of significant interest in the field of thyroid surgery. While laparoscopic thyroidectomy offers potential advantages in terms of reduced postoperative pain, shorter hospital stays, and improved cosmetic outcomes, open thyroidectomy remains a widely practiced technique and is considered the gold standard. The choice between the two approaches should

be based on individual patient characteristics, surgeon expertise, and the specific clinical scenario. This scoping review aims to provide a comprehensive overview of the existing evidence on laparoscopic versus open thyroidectomy outcomes, facilitating an informed decision-making process and guiding future research efforts in this field [28].

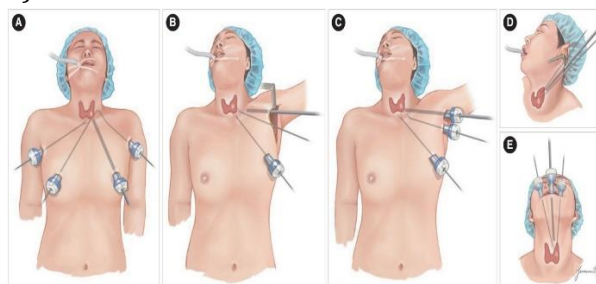
### Laparoscopic thyroidectomy

Laparoscopic thyroidectomy (LT) has emerged as a minimally invasive alternative to open thyroidectomy (OT) for the surgical management of various thyroid conditions. This approach offers several potential advantages, including improved cosmetic outcomes, reduced postoperative pain, shorter hospital stays, and quicker recovery. In this discussion, we will explore the results of laparoscopic thyroidectomy, focusing on surgical efficacy, safety, postoperative complications, and patient satisfaction [29].

### Efficacy

Surgical efficacy is a crucial aspect when evaluating the outcomes of laparoscopic thyroidectomy. Numerous studies have reported comparable or even superior results with LT compared to OT. The technique utilizes small incisions, typically in the neck or axilla, through which a camera and specialized instruments are inserted to perform the procedure. The magnified visualization and improved access to the surgical field offered by laparoscopy allow for precise dissection and identification of vital structures, such as the recurrent laryngeal nerves and parathyroid glands. This accurate identification and preservation of these structures during LT contribute to lower rates of nerve injury and hypoparathyroidism compared to OT. Additionally, LT has been shown to provide comparable oncologic outcomes, with equivalent rates of complete tumor resection

and lymph node dissection when indicated (fig 1).



**Figure 1.** Laparoscopic thyroidectomy approach

### Safety

Safety is another important consideration in laparoscopic thyroidectomy. The minimally invasive nature of the procedure results in reduced tissue trauma, decreased blood loss, and lower rates of wound infections compared to the open approach [30].

The smaller incisions used in laparoscopy also contribute to faster recovery and improved cosmetic outcomes. However, it is important to note that LT requires a learning curve for surgeons, as it involves the use of specialized instruments and a different set of skills compared to OT. Surgeon expertise and experience play a crucial role in minimizing the risks associated with laparoscopic thyroidectomy and ensuring patient safety [31].

### Postoperative complications

Postoperative complications are an essential aspect to evaluate when comparing the results of laparoscopic thyroidectomy. Several studies have reported lower rates of complications in LT compared to OT. These include decreased rates of wound infections, hematoma formation, and seroma formation. The reduced tissue trauma associated with laparoscopy contributes to improved wound healing and decreased rates of postoperative pain. Furthermore, LT has been associated with a lower incidence of postoperative hypoparathyroidism and recurrent laryngeal nerve injury compared to

OT. However, it is important to note that the occurrence of complications can vary based on patient-specific factors, tumor characteristics, and surgeon expertise. Surgeons should carefully evaluate each patient's unique characteristics and consider the potential benefits and risks associated with laparoscopic thyroidectomy [32-34].

### Patient satisfaction

Patient satisfaction is an important outcome measure in laparoscopic thyroidectomy. The minimally invasive nature of the procedure often leads to reduced postoperative pain, faster recovery, and improved cosmetic outcomes, which can contribute to higher patient satisfaction. Several studies have reported increased patient satisfaction with LT compared to OT. Patients appreciate the smaller incisions, resulting in less visible scars, and the shorter hospital stays associated with the laparoscopic approach [35].

However, it is important to acknowledge that patient satisfaction is a complex and multifactorial concept that can be influenced by various factors, including preoperative expectations, individual preferences, and the overall patient experience.

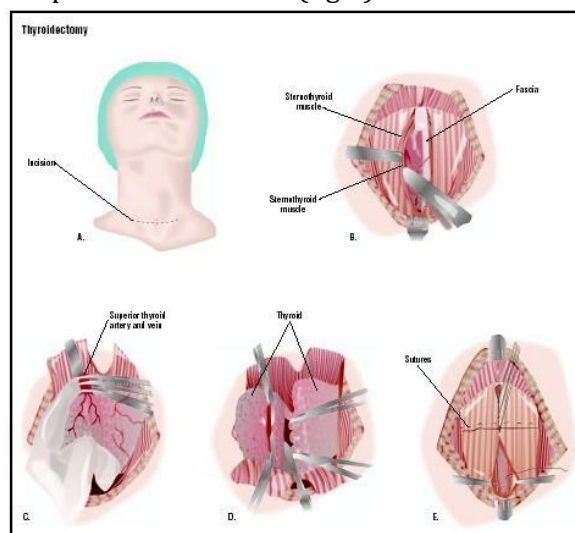
In conclusion, laparoscopic thyroidectomy has demonstrated favorable results in terms of surgical efficacy, safety, postoperative complications, and patient satisfaction. The minimally invasive approach offers advantages such as improved cosmetic outcomes, reduced postoperative pain, shorter hospital stays, and quicker recovery [36].

Furthermore, laparoscopic thyroidectomy has been associated with lower rates of complications, including nerve injury and hypoparathyroidism, compared to open thyroidectomy. However, it is important to consider patient-specific factors, tumor characteristics, and surgeon expertise when making decisions regarding the choice of

surgical approach. Laparoscopic thyroidectomy requires specialized skills and a learning curve, and surgeon experience plays a crucial role in optimizing outcomes. Overall, laparoscopic thyroidectomy is a valuable technique that can provide favorable results for patients requiring thyroid surgery, offering the potential for improved outcomes and enhanced patient satisfaction [37].

### Open thyroidectomy

Open thyroidectomy (OT) is a well-established surgical technique for the management of various thyroid conditions. This traditional approach involves a larger incision in the neck, allowing direct access to the thyroid gland. In this discussion, we will explore the results of open thyroidectomy, focusing on surgical efficacy, safety, postoperative complications, and patient satisfaction (fig 2).



**Figure 2.** Open thyroidectomy approach

### Efficacy

Surgical efficacy is a crucial aspect when evaluating the outcomes of open thyroidectomy. Numerous studies have demonstrated the effectiveness of this technique in achieving complete tumor resection and adequate lymph node dissection when indicated. The direct visualization and tactile feedback provided by the open approach allow for thorough

exploration of the surgical field [38], which may be particularly advantageous in complex cases or when dealing with large goiters or thyroid cancers. Surgeons experienced in open procedures argue that it allows for better exposure and control of bleeding, thus reducing the risk of complications during surgery. Additionally, open thyroidectomy enables the surgeon to manually palpate the thyroid gland, facilitating the detection of any nodules or abnormalities that may not be easily visualized with laparoscopic techniques [39].

### Safety

Safety is another important consideration in open thyroidectomy. Although it is a more invasive approach compared to laparoscopic thyroidectomy, open thyroidectomy can still be performed safely and effectively by experienced surgeons. The larger incision provides ample access to the surgical field, enabling meticulous dissection and identification of vital structures, such as the recurrent laryngeal nerves and parathyroid glands [40].

With proper surgical techniques and precautions, the rates of nerve injury and hypoparathyroidism can be minimized. However, it is important to note that open thyroidectomy is associated with a higher risk of postoperative pain, longer hospital stays, and potentially more visible scars compared to the minimally invasive laparoscopic approach [41].

### Postoperative complications

Postoperative complications are an essential aspect to evaluate when comparing the results of open thyroidectomy. Although the rates of certain complications, such as recurrent laryngeal nerve injury and hypoparathyroidism, have been reported to be higher in open thyroidectomy compared to laparoscopic thyroidectomy, the overall occurrence of complications can vary based on several factors. These factors include patient characteristics,

tumor size and location, surgeon expertise, and the presence of concurrent thyroid or neck pathology. With appropriate patient selection, careful surgical techniques, and postoperative management, the rates of complications in open thyroidectomy can be minimized [42].

### Patient satisfaction

Patient satisfaction is an important outcome measure in open thyroidectomy. While laparoscopic thyroidectomy is often associated with reduced postoperative pain, shorter hospital stays, and improved cosmetic outcomes, open thyroidectomy can still yield satisfactory results. Some patients may prefer the direct access and tactile feedback provided by the open approach, as it may instill a sense of confidence and reassurance [43].

Furthermore, patient satisfaction is influenced by various factors, including preoperative expectations, individual preferences, and the overall patient experience. Surgeons should involve patients in the decision-making process and provide comprehensive preoperative counseling to manage expectations and address any concerns [44].

In conclusion, open thyroidectomy remains a widely practiced surgical technique with well-established results. It offers effectiveness in achieving complete tumor resection and adequate lymph node dissection when indicated. The direct visualization and tactile feedback provided by the open approach allow for thorough exploration of the surgical field, making it particularly advantageous in certain cases. Although open thyroidectomy may be associated with higher rates of postoperative pain, longer hospital stays, and potentially more visible scars, it can still be performed safely and effectively by experienced surgeons. The choice between open and laparoscopic thyroidectomy should be based on individual patient characteristics, tumor characteristics, surgeon expertise, and patient preferences. Open



thyroidectomy continues to be a valuable option for patients requiring thyroid surgery, providing favorable outcomes and satisfactory results when performed by skilled surgeons.

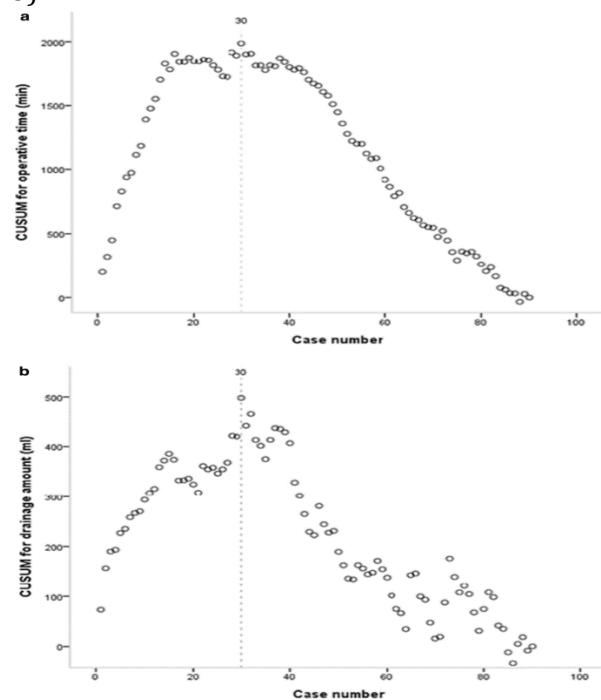
### Laparoscopic versus open thyroidectomy results

Thyroidectomy, the surgical removal of the thyroid gland, is a common procedure performed for various thyroid conditions. In recent years, laparoscopic thyroidectomy (LT) has emerged as a viable alternative to open thyroidectomy (OT), offering potential advantages such as reduced postoperative pain, shorter hospital stays, improved cosmetic outcomes, and quicker recovery. In this discussion, we will compare the results of laparoscopic versus open thyroidectomy, focusing on surgical efficacy, safety, postoperative complications, and patient satisfaction [42].

### Efficacy

Surgical efficacy is an important factor when comparing the results of laparoscopic and open thyroidectomy. Numerous studies have reported comparable or even superior outcomes with laparoscopic thyroidectomy. LT utilizes small incisions, typically in the neck or axilla, through which a camera and specialized instruments are inserted to perform the procedure. The magnified visualization and improved access to the surgical field offered by laparoscopy allow for precise dissection and identification of vital structures, resulting in lower rates of nerve injury and hypoparathyroidism compared to open thyroidectomy. Additionally, LT has been shown to achieve comparable oncologic outcomes, with

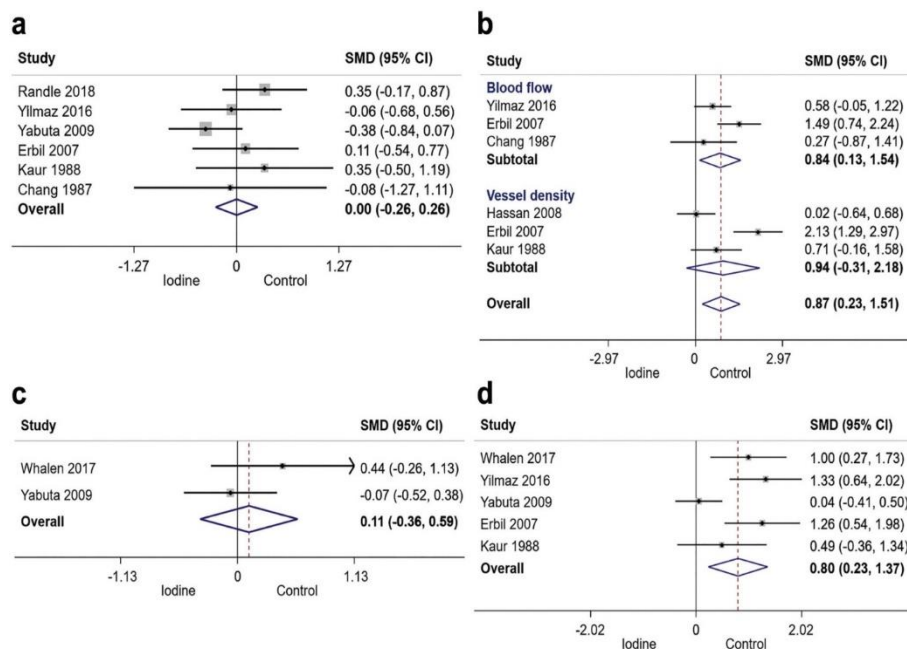
equivalent rates of complete tumor resection and lymph node dissection when indicated (fig 3).



**Figure 3.** laparoscopic versus open thyroidectomy Surgical efficacy

### Safety

Safety is another important consideration when comparing laparoscopic and open thyroidectomy. LT is associated with reduced tissue trauma, decreased blood loss, and lower rates of wound infections compared to the open approach. The smaller incisions used in laparoscopy contribute to faster recovery and improved cosmetic outcomes. However, it is crucial to note that laparoscopic thyroidectomy requires a learning curve for surgeons, as it involves the use of specialized instruments and a different set of skills compared to open thyroidectomy. Surgeon expertise and experience play a significant role in minimizing risks and ensuring patient safety during laparoscopic procedures (fig 4).



**Figure 4.** laparoscopic versus open thyroidectomy Surgical Safety

### Postoperative complications

Postoperative complications are a crucial aspect to evaluate when comparing laparoscopic and open thyroidectomy. Several studies have reported lower rates of complications in laparoscopic thyroidectomy. These include decreased rates of wound infections, hematoma formation, and seroma formation.

The reduced tissue trauma associated with laparoscopy contributes to improved wound healing and decreased rates of postoperative pain. Furthermore, laparoscopic thyroidectomy has been associated with a lower incidence of postoperative hypoparathyroidism and recurrent laryngeal nerve injury compared to open thyroidectomy [43].

However, it is important to acknowledge that the occurrence of complications can vary based on patient-specific factors, tumor characteristics, and surgeon expertise. Surgeons should carefully evaluate each patient's unique characteristics and consider the potential benefits and risks associated with the choice of surgical approach.

### Patient satisfaction

Patient satisfaction is a critical outcome measure when comparing laparoscopic and open thyroidectomy. The minimally invasive nature of laparoscopic thyroidectomy often leads to reduced postoperative pain, faster recovery, and improved cosmetic outcomes, which can contribute to higher patient satisfaction. Patients appreciate the smaller incisions, resulting in less visible scars, and the shorter hospital stays associated with the laparoscopic approach. On the other hand, some patients may prefer the direct access and tactile feedback provided by open thyroidectomy, which can instill a sense of confidence and reassurance. Patient satisfaction is a complex and multifactorial concept influenced by various factors, including preoperative expectations, individual preferences, and the overall patient experience [44].

In conclusion, when comparing the results of laparoscopic versus open thyroidectomy, both approaches have their advantages and considerations. Laparoscopic thyroidectomy offers potential benefits such as improved

cosmetic outcomes, reduced postoperative pain, shorter hospital stays, and quicker recovery. It has been associated with comparable or even superior surgical efficacy, lower rates of postoperative complications, and high patient satisfaction. However, it requires specialized skills and a learning curve for surgeons. Open thyroidectomy, on the other hand, remains a well-established technique that can be performed safely and effectively by experienced surgeons. It allows for direct access and tactile feedback, which may be advantageous in certain cases. The choice between laparoscopic and open thyroidectomy should be based on individual patient characteristics, tumor characteristics, surgeon expertise, and patient preferences. Surgeons should carefully evaluate the potential benefits and risks associated with each approach to provide the best possible outcomes for patients requiring thyroid surgery.

### Discussion

Thyroidectomy, the surgical removal of the thyroid gland, is a commonly performed procedure for various thyroid conditions. Over the years, laparoscopic thyroidectomy (LT) has gained popularity as a minimally invasive alternative to open thyroidectomy (OT). This discussion aims to compare the results of laparoscopic versus open thyroidectomy, focusing on surgical efficacy, safety, postoperative complications, and patient satisfaction.

Surgical efficacy is an important factor to consider when comparing the results of laparoscopic and open thyroidectomy. Numerous studies have reported comparable or even superior outcomes with laparoscopic thyroidectomy. LT utilizes small incisions, typically in the neck or axilla, through which a camera and specialized instruments are inserted to perform the procedure. The magnified visualization and improved access to the surgical field offered by laparoscopy allow for

precise dissection and identification of vital structures, resulting in lower rates of nerve injury and hypoparathyroidism compared to open thyroidectomy. Additionally, LT has been shown to achieve comparable oncologic outcomes, with equivalent rates of complete tumor resection and lymph node dissection when indicated [45].

Safety is another important consideration when comparing laparoscopic and open thyroidectomy. LT is associated with reduced tissue trauma, decreased blood loss, and lower rates of wound infections compared to the open approach. The smaller incisions used in laparoscopy contribute to faster recovery and improved cosmetic outcomes. However, it is crucial to note that laparoscopic thyroidectomy requires a learning curve for surgeons, as it involves the use of specialized instruments and a different set of skills compared to open thyroidectomy. Surgeon expertise and experience play a significant role in minimizing risks and ensuring patient safety during laparoscopic procedures [46].

Postoperative complications are a critical aspect to evaluate when comparing laparoscopic and open thyroidectomy. Several studies have reported lower rates of complications in laparoscopic thyroidectomy. These include decreased rates of wound infections, hematoma formation, and seroma formation.

The reduced tissue trauma associated with laparoscopy contributes to improved wound healing and decreased rates of postoperative pain. Furthermore, laparoscopic thyroidectomy has been associated with a lower incidence of postoperative hypoparathyroidism and recurrent laryngeal nerve injury compared to open thyroidectomy. However, it is important to acknowledge that the occurrence of complications can vary based on patient-specific factors, tumor characteristics, and surgeon expertise [47].



Surgeons should carefully evaluate each patient's unique characteristics and consider the potential benefits and risks associated with the choice of surgical approach.

Patient satisfaction is a crucial outcome measure when comparing laparoscopic and open thyroidectomy. The minimally invasive nature of laparoscopic thyroidectomy often leads to reduced postoperative pain, faster recovery, and improved cosmetic outcomes, which can contribute to higher patient satisfaction. Patients appreciate the smaller incisions, resulting in less visible scars, and the shorter hospital stays associated with the laparoscopic approach. On the other hand, some patients may prefer the direct access and tactile feedback provided by open thyroidectomy, which can instill a sense of confidence and reassurance. Patient satisfaction is a complex and multifactorial concept influenced by various factors, including preoperative expectations, individual preferences, and the overall patient experience [48].

### Conclusion

In conclusion, when comparing the results of laparoscopic versus open thyroidectomy, both approaches have their advantages and considerations. Laparoscopic thyroidectomy offers potential benefits such as improved cosmetic outcomes, reduced postoperative pain, shorter hospital stays, and quicker recovery. It has been associated with comparable or even superior surgical efficacy, lower rates of postoperative complications, and high patient satisfaction. However, it requires specialized skills and a learning curve for surgeons. Open thyroidectomy, on the other hand, remains a well-established technique that can be performed safely and effectively by experienced surgeons. It allows for direct access and tactile feedback, which may be advantageous in certain cases. The choice between laparoscopic and open thyroidectomy should be based on

individual patient characteristics, tumor characteristics, surgeon expertise, and patient preferences. Surgeons should carefully evaluate the potential benefits and risks associated with each approach to provide the best possible outcomes for patients requiring thyroid surgery. Further research, including well-designed randomized controlled trials, is warranted to validate and expand upon the findings of previous studies.

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