

ORIGINAL RESEARCH

Otolaryngologist surgical preferences for orbital decompression in thyroid eye disease: A North American survey

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Abstract

Background: Orbital decompression is recommended for TED especially in the treatment of severe, refractory cases yet there are no clear guidelines regarding the optimal surgical approach. Previously conducted surveys assessed variations in the management of TED but only amongst ophthalmologists. Our study attempts to better characterize surgical and perioperative preferences amongst otolaryngologists in the management of TED.

Methods: A survey was administered to the American Rhinologic Society and Canadian Society of Otolaryngology – Head and Neck Surgery via REDCap with 52 total respondents. Respondent demographic information and pre-operative management, procedural specifics, and post-operative management preferences were collected.

Results: The majority of respondents practiced in a metropolitan (82.7%), academic setting (73.1%) and received subspecialty training in Rhinology & Skull Base Surgery (88.9%). Most elected for corticosteroids (63.5%) and medical management (69.2%) prior to orbital decompression but did not use any classification system (86.5%). Orbital decompression was most often done with ophthalmology collaboration (71.2%). Removal of two bony walls (55.8%) via medial wall (97.9%) and orbital floor (72.3%) removal was most preferred. Removal of one orbital fat aspect (60.6%) via the medial fat pad was most preferred. Combined bone and fat removal (59.6%) completed via an endoscopic approach (71.2% and 97.0%, respectively) was most common. Post-operatively, most patients were not admitted (88.4%) with saline nasal rinses (92.3%) utilized by most respondents.

Conclusions: This survey completed by otolaryngologists highlights several key distinctions in the preferred surgical approach during orbital decompression and the perioperative management of TED when compared to ophthalmologists and current recommendations.

Level of evidence: Level 4.

KEYWORDS

endoscopy, orbital decompression, otolaryngology, thyroid eye disease

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1 | INTRODUCTION

Thyroid eye disease (TED) is most commonly a complication of Graves' disease or unstable thyroid function.¹ With an incidence of 1.9 cases per 10,000 per year,² TED affects up to 40% of patients worldwide with Graves' disease,³ with moderate-to-severe forms of TED representing 5–6% of all cases.⁴ Smoking status, age, male sex, and worsening hyperthyroidism have all been identified as risk factors for the development of TED in patients with Graves' disease.^{5,6} TED is hypothesized to be due to an autoimmune-mediated inflammatory response driven by thyrotropin receptor antibodies (TRAbs) targeting fibroblasts within orbital connective tissue and intraorbital fat.⁷ TED can present with varying degrees of severity with possible upper eyelid retraction, conjunctival and caruncle injection or edema, eyelid edema and erythema, ocular motility disruption, strabismus, and proptosis, although many patients present with non-specific dry eye complaints.⁸

While management of TED includes addressing the thyroid dysfunction itself, early medical and potential surgical management for TED is essential to prevent long-term complications and worsening overall quality of life.^{8,9} Medical management is the initial treatment for TED and surgical orbital decompression is used for treatment of moderate-severe TED.^{8,10,11} With a variety of medical and surgical treatment regimens available, the American Thyroid Association and European Thyroid Association (ATA-ETA) made a joint Consensus Statement in 2022 for the management of TED.¹² In general, the ATA-ETA recommended surgical decompression during the inactive phase in mild and moderate-to-severe TED (e.g., disfiguring proptosis, chronic orbital congestion, globe subluxation) or during sight threatening TED in the case of compressive or stretch optic neuropathy.¹² In mild cases, intraconal orbital fat resection and/or lateral orbital wall decompression was recommended, with decompression of the deep medial wall and orbital floor reserved for optic neuropathy.¹² However, clear operative guidelines for TED were not established by the ATA-ETA 2022 Consensus Statement.¹²

There are considerable variations between the specific surgical approaches to orbital decompression: the amount of orbital walls removed, whether bone and/or fat are removed, the use of an external or endoscopic approach, and the degree of collaboration across medical specialties.^{11,13–15} Differences in treatment preferences for TED by U.S. ophthalmologists has been assessed by several studies through the American Society of Assessment Ophthalmic Plastic and Reconstructive Surgery.^{11,14,15} Of the U.S. ophthalmologists assessed, the majority performed orbital decompressions¹¹ and preferred a two-wall decompression of either the medial and lateral walls or the medial wall and orbital floor.^{14,15} While the majority of responders did not collaborate with otolaryngology, those that did elect to perform fat decompression were more likely to collaborate with otolaryngology.¹⁴ While other studies have indicated U.S. geographical differences between the preferred technique for orbital decompression,¹³ no studies have looked at variations in surgical approaches to orbital decompression for TED among otolaryngologists.

With the increasing use of orbital decompression as a treatment modality for TED,¹³ it is essential that medical providers and patients alike have a better understanding of the most common specialties and practices involved, the preferred surgical approach, and the specific pre-operative and post-operative considerations given during the course of treatment for TED. To better understand the surgical preferences of otolaryngologists for orbital decompression in TED, a survey was administered to both the American Rhinologic Society (ARS) and Canadian Society of Otolaryngology – Head and Neck Surgery (CSO-HNS).

2 | MATERIALS AND METHODS

2.1 | Survey distribution

A 33-question survey was administered to all members of the ARS and CSO-HNS from October 2023 to December 2023 via REDCap using both societies email databases. Descriptive characteristics of respondents were assessed to determine subspecialty training, practice location and setting, years of post-residency/post-fellowship training, and annual frequency of orbital decompressions performed. The collaboration between specialties, use of professional classifications systems of TED, indications for orbital decompression, and preoperative management for TED were evaluated. Orbital decompression procedural specifics were assessed for both bone and fat decompression. Finally, post-operative preferences for hospitalization and medical management were evaluated. For the 10 survey questions that included the answer choice “other,” respondents were allowed a free-text response. Responses were completely anonymous with no identifying information other than the demographic information that was provided voluntarily within the survey. The administered survey questions are represented in Figure 1.

2.2 | Statement of Institutional Review Board approval

The Human Subjects Protection Office determined that the proposed activity did not require formal Institutional Review Board (IRB) review because the research met the criteria for exempt research according to the policies of the institution and the provisions of applicable federal regulations.

3 | RESULTS

3.1 | Demographics

This study included 52 respondents (Table 1). Forty-one out of fifty-two respondents (78.8%) were members of the ARS, 3/52 (5.8%) were members of the CSO-HNS, and 8/52 (15.4%) were members from both societies. Of the 45/52 (86.5%) of respondents that do perform

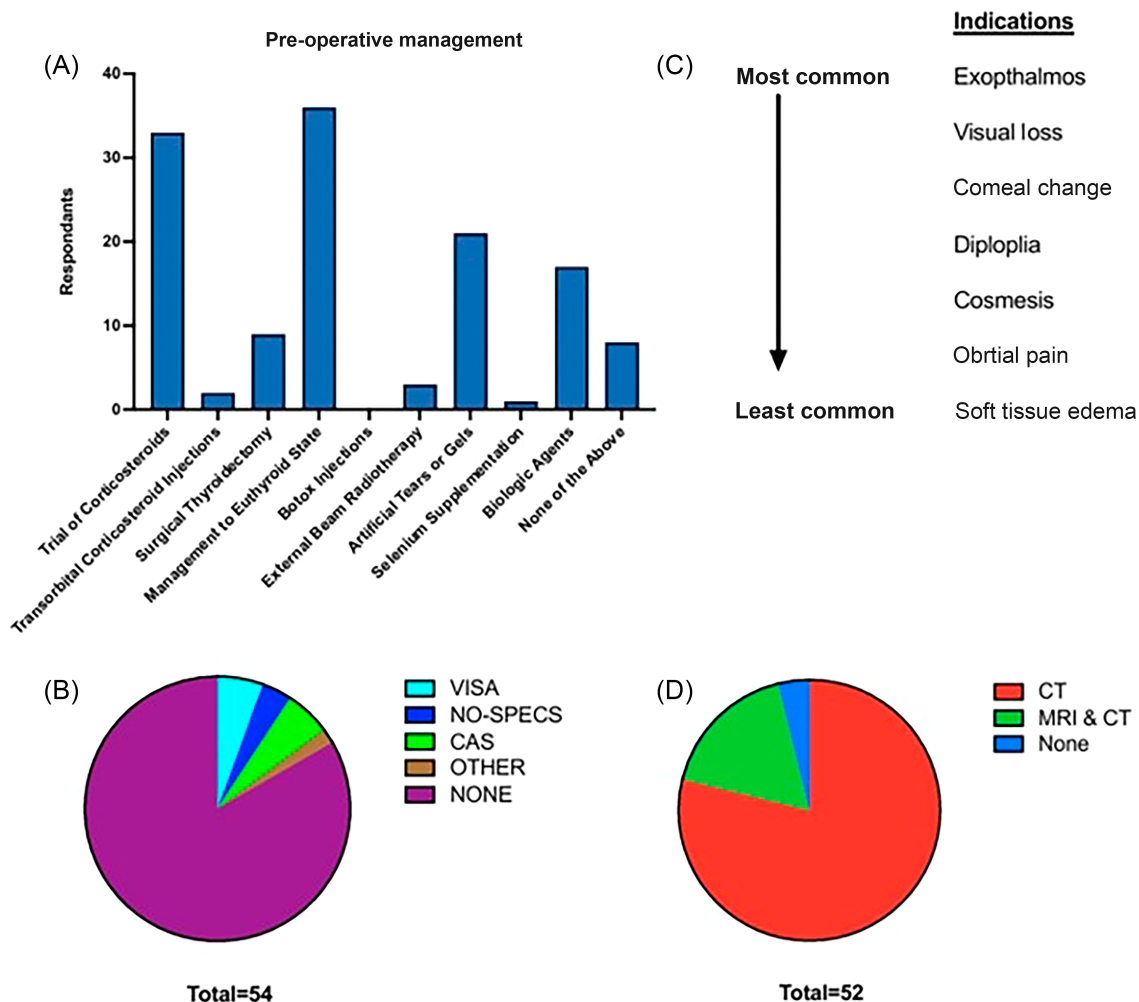


FIGURE 1 Pre-operative management.

orbital decompression for TED, 40/45 (88.9%) received subspecialty training in Rhinology and Skull Base Surgery. The majority of respondents indicated that their medical practice was located in a metropolitan area (43/52; 82.7%) and in an academic setting (38/52; 73.1%). Most respondents finished fellowship training within 15 years (29/52; 55.8%) and performed between 1 and 10 decompressions annually (44/52; 69.3%). The majority of respondents indicated that they collaborate with ophthalmology during orbital decompression (37/52; 71.2%).

3.2 | Pre-operative management

Most respondents elected for a trial of corticosteroids (33/52; 63.5%) and medical management of Graves' disease to a euthyroid state (36/52; 69.2%) before consideration of orbital decompression for TED. Seventeen out of fifty-two respondents (32.7%) endorse the use of biologic agents prior to surgical management of TED. Furthermore, 9/52 (17.3%) and 3/52 (5.8%) elect for surgical thyroidectomy or external beam radiotherapy, respectively, prior to considering orbital

decompression for TED (Figure 1A). Most respondents did not use any classification system prior to orbital decompression (45/52; 86.5%; Figure 1B). Exophthalmos was the most common indication for orbital decompression by respondents (23/48; 47.9%; Figure 1C). CT was the most common radiographic imaging modality used for surgical planning (41/52; 78.8%; Figure 1D). 46/52 (88.5%) of respondents would offer bilateral orbital decompression if clinically indicated.

3.3 | Procedural preferences

In performing orbital decompression for TED, the majority of respondents indicated that they most frequently perform both bone and fat decompression (28/47; 59.6%) compared to bone decompression only (21/46; 45.7%) or fat decompression only (1/41; 2.4%; Figure 2A).

In those who perform bone decompression, an endoscopic approach was preferred by most respondents (37/52; 71.2%; Figure 2B) with 50/52 (96.2%) preferring to perform a maxillary antrostomy and/or total ethmoidectomy during endoscopic

TABLE 1 Survey respondent demographics.

Demographic information	Answer choices	n (%)
Professional society	American Rhinologic Society	41 (78.8)
	Canadian Society Of Otolaryngology-Head And Neck Surgery	3 (5.8)
	Both	8 (15.4)
Subspecialty training	Head and neck	2 (4.4)
	Rhinology and skull base surgery	40 (88.9)
	Facial plastics	3 (6.7)
	Sleep medicine	1 (2.2)
	General	2 (4.4)
Practice location	Metropolitan (>250,000 residents)	43 (82.7)
	Urban (2500–250,000 residents)	9 (17.3)
	Rural (<2500 residents)	0 (0)
Practice setting	Academic	38 (73.1)
	Community	11 (21.2)
	Other	3 (5.8)
Years post-fellowship	0–5 years	15 (28.8)
	6–10 years	7 (13.5)
	11–15 years	7 (13.5)
	16–20 years	6 (11.5)
	20–25 years	8 (15.4)
	26–30 years	2 (3.8)
	30+ years	7 (13.5)
Annual number of orbital decompressions	<1 procedure	8 (15.4)
	1–2 procedures	11 (21.2)
	2–5 procedures	14 (26.9)
	5–10 procedures	11 (21.2)
	10+ procedures	8 (15.4)
Collaboration	Independent	14 (26.9)
	Collaboration—another otolaryngologist	1 (1.9)
	Collaboration—ophthalmology	37 (71.2)

dissection (Figure 2C). Furthermore, 34/52 (65.4%) indicated that they preferred to perform a sphenoidotomy and 12/52 (23.1%) preferred to perform a middle turbinectomy (Figure 2C). Of the 18 respondents that utilize an open approach for bone decompression, a Krolein incision and canthotomy was the most preferred approach (5/18; 23.0%; Figure 2D). The subsequent preferred approaches were via an eyelid crease (4/18; 22.2%), transconjunctival and canthotomy (3/18; 16.7%), transcaruncular (3/18; 16.7%), transconjunctival (2/18; 11.1%), and subciliary approach (1/18; 5.6%; Figure 2D).

During bone decompression, 47/52 (90.4%) utilized stereotactic computer-assisted navigation. Most respondents indicated that they most often removed two bony walls (29/52; 55.8%; Figure 3A) in

which the medial wall (46/47; 97.9%) and orbital floor (34/47; 72.3%) were removed most often. For those who perform single bony wall removal for orbital decompression all respondents preferred removal of the medial wall. Of those who perform a medial bone decompression, a Cottle/Freer elevator is most often utilized (35/51; 68.6%; Figure 3B). Most respondents preferred to preserve the inferomedial orbital strut (27/52; 51.9%) and periorbital sling at the level of the medial rectus (29/52; 55.8%; Figure 3C). Of the 21 respondents that perform lateral bone decompression (21/52; 40.4%), the ultrasonic aspirator (8/21; 38.1%) and high-speed drill (8/21; 38.1%) were the most commonly preferred devices utilized (Figure 3D).

Of the 33 respondents that perform fat decompression, an endoscopic approach was the preferred surgical method of choice by respondents (32/33; 97.0%) with the majority preferring to remove one orbital fat aspect (20/33; 60.6%; Figure 4A). Cold steel instrumentation was the preferred device utilized by those who perform fat decompression (20/32; 62.5%; Figure 4B). For those who perform single fat aspect decompression, the medial fat aspect was most commonly removed (27/30; 90.0%; Figure 4C). For those who perform two aspect fat decompression, the medial fat aspect (23/24; 95.8%) was the most commonly removed followed by the orbital floor fat aspect (14/24; 58.3%) and the lateral fat aspect (7/24; 29.2%; Figure 4C).

3.4 | Post-operative management

Most respondents indicated that their patients were not admitted following orbital decompression (46/52; 88.5%) with patients most often managed via short stay (<24 h; 24/52; 46.2%) or day surgery (22/52; 42.3%). Saline nasal rinses were indicated to be the post-operative medication management of choice by 48/52 (92.3%) of respondents. This was followed by artificial tears/ophthalmic gels (22/52; 42.3%), antibiotics (21/52; 40.4%), oral steroids (13/52; 25.0%), intranasal steroid sprays/rinses (11/52; 21.2%), and intravenous steroids (5/52; 9.6%). Only one respondent elected for no post-operative medical management and no respondents elected for acetazolamide use post-operatively.

4 | DISCUSSION

This is the first survey to explore the practice patterns of otolaryngologists in the management of TED. This survey focused on pre-operative, operative, and post-operative preferences in the surgical management of TED. By administering a survey to members of the ARS and CSO-HNS, we were able to better characterize the surgical preferences of North American otolaryngologists who perform orbital decompression in the treatment of TED. Fewer than 250 endoscopic procedures are performed annually in the United States¹³ with the surgical management of TED likely focused to specialized centers. Our study respondents are representative of this specialized management of TED as nearly 89% (40/45) have completed a Rhinology and Skull Base fellowships and 83% (43/52) practice in a metropolitan region.

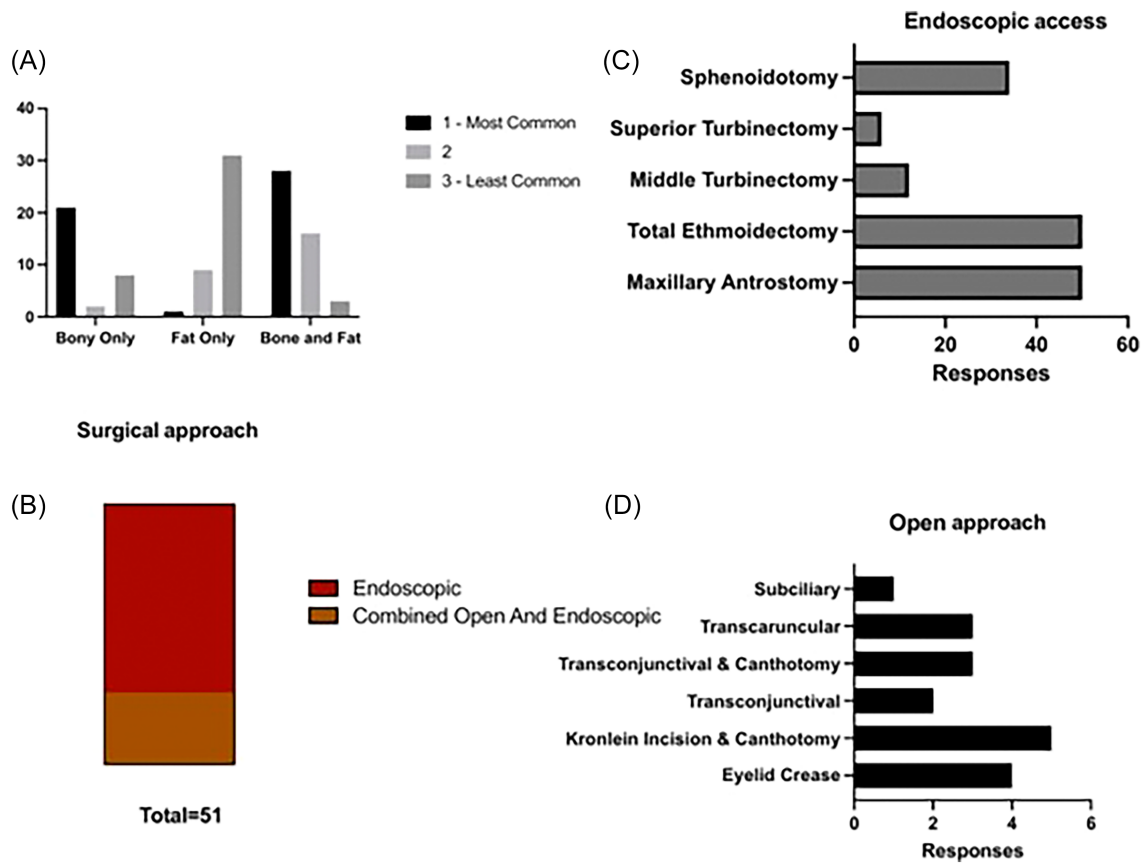


FIGURE 2 Procedural specifics—general surgical approach.

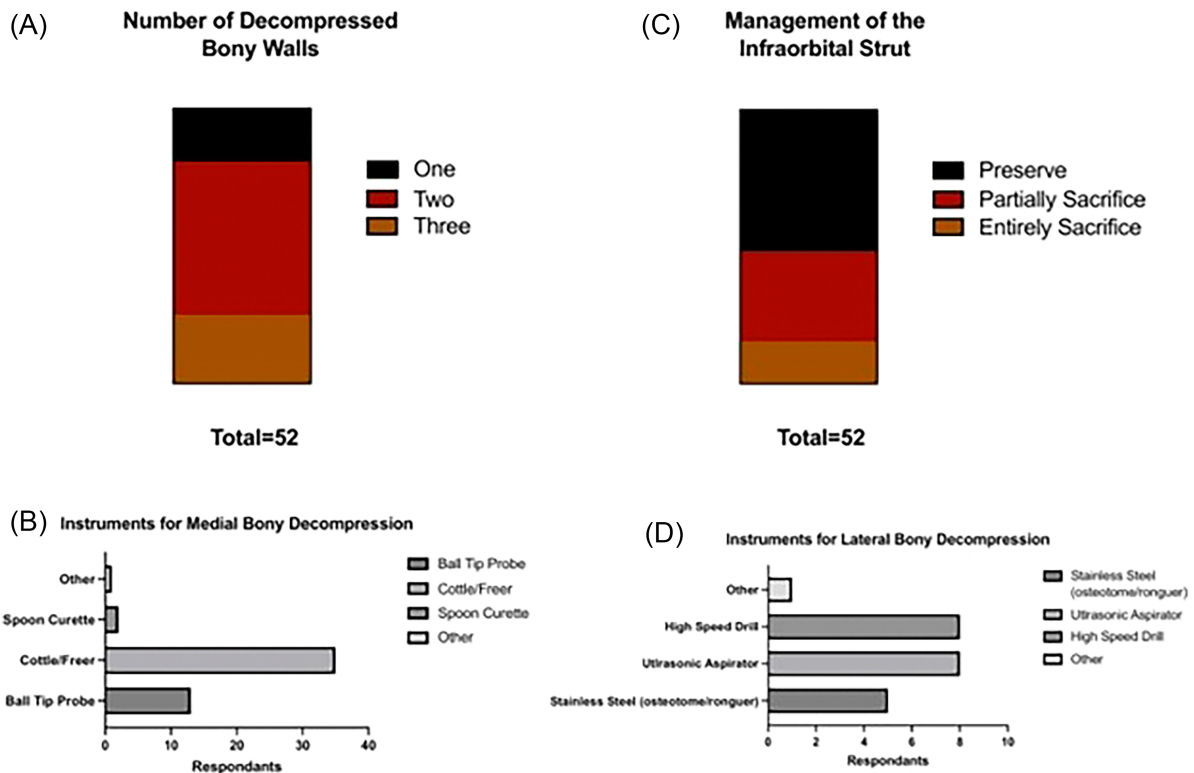


FIGURE 3 Procedural specifics—surgical approach to bony decompression.

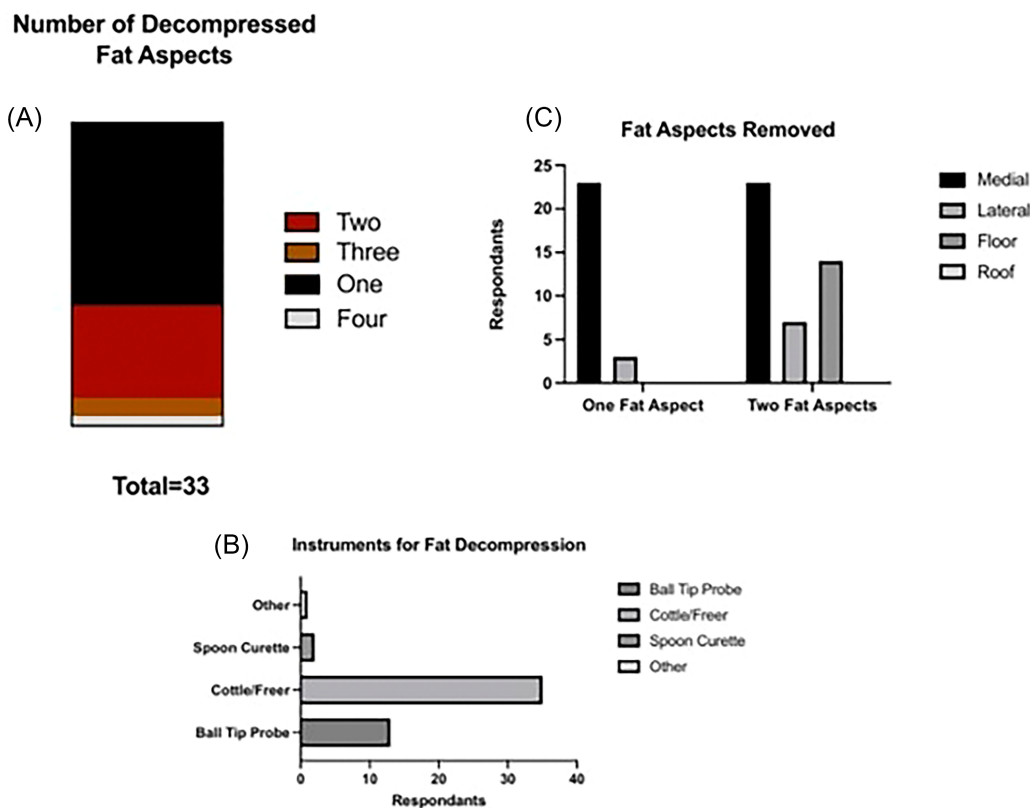


FIGURE 4 Procedural specifics—surgical approach to fat decompression.

In comparing our survey responses from otolaryngologists to responses from ophthalmologists from previously conducted surveys, several important similarities arise in the pre-operative treatment of TED. Similar to our findings, Perumal and Meyer found that medical management for TED typically consisted of oral or intravenous steroids.¹¹ This is reflective of the Consensus Statement indicating that the use of corticosteroids is accepted or preferred in the management of TED regardless of severity.¹² While Perumal and Meyer found that the majority of ophthalmologists use orbital radiation in the treatment of severe TED, orbital decompression of bone and fat was still the preferred second-line treatment after initial management with corticosteroids.¹¹ Our survey of otolaryngologists found that radiotherapy was utilized in only a minority of patients with TED prior to consideration of orbital decompression. The Consensus Statement indicates that radiotherapy is preferred only for those with moderate-to-severe TED with primary complaints of progressive diplopia but relatively contraindicated in those <35 years of age.¹² However, there is some evidence that a combination of radiotherapy with glucocorticoid therapy provides superior benefit for TED than glucocorticoids alone.¹⁶ Further studies are necessary to better identify possible physician- and patient-specific barriers to the use of radiation monotherapy or combination therapy with glucocorticoids in the management of TED regardless of severity.

Most of our respondents did not utilize a classification system prior to orbital decompression. Yet, the ATA-ETA acknowledges the utility of the CAS, EUGOGO, and VISA for the assessment of TED

activity and/or severity¹² due to prognostic utility of such classification systems in predicting the need for further interventions for TED.^{17,18} Studies assessing these classification systems have shown mixed interrater reliability.^{19–21} Furthermore, adherence to professional guidelines have been shown to be both highly variable and broadly inadequate amongst otolaryngologists.²² We speculate that increased documentation time requirements and a lack of a precise, universally-recognized classification system are barriers to the widespread use of these classification systems.²³

CT imaging was the most preferred pre-operative imaging modality used amongst our cohort. This is not only consistent with prior survey responses by ophthalmologists,¹⁵ but also in accordance with the 2022 ATA-ETA Consensus Statement which advocates for non-contrast CT for patients considered for surgery.¹² Beyond its efficacy at identifying both bony and soft tissue pathology associated with TED, CT imaging is relatively inexpensive and easy to obtain in comparison to MRI imaging and can be utilized for surgical planning in defining the bony orbital and sinus walls.²⁴ The frequency in which CT imaging was utilized in pre-operative planning amongst our cohort may be a reflection of the proliferation of image-guided navigation for endoscopic skull base surgery. Recent case studies assessing the utilization of image-guided navigation in approaches to the orbit have been subjectively reported favorable,^{25–27} however an earlier comparative study found no statistically significant improvements in outcomes.²⁸ Furthermore, the majority of ophthalmologists assessed by DeParis et al. indicated that they do not routinely use image-guided navigation when performing orbital decompression.¹⁵

In terms of operative management, previous surveys completed by ophthalmologists also found that most preferred to decompress both bone and fat^{11,14} and perform a two-wall decompression.^{11,14,15} Similar to our findings, earlier surveys of ophthalmologists found a preference for a medial wall and orbital floor decompression.^{11,14} However, the most recent survey of ophthalmologists by DeParis et al. indicated a preference for a balanced medial and lateral orbital wall decompression.¹⁵ Prior studies assessing two-wall decompressions have emphasized that an endoscopic approach with removal of the medial wall and orbital floor is efficacious and associated with low rates of complications.^{29,30} While both a balanced and an inferomedial decompression have demonstrated success at increasing orbit capacity, there is evidence that a balanced decompression is more efficient at reducing the severity of exophthalmos.³¹ In spite of these findings, the ATA-ETA does not advocate for one specific surgical approach; rather, they advocate for the approach to be adjusted according to the indication, type of orbitopathy, and ultimate goals in reduction of proptosis.¹²

This difference in decompression is partially explained by the technical approach considered by each specialty. Most ophthalmologists did not approach the medial wall via an endoscopic approach¹¹ and instead preferred an open transcaruncular or medial canthal approach to decompressing the medial wall.¹⁴ This is consistent with previous studies showing that only 25% of orbital decompressions are performed via an endoscopic approach.¹³ The difference in preference for an open approach by ophthalmologists in comparison to an endoscopic approach by otolaryngologists is likely due to the relative lack of training and familiarity ophthalmologists have with transnasal endoscopic approaches to the orbit.^{32–35} For the minority of ophthalmologists who utilized an endoscopic approach to the medial wall, most performed this in conjunction with an otolaryngologist.¹¹ However, contradictory to our findings, these prior studies of ophthalmologists found that when performing orbital decompressions, the majority do not collaborate with otolaryngology.^{11,14} Interdisciplinary collaboration between ophthalmologists and otolaryngologists is not only essential but recommended by the ATA-ETA.^{12,29,36} Physicians should consider the benefits of a multidisciplinary approach which has been successful in improving outcomes and care for patients with other disease processes.^{37–39}

While our findings provide unique insight into the surgical preferences for orbital decompression in TED amongst otolaryngologists, our study is not without limitations. We were unable to assess the response rate amongst members of the ARS and CSO-HNS due to the privacy constraints from these societies. However, we acknowledge that the number of respondents in our study was limited compared to previous surveys conducted by ophthalmologists.^{11,14,15} Furthermore, we recognize that the large majority of our respondents practice within a metropolitan, academic setting and received subspecialty training in Rhinology and Skull Base Surgery. With previous findings illustrating regional variations in surgical approaches to orbital decompression,¹³ the restricted diversity of our cohort inevitably limits our ability to extrapolate these findings to rural and/or private practice clinical settings. However, given the subspecialized nature of

the procedure, we hypothesize that the number of physicians performing this procedure annually in North America is likely limited to specialized, higher-volume, tertiary-care centers. Additionally, despite almost a third of our respondents (17/52) endorsing the use of biologics prior to pursuing surgical management of TED, we did not assess the specific biologics utilized. With the recent approval and support for newer biologics such as teprotumumab,⁴⁰ future studies are necessary to assess how these biologics are integrated into the treatment preferences for TED. Overall, our survey responses do not necessarily represent best evidence-based practices and should be interpreted with caution.

5 | CONCLUSION

To our knowledge, this was the first study that assessed surgical preferences for orbital decompression in TED amongst otolaryngologists. Our findings illustrate several key similarities between preferences by ophthalmologists and otolaryngologists for pre-operative management and the removal of both bone and fat when performing orbital decompression. However, differences in the preferred surgical approach and the degree of intra-disciplinary collaboration are evident within our cohort of otolaryngologists. Furthermore, we found discordance between the use of classification systems for TED and ATA-ETA recommendations. While this study provides unique insight into the surgical preferences of otolaryngologists performing orbital decompression for TED, future research is necessary to identify barriers to adopting intra-disciplinary collaboration in the management of TED.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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