American Society of Plastic Surgeons Evidence-Based Clinical Practice Guideline: Eyelid Surgery for Upper Visual Field Improvement

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Background: A group of experts from different disciplines was convened to develop guidelines for the management of upper visual field impairments related to eyelid ptosis and dermatochalasis. The goal was to provide evidence-based recommendations to improve patient care.
Methods: A multidisciplinary group of experts representing their specialty organizations was selected. A systematic literature review was performed including topics regarding documentation of the underlying cause for visual field impairment, selection of an appropriate surgical repair, assessment of the type of anesthesia, the use of adjunctive brow procedures, and follow-up assessments. The Grading of Recommendations, Assessment, Development, and Evaluation methodology process was used to evaluate the relevant studies. Clinical practice recommendations were developed using BRIDGE-Wiz (Building Recommendations In a Developers' Guideline Editor) software.
Results: Each topic area was assessed. A clinical recommendation was made, and the relevant literature was discussed.
Conclusions: The review of the literature revealed varied complication rates and diverse treatment modalities for the correction of upper visual field deficit. Strong recommendations could not be made in most topic areas because of a paucity of methodologically sound studies in the literature. More rigorously designed studies are needed to measure outcomes of interest, with fewer sources of potential error or bias. (*Plast. Reconstr. Surg.* 150: 419e, 2022.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, V.

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Upper lid surgery is one of the most commonly performed facial operations. People seek aesthetic enhancement when there is excessive upper lid skin. However, when the excess skin begins to weigh down the lid and obstructs upper visual fields (dermatochalasis), it becomes a functional operation, as it can hinder daily functions such as driving. Another functional condition of the upper lids that limits the upper field of vision is blepharoptosis (eyelid ptosis/ptosis), which is a weakness of the levator muscle complex. Upper visual obstruction leads patients to chronically raise their foreheads, which can subsequently cause eye strain, frontalis muscle compensatory hyperactivity, and forehead rhytides. According to the 2018 American Society of Plastic Surgeons (ASPS) Procedural Statistics Report, eyelid surgery is the most commonly performed surgical procedure among those aged 55 years and older, and the second most commonly performed facial operation regardless of age.[1] Medicare Part B claims data further reflect this prevalence, with 183,264 unique upper lid blepharoplasty, blepharoptosis repair, or brow ptosis repair procedures reimbursed in 2018.[2] Despite being a common surgery, upper eyelid surgery to correct upper visual field loss has a wide range of complications (2 to 10 percent) and revision rates highly dependent on surgical approach (1 to 72 percent).[3–9] In addition, there are several variations in practice that result in a gap in care and patient satisfaction.

In cases where visual obstruction is caused by hooding of the anterior lamella (skin and orbicularis muscle) or anterior and middle lamella (orbital fat), the correction is relatively straightforward and involves removing the excess soft tissue. However, in cases where visual obstruction is caused by inadequate eyelid-elevating function, the methods of improving the levator function are varied. These differences include the initial approach of whether to operate from the anterior (skin) or posterior (conjunctiva) region and the specifics of whether the levator muscle components should be plicated or advanced. Furthermore, even the difference in anesthesia type (local or general anesthesia) used to perform the procedure has wide economic and patient safety implications that warrant investigation.

For these primary reasons, upper eyelid surgery for visual field loss has been determined to be one of the leading topics of interest for clinical practice guideline development by the Quality and Performance Measurement Committee and the leading members of the ASPS. This guideline is an effort to evaluate the evidence in the literature to determine the recommended diagnostic and surgical approaches. The committee's work was a coordinated effort by the medical specialties of plastic surgery, head and neck surgery, ophthalmology, and their respective subspecialties involved in eyelid surgery to help surgeons improve diagnosis, surgical outcomes, and patient satisfaction.

SCOPE AND INTENDED USERS

This guideline provides evidence-based recommendations for correction of upper visual field obstruction. The workgroup recommends that the corrective surgery should be performed by surgeons trained and experienced in upper blepharoplasty and eyelid ptosis surgery. Neonatal and young pediatric ptosis cases (infancy to preadolescence) were excluded from this guideline. Other medical comorbidities causing neurogenic eyelid ptosis by itself or as a syndrome such as myasthenia gravis, aneurysms, tumors, and myelitis are also excluded from this guideline.

This evidence-based guideline is supported by a systematic review of evidence and specifically addresses the diagnosis and benefits of upper blepharoplasty or ptosis correction. This guideline is intended to be used by the surgeons that provide

Table 1. ASPS Recommendation Definitions and Levels of Adherence

Descriptor	Definition	Implications for Practice
Strong	A particular action is favored because anticipated benefits clearly exceed harms (or vice versa), and quality of evidence is excellent (moderate or strong) or unobtainable.	Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Moderate	A particular action is favored because anticipated benefits clearly exceed harms (or vice versa), and the quality of evidence is good but not excellent (or is unobtainable).	Clinicians would be prudent to follow a moderate recommendation but should remain alert to new information and sensitive to patient preferences.
Weak	A particular action is favored because anticipated benefits clearly exceed harms (or vice versa), but the quality of evidence is low or very low.	Clinicians would be prudent to follow a weak recommendation but should remain alert to new information and very sensitive to patient preferences.
Option	An option is provided when the aggregated data show evidence of both benefit and harm that appear similar in magnitude for any available courses of action.	Clinicians should consider the options in their decision-making, but patient preference may have a substantial role.

care for patients with upper visual field obstruction requiring upper eyelid surgery. Health care practitioners should evaluate each case individually, considering these evidence-based recommendations along with patient medical conditions and preferences to determine the optimal treatment plan for each patient. This guideline is intended to serve as a resource for surgeons and developers of clinical practice guidelines and recommendations.

DISCLAIMER

Evidence-based guidelines are strategies for patient management, developed to assist physicians in clinical decision-making. This guideline was developed through a comprehensive review of the scientific literature and consideration of relevant clinical experience and describes a range of generally acceptable approaches to diagnosis, management, or prevention of specific diseases or conditions. This guideline attempts to define principles of practice that should generally meet the needs of most patients in most circumstances.

However, this guideline should not be construed as a rule, nor should it be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the appropriate results. It is anticipated that it will be necessary to approach some patients' needs in different ways. The ultimate judgment regarding the care of a particular patient must be made by the physician in light of all the circumstances presented by the patient, the available diagnostic and treatment options, and available resources.

This guideline is not intended to define or serve as a standard of medical care. Standards of medical care are determined on the basis of all facts or circumstances involved in an individual case and are subject to change as scientific knowledge and technology advance and as practice patterns evolve. The recommendations in this guideline reflect the state of current knowledge at the time of publication. Given the inevitable changes in the state of scientific information and technology, this guideline will be considered relevant for a period of 5 years after publication, in accordance with the inclusion criteria of the ECRI Guidelines Trust.

METHODS

Workgroup Selection Process

The guideline was led by the ASPS, with stakeholder input and representation from the American Academy of Facial Plastic and Reconstructive Surgery, the American Society for Aesthetic Plastic Surgery, and the American Society of Ophthalmic Plastic and Reconstructive Surgery. (**See Appendix, Supplemental Digital Content 1**, which shows the full, detailed ASPS guideline methodology, ***http://links.lww.com/PRS/F243***.) All applicants were required to submit an online conflict-of-interest disclosure form, and the co-chairs were free of all conflicts of interest for the duration of the project, as required by policy.

Clinical Question Development

Workgroup members used a consensus-based approach to select the seven clinical questions to be addressed in this evidence-based guideline.

Literature Search

Multiple literature searches were performed during 2018 to identify relevant studies published from 1990 to 2018. The initial search dates were January 1, 1980, through April 16, 2018, with a subsequent updated and final search on November 2, 2018. Electronic searches of PubMed, Embase, and Cochrane Central Register of Controlled Trials were performed using appropriate combinations of MEDLINE Medical Subject Headings terms and keywords, as permitted by the search functionalities of each database/journal.

Critical Appraisal of Evidence

A modified version of the Grading of Recommendations, Assessment, Development, and Evaluation process was used to evaluate the methodologic quality of clinical studies and the strength of clinical evidence. A total of 4675 references were identified from databases; with 3354 screened after excluding duplicate records. After screening and critical appraisal were performed, 39 studies had data abstracted. The recommendations in this guideline are based on 23 of those studies.

Grading of Recommendations

Clinical practice recommendations were developed using BRIDGE-Wiz[10] (Building Recommendations In a Developers' Guideline Editor) software during an in-person workgroup meeting in February of 2019. Each recommendation in this guideline is accompanied by a grade indicating the strength of the recommendation, which was determined by considering the overall level of evidence supporting the recommendation and the judgment of the guideline developers. Figure 1 shows the ASPS strength of aggregate evidence and recommendations (**see Appendix, Supplemental Digital Content 1**, ***http://links.lww.com/PRS/F243***).

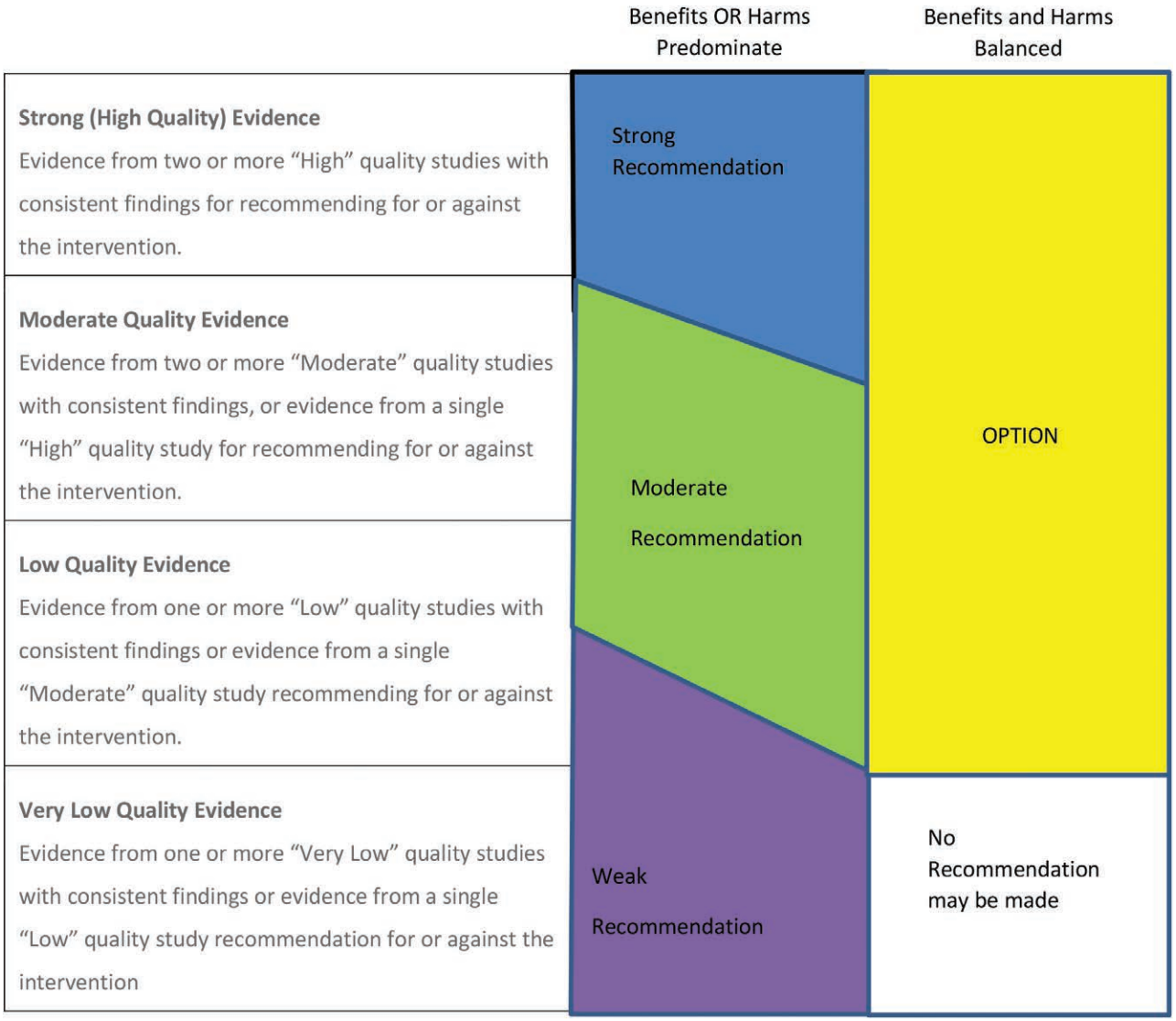

Fig. 1. ASPS strength of aggregate evidence and recommendations.

Peer Review and Public Comment Process

The draft guideline was peer reviewed by American Academy of Facial Plastic and Reconstructive Surgery and the American Society of Ophthalmic Plastic and Reconstructive Surgery using the Appraisal of Guidelines for Research and Evaluation Global Rating Scale instrument. The draft guideline was posted online for a 30-day public comment period from October 5, 2019, until November 4, 2019.

Guideline Approval Process

The final guideline was approved by the Executive Committee of the ASPS during their meeting in March of 2020.

Plan for Updating the Guideline

The guideline will be updated within 5 years or in the event when newly published evidence may result in a change to current recommendations. The ASPS uses a digital platform (Presentation and Evaluation of Evidence-based Research, or P.E.E.R.) to store literature and data, thereby facilitating an efficient updating process.

RECOMMENDATIONS

A summary of recommendation statements is shown in Table 2. Subsequent tables discuss the components the workgroup considered in formatting and rating the recommendations.

Table 2. Recommendations with Level of Evidence and Strength of Recommendation

Recommendation	Evidence Quality	Recommendation Strength
1. The workgroup recommends that for patients presenting with low upper eyelid position, clinicians obtain a clinical history, which should include an assessment of impact on visual field or activities of daily living; *and* perform a physical examination to assess upper eyelid position (ptosis) relative to the pupil (such as MRD-1) with photographic documentation *and* assessment of levator function.	Moderate	Moderate
2A. The workgroup suggests that surgeons not perform blepharoplasty alone (i.e., without ptosis correction) for patients presenting with diagnosed ptosis or low upper eyelid position.	Low	Weak
2B. The workgroup suggests that surgeons perform concurrent upper eyelid blepharoplasty and ptosis correction in patients presenting with ptosis and dermatochalasis (excess upper eyelid soft-tissue hooding).	Low	Weak
2C. The workgroup suggests that surgeons perform upper eyelid blepharoplasty in patients presenting with dermatochalasis (excess upper eyelid soft-tissue hooding) without underlying ptosis.	Low	Weak
3A. The workgroup recommends that surgeons should perform anterior ptosis correction for patients diagnosed with severe upper eyelid ptosis.	Moderate	Moderate
3B. It is an option for surgeons to perform either anterior or posterior ptosis correction for patients diagnosed with mild or moderate upper eyelid ptosis.	Moderate	Option
4. There is insufficient evidence to support a recommendation.	—	—
5. The workgroup suggests that surgeons may use local anesthesia for patients presenting for upper eyelid ptosis correction and/or blepharoplasty.	Low	Weak
6. It is an option for surgeons to perform adjunctive brow surgery in patients presenting with dermatochalasis and coexisting brow and upper eyelid ptosis.	Low	Option
7. It is an option for surgeons to perform levator plication *or* levator advancement for patients presenting with upper eyelid ptosis.	Very low	Option
8. The workgroup recommends that patients should have an assessment for complications including asymmetry and lagophthalmos within 1–3 mo following the procedure and again ideally at 9 mo to 1 yr for patients who have had upper eyelid ptosis correction and/or blepharoplasty.	Moderate	Good practice

MRD-1, margin reflex distance 1.

Recommendation 1:

The workgroup recommends that for patients presenting with low upper eyelid position obstructing the superior visual field, clinicians obtain the following: A clinical history, which should include an objective assessment of impact on visual field or activities of daily living; *and* perform a physical examination to assess upper eyelid position relative to the pupil. The examination should differentiate whether the cause of the visual field obstruction is because of excess skin (dermatochalasis) or low position of the eyelid margin (blepharoptosis). The margin reflex distance 1 and the levator function should be assessed. Photographs of the eyelids should be taken (Table 3).

Rationale

The systematic literature review returned several studies on the use of diagnostic tools in quantifying the level of visual field impairment.[11–16] Although these studies present important data, they did not directly address how the reconstructive surgeon might best document and determine the underlying cause leading to visual field impairment. Therefore, although these articles were critically appraised and are counted in the study attrition diagram (**see Appendix, Supplemental Digital Content 1**, ***http://links.lww.com/PRS/F243***), they were not included as final evidence in support of recommendation 1.

The initial patient evaluation should include general medical and periorbital history. A detailed medical and focused history should document elements of previous eye and eyelid surgery, cardiac and chronic illness, bleeding disorders, medications, and smoking. Specific history elements include presence of dry eyes, glaucoma, the need for glasses, trauma, allergies, and excess tearing. According to Drolet and Sullivan, a patient presenting for a revision procedure will need additional counseling.[17] We recommend that the history should include an objective assessment of impact of the condition on visual field or activities of daily living.

A physical examination should be performed. The eye examination should consist of basic visual acuity, extraocular muscle and pupil evaluation, and Bell phenomenon for corneal protection. Whether or not skin removal for dermatochalasis is required should be determined. The upper lid margin normally covers 2 mm of the iris on primary gaze. A lower position may indicate blepharoptosis, which needs to be addressed preoperatively. We recommend the eyelid position should be determined relative to pupil or corneal light reflex on primary gaze and in a restful state

Table 3. Recommendation 1

Aggregate evidence quality	Moderate
Strength of recommendation	Moderate
Benefits	• Accurate diagnosis • Helps surgeon plan treatment strategy • Provides documentation of problem
Risks, harms, and costs	• Increases physician/staff time • Potential additional cost to patient, especially if additional diagnostic examinations are determined to be necessary
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	Did not define specific measurement to include in an examination to assess upper eyelid position relative to pupil (i.e., MRD-1 measurement); did not define specific type of photographic documentation, such as angles or image technical specifications; did not specify a particular assessment or measurement for levator function (left to surgeon discretion)
Role of patient preference	None
Exclusions	Cosmetic ptosis patients (i.e., those desiring surgery whose eyelids do not preoperatively obstruct their visual field)
Differences of opinion	None

MRD-1, margin reflex distance 1.

to avoid a sympathetic effect on the Müller muscle. The resultant margin reflex distance 1 should be noted. The normal value ranges between 4.0 and 4.5 mm.[18] However, this range is variable based on the size of the iris and the overall eye of the patient, and for this reason, the workgroup did not set defined cutoff values. Ptosis in conjunction with a high tarsal fold may be indicative of levator dehiscence. However, patients with prior blepharoplasty may have an iatrogenically high supratarsal fold. The position and shape of the brow needs to be assessed. The other method of evaluating the levator muscle is determined by maximum eyelid excursion or levator function.[19,20] Levator function should also be assessed by the excursion of the upper lid from downgaze to upgaze, without the contribution of the frontalis muscle. Studies demonstrate that margin reflex distance 1 is correlated with levator function.[21] In general, mild ptosis is associated with slightly diminished but acceptable levator function (>8 mm), moderate ptosis with compromised levator function (5 to 7 mm), and severe ptosis with minimal to no levator function (0 to 4 mm).[22]

The presence of lagophthalmos and lid lag should also be assessed, documented, and considered in determining surgery. Preoperative assessment of the type or severity of blepharoptosis may help plan the type of blepharoptosis correction (i.e., levator plication, resection, frontalis suspension, or anterior or posterior approach) and the degree of correction. Thorough evaluation supported by standardized photography should be obtained in each case and documented.

Recommendation 2

Recommendation 2A:

The workgroup suggests that surgeons not perform blepharoplasty alone (i.e., without ptosis correction) for patients presenting with diagnosed blepharoptosis (Table 4).

Recommendation 2B:

The workgroup suggests that surgeons perform concurrent upper eyelid blepharoplasty and ptosis correction in patients presenting with dermatochalasis and blepharoptosis (Table 5).

Recommendation 2C:

The workgroup suggests that surgeons perform upper eyelid blepharoplasty in patients presenting with dermatochalasis without underlying ptosis (Table 6).

Rationale

Dermatochalasis or excess eyelid skin is a common condition. It results from progressive age-related changes in the periocular soft tissue. Gravity and connective tissue (collagen) weakness over time lead to loss of skin elasticity and sagging of the eyelid. The overall prevalence of dermatochalasis among individuals older than 45 years is 16 percent, and the condition is more frequent in male patients.[23] Blepharoplasty is a common procedure for rejuvenation of upper eyelids in patients presenting with dermatochalasis. Acquired blepharoptosis involves eyelid drooping caused by a thinning or detachment of the levator aponeurosis. It can also be caused by progressive weakness of the levator palpebrae superioris

Table 4. Recommendation 2A

Aggregate evidence quality	Low
Strength of recommendation	Weak
Benefits	• Lower rate of revision • Higher patient satisfaction • Effective in improving upper visual field deficit
Risks, harms, and costs	• Longer operative time • Increased technical difficulty of procedure • Higher risk of overall complications (because of procedure invasiveness)
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	None
Role of patient preference	Recommendation may not apply to patients with mild ptosis (not specifically defined); blepharoplasty is a less invasive procedure and may satisfy needs of patients with mild blepharoptosis conditions
Exclusions	None
Differences of opinion	None

Table 5. Recommendation 2B

Aggregate evidence quality	Low
Strength of recommendation	Weak
Benefits	• Lower rate of revision • Higher patient satisfaction • Effective in correcting improving upper visual field deficit • Effective in addressing both presenting issues
Risks, harms, and costs	• Increased risk of surgical complications • Longer operative time
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	None
Role of patient preference	None
Exclusions	None
Differences of opinion	None

muscle. For a successful surgical outcome, preexisting blepharoptosis needs to be identified, discussed, and properly addressed preoperatively.

Blepharoplasty and blepharoptosis repair are distinct operations with specific indications. Studies have confirmed that either operation, when indicated, leads to measurable improvement in function and alleviation of symptoms.[24,25] Considering that blepharoplasty is less invasive, it may be adequate in patients presenting with minimal to mild blepharoptosis, as defined previously. However, in patients presenting with moderate to severe blepharoptosis, it is recommended that the two operations be combined to reduce revision rates, improve visual field, and increase patient satisfaction. There are few outcomes studies comparing benefits of blepharoplasty alone versus blepharoplasty combined with blepharoptosis surgery.[4]

Table 6. Recommendation 2C

Aggregate evidence quality	Low
Strength of recommendation	Weak
Benefits	• Shorter operative time • Decreased complication rates • Increased patient satisfaction
Risks, harms, and costs	None
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	None
Role of patient preference	None
Exclusions	None
Differences of opinion	None

A low-quality outcome study compared blepharoplasty with skin excision only to blepharoplasty with simultaneous ptosis correction for senile or subclinical ptosis in Asians.[26] Palpebral fissure improvements were more significant in the joint blepharoplasty and ptosis correction group. Simultaneous ptosis correction included either levator aponeurosis plication (in patients with good or fair levator function) or levator advancement/Müller muscle and aponeurosis composite flap advancement. Blepharoplasty-only patients (n = 20) had an overall increase in their postoperative margin reflex distance 1 of 0.71 mm ($p < 0.05$). Margin reflex distance 1 changes were more significant in patients who underwent blepharoplasty with simultaneous ptosis correction (1.22 mm; n = 55). There was also a higher percentage of corneal exposure area in the combined group postoperatively (11.4 percent versus 19.9 percent). However, preoperative margin reflex

distance 1 measurements were markedly higher in the blepharoplasty-only cohort, indicating a milder condition than those who were selected for ptosis correction. The study did report a higher rate of undercorrection (e.g., some patients still left with visual obstruction after initial surgery) in patients undergoing simultaneous repair, but a greater improvement of visual field correction was found in this combined group. This rate of undercorrection was not significantly different from another published cohort of patients undergoing both blepharoptosis correction and upper eyelid blepharoplasty.[6] Therefore, the workgroup found this rate to be acceptable for routine procedures.

There are several low- to very low-quality articles evaluating postoperative changes, pitfalls, and complications following blepharoplasty combined with blepharoptosis repair. A study by Rymer et al. ($n = 46$) in 2017 compared effects of blepharoplasty alone or in conjunction with Müller muscle–conjunctival resection for ptosis repair on ocular surface scores or dry eye symptoms.[27] In this study, addition of Müller muscle–conjunctival resection for ptosis correction to upper eyelid blepharoplasty did not worsen ocular surface scores or dry eye symptoms. Brown and Putterman studied the postoperative eyelid effects of upper blepharoplasty concomitantly performed with Müller muscle–conjunctival resection versus Müller muscle–conjunctival resection only.[28] They determined that the combined procedure reduced the anticipated postoperative eyelid elevation by as much as 1 mm compared to Müller muscle–conjunctival resection only.

A low-quality study tracked changes in corneal curvature, using corneal topography, after upper eyelid surgery.[29] The study concluded that repositioning of the upper eyelid after levator resection showed greater changes of corneal curvature than blepharoplasty. Significant advancement of the levator aponeurosis or the aponeurosis–Müller muscle complex, compared to minor advancement or plication, may have a greater effect on three-dimensional shape of the corneal lens. The mechanism may be attributable to changing the pressure where the lid rests against the cornea. They suggest that patients with blepharoptosis or dermatochalasis who intend to undergo cataract or refractive surgery in the future should consider first undergoing ptosis surgery to avoid any additional refractive changes.

Eyelid sensation after supratarsal lid crease incision was evaluated in another study.[30] Loss of skin sensation in the eyelid after upper eyelid crease incision blepharoplasty or blepharoptosis repair occurs in most patients and should be considered an expected outcome of the procedure. Partial to complete recovery of eyelid sensation over 2 to 6 months should also be expected, although in rare instances this does not occur. Tucker and Cabral found the incidence of lagophthalmos after levator aponeurosis ptosis repair to be 60 percent on the first postoperative day, decreasing to 11 percent at 6 to 20 weeks (mean, 11 weeks and 0.6-mm lagophthalmos).[31]

A low-quality study evaluated long-term tear volume changes after blepharoptosis surgery and blepharoplasty.[32] The authors found that tear volume was not decreased after blepharoplasty but was decreased after blepharoptosis correction for at least 6 months, especially in cases with an initially high tear volume. Lee and colleagues evaluated changes in brow position after upper blepharoplasty versus levator advancement in Asians (margin reflex distance 1, 1.91 mm versus 0.20 mm).[33] They found that the change in brow height was greater after levator advancement than after blepharoplasty. Their study implies that the possibility of change in postoperative brow position (drop in brow position) should be explained to patients before surgery, particularly in blepharoptosis patients undergoing ptosis correction.

Recommendation 3

Recommendation 3A:

The workgroup recommends that surgeons should perform anterior ptosis correction for patients diagnosed with severe upper eyelid ptosis (Table 7).

Recommendation 3B:

It is an option for surgeons to perform either anterior or posterior ptosis correction for patients diagnosed with mild or moderate upper eyelid ptosis (Table 8).

Rationale

This conditional recommendation has a moderate quality evidence. It is based on a randomized controlled trial that showed equally effective outcomes for visual field improvement from anterior (by means of skin incision) levator aponeurosis advancement or plication versus posterior (by means of conjunctival incision) Müller muscle–conjunctival resection on patients with mild or moderate ptosis.[34] In this cohort, margin reflex distance 1 improved by a mean of 1.8 mm from baseline in the anterior approach group and by a mean of 1.7 mm from baseline in the posterior approach group. The anterior approach did result in higher rates of asymmetry and reoperation at

Table 7. Recommendation 3A

Aggregate evidence quality	Moderate
Strength of recommendation	Moderate
Benefits	• Lower risk of infection, dehiscence, corneal abrasion, and hemorrhage • Greater effectiveness in resolving visual field impairment than posterior approach
Risks, harms, and costs	• Longer operative time • Technically difficult • Longer recovery times • Potential risk of donor-site complications/morbidity • May require a sling, which includes autologous or nonautologous material • Theoretical increase in lid contour deformity and lagophthalmos
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	Did not define a specific anterior technique or severity of ptosis (see recommendation 1)
Role of patient preference	None
Exclusions	None
Differences of opinion	None

1 month postoperatively, but because of the low frequency of these outcomes in each arm (i.e., $n = 3$ versus $n = 1$ for reoperation, and $n = 5$ versus $n = 2$ for asymmetry), the workgroup found the absolute differences to be clinically insignificant.

Similar results were seen in a very low-quality study. Risk of overcorrection, undercorrection, granuloma, and prolapse were all higher in patients undergoing a posterior approach, although the absolute difference in postoperative granuloma formation and prolapse were 2 percent and 1 percent, respectively.[35] With the anterior approach, any dermatochalasis can also be corrected through the same incision. In cases of unilateral ptosis, however, the risk of asymmetry was less with posterior approach ptosis repair. The posterior approach has a shorter operative time and lower revision rate with no externally visible scar. Risks of the anterior procedure are longer operative time and higher revision rates with externally visible scars. However, for patients who had a very low preoperative margin reflex distance 1 value, the anterior approach has been shown to increase postoperative margin reflex distance 1 significantly more than the posterior approach.[4,6]

In a retrospective, consecutive cohort study, the overall revision rate for all patients was 8.7 percent.[6] Of the posterior group, 6.8 percent required ptosis revision; of the anterior group, 9.5 percent required revision surgery although,

Table 8. Recommendation 3B

	Anterior Approach	Posterior Approach
Aggregate evidence quality	Moderate	Moderate
Strength of recommendation	Option	Option
Benefits	• Lower risk of infection, dehiscence, corneal abrasion, and hemorrhage • Lower risk of lagophthalmos or overcorrection • Surgeon is able to address any dermatochalasis through same incision	• Decreased risk of eyelid contour asymmetry • Shorter operative time • Lower revision rates • No externally visible scar
Risks, harms, and costs	• Longer operative time • Increased risk of eyelid contour asymmetry or undercorrection • Increased revision rates • Technically more difficult	• Require additional anterior incision in patients with concomitant dermatochalasis • Decreased ability of intraoperative adjustment of lid height change • Increased risk of hemorrhage, infection, corneal abrasion
Benefits/harms assessment	Balance of benefits and harms	Balance of benefits and harms
Value judgments	Surgeon proficiency/experience with approach	Surgeon proficiency/experience with approach
Intentional vagueness	Did not define mild or moderate ptosis; did not define a specific anterior or posterior technique	Did not define mild or moderate ptosis; did not define a specific anterior or posterior technique
Role of patient preference	Moderate; if surgeon is proficient in both techniques, benefits and harms of each approach should be discussed with patient	Moderate; if surgeon is proficient in both techniques, benefits and harms of each approach should be discussed with patient
Exclusions	None	None
Differences of opinion	None	None

as previously mentioned, those who underwent anterior approach correction did have more severe ptosis preoperatively. Other studies have reported that rates of revision associated with the anterior approach may be as high as 18 percent.[36] The main reason for ptosis revision surgery was undercorrection of one or both eyelids. However, multivariable logistic regression for predictive factors showed that when adjusted for gender and concurrent blepharoplasty, the revision rate in anterior-approach ptosis surgery is higher than in posterior-approach ptosis surgery (OR, 1.91; 95 percent CI, 1.19 to 3.05; $p = 0.007$).[6] The panel agrees with the findings of Chou et al. that the benefits of the anterior approach relative to the posterior approach include a lower risk of infection, low risks of dehiscence and hemorrhage, and less corneal abrasion. Although findings are similar to other studies on the subject, the absolute clinical difference between the incidence of these outcomes among the two procedures were relatively equivalent

The workgroup determined the literature to show a balance of benefits and harms between the two surgical approaches for cases of mild to moderate blepharoptosis. Therefore, should a surgeon be proficient in either approach, the benefits and harms of both should be discussed with the patient and weight should be given to patient preferences and individual circumstances before an operative technique is decided.

In cases of severe blepharoptosis, the workgroup found that the anterior approach led to superior long-term outcomes in visual field improvement and equivalent rates of surgical complications as found in posterior approach operations, although patients who underwent the posterior approach were reported to have lower rates of contour abnormalities and need for revision in a limited number of studies.[4,34,37] Patients should be counseled that the anterior approach may result in the need for multiple procedures to achieve the desired visual field improvement. The anterior approach for severe blepharoptosis includes frontalis suspension with graft, levator muscle complex advancement, and conjoint fascial sheath advancement.

Recommendation 4: No Evidence Found.

The workgroup was interested in better understanding the Herring law and the possible need for bilateral surgical intervention when a patient presents with a unilateral visual deficit. However, we were unable to find any head-to-head studies that compared unilateral to bilateral surgical intervention that met the inclusion criteria, and we are unable to make a literature-supported recommendation for this clinical question. However, relying on their cumulative clinical experience and the principles of plastic surgery (including the Hering law),[38] the workgroup consensus was that surgeons should be operating on a contralateral upper lid to obtain relative symmetry in cases where one lid is significantly different. Some very low-quality case series studies supported this judgment.[3,39,40] When stratified by repair type (i.e., unilateral versus bilateral), bilateral ptosis repair yielded a more symmetric outcome than unilateral ptosis repair, quantified by a lower mean difference in margin reflex distance 1 values between eyelids.[3] Similar findings for satisfaction with eyelid symmetry were reported in a very low-quality study.[41] A study by Pan et al. further demonstrated a significant increase in self-reported patient satisfaction scores associated with bilateral interventions in patients with unilateral ptosis.[42]

The eyelids are perceived as a pair existing in relative symmetry. Identical appearance on contralateral sides of the body is rare. However, after an injury or disease process alters a single side, gross asymmetry may occur. Cases of induced, contralateral blepharoptosis have also been reported in unilateral blepharoptosis correction alone.[39,40,43] This may mandate corrective surgery on the side contralateral to the initially operated side. In addition, ptosis severity plays a role, with a more severe ptosis likely increasing the chance of the contralateral eyelid being affected. Therefore, to preemptively avoid this postoperative change in the unaffected eyelid, performing a bilateral eyelid operation may remediate changes and complications arising from the effect of the Hering law. However, if the experienced surgeon can accurately predict the postoperative change of the contralateral eyelid when operating on the ptotic eyelid, it is generally acceptable to operate only unilaterally.

Although beyond the scope of this guideline it is reasonable to extend the physiologic implications of the Hering law to cases secondary to trauma, tumor excision, facial paralysis, or other such injury. Well-designed head-to-head studies comparing outcomes for both unilateral and bilateral interventions, especially the need for reoperation, could allow future workgroups to make a recommendation for this question.

Recommendation 5:

The workgroup suggests that surgeons may use local anesthesia for patients presenting for

upper eyelid ptosis correction and/or blepharoplasty (Table 9).

Rationale

Surgical procedures for adults with visual field impairment who undergo blepharoplasty and/or ptosis correction will require some sort of anesthesia, namely, local anesthesia or general anesthesia. There is weak direct support by the literature that local anesthesia results in better patient satisfaction and a reduction in complications.[44] In one study, a 24 percent reduction in the need for postoperative revision was observed in patients receiving local anesthesia.[6] Indirect literature did not often differentiate between the types of local anesthetics used. Subcutaneous infiltration of lidocaine and epinephrine were frequently chosen for both anterior and posterior repairs,[29,34] with some authors reporting additional use of bupivacaine, hyaluronidase, or topical tetracaine drops.[7,29,31,34] Using local anesthesia for ptosis repair allows for intraoperative patient cooperation, which may result in better intraoperative assessment of eyelid position and is a benefit of this modality compared to general anesthesia. In addition, local anesthesia has fewer side effects such as postoperative nausea and faster overall recovery times. Disadvantages to local anesthesia include increased discomfort, anxiety, and awareness, which may cause distress to the patient. For upper eyelid surgery, preliminary evidence to support one type of anesthesia over the other was confounded by inclusion of pediatric patients who may predominately undergo a procedure under general anesthesia.[44] The surgical approach (i.e., anterior or posterior repair) may be influenced by the degree of eyelid ptosis and thus dictate the type of anesthesia used, evidenced by the higher (albeit small) proportion of posterior repair cases performed under general anesthesia compared to anterior repair cases.[6] The evidence may be confounded, as surgical results and patient satisfaction are related more to the degree of upper visual field deficit correction rather than the type of anesthesia administered. Although intravenous sedation anesthesia can also be used, this type of anesthesia was not directly compared to general anesthesia or other forms of local anesthesia in any of the literature. Studies that did include intravenous sedation in their protocol used a combination of midazolam, fentanyl, and propofol at injection to make intraoperative adjustments with the patient's cooperation.[7,31] The evidence anecdotally supports the recommendation that surgeons may use local anesthesia for patients presenting for upper eyelid ptosis correction and/or blepharoplasty. However, we defer to the American Society of Anesthesiologists guidelines on moderate procedural sedation and their Continuum of Depth of Sedation standards for more specific indications for analgesia modality.[45]

Recommendation 6:

It is an option for surgeons to perform adjunctive brow surgery in patients presenting with dermatochalasis and coexisting brow and upper eyelid ptosis (Table 10).

Rationale

Commonly, patients seeking eyelid surgery who present with visual field impairment have concurrent brow ptosis and brow asymmetry. The eyebrow and forehead should be considered an aesthetic and functional anatomical extension of the upper eyelids. Therefore, eyebrow and forehead function should be evaluated in all patients who present with visual field complaints. A comprehensive physical examination should note the eyebrow position in relation to the supraorbital

Table 9. Recommendation 5

Aggregate evidence quality	Low
Strength of recommendation	Weak
Benefits	• Patients do not have to fast • Easier recovery time • Decreased cost • Lower complications from side effects associated with general anesthesia • More flexibility in surgical setting • Intraoperative assessment of eyelid position and function is possible
Risks, harms, and costs	• Possible increased patient anxiety • Need for patient cooperation in awake state
Benefits/harms assessment	Preponderance of benefit
Value judgments	None
Intentional vagueness	Did not specify a type of local anesthesia, but defines local anesthesia broadly based on patient's intraoperative awareness and cooperation
Role of patient preference	Moderate; risks and benefits should be explained to the patient ahead of surgery
Exclusions	None
Differences of opinion	None

Table 10. Recommendation 6

Aggregate evidence quality	Low
Strength of recommendation	Option
Benefits	• Lower revision rate • Better position of eyebrows • May improve visual field • Improvement in cosmetic outcome
Risks, harms, and costs	• Increased risk of nerve injury • Increased risk of hematoma • Longer operative time • Additional cost from multiple procedures • Increased risk of asymmetry • Recurrence of brow ptosis • Increased recovery time • Increased risk of pain • Increased risk of lagophthalmos
Benefits/harms assessment	Balance of benefits and harms
Value judgments	None
Intentional vagueness	Did not define diagnosis of brow ptosis or specific surgical technique of brow lift
Role of patient preference	Moderate; risks and benefits of the procedures need to be explained
Exclusions	None
Differences of opinion	None

rim and recognize the presence of eyebrow asymmetry and any compensatory brow activity. In the setting of brow ptosis, patients should be given the option of concurrent brow surgery. The goal of concurrent brow surgery is to elevate the brows to an optimal position for better aesthetic result. Observational studies in the literature have shown that brow position (as measured laterally and centrally) may be inadvertently lowered postoperatively in patients who are diagnosed with brow ptosis undergoing upper blepharoplasty and/or ptosis surgery.[33,46,47] The effect of postoperative brow ptosis is more prominent or occurs more often with ptosis surgery. One retrospective, consecutive cohort study found that patients with eyelid ptosis undergoing concurrent brow lift (technique not specified) had a decreased rate of revision relative to those without concurrent brow lift.[6] The lower revision rate may be attributable to the overall improved aesthetic appearance and decrease in brow weight on the eyelid.

In contrast to the aforementioned benefits of performing brow operations, certain factors limit the ability of patients to undergo concurrent brow procedures with eyelid operations. The associated expense of added procedures and longer operative time may be prohibitive to patients. Insurance authorization may be complicated if brow lift surgery is considered cosmetic and medically unnecessary. Furthermore, additional surgical risks, although low in frequency, are associated with eyebrow surgery. These risks include nerve injury, hematoma, wound healing issues, lagophthalmos, increased pain, and prolonged recovery time. With these in mind, the committee recommends that brow position and its effect on eyelid dynamics should be discussed with the patients during the preoperative assessment. The surgeon should then guide patients to select the appropriate brow-lifting or brow-stabilizing procedures, depending on the patient's anatomy and desires and surgeon expertise.

Finally, a paucity of literature exists regarding the effect of different techniques of brow surgery (e.g., direct suprabrow excision, subbrow excision, temporal, endoscopic, coronal, pretrichial, browpexy through blepharoplasty incision) on the outcomes of interest in concurrent eyelid and ptosis surgery. Therefore, there is no recommendation from the committee on specific techniques that should be used during concurrent brow surgery. The workgroup encourages surgeons to use clinical aesthetic judgment to determine the type of brow surgery needed, and advocates for comparative research in this area to make stronger recommendations in the future. The workgroup suggests that it is a valid option for surgeons to perform adjunctive brow surgery in patients presenting with dermatochalasis and coexisting brow and upper eyelid ptosis.

Recommendation 7:

It is an option for surgeons to perform levator plication *or* levator advancement for patients presenting with upper eyelid ptosis (Table 11).

Rationale

The workgroup was interested in better understanding and comparing outcomes associated with either levator plication or advancement. However, we were unable to find any studies directly comparing these techniques. We

Table 11. Recommendation 7

	Perform Levator Plication	Perform Levator Advancement
Aggregate evidence quality	Very low	Very low
Strength of recommendation	Option	Option
Benefits	• Simplicity • Shorter operative time • Low risk of hematoma	• Effective for ptosis correction
Risks, harms, and costs	• Risk of lid contour asymmetry • Risk of recurrent ptosis • Risk of mechanical failure	• Increased risk of hematoma • Longer operative time • Technically demanding
Benefits/harms assessment	Balance of benefits and harms	Balance of benefits and harms
Value judgments	Surgeon proficiency has a strong role	Surgeon proficiency has a strong role
Intentional vagueness	None	None
Role of patient preference	None	None
Exclusions	None	None
Differences of opinion	None	None

did find several case series discussing the efficacy of each technique, but all received an evidence grade of "very low-quality" because of their study designs.[48–50] Technically, levator plication is easier to perform and has fewer complications than advancement. Theoretically, advancement would have a more mechanical advantage in terms of effectiveness of correcting blepharoptosis. Because of the limited comparative evidence, the workgroup could not make any recommendation on the benefits and risks of one technique over the other.

Recommendation 8:

The workgroup recommends that patients should have a postoperative follow-up assessment for complications, such as lagophthalmos and eyelid asymmetry. This should occur within 1 to 3 months following upper eyelid blepharoplasty and/or ptosis correction and again at 9 months to 1 year to evaluate cosmetic symmetry and functional outcomes (Table 12).

Rationale

Although upper eyelid blepharoplasty and ptosis correction are conceptually simple procedures, attention to detail and technical finesse are necessary to achieve optimal outcomes. These operations can be pursued for functional and/or cosmetic reasons to improve peripheral vision and/or enhance the appearance of the eyelids. Follow-up appointments are excellent opportunities to better understand outcomes and to enhance patient-physician communication. Increased communication between the patient and physician can help patients to better understand the healing process and to form realistic expectations, and help the physician understand the patient's experiences, satisfaction, and other functional and cosmetic outcomes. Follow-up appointments are opportunities to identify areas for improved preoperative patient counseling and technique enhancement, and to identify those patients who may benefit from further counseling or management, thus promoting quality control and improvement. Because of the potentially devastating consequences, early identification of exposure keratopathy attributable to lagophthalmos and other mechanical eyelid abnormalities is key to counsel patients and achieve corneal protection. Critical appraisal of the results including assessments of symmetry, eyelid contour and shape, and eyelid position (e.g., margin reflex distance 1) require longer follow-up than the early postoperative period—as does

Table 12. Recommendation 8

Aggregate evidence quality	Moderate
Strength of recommendation	Good practice • Optimize patient-doctor communication • Early identification of patients who may benefit from further management or counseling • Empower patients to express questions and satisfaction
Benefits	• Improve outcomes assessment and quality control
Risks, harms, and costs	• Additional cost of visit/travel/time to patient and physician
Benefits/harms assessment	Balance of benefits and harms
Value judgments	Surgeon proficiency has a strong role
Intentional vagueness	Precise follow-up intervals are not defined
Role of patient preference	Small; scheduling, desire to be assessed more than the intervals outlined
Exclusions	None
Differences of opinion	None

recognition of the need for revision procedures. Precise follow-up intervals after upper blepharoplasty and/or eyelid ptosis repair have not been determined. A low-quality study assessed changes in margin reflex distance 1 measurements at varying postoperative intervals and found that 60 percent of patients were still experiencing changes 6 weeks after surgery.[36] A smaller cohort (n = 39) had an additional follow-up appointment at 5 months, where 38.5 percent were still experiencing changes in margin reflex distance 1. Another low-quality study focused on comparing external levator advancement and Müller muscle–conjunctival resection approaches provided multiple postoperative follow-up time points with margin reflex distance 1 measurements.[51] Early (1 week) postoperative changes were most dramatic in the anterior approach group, but final margin reflex distance 1 values had stabilized and were similar between groups by 3 months. The workgroup recommends good practice intervals of 1 to 3 months for early outcomes and 9 months to 1 year for longer term outcomes.

In addition to considering the benefits of postoperative follow-up visits, there is an associated cost for both patients and physicians to also take into account. These include the cost of follow-up office visits (including those visits outside of the global period), visit lengths, and travel time to the appointments. In addition, collection and assessment of outcome measures may cost the physician time and resources, particularly when additional measurements, photographs, or patient-reported outcome measures questionnaires are used. In some cases, it may be impractical (and/or unnecessary) for patients to return for follow-up, particularly when the patients are satisfied—for example, when patients have relocated to a different geographic area, or if patients initially traveled a far distance for surgical treatment. In these cases, advising patients to seek care with a local physician as necessary may be preferred.

CONCLUSIONS AND FUTURE DIRECTIONS

The review of the literature revealed varied complication rates and diverse treatment modalities for the correction of the upper visual field deficit. These disparities may arise because of the diversity of the cause of visual field obstruction (dermatochalasis versus ptosis versus a combination of both), the presence of asymmetry, and compensatory mechanisms involved. There are a wide range of reported complication rates, especially in blepharoptosis, as blepharoptosis correction is a more technically demanding procedure and there is variation in practice based on diagnosis and a surgeon's preference on how to correct these defects. In the case of unilateral ptosis or asymmetric upper visual field obstruction, the correction of one eyelid will also affect the contralateral side because of the Hering law. In addition, correcting the upper visual field obstruction may reduce or eliminate the compensatory mechanism of the brow hyperactivity and thus cause postoperative brow ptosis. Furthermore, among the various degrees of mild, moderate, and severe ptosis, the more severe the ptosis, the more difficult it is to correct the visual field obstruction, necessitating a more technically advanced correction method.

Reducing the wide-ranging revision rates can improve the overall health care cost and quality of life for patients. Unfortunately, many of the publications on this topic were of low or very low quality because of the lack of high-quality randomized controlled trials or well-constructed prospective observational cohort studies in the eyelid surgery literature. The paucity of high-quality evidence was similarly noted almost a decade ago in 2010, and only slight progress has been made in this time.[52] Following the Grading of Recommendations, Assessment, Development, and Evaluation methodology for translating evidence to recommendations, the guideline panel assumed a duty to consider evidence objectively for each clinical question with full knowledge of the variability and lack of confidence in effect estimates. It was the consensus among the group that forming a recommendation statement would be too speculative in only one instance (what would have been recommendation 4). The panel refers readers to the tables accompanying each recommendation statement for a transparent analysis of the values and preferences used to qualify each recommendation. More rigorously designed studies are needed to measure outcomes of interest with less sources of potential error or bias. These future studies will provide the evidence base for stronger recommendations in further iterations of this guideline.

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DISCLOSURE APPENDIX

All contributors and preparers of the guideline, including ASPS staff, disclosed all relevant conflicts of interest via an online disclosure reporting database. In accordance with the Institute of Medicine's recommendations for guideline development, members with a conflict of interest represented less than half of the guideline workgroup. ***Kenneth K. Kim, M.D.,*** *Workgroup Co-Chair, has no relevant disclosures.* ***Mark S. Granick, M.D.,*** *Workgroup Co-Chair, serves or has served as a consultant for Misonix, Inc., Sanuwave, PolartiyTE, Molnlycke, Novadaq, and Cytori, and has served as the co-editor in chief of Eplasty.* ***Gregory A. Baum, M.D.,*** *has served as a consultant for the Medical Liability Mutual Insurance Company.* ***Francis Beninger, M.D., Kenneth V. Cahill, M.D., Katelyn Donnelly, M.P.H., Ashton A. Kaidi, M.D., Ajaipal S. Kang, M.D., Lauren Loeding, M.P.H., Myriam Loyo, M.D., Parit A. Patel, M.D., M.B.A., Jason Roostaeian, M.D., Goretti Ho Taghva, M.D.,*** *and* ***George M. Varkarakis, M.D.,*** *have no relevant disclosures.*

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