

Current Ptosis Management: A National Survey of ASOPRS Members

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Purpose: To assess current practice patterns for management of ptosis by current ASOPRS members.

Methods: An invitation to participate in a web-based, anonymous survey was sent to current members of the American Society of Ophthalmic Plastic and Reconstructive Surgeons (ASOPRS) via e-mail. The survey consisted of 4 sections: preoperative testing of ptosis patients, surgical preferences, dry eye evaluation in ptosis patients, and length of postfellowship practice. Responses were analyzed using standard statistical methods.

Results: Fifty percent of ASOPRS members performed more than 100 ptosis procedures in the past year. Most ASOPRS members performed preoperative photography, automated perimetry testing, and phenylephrine testing in evaluation of ptosis patients. A slight majority of ASOPRS members did not use preoperative Schirmer testing as the primary screening tool for dry eye disease. Most ASOPRS members performed internal levator aponeurosis advancement surgery, although most surgeons performing concurrent ptosis repair and blepharoplasty preferred an external approach. Frontalis sling surgery was performed using a wide variety of materials for suspension.

Conclusion: Current trends in the management and preoperative evaluation of blepharoptosis by ASOPRS members revealed a number of interesting common practices that are of value to current practitioners.

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The management of blepharoptosis is a complex issue. Many different methods of treating ptosis, even with the same underlying cause, exist.¹ Numerous studies have reported the benefits of different ptosis procedures.^{1–3} In addition, there is no consensus on the optimal preoperative evaluation strategy of ptosis patients.^{4,5} Finally, the potential for worsening dry eye disease postsurgically in ptosis patients has been suggested, but controversy exists on appropriate screening measures for dry eye disease in this population.⁵ We administered a national survey to members of the American Society of Ophthalmic Plastic and Reconstructive Surgeons (ASOPRS) community to determine current trends in ptosis management.

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MATERIALS AND METHODS

A 21-question web-based survey was created and an invitation was sent to all members of the ASOPRS using the society's e-mail database. This survey was answered in an anonymous fashion. The survey consisted of 4 sections: 1) preoperative surgical testing, 2) ptosis surgical preferences, 3) dry eye evaluation in ptosis patients, and 4) time from completion of fellowship. The questions focused on preoperative visual field testing, photography, use of the phenylephrine test, types of surgical interventions, choice of surgical intervention based on patient characteristics, types of dry eye evaluation, and utilization determinants for dry eye evaluation. Internal levator aponeurosis advancement surgeries were described as Putterman, Fasanella-Servat, or Müller muscle conjunctival resection procedures. Many of the questions also contained an open-ended "other" option, which allowed the respondents to include an answer choice that was not included in the survey choices. Respondents were allowed to select more than one answer choice for the questions and were not required to answer every question. Only surveys which had been completed (as determined by the survey program) were analyzed. The data were entered in a computerized database. Standard statistical analysis was performed using Open Epi (www.openepi.com). Five hundred fifty-two e-mail requests were sent to ASOPRS members and a total of 208 completed surveys were analyzed.

RESULTS

Five hundred fifty-two e-mail requests were sent to ASOPRS members and a total of 208 surveys were completed. This represented a 37.7% response rate for this survey. Of the respondents, 18.1% had been in practice between 0 and 5 years, 31.4% between 6 and 15 years, 51.0% >15 years. Table 1 shows the preoperative management and practice characteristics of ASOPRS members. Of the respondents, 59.9% performed preoperative phenylephrine testing, with 82.7% of those using 2.5% phenylephrine. Almost all (97.6%) of the respondents utilized preoperative photography in their evaluation, and 87.4% of respondents used preoperative visual field testing, with 35.1% of those respondents that performed visual field testing using the Humphrey Superior 64 program, 37.4% using Goldmann perimetry, and 24.2% using other Humphrey automated static field testing programs.

Table 2 contains the ptosis surgical preferences of ASOPRS members that responded to the survey. Half (50.5%) of the respondents performed more than 100 ptosis procedures over the past year. Only 2.4% of respondents do not perform external levator aponeurosis advancement procedures. Seventy-four percent of respondents perform some form of internal levator aponeurosis advancement procedure (Putterman, Fasanella-Servat, etc). Only 13.2% of respondents used a standard amount of resection with internal levator advancement procedures; 55.6% of respondents used a variable amount of resection based on response to phenylephrine, while 46.5% performed a variable amount of resection based on the amount of ptosis present. Of the respondents, 81.5% that performed

TABLE 1. Preoperative testing preferences

Question	Response choice (No.) [% of total respondents]							Total respondents (No.)	“Other” answers (No. if >1)
When completing preoperative evaluations for ptosis do you perform a phenylephrine test?	Yes (n = 124) [59.9%]	No (n = 83) [40.1%]	NA	NA	NA	NA	NA	207	NA
If you perform a phenylephrine test what percentage of phenylephrine do you use?	2.5% (n = 109) [61.6%]	10% (n = 23) [13.0%]	Do not perform (n = 45) [25.4%]	NA	NA	NA	NA	177	NA
When completing preoperative evaluations for ptosis do you perform preoperative photography?	Yes (n = 202) [97.6%]	No (n = 5) [2.4%]	NA	NA	NA	NA	NA	207	NA
If you perform preoperative photography, what do you photograph (check all that apply)?	Full face (n = 144) [69.9%]	Profile (n = 70) [34.0%]	Eyelids only (n = 154) [74.8%]	Don't perform photography (n = 4) [1.9%]	Other (n = 12) [5.8%]	NA	NA	206	Up- and downgaze (n = 6); downgaze (n = 5); lateral/oblique views/45° angle (n = 10); full-face up- and downgaze; upper 50% of face - “full eye plastic series- 7 views”; each eye individually; each eye obliquely; eyes closed; lid skin held up
Do you perform preoperative visual field testing?	Yes (n = 180) [87.4%]	No (n = 26) [12.6%]	NA	NA	NA	NA	NA	(n = 206)	NA
If you perform preoperative visual field testing what type of testing do you perform (check all that apply)?	Confrontation testing only (n = 16) [8.1%]	Tangent screen testing (n = 34) [17.2%]	Goldmann kinetic perimetry (n = 58) [29.3%]	Humphrey- Superior 64 program; static perimetry (n = 64) [32.3%]	Humphrey- other program; static perimetry (n = 44) [22.2%]	Other (n = 12) [6.1%]	Do not perform visual field testing (n = 16) [8.1%]	(n = 198)	NA

NA, not applicable.

The total number in each column may not add to the total number of respondents, as respondents were allowed to choose more than one answer for each question.

internal levator aponeurosis advancement surgery did so on patients with moderate (2–4 mm) ptosis, and 32.4% of respondents that performed internal levator aponeurosis advancement surgery did so on patients with severe (>4 mm) ptosis. Of respondents that performed concurrent blepharoplasty and ptosis repair procedures, 68% preferred external levator approaches for ptosis repair, while 24.5% preferred internal levator repair procedures.

The frontalis sling procedure preferences of respondent ASOPRS members are shown in Table 3. Most (93.3%) of the respondents performed frontalis sling ptosis repairs. With regard to materials

used during frontalis sling surgery, 74.3% of respondents had used silicone rod material, 34.9% had used autogenous fascia lata, 25.1% had used cadaveric fascia lata, and 13.3% had used supra-mid material. A variety of other surgical materials were used, and these are noted in Table 3. In addition, Table 3 separates the surgeon’s preferred use of different sling materials by surgeon activity level over the past year.

The dry eye testing preferences of respondent ASOPRS members are noted in Table 4. Of respondents, 47.6% performed preoperative Schirmer testing, with 43.4% of respondents that performed preoperative Schirmer testing utilizing it on all patients; 84.5% of those

TABLE 2. Ptosis surgical preferences

Question	Response choice (No.) [% of total respondents]						Total respondents (No.)	“Other” answers (No. if >1)
Approximately how many ptosis procedures did you perform in the past year (count each eyelid as one procedure)?	0 (n = 3) [1.4%]	1–25 (n = 13) [6.3%]	26–50 (n = 23) [11.1%]	51–75 (n = 31) [14.9%]	76–100 (n = 33) [15.9%]	>100 (n = 105) [50.5%]	208	NA
Do you perform an external levator resection/ advancement approach procedure for ptosis? If yes, approximately how many did you perform in the past year (count each eyelid as one procedure)?	Yes, 1–25 (n = 43) [20.7%]	Yes, 26–50 (n = 40) [19.2%]	Yes, 51–75 (n = 22) [10.6%]	Yes, 76–100 (n = 20) [9.6%]	Yes, >100 (n = 79) [38.0%]	Do not perform (n = 5) [2.4%]	208	NA
Do you perform an internal levator advancement approach procedure for ptosis (i.e. Putterman, Fasanella-Servat, Müller’s muscle-conjunctival resection, etc)? If yes, approximately how many did you perform in the past year (count each eyelid as one procedure)?	Yes, 1–25 (n = 69) [33.2%]	Yes, 26–50 (n = 34) [16.3%]	Yes, 51–75 (n = 13) [6.3%]	Yes, 76–100 (n = 15) [7.2%]	Yes, >100 (n = 24) [11.5%]	Do not perform (n = 54) [26.0%]	208	NA
If you perform internal levator advancement approach ptosis surgery, do you perform a standard or variable amount of resection? If variable, please note what method you use to decide on the amount resected.	Standard (n = 19) [9.5%]	Variable based on response to phenylephrine (2.5% or 10%) (n = 80) [40.2%]	Variable based on amount of ptosis (n = 67) [33.7%]	Variable based on other criteria (n = 13) [6.5%]	Do not perform (n = 55) [27.6%]	—	199	Congenital ptosis; levator function (n = 4); “Dresner nomogram”; about 8 mm for 1 mm lift and 10 for 2 mm lift; relative position of other eyelid; considerations re: Herring’s Law; prior surgery; other lid position, cornea, tear production, orbicularis function; if blepharoplasty is being done at same time; height of other eyelid; amount of dehiscence of levator; if it can be seen through conjunctiva
If you perform internal levator advancement surgery, do you perform this procedure for moderate ptosis (as defined by 2–4 mm ptosis)?	Yes (n = 115) [59.6%]	No, I do not perform this procedure for moderate ptosis (n = 28) [14.5%]	No, I do not perform this procedure at all (n = 52) [26.9%]	—	—	—	193	—

(Continued)

TABLE 2. (Continued)

Question	Response choice (No.) [% of total respondents]						Total respondents (No.)	“Other” answers (No. if >1)
If you do perform internal levator advancement surgery, do you perform this procedure for severe ptosis (as defined by >4 mm ptosis)?	Yes (n = 46) [23.0%]	No, I do not perform this procedure for moderate ptosis (n = 97) [48.5%]	No, I do not perform this procedure at all (n = 58) [29.0%]	—	—	—	200	—
If you are performing a concurrent upper eyelid blepharoplasty and ptosis repair, what is your preferred ptosis procedure?	External levator resection/ advancement procedure (n = 147) [70.7%]	Internal levator advancement procedure (n = 53) [25.5%]	Frontalis sling procedure (n = 3) [1.4%]	No preference (n = 9) [4.3%]	Other (n = 4) [1.9%]	Do not perform concurrent upper eyelid blepharoplasty and ptosis repair procedures (n = 6) [2.9%]	222	External Müller’s muscle resection; depends on amount of ptosis (mild-moderate-internal levator advancement; moderate to severe external levator advancement/ resection) (n = 2)

NA, not applicable.

The total number in each column may not add to the total number of respondents, as respondents were allowed to choose more than one answer for each question.

TABLE 3. Frontalis sling ptosis surgical preferences

Question	Response choice (No.) [% of total respondents]						Total respondents (No.)	“Other” answers (No. if >1)
Do you perform the frontalis sling procedure for ptosis? If yes, how approximately many did you perform in the past year (count each lid as one procedure)?	Yes, 1–25 (n = 168) [80.8%]	Yes, 26–50 (n = 22) [10.6%]	Yes, 51–75 (n = 2) [1.0%]	Yes, 76–100 (n = 1) [0.5%]	Yes, >100 (n = 1) [0.5%]	Do not perform (n = 14) [6.7%]	208	NA
If you do perform frontalis sling procedures for ptosis, what material do you use (check all that apply)?	Silicone rod (n = 145) [71.4%]	Autogenous fascia lata (n = 68) [33.5%]	Cadaveric fascia lata (n = 49) [24.1%]	Supra-mid (n = 26) [12.8%]	Other (n = 28) [13.8%]	Do not perform (n = 8) [3.9%]	203	Gortex®/“Ptose Up”/expanded Polytetrafluoroethylene (n = 17); temporalis fascia (n = 2); prolene (n = 2); direct brow coupling; “suture”
Surgeons performing 1–25 slings per year	Silicone rod (n = 123) [73.2%]	Autogenous fascia lata (n = 52) [31.0%]	Cadaveric fascia lata (n = 45) [26.8%]	Supra-mid (n = 20) [11.9%]	Other (n = 23) [13.7%]	Do not perform (n = 0) [0%]	168	Gortex®/“Ptose Up”/expanded Polytetrafluoroethylene (n = 13); temporalis fascia (n = 2); prolene (n = 2); direct brow coupling; “suture”
Surgeons performing 26–50 slings per year	Silicone rod (n = 18) [81.8%]	Autogenous fascia lata (n = 11) [50.0%]	Cadaveric fascia lata (n = 3) [13.6%]	Supra-mid (n = 5) [22.7%]	Other (n = 4) [18.2%]	Do not perform (n = 0) [0%]	22	Gortex®/“Ptose Up”/expanded Polytetrafluoroethylene (n = 3)
Surgeons performing >50 slings per year	Silicone rod (n = 3) [75.0%]	Autogenous fascia lata (n = 4) [100%]	Cadaveric fascia lata (n = 1) [25.0%]	Supra-mid (n = 0) [0%]	Other (n = 1) [25%]	Do not perform (n = 0) [0%]	4	Gortex®/“Ptose Up”/expanded Polytetrafluoroethylene

NA, not applicable.

The total number in each column may not add to the total number of respondents, as respondents were allowed to choose more than one answer for each question.

TABLE 4. Dry eye testing preferences

Question	Response choice (No.) [% of total respondents]							Total respondents (No.)	"Other" answers (No. if > 1)
	Yes	No (n = 109) [52.4%]	NA	NA	NA	NA	NA		
Do you perform preoperative Schirmer testing?	Yes (n = 99) [47.6%]	No (n = 109) [52.4%]	NA	NA	NA	NA	NA	208	NA
If you perform preoperative Schirmer testing, in what patient population do you use Schirmer testing (check all that apply)?	History of dry eye (n = 40) [22.0%]	Symptoms of dry eye only (n = 25) [13.7%]	Signs of dry eye only (n = 27) [14.8%]	Signs and symptoms of dry eye (n = 54) [29.7%]	All patients (n = 46) [25.3%]	Other (n = 2) [1.1%]	Do not perform (n = 76) [41.8%]	182	All patients except children; all patients over 40; for "moderate" to "severe" dry eye patients; only with "significant" "history of dry eye"; only in patients with "significant" dry eye symptoms
Do you routinely perform other measures of dry eye on patients undergoing ptosis surgery?									
Surgeons that perform Schirmer testing preoperatively	Fluorescein testing (n = 63) [64.3%]	Tear lake measurement (n = 36) [36.7%]	Tear film breakup time (n = 44) [44.4%]	Historical questioning (n = 71) [72.4%]	Other (n = 4) [4.1%]	NA	No (n = 12) [12.2%]	98	Rose Bengal; slit lamp examination (n = 2)
Surgeons that do not perform Schirmer testing preoperatively	Fluorescein testing (n = 66) [60.6%]	Tear lake measurement (n = 46) [42.2%]	Tear film breakup time (n = 49) [45.0%]	Historical questioning (n = 77) [70.6%]	Other (n = 2) [1.8%]	NA	No (n = 18) [16.5%]	109	Lissamine green; slit lamp examination (n = 2); check for Bell phenomenon (n = 2)

NA, not applicable.

The total number in each column may not add to the total number of respondents, as respondents were allowed to choose more than one answer for each question.

physicians that did not perform preoperative Schirmer testing performed some other form of preoperative dry eye testing.

DISCUSSION

Blepharoptosis is a complex problem that is treated in various ways. Ptosis management is a controversial issue, and numerous studies on different surgical interventions and their outcomes have been published over the years.¹⁻³ We administered a national survey in the hopes of obtaining information about current trends in ptosis management. The 37.7% response rate for this survey is similar to a previous survey of ASOPRS members, which yielded a 36% response rate.⁶ We divided this survey in multiple sections to determine current preoperative management trends, dry eye screening practices, and surgical preferences among ASOPRS members.

Examination of the results of this survey reveals a number of interesting findings. Half (50.5%) of ASOPRS members performed at least 100 ptosis repairs in the past year.

This indicates the importance of ptosis repair and management in an oculoplastic surgeon's practice.

Nearly two-thirds of ASOPRS members that responded to the survey utilized a phenylephrine test in their preoperative testing protocol. This indicates the high level of openness to performing internal levator aponeurosis advancement surgeries. Interestingly, a vast majority of surgeons performing the phenylephrine test use 2.5% phenylephrine despite the fact that the original investigators used 10% phenylephrine.² This is in line with later studies showing the utility of 2.5% phenylephrine with reduction in potential side effects.⁷ Other findings of interest include the extensive use of formal preoperative visual field testing. Specifically, it was surprising to the authors that the majority of respondents used the automated Humphrey visual field for their preoperative visual fields. This approach was noted to be more time intensive than kinetic perimetry in previous studies.⁴ In fact, static perimetry may be less sensitive than kinetic perimetry in finding visual field loss in ptosis

TABLE 5. Use of internal levator aponeurosis surgery by years after fellowship

Years after fellowship	Used internal levator aponeurosis surgery? (No.) [% of total respondents]*		Total respondents (No.)
	Yes	No	
0–5 years	33 [89.2%]	4 [10.8%]	37
6–15 years	49 [76.6%]	15 [23.4%]	64
>15 years	73 [68.9%]	34 [32.1%]	106
All surgeons	155 [74.2%]	54 [25.8%]	209

*The question asked was as follows: “Do you perform an internal levator advancement approach (Putterman, Fasanella-Servat, Müller’s muscle-conjunctival resection, etc.) procedure for ptosis? If yes approximately how many did you perform in the past year (count each lid as one procedure)?”

The total number in each column may not add to the total number of respondents, as respondents were allowed to choose more than one answer for each question.

patients.⁴ This suggests that the responding ASOPRS members as a whole take a relatively conservative approach to preoperative testing.

Worsening of dry eye disease is a potential problem with ptosis repair and has been studied extensively in the literature, with a number of studies showing minimal effect of ptosis repair on tear production and dry eye complications.^{5,8} Accordingly, respondent ASOPRS members appeared to take a relatively conservative approach to the issue, with only 53.4% of respondents not utilizing preoperative Schirmer testing. As might be expected, the majority of physicians performed some form of dry eye testing preoperatively, with 84.5% of surgeons that did not perform Schirmer testing utilizing some other form of dry eye evaluation preoperatively.

It was not surprising that nearly 100% of respondent ASOPRS members performed some variant of external levator repair for ptosis. It was of note, however, that 74% of respondents currently perform some type of internal levator aponeurosis advancement surgery. Of particular interest is the high rate of internal surgical approaches to treat moderate and severe ptosis, as this has not been the primary reported use of these procedures.⁹ Although some authors have suggested the use of a standard amount of resection in internal aponeurosis advancement procedures, only 13.2% of respondents report resecting a fixed amount of tissue in their cases.¹⁰ This is also in line with later studies suggesting a graded approach to resection based on response to phenylephrine or other factors.^{11,12}

Although it is intuitively more efficient to perform a concurrent external levator aponeurosis advancement and upper eyelid blepharoplasty, 24.5% of respondents preferred concurrent upper blepharoplasty and internal levator advancement.

This is of interest as the concurrent internal levator advancement and blepharoplasty approach has been studied, and recommended with some caveats, by some authors due to the purported increased predictability of internal procedures for ptosis.^{10,13}

Investigation in the frontalis sling approaches to ptosis revealed that respondent ASOPRS members used a variety of tools for suspension, but the majority had used silicone, while a minority had used fascia lata (either cadaveric or autologous). This appears to be in line with the variety of approaches found in the literature.^{14–16} Of interest is the observation that less active surgeons appeared to utilize a wider variety of sling material than did more active surgeons (Tab. 3).

Tables 5 and 6 describe the relationship between use of the internal levator aponeurosis advancement surgery and years since completion of fellowship. In this study, there appeared to be a statistically significant association between years out of fellowship and probability of performing internal levator aponeurosis advancement surgery. In particular, surgeons that do not perform internal levator aponeurosis advancement surgery were nearly 4 times more likely to have trained more than 15 years ago than 0 to 5 years ago. In addition, there appeared to be a significant trend association (Extended Mantel-Haenszel chi-square for linear trend = 6.98, $p = 0.008250$) between nonperformance of internal levator aponeurosis advancement surgery and increasing years out of practice.

Weaknesses of this study include recall bias, selection bias, and the open nature of the survey. Respondents were allowed to selectively answer questions and were allowed to provide more than one answer to each question. In addition, while the ASOPRS e-mail list includes a large number of experienced surgeons, many other physicians treat and evaluate patients with ptosis. These physicians are not included in this study.

We have provided a snapshot of the current blepharoptosis management practices of ASOPRS members that responded to the survey. It is encouraging that many of the members’ current practices seem to follow the trends in the literature (phenylephrine concentration choice, dry eye testing, nontraditional use of internal levator advancement operations).

CONCLUSION

Current trends in the management and preoperative evaluation of blepharoptosis by ASOPRS members revealed a number of interesting common practices that are of value to current practitioners. Future studies to determine a consensus on preoperative evaluation, optimal surgical indications and applications for ptosis repair, and approaches to dry eye screening will be of interest to the oculoplastic surgery community. In addition, future studies may be performed to determine the motivation behind the various preferences in ptosis surgery,

TABLE 6. Dose-response analysis of years after fellowship and use of internal levator aponeurosis advancement ptosis surgery

Years after fellowship	Surgeons performing or not performing internal levator aponeurosis advancement		Total number of surgeons	Odds of performing internal levator aponeurosis advancement /odds ratio
	Performing	Not performing		
0–5 years	33	4	37	8.25/1
6–15 years	49	15	64	3.27/0.4
>15 years	73	34	107	2.15/0.26
Total	155	53	208	—

including whether younger surgeons are adopting and internal approach more readily than older surgeons or if older surgeons have abandoned this procedure.

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