

External lacrimal punctum grading: Reliability and interobserver variation

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PURPOSE. *To test the reliability and interobserver variation of external lacrimal punctum (ELP) grading.*

METHODS. *In a population-based epidemiologic study, ELP was visually graded based on slit lamp examination (grade 0 to 5), as described previously. Grades 0, 1, and 2 are for closed or stenotic ELP and grade 3 is for normal ELP (subjective grades). Grades 4 and 5 are for larger than normal (slit) ELP measured in millimeters by slit lamp beam (objective grades). Upper and lower ELP were graded by an oculoplastic surgeon and a senior ophthalmology resident. Both observers were masked to the reading of the other. Both observers were familiar to the grading system for past few years, although the oculoplastic surgeon had more experience in this regard. Patients with previous periocular surgery, medial lid mass obscuring the ELP, anatomically distorted punctum, and subjects with grade 4 and 5 ELP (objective grades) were excluded. The intraclass correlation coefficient test was used for the statistical analysis.*

RESULTS. *There were 632 eyes from 174 (55.10%) male and 142 (44.90%) female subjects. Subjects' ages ranged from 7 to 87 years (mean \pm SD = 54 \pm 17.56). The intraclass correlation coefficient test showed a positive and strong correlation between two observers for grading the upper (value=+0.87, 95% CI: 0.84 and 0.88, p=0.000) and lower (value=+0.91, 95% CI: 0.90 and 0.92, p=0.000) ELP. In general, the less experienced observer tended to overestimate both upper and lower ELP grading.*

CONCLUSIONS. *Reliability of the new ELP grading makes it a recommendable option for use in the clinic and comparing reports on ELP pathologies. (Eur J Ophthalmol 2008; 18: 507-11)*

KEY WORDS. *External lacrimal punctum, Grading, Reliability*

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INTRODUCTION

External lacrimal punctum (ELP) is normally 0.3 mm in diameter (1). It changes with congenital (atresia or stenosis) and acquired (stenosis) diseases or therapeutic intervention (intubation, dilation, or snip procedure). There are various descriptive and sometimes confusing terms to define the pathology and size of the ELP (1-16). We previously (17) introduced a visual grading system for the assessment of ELP (Tab. I and Figs. 1-3). Grade 0, 1, and 2 are

for closed or stenotic ELP and grade 3 is for normal ELP (subjective grading). Grades 4 and 5 are for larger than normal (slit) ELP measured in millimeters by slit lamp beam (objective grading). Various descriptive terms and their equivalent in the new grading system include punctal atresia (9), punctal agenesis (10), complete occlusion with no punctum (3), and punctal absence (11) for grade 0; total obstructed punctum (2), complete punctal closure (12), complete membranous punctal occlusion (3, 4), very stenotic punctum (4), punctal occlusion (5), severe punc-

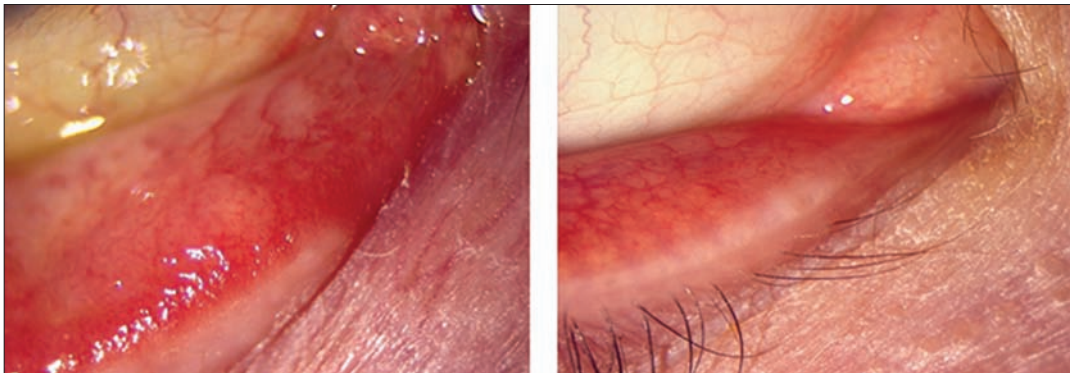


Fig. 1 - External lacrimal punctum is not visible in grade 0 (left) and very stenotic in grade 1 (right).

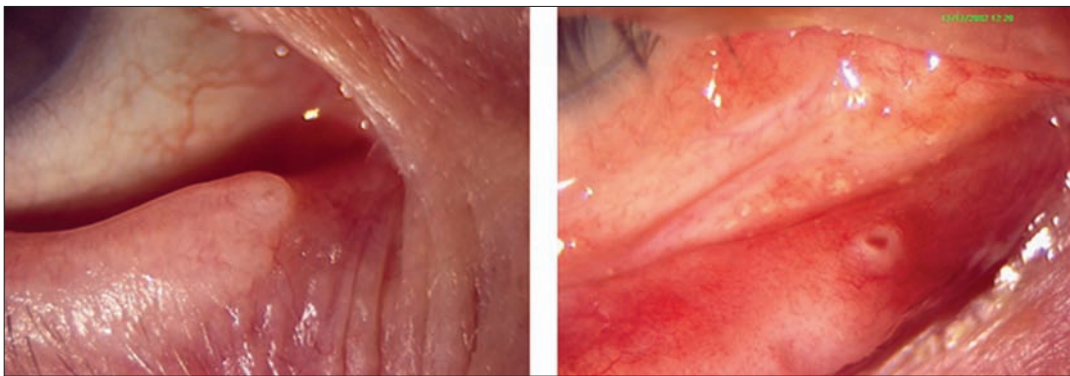


Fig. 2 - Less severe external lacrimal punctal stenosis in grade 2 (left) and normal external lacrimal punctum in grade 3 (right).

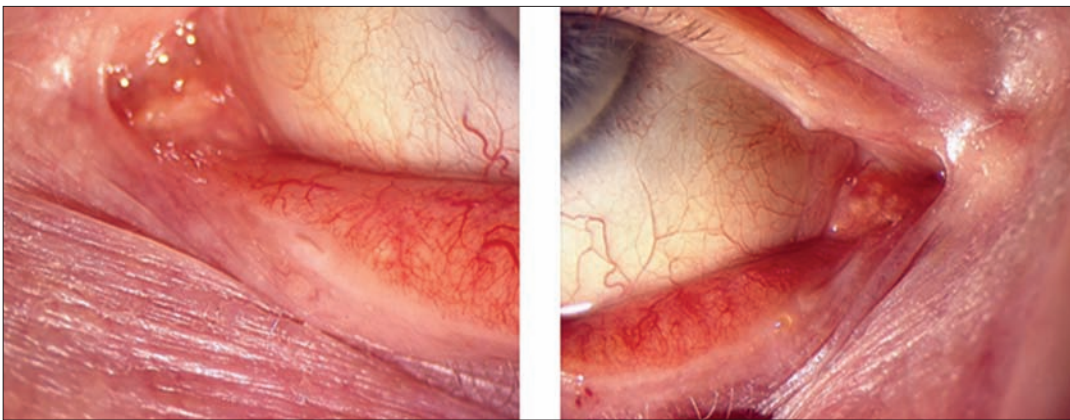


Fig. 3 - Small slit (<2 mm) and large slit (≥ 2 mm) external lacrimal punctum are seen in grades 4 (left) and 5 (right), respectively.

TABLE I - GRADING OF EXTERNAL LACRIMAL PUNCTUM

Grade	Clinical finding on slit lamp examination	Way to enter a #00 Bowman probe
0	No papilla and punctum (punctal atresia)	Needs to create a papilla with surgery
1	Papilla is covered by a membrane (exudative or true membrane) or fibrosis and difficult to recognize	Needs a #25 needle, followed by a punctal finder and then standard punctum dilator
2	Less than normal size but recognizable	Needs a punctal finder and then a standard punctum dilator
3	Normal	Needs regular punctum dilator
4	Small slit (<2 mm)	No need for intervention
5	Large slit (≥ 2 mm)	No need for intervention

tal stenosis with no appreciable punctal opening (6), and punctal epithelialization and scarification (13) for grade 1; less than 1 mm punctal size (2), incomplete punctal stenosis (3), punctal stenosis (5), punctal phimosis (7), and punctal stenosis with abnormally small or scarred punctum (6) for grade 2; punctal stenosis (14-16) for grades 1 and 2; more than 1 mm punctal size (2) for grade 3; slit punctum (3) for grades 4 and 5; and punctal erosion of >2 mm (9) for grade 5. Different success rates regarding to surgical procedures performed for ELP stenosis seem to be partly attributed to different severity of stenosis. Although we used silicone stent for treating all types of ELP stenosis (17), we have reached the conclusion that less stenotic ELP (grade 2) is responding well to simpler procedures like simple ELP dilation or snip procedure. More stenotic ELP (grades 1 and 0) needs a stent (Minimonoka, for example) to keep the punctum open and prevent recurrence after opening and dilating the punctum. Thus, knowing and recording the ELP size uniformly will make the results of different studies more comparable. We found the grading system simple and easy to use and our fellows and residents have been using this grading with no difficulty in the lacrimal clinic since then.

Reliability is an important issue at the time of examination and recording a particular sign. A reliable measurement is repeatable and reproducible. Consistency among observers does not imply accuracy because observers may be consistent but inaccurate in the absence of an absolute standard. Reliability could be used to evaluate validity issues, especially if one of the observers is regarded as an expert.

In a population-based epidemiologic (cohort) study, we aimed to compare the grading of ELP recorded by two observers in order to assess the interobserver variation of the ELP grading system.

METHODS

A slit lamp examination was performed to grade the ELP. Patients with previous periocular surgery, medial lid mass obscuring the ELP, anatomically distorted punctum, and grade 4 and 5 ELP were excluded. All subjects with different ELP size with and/or without watery eye symptom who did not meet the exclusion criteria were included. There were 632 eyes from 174 (55.10%) male and 142

TABLE II - NUMBER OF THE UPPER EXTERNAL LACRIMAL PUNCTUM GRADED BY ATTENDING (A) AND SENIOR OPHTHALMOLOGY RESIDENT (R)

		Upper punctum grade (R)				Total
		0	1	2	3	
Upper punctum grade (A)	0	4	0	0	0	4
	1	0	7	0	0	7
	2	0	0	25	18	43
	3	0	0	30	548	578
Total		4	7	55	566	632

Intraclass correlation coefficient test: Value=+0.87, 95% CI: 0.84 and 0.88, p=0.000

TABLE III - NUMBER OF THE LOWER EXTERNAL LACRIMAL PUNCTUM GRADED BY ATTENDING (A) AND SENIOR OPHTHALMOLOGY RESIDENT (R)

		Lower punctum grade (R)				Total
		0	1	2	3	
Lower punctum grade (A)	0	6	0	0	0	6
	1	0	9	2	0	11
	2	0	4	32	13	49
	3	0	0	25	541	566
Total		6	13	59	554	632

Intraclass correlation coefficient test: Value=+0.91, 95% CI: 0.90 and 0.92, p=0.000

(44.90%) female subjects included from March 2003 to May 2005. Since grade 4 and 5 are based on the size in millimeters and measured with a slit lamp, they do not have interobserver variation as found in our series. Upper and lower ELP were graded by an attending oculoplastic surgeon and a senior ophthalmology resident. Both observers were masked to the reading of the other. Both observers were familiar to the grading system for the past few years, though the oculoplastic surgeon had more experience in this regard.

A significant number of subjects in this study were recruited from the study comparing the lacrimal drainage system obstruction between the normal population and glaucomatous patients (18). The ethics committee approved this study and informed consent was obtained from the patients.

Data were entered with software SPSS MS Windows release 11.5 (Chicago). *p* Value of less than 0.05 was considered significant. The intraclass correlation coefficient test was used for the statistical analysis.

RESULTS

Grading of ELP was performed on 632 eyes from 174 (55.10%) male and 142 (44.90%) female subjects from March 2003 to May 2005. Subjects' age ranged from 7 to 87 years (mean \pm SD = 54 \pm 17.56).

Less experienced observers tended to overestimate both upper and lower ELP grading (Tabs. II and III). The intraclass correlation coefficient test showed a positive and strong correlation between two observers for grading the upper (value=+0.87, 95% CI: 0.84 and 0.88, *p*=0.000) and lower (value=+0.91, 95% CI: 0.90 and 0.92, *p*=0.000) ELP.

DISCUSSION

Treatment of lacrimal drainage system insufficiency is based on the location, extent, and relative degree of the stenosis (20, 21). Therefore, the degree of punctal ectropion and stenosis are important parameters for the assessment of the severity of the underlying inflammation and fibrosis and for planning the treatment of LDS.

On the other hand, different severity of symptoms as well as success rate of the procedures performed for ELP stenosis could be partly attributed to the different severity of ELP stenosis defined as different describing terms.

Lack of single language in such a description resulted in a uniform grading system in 2003 (17). It was introduced in order to clearly define the severity of ELP stenosis and avoid different descriptive terms (1-16) in this regard. We have been using this system in the lacrimal clinic with no difficulty for the new residents and fellows starting their rotation in the clinic. This has made a single language instead of different terms for better assessment of the patients, comparing the results of procedures, and for research purposes. The grading system is based on the ELP shape for stenosis (grade 0 to 3) and size for its enlargement (grade 4 and 5).

Consistency among observers does not imply accuracy because observers may be consistent but inaccurate in the absence of an absolute standard. The reliability could be used to evaluate the validity issues, especially if one of the observers is regarded as an expert. There was no significant interobserver variation in our series and statistical analysis showed that the ELP grading is a reliable grading system. The less experienced observer has been reported to overestimate the pathology (19). This was true in this study without compromising the reliability.

In conclusion, a new reliable grading system for the ELP is recommended to not only facilitate the patients' records but to make the different reports comparable in this regard.

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