

Relationship between dermatochalasis and more prominent with aging: a prospective study in a tertiary referral center

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眼睑皮肤松垂程度与年龄的关系——三级转诊中心的前瞻性研究

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摘要

目的:调查眼睑皮肤松垂的位置和程度及是否伴随假性上睑下垂与年龄的关系。

方法:选取 113 例眼睑皮肤松垂患者纳入本研究,记录患者的年龄,性别及体质指数。于第一眼位检测睑裂高度和睑缘至瞳孔反射点距离(MRD)。皮肤松垂的程度分为 1 级:皮肤松垂未及睑缘(至少距睑缘 1 mm);2 级:皮肤松垂达睑缘水平;3 级:皮肤松垂越过睑缘前。

结果:患者平均年龄为 52.7±8.6(32~74)岁。男 36 例(31.9%),女 77 例(68.1%)。平均体质指数为 30.3±4.7(21.5~36.6)kg/m²,平均睑裂高度为 10.7±1.6(7~15)mm,平均 MRD 为 3.8±1.2(1~5)mm。30 例(26.5%)患者的皮肤松垂未及睑缘(1 级),38 例(33.6%)患者位于睑缘水平线(2 级),而 45 例(39.8%)患者越过睑缘前(3 级)。50 例(44.2%)患者由于皮肤松垂引起假性上睑下垂。皮肤松垂程度在年龄方面的差异显著。皮肤松垂 1 级和 2 级患者的平均年龄(50.3±6.6, 50.5±9.5 岁)明显低于 3 级患者年龄(56.0±8.2 岁)。假性上睑下垂患者(56.3±8.3 岁)的平均年龄明显高于非假性上睑下垂患者

(49.8±7.8 岁)。对于皮肤松垂严重程度和假性上睑下垂,患者体质指数无显著差别。

结论:皮肤松垂严重程度和假性上睑下垂的发生率随年龄的增长而有所增加。

关键词:年龄;上睑下垂;眼睑皮肤松垂

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Abstract

• **AIM:** To investigate the localization and severity of dermatochalasis and accompanying pseudoptosis with age.

• **METHODS:** One hundred and thirteen subjects with dermatochalasis were included in the study. Age, gender and body mass index (BMI) of the subjects were recorded. Palpebral fissure height (PFH) and marginal reflex distance (MRD) were measured in the primary position. The severity of dermatochalasis was assessed as Stage 1: behind eyelid margin (minimum 1 mm); Stage 2: inline with eyelid margin; Stage 3: before eyelid margin.

• **RESULTS:** Mean age of the subjects were 52.7±8.6 (range 32 to 74) y. Thirty-six cases (31.9%) were male and 77 (68.1%) were female. The mean BMI was 30.3±4.7 (range 21.5 to 36.6) kg/m², mean PFH was 10.7±1.6 (range 7 to 15) mm, mean MRD was 3.8±1.2 (range 1 to 5) mm. In 30 (26.5%) of the subjects dermatochalasis was localized behind eyelid margin, in 38 (33.6%) it was inline with eyelid margin and in 45 (39.8%) it was before eyelid margin. There was pseudoptosis due to dermatochalasis in 50 (44.2%) of the subjects. Age was significantly different in terms of dermatochalasis severity. Mean ages of subjects with dermatochalasis localization behind or inline with eyelid margin (50.3±6.6, 50.5±9.5 y), were significantly lower than subjects with dermatochalasis localization before eyelid corner (56.0±8.2 y). Mean age of subjects with pseudoptosis were significantly higher (56.3±8.3 y), than subjects without it (49.8±7.8 y). There was no BMI difference between the subjects in terms of dermatochalasis severity and presence of pseudoptosis.

• **CONCLUSION:** Dermatochalasis localization, severity and frequency of pseudoptosis increase with age.

• **KEYWORDS:** aging; blepharoptosis; dermatochalasis
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INTRODUCTION

Various changes in eyelids, eyebrows and eyelashes, such as dermatochalasis, senile entropion and ectropion, and ptosis, may be observed with increasing age^[1]. Eyelashes and eyelids get white with increasing age and this can be used in age determination after 40y of age^[2]. Dermatochalasis is a common ocular manifestation of aging^[1,3]. Dermatochalasis refers to redundant eyelid skin and subcutaneous tissue. Dermatochalasis is caused by laxity from involutional changes with aging. The orbital fat frequently prolapses through an attenuated septum^[3-4]. Excess upper eyelid skin may overhang the eyelashes and obstruct visualization of the eyelid margin, giving the impression of a low-lying eyelid^[5]. Blepharoptosis, more commonly known as ptosis, is a downward displacement of the upper eyelid margin. The causes of ptosis are myogenic, involutional, neurogenic, mechanical, traumatic, or congenital^[6]. Severe dermatochalasis is also associated with upper-eyelid ptosis (droopy lid) or pseudoptosis (mechanical effect from the dermatochalasis)^[4,7].

Gravity, loss of elasticity in eyelid skin, and weakening of connective tissue contribute to the formation on lax and redundant eyelid tissue^[4,8-10]. Age and ultraviolet dependent changes in elastin and collagen in eyelid tissue may be observed. Collagenase enzyme released from impaired epidermis contributes to collagen degeneration. Dermatochalasis may also be observed among young people due to ultraviolet damage. Orbital septum which become thinner and weaker with time makes protrusion of subcutaneous fat pads easier. Subcutaneous fat pads may also be seen at medial of upper eyelid and central and lateral of lower eyelid^[11].

Hereditary passing, smoking and nutrition may be effective on dermatochalasis formation^[11-12]. Hereditary angioedema, lymphedema, renal diseases, cutis laxa, and collagen vascular diseases (Ehlers - Danlos syndrome) must be considered in subjects with recurring dermatochalasis^[11].

Dermatochalasis may lead to functional and cosmetic impairments in the patients^[10,13-15]. It may lead to narrowing of visual field due to blepharoptosis^[13,16]. Besides, entropion, corneal irritation, difficulty in reading and narrowed peripheral vision may also develop. Laxed eyelid skin may lead to eye tiredness and may prevent eye make-up in women^[6,11,14]. Dermatochalasis may also cause serious psychological problems in the subjects^[13,15]. For all these reasons, dermatochalasis must be treated^[3].

The type and requirement of surgery differ with severity of

dermatochalasis. Therefore, in our study, we investigated clinically the localization and severity of dermatochalasis. Association of dermatochalasis localization and severity with age and accompanying signs were evaluated. Effects of gender and body mass index (BMI) on dermatochalasis were also investigated.

SUBJECTS AND METHODS

Our study was conducted in 113 individuals with dermatochalasis who were evaluated at Fatih University Ophthalmology Clinic. Our study was approved by the relevant institutional review boards and performed in accordance with the ethical guidelines of the Declaration of Helsinki. All individuals signed written informed consent. Age, gender, weight and height of the individuals were recorded. BMI was computed as 'weight/height²' after weight was measured as kilogram and height was measured as metres. BMI was categorised into four groups: normal range (18.5-24.9), overweight range (25-30), obese (>30), and under the weight range (<18.5). Subjects with history of recurring eyelid edema and systemic diseases, which may lead to blepharochalasis were not included in the study.

Individuals were also evaluated for eyebrow ptosis since it can be confused with dermatochalasis. If the eyebrow is under superior orbital rim, the low eyebrow will push the eyelid down. Clinician must lift eyebrow above superior orbital rim with two fingers and must evaluate redundant eyelid tissue which is supposed to be due to dermatochalasis. If dermatochalasis is due to low eyebrows, correction of this condition usually leads to cosmetic and functional improvement. Levator muscle function was evaluated to differentiate from real ptosis^[9,11]. Complete ophthalmological examination of the subjects, including visual acuity, intraocular pressure, fundus and anterior segment examinations. Palpebral fissure height (PFH) and marginal reflex distance (MRD) were measured in the primary position. The distance between the corneal light reflex and the upper eyelid margin when the patient gazes at light source is named as MRD1, and the distance to lower eyelid is named as MRD2^[9,17]. PFH ranges changes between 7-10 mm in men and 8-12 mm in women. In ptosis evaluation, mild refers to drooping to 2 mm, moderate refers to drooping to 3 mm, and severe refers to drooping of 4mm or more. The distance between upper eyelid fold and eyelid margin is 10 mm in women and 8 mm in men. MRD1 measurement is 4-4.5 mm on average^[18].

In our study, the severity of dermatochalasis was evaluated as Stage 1: behind eyelid margin (minimum 1 mm) (Figure 1A), Stage 2: inline with eyelid margin (Figure 1B), Stage 3: before eyelid margin (Figure 1C). Pseudoptosis due to dermatochalasis was evaluated in the cases (Figure 1D).

Statistical Analysis NCSS (Number Cruncher Statistical System) 2007&PASS (Power Analysis and Sample Size) 2008 Statistical Software (Utah, USA) was used for statistical analysis. Statistical analysis included descriptive statistical



Figure 1 Severity of dermatochalasis A: Stage 1: behind the eyelid margin (minimum 1 mm); B: Stage 2: in alignment with eyelid margin; C: Stage 3: before the eyelid margin; D:Pseudoptosis due to dermatochalasis.

Table 1 Evaluation of descriptive features regarding dermatochalasis severity

Parameters	Behind margin (n=30)	Inline with margin (n=38)	Before margin (n=45)	$\bar{x}\pm s; n(\%)$ P
Age (a)	50.3±6.6	50.5±9.5	56.0±8.2	0.003 ^a
BMI(kg/m ²)	31.2±5.0	29.4±3.9	30.6±5.0	0.291 ^a
Eyelid aperture(mm)	11.3±1.2	10.9±1.4	10.0±1.7	0.001 ^a
Gender				
Male	6 (20%)	18 (47.4%)	12 (26.7%)	0.035 ^b
Female	24 (80%)	20 (52.6%)	33 (73.3%)	
Pseudoptosis				
Present	30 (100%)	29 (76.3%)	4 (8.9%)	0.001 ^b
Not	0 (0%)	9 (23.7%)	41 (91.1%)	

^aOneway ANOVA test; ^bPearson Chi-square test.

methods (mean, standard deviation, median, frequency, rate, minimum, maximum), along with Student's *t* - test, which was used to compare two groups in quantitative data which were normally distributed. Oneway ANOVA test was used to compare three or more groups with normal distribution and Tukey HSD test was used to detect the group which lead to statistical difference. Pearson Chi-square test and Yates Continuity Correction test were used to compare qualitative data. Significance was evaluated at $P < 0.01$ and $P < 0.05$ levels.

RESULTS

Mean age of the individuals were 52.7 ± 8.6 (range 32 to 74)y. Thirty - six cases (31.9%) were male and 77 cases (68.1%) were female.

BMI measurement changed between 21.5 and 36.6 kg/m², with a mean of 30.3 ± 4.7 kg/m². The mean eyelid aperture was 10.7 ± 1.6 (range 7 to 15) mm, and mean MRD1 was 3.8 ± 1.2 (range 1 to 5) mm.

In 30 of the cases (26.5%) dermatochalasis was localized behind eyelid margin, in 38 of the cases (33.6%) was inline with eyelid margin and in 45 of the cases (39.8%) was front eyelid margin.

There was a highly significant difference between mean ages in terms of dermatochalasis severity ($P = 0.003$). Binary comparisons indicated that mean ages of individuals mild dermatochalasis (behind eyelid margin or inline with eyelid margin) were significantly lower than individuals with severe (dermatochalasis skin fold before the eyelid margin) ($P = 0.011$; $P = 0.008$) (Table 1). There was no significant age difference between individuals with dermatochalasis behind eyelid margin or inline with eyelid margin ($P > 0.05$) (Table 1,

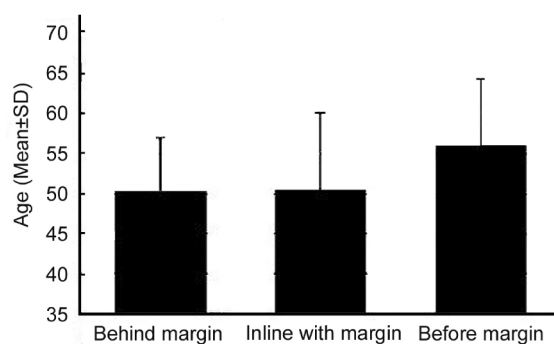


Figure 2 The relationship between age distribution and severity of dermatochalasis.

Figure 2). There were no significant differences of BMI measurements of the individuals regarding dermatochalasis severity ($P > 0.05$).

There was a highly significant difference of eyelid aperture measurements in terms of dermatochalasis severity ($P = 0.001$) (Table 1). Binary comparisons indicated that mean eyelid aperture of individuals with mild dermatochalasis (behind eyelid margin or inline with eyelid margin) were significantly higher than individuals with severe (dermatochalasis skin fold before the eyelid margin) ($P = 0.001$; $P = 0.019$). There was no significant eyelid aperture difference between individuals with dermatochalasis behind eyelid margin or inline with eyelid margin ($P > 0.05$) (Table 1).

There was a significant difference of gender in terms of dermatochalasis severity ($P = 0.035$) (Table 1, Figure 3). The ratio of females were higher among individuals with dermatochalasis severity behind eyelid margin when compared with individuals with inline with eyelid margin. There were no significant gender differences between other groups.

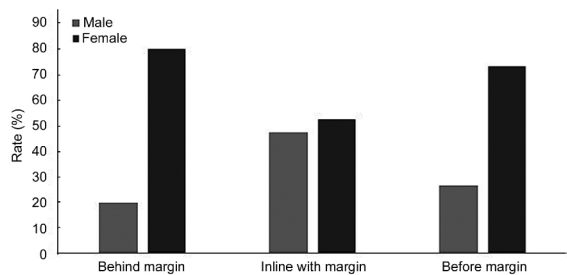


Figure 3 The relationship between gender and severity of dermatochalasis.

There was a highly significant difference of pseudoptosis frequency in terms of dermatochalasis severity ($P = 0.001$) (Table 1). Pseudoptosis was significantly less common among individuals with dermatochalasis localized behind eyelid margin when compared with subjects with dermatochalasis localization inline with eyelid margin or before eyelid margin. Pseudoptosis was also significantly less frequent in individuals with dermatochalasis in line with the eyelid margin when compared with subjects with dermatochalasis localized before eyelid margin. It can be suggested that pseudoptosis frequency increased with increasing the lower edge of the dermatochalasis fold (Table 1).

There was a highly significant age difference among individuals in terms of presence of pseudoptosis ($P = 0.001$). Mean age of subjects with pseudoptosis was significantly higher than individuals without it. There was no significant BMI measurement and gender distribution differences regarding presence of pseudoptosis ($P > 0.05$) (Table 2).

DISCUSSION

Eyes are the most important parts of the face aesthetically and they may be exposed to changes with increasing age^[1]. Mild degrees of dermatochalasis may be managed with laser skin resurfacing^[19]. In most cases, surgical excision of skin and muscle will be required to achieve an acceptable cosmetic and functional result^[9,15,20]. Dermatochalasis may present alone or with fatty prolapse, or ptosis. Accordingly, the surgical solutions may vary. Dermatochalasis alone is corrected by carrying out a skin-excision blepharoplasty. Dermatochalasis with fatty prolapse is managed by performing a blepharoplasty with trimming of only sufficient fat. Pseudoptosis with dermatochalasis is corrected using blepharoplasty, plus levator aponeurotic repair^[20-22]. It has been shown that dermatochalasis has negative effects on individuals and that these effects decrease with surgical correction^[23].

Dermatochalasis is a redundant skin fold which increase with time, and there is no definitive classification of it. Therefore, we evaluated individuals with dermatochalasis in our study in terms of the position of skin fold relative to eyelid margin. We also compared presence of pseudoptosis regarding dermatochalasis severity. We evaluated the association with age, gender and BMI. In our study, we investigated individuals with dermatochalasis who did not have systemic problems.

Table 2 Evaluation of demographical features regarding pseudoptosis $\bar{x} \pm s; n(\%)$

Parameters	Pseudoptosis		P
	Present (n=50)	Not (n=63)	
Age(a)	56.3±8.3	49.8±7.8	0.001 ^a
BMI(kg/m ²)	30.1±4.8	30.5±4.6	0.697 ^a
Gender			
Male	16 (32%)	20 (31.7%)	1.000 ^b
Female	34 (68%)	43 (68.3%)	

^aStudent's *t*-test; ^bYates' Continuity correction test.

In our study, mean age of the individuals was 52.7±8.6 (range 32 to 74)y and 77 individuals (68.1%) were female. It has been known that dermatochalasis is caused by age dependent changes. We did not find any information in the literature indicating whether dermatochalasis is more common in males or females. A previous study reported that 64.1% of individuals who have blepharoplasty surgery for dermatochalasis were females^[24]. A significant gender difference was found in terms of dermatochalasis severity. Female ratio was significantly higher among individuals with dermatochalasis localized behind eyelid margin when compared with individuals with dermatochalasis localized inline with eyelid margin.

Progressive effects of aging on dermatochalasis stage has not been defined in the literature. In our study, we found a highly significant difference of age regarding dermatochalasis. Mean ages of individuals with dermatochalasis localized behind eyelid margin or inline with eyelid margin (50.3±6.6, 50.5±9.5y) were significantly lower than mean age of individuals with dermatochalasis localized before eyelid margin (56.0±8.2y). This difference may indicate that skin fold increase and become more prominent with aging.

Eyelid opening measurements of individuals with dermatochalasis localized behind eyelid margin or inline with eyelid margin were significantly higher than subjects with dermatochalasis localized before eyelid margin. Rate of pseudoptosis was significantly higher in individuals with dermatochalasis localized before eyelid margin when compared with individuals with dermatochalasis localized inline with or before eyelid margin.

Blepharoplasty surgery is applied to subjects with pseudoptosis due to dermatochalasis for functional and cosmetic reasons. Among these individuals those with a superior visual field defect, a MRDI ≤ 2 mm and those with difficulty when reading looking down have been reported to be more content with the treatment^[3]. Kim *et al*^[25] reported that increased contrast sensitivity and improved functional visual acuity after upper eyelid blepharoplasty were caused by changes in corneal high-order aberration and the degree of lash ptosis after surgery. In addition, there were no changes in corneal topography or astigmatism. Watanabe *et al*^[26] showed that long-term tear volume was not changed after blepharoplasty for dermatochalasis. On the contrary, long-term tear volume was

decreased after blepharoptosis surgery, and even more so in cases with an initial high tear volume. After the blepharoplasty, significant variations were shown from those before the surgery, indicating that the correction of redundant tissues in the brow accentuates the tendency of the eyebrow to move down^[27].

There was pseudoptosis in 44.1% of the individuals. In our study, we found a highly significant difference of mean age between individuals with and without pseudoptosis. It can be argued that, with increasing age skin fold increases and rates of pseudoptosis become higher.

It has been reported that dermatochalasis may be hereditary or due to smoking, nutrition and systemic diseases, along with aging^[11].

In our study, we also evaluated the association between BMI and dermatochalasis localization among individuals without systemic diseases. Mean BMI measurement of the subjects were 30.3 ± 4.7 (range 21.5 to 36.6) kg/m^2 . BMI was not associated with dermatochalasis severity and presence of pseudoptosis.

Limitations of our study included small sample size, no follow-up, not evaluating visual field defects and psychological complaints of the individuals due to dermatochalasis. The study can be repeated in the future in a more elaborate design.

In conclusion, degenerative changes in elastin and collagen tissues in eyelid structure have been shown to be associated with development of dermatochalasis^[11]. In our study, we found that dermatochalasis localization and severity increase with increased age.

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