Original Article

DOI: 10.4274/haseki.galenos.2025.96646
Med Bull Haseki 2025;63(3):135-140

Evaluation of Serum Vitamin and Mineral Levels in Patients with Dermatochalasis

Burcu Yakut*, Songul Kilic*, Ahu Yilmaz**, Feyza Onder*

*University of Health Sciences Türkiye, Istanbul Haseki Training and Research Hospital, Clinic of Ophthalmology, Istanbul, Türkiye
**University of Health Sciences Türkiye, Prof. Dr. Cemil Tascioglu City Hospital, Clinic of Ophthalmology, Istanbul, Türkiye

Abstract

Aim: Dermatochalasis (DC) is a common ophthalmic condition characterized by excess skin in the upper eyelids, which not only affects aesthetic appearance but can also lead to functional impairments, such as difficulty in lifting the eyelids and peripheral vision constriction. We aimed to assess serum concentrations of 25-hydroxy (OH) vitamin D, vitamin B12, folate, ferritin (Fe), and zinc (Zn) by comparing patients with DC who have undergone upper eyelid blepharoplasty to healthy controls in this retrospective, case-control study.

Methods: This retrospective comparative analysis encompassed individuals with DC who received upper eyelid blepharoplasty, alongside age- and sex-matched controls, during the period from 2022 to 2023. Data, including complete ophthalmologic evaluations and laboratory findings of DC patients and healthy controls, were extracted from medical records. Serum levels of 25-OH vitamin D, vitamin B12, folate, Fe, and Zn were assessed and compared between the DC and control groups.

Results: The DC group consisted of 59 patients, including 40 women (67.79%) and 19 men (32.21%). The control group comprised 40 individuals, including 25 women (62.5%) and 15 men (37.5%). The mean age of the participants was 58.4±8.2 years (range: 45-75). No statistically significant associations were observed between serum levels of 25-OH vitamin D, folate, vitamin B12, Fe, and Zn and the occurrence of DC.

Conclusion: This study found no significant difference between serum levels of 25-OH vitamin D, Zn, folate, vitamin B12, Fe, and the occurrence of DC. Although nutritional variables may influence overall skin health, the findings indicate that DC is not impacted solely by these vitamins and minerals. 82.8% of participants had serum 25-OH vitamin D levels below 20 ng/mL, with no statistically significant difference between the groups. This finding suggests that vitamin D deficiency may be a widespread issue but does not appear to be directly linked to the presence of DC.

Keywords: Dermatochalasis, blepharoplasty, serum biomarkers, vitamin D, zinc

Introduction

Dermatochalasis (DC) is a common ophthalmic disorder marked by an excess of skin in the upper eyelids. This condition impacts not only aesthetics but also results in functional deficits such as eyelid heaviness, peripheral vision field constriction, difficulty in lifting the eyelids, periorbital discomfort, and psychological distress (1). Dermatitis, entropion, and ectropion can also accompany DC. The underlying pathophysiology of DC remains incompletely understood. Dermal lymphatic capillaries play a vital role in the lymphatic system, facilitating fluid removal from the interstitial space and delivering proteins and macrophages within dermal tissues (2). Histopathological findings of DC are macrophage-related subclinical inflammation, elastolysis, reduced elastic fibers, disorganized collagen fiber organization, lymphocytosis, and impaired lymphatic drainage within the eyelid

Corresponding Author: Burcu Yakut, MD, University of Health Sciences Türkiye, Istanbul Haseki Training and Research Hospital, Clinic of Ophthalmology, Istanbul, Türkiye
E-mail: burcuykt@hotmail.com **ORCID:** orcid.org/0000-0003-2791-5684
Received: 27.01.2025 **Accepted:** 19.06.2025 **Epub:** 12.08.2025 **Publication Date:** 29.08.2025

Cite this article as: Yakut B , Kilic S, Yilmaz A, Onder F. Evaluation of serum vitamin and mineral levels in patients with dermatochalasis. Med Bull Haseki. 2025;63(3):135-140

(3,4). The aging of the face, particularly the eyelids, is caused by decreased regeneration ability and increased activity of degradative enzymes (5). These modifications precipitate collagen degradation, especially within the deep dermis (6). With advancing age, the components of the extracellular matrix deteriorate in their interwoven structure and cohesive interactions. This procedure can affect the upper eyelids due to the condition DC. Genetic predisposition and lifestyle variables, such as sun exposure, smoking, and inadequate nutrition, might accelerate these alterations. Nutritional deficiencies, especially concerning vitamins and minerals, are thought to affect skin elasticity and healing (7).

We hypothesized that serum deficiencies in specific vitamins and minerals, particularly vitamin D, vitamin B12, folate, zinc (Zn), and ferritin (Fe), could contribute to the development of DC. These nutrients are essential for collagen synthesis, skin integrity, and the repair of dermal tissues (8-11). Given the importance of these vitamins and minerals in maintaining skin health, we aimed to investigate whether variations in their serum levels could be associated with the occurrence of DC.

This study sought to assess serum concentrations of 25-hydroxy (OH), vitamin D, vitamin B12, folate, Fe, and Zn in patients with DC and compare them to age- and sex-matched healthy controls. By exploring the relationship between nutritional status and DC, this study will contribute to understanding the potential role of vitamin and mineral deficiencies in eyelid tissue aging and elasticity. This knowledge may guide future clinical approaches, potentially improving management strategies for patients with DC by addressing underlying nutritional factors.

Materials and Methods

Compliance with Ethical Standards

This study was conducted in accordance with the tenets of the Declaration of Helsinki. Ethical approval was obtained from the University of Health Sciences Türkiye, Istanbul Haseki Training and Research Ethics Committee (approval no.: 180-2023, date: 04.10.2023). Informed consent was obtained from all participants prior to data collection.

Study Design

This retrospective case-control study included DC patients who underwent upper eyelid blepharoplasty at University of Health Sciences Türkiye, Istanbul Haseki Training and Research Hospital between 2022 and 2023. The control group comprised age- and sex-matched individuals recruited from routine ophthalmology outpatient visits during the same period. Fifty-nine patients with DC satisfied the inclusion criteria, who possessed complete laboratory test results and electronic medical records, alongside 40 healthy controls. Comprehensive ophthalmologic examinations, including best-corrected visual acuity, intraocular pressure using Goldmann applanation tonometry, slit-lamp biomicroscopy, and fundus evaluation, were conducted. The epicrisis from the internal medicine polyclinic, morning fasting blood test laboratory data, and drug prescriptions from the past six months were analyzed from our hospital's health record dataset.

Inclusion and Exclusion Criteria

Inclusion criteria were patients diagnosed with DC who underwent upper eyelid blepharoplasty and age- and sex-matched healthy controls. Participants with systemic diseases affecting serum vitamin or mineral levels, including diabetes, cardiovascular diseases, renal failure, thyroid disorders, and gastrointestinal conditions, were excluded. Individuals using supplements or medications affecting serum levels, such as anticonvulsants, corticosteroids, or vitamin D, were also excluded. Medications or supplements that could affect serum levels of vitamin D, vitamin B12, folate, Fe, or Zn were verified through patient medical records. Patients with a history of smoking, alcohol use, or ocular conditions such as dry eye, glaucoma, uveitis, or previous ocular surgeries were excluded.

Biochemical Analysis

Serum levels of 25-OH vitamin D, vitamin B12, folate, Fe, and Zn were analyzed. Laboratory data were retrieved from fasting blood samples collected within 30 days pre- or post-surgery and were measured using automated systems. Normal ranges of serum concentration were between 15 and 55.5 ng/mL for 25-OH vitamin D, 197 and 771 ng/L for vitamin B12, 3.89 and 26.8 mg/L for folic acid, 13 and 150 ng/dL for Fe and 70 and 114 mg/dL for Zn in our laboratory. The Endocrine Society's Clinical Practice Guidelines classify blood 25-OH vitamin D levels of 20-30 ng/mL as insufficient, 10-20 ng/mL as deficient, and <10 ng/mL as severely inadequate (12).

Statistical Analysis

Data analyses were performed using Statistical Package for the Social Sciences version 25 (IBM, USA). Normality was tested using the Kolmogorov-Smirnov test. Descriptive statistics involving means and standard deviations were determined for continuous variables. Based on the data distribution, parametric and non-parametric tests, including the independent samples t-test and chi-square tests, were applied. A p-value below 0.05 was deemed statistically significant.

Results

This study included patients, comprising 59 (67.79% females: 40, 32.21% males: 19) in the DC group and 40 (62.5% females: 25, 37.5% males: 15) in the control group. Table 1 summarizes the demographic characteristics and biochemical parameters of the participants.

Analysis of serum vitamin B12, folate, Fe, and Zn levels showed no significant differences between the groups (p>0.05). The proportions of participants with deficiencies in these parameters were comparable between the DC and control groups, as detailed in Table 2.

The mean serum 25-OH vitamin D levels were 12.50±7.05 ng/mL in the DC group and 12.63±6.41 ng/mL in the control group, with no statistically significant difference between the groups (p=0.744). Regarding vitamin D deficiency, 82 (82.8%) participants had serum 25-OH vitamin D levels below 20 ng/mL. Among these, 49 (83.0%) were in the DC group and 33 (82.0%) were in the control group (p=0.418). Severe vitamin D deficiency (<10 ng/mL) was observed in 37 (37.3%) participants, including 21 (35.5%) in the DC group and 16 (40.0%) in the control group, with no statistically significant difference (Table 3).

Table 1. Demographic characteristics and biochemical parameters of the dermatochalasis patients and control group

	DC (n=59)	C (n=40)	p-value
Gender (F/M)	40/19	25/15	0.370
Age (Mean ± SD)	56.76±9.17	58.75±12.75	0.138
Vitamin D (ng/mL)	12.50±7.05	12.63±6.41	0.744
Vitamin B12 (ng/L)	326.37±144.31	333.10±170.74	0.832
Folate (mg/L)	7.14±2.67	8.88±4.27	0.056
Ferritin (ng/dL)	60.17±52.51	73.30±51.70	0.160
Zinc (mg/dL)	86.19±14.15	81.71±14.97	0.153

DC: Dermatochalasis, C: Control, F: Female, M: Male, SD: Standard deviation

Discussion

This study examined the possible correlation between serum concentrations of essential vitamins and minerals, including 25-OH vitamin D, vitamin B12, folate, Fe, and Zn, and the onset of DC. Our results indicated no statistically significant differences in the levels of these vitamins and minerals between individuals with DC undergoing blepharoplasty and healthy controls. While prior studies have implicated nutritional deficiencies and oxidative stress in skin aging and dermal tissue remodeling (13,14), the present data suggest that systemic nutritional status may not play a dominant role in the pathogenesis of DC.

Vitamin D's influence on skin integrity and repair has been extensively researched, particularly regarding its effects on keratinocyte proliferation, collagen synthesis, and anti-inflammatory characteristics (15). Vitamin D

Table 2. Vitamin and mineral deficiency levels of the dermatochalasis patients and control group

	<Cut-off n (%)	Within range n (%)	>Cut-off n (%)	Mean ± SD
Vitamin B12				
DC	3 (5.0%)	55 (93.2%)	1 (1.8%)	338.46±132.08
C	7 (17.5%)	32 (80.0%)	1 (2.5%)	333.10±170.75
Folic Acid				
DC	5 (8.5%)	54 (91.5%)	0 (0.0%)	7.15±2.67
C	3 (7.5%)	37 (92.5%)	0 (0.0%)	8.57±3.84
Ferritin				
DC	8 (13.5%)	48 (81.3%)	3 (5.2%)	60.18±52.51
C	4 (10.0%)	32 (80.0%)	4 (10.0%)	73.30±51.71
Zinc				
DC	5 (8.4%)	52 (88.1%)	2 (3.5%)	86.19±14.16
C	6 (15.0%)	33 (82.5%)	1 (2.5%)	81.71±14.98

Chi-square test was used for categorical comparisons of deficiency levels; independent samples t-test was used for comparison of mean 25-OH vitamin D levels
DC: Dermatochalasis, C: Control, SD: Standard deviation, OH: Hydroxy

Table 3. 25-hydroxy vitamin D deficiency levels of the dermatochalasis patients and control group

25-hydroxy	DC n (%)	C n (%)	DC Mean ± SD	C Mean ± SD
<10 ng/mL	21 (35.6%)	16 (40.0%)	12.50±7.05	12.63±6.41
10-20 ng/mL	28 (47.5%)	17 (42.5%)		
>20 ng/mL	10 (16.9%)	7 (17.5%)		
p-value	0.879			

DC: Dermatochalasis, C: Control, SD: Standard deviation

insufficiency is linked to compromised wound healing, increased oxidative stress, and skin fragility (13). Despite these established correlations, our investigation revealed similar mean blood 25-OH vitamin D levels between the DC and control groups (p=0.744). Furthermore, the prevalence of vitamin D deficiency (levels <20 ng/mL) and severe deficiency (<10 ng/mL) was similarly high in both groups, suggesting that vitamin D insufficiency may be a population-wide phenomenon rather than a specific factor leading to DC.

Recent histopathological evidence from Aydemir et al. (16) demonstrated that vitamin D deficiency may be associated with structural alterations in eyelid tissues of patients with DC, including reduced elastic fiber density and increased collagen disorganization. However, in contrast to their findings, our study did not identify statistically significant differences in serum 25-OH vitamin D levels between DC patients and controls. This discrepancy may arise from differences in study design, as the former directly examined tissue-level pathology while our approach relied on systemic biomarker analysis. These divergent findings suggest that local tissue-specific vitamin D activity and receptor expression may play a more critical role in DC pathogenesis than systemic serum levels alone. Future investigations integrating both biochemical and histological assessments may provide a more comprehensive understanding of vitamin D's role in periocular tissue remodeling.

Vitamin B12 and folate are crucial cofactors for DNA synthesis and homocysteine metabolism, affecting oxidative stress and inflammatory processes (17,18). Deficiencies in these vitamins can result in compromised cellular repair processes, diminished collagen synthesis, and oxidative damage (19). The current investigation found that serum vitamin B12 and folate levels were normal for the majority of patients, with no significant differences between the DC and control groups. Although a slightly higher mean folate level was detected in the control group, the difference did not reach statistical significance (p=0.056). This finding raises the possibility that subtle variations in folate metabolism may influence skin repair and elasticity, but further investigation with larger cohorts is necessary to validate this hypothesis.

Zinc and Fe are essential for collagen formation, antioxidant defense mechanisms, and dermal tissue remodeling. Zinc deficiency has been associated with delayed wound healing, corneal ulcers, and epithelial damage (20), while Fe levels indicate iron reserves and collagen integrity (21). The results revealed no significant differences in Zn (p=0.153) and Fe (p=0.160) levels between the groups. The data indicate that systemic mineral deficiencies may not be a significant factor in the development of DC. At the same time, localized alterations in collagen organization and elastic fiber integrity could be pathways.

Although no statistically significant variations were seen in biochemical markers, it is notable that most subjects displayed inadequate dietary profiles, especially concerning vitamin D. Approximately 83% of subjects had vitamin D levels below 20 ng/mL, aligning with global patterns of prevalent vitamin D insufficiency (22). The high prevalence of vitamin D deficiency observed in both groups may reflect a broader population-wide insufficiency, potentially influenced by geographic or seasonal factors, including limited sunlight exposure. These findings emphasize the necessity for extensive public health efforts to address nutritional deficiencies and enhance skin health, particularly in older populations. Addressing vitamin D insufficiency through supplementation or increased screening may be necessary.

Our findings further highlight the complex relationship between factors contributing to DC. Age is the primary risk factor, resulting in diminished regenerative ability, modified extracellular matrix composition, and increased degradation of collagen and elastic fibers (23). Although systemic nutritional status may affect skin aging, intrinsic aging processes influenced by hereditary factors, ultraviolet radiation exposure, and environmental stressors likely have a more significant impact on the development of DC (24). Another consideration is the possible impact of lifestyle factors, such as smoking, alcohol intake, and sun exposure, which were excluded from this study. While these characteristics are associated with accelerated skin aging, their contribution to DC requires additional examination in future studies with more comprehensive criteria. Systemic nutritional factors like vitamin D deficiency may contribute to general skin health; on the other hand, the development of DC is likely influenced by more localized mechanisms. Specifically, the degradation of the periorbital extracellular matrix, including collagen and elastin fibers, plays a critical role in the pathophysiology of DC. These local tissue alterations may result from the interplay of aging processes, mechanical stress, and possibly even chronic inflammation, leading to skin laxity and the characteristic eyelid changes observed in DC.

Study Limitations

The study's limitations include its retrospective methodology and relatively small sample size, which may have limited the statistical power to identify subtle differences in serum biomarkers. Additionally, the study did not account for potential confounding variables such as physical activity, dietary habits, or sunlight exposure, all of which may influence serum vitamin and mineral levels. The absence of direct histopathological analyses also restricts our ability to assess localized changes in

collagen and elastin within the eyelid tissues. Despite these limitations, this study addresses an underexplored area by systematically evaluating multiple serum vitamins and minerals in patients with DC, a condition often discussed from a purely surgical or anatomical standpoint. The use of age- and sex-matched controls enhances the validity of the comparisons. Furthermore, the exclusion of major confounding factors such as systemic disease, smoking, alcohol use, and supplementation contributes to the internal consistency and reliability of the findings. This study adds valuable insights into the systemic nutritional profiles of patients undergoing blepharoplasty and may serve as a foundation for future prospective and histopathology-based research.

Conclusion

This study found no significant relationships between serum levels of vitamin B12, 25-OH vitamin D, folate, Fe, and Zn and the presence of DC. Although nutritional variables may influence overall skin health, the findings indicate that these vitamins and minerals do not exclusively impact DC. Future investigations concentrating on localized tissue examination and the molecular mechanisms governing collagen degradation and elastin disorganization may provide novel therapeutic targets for the prevention or treatment of DC. In clinical practice, patients undergoing blepharoplasty must receive thorough evaluations, including examinations of systemic nutritional conditions, to enhance surgical outcomes and promote long-term skin health.

Ethics

Ethics Committee Approval: This study was conducted in accordance with the tenets of the Declaration of Helsinki. Ethical approval was obtained from the Clinical Research Ethics Committee of University of Health Sciences Türkiye, Istanbul Haseki Training and Research Hospital (approval no.: 180-2023, date: 04.10.2023).

Informed Consent: Informed consent was obtained from all participants prior to data collection.

Footnotes

Authorship Contributions

Surgical and Medical Practices: B.Y., Concept: B.Y., F.O., Design: B.Y., F.O., Data Collection or Processing: B.Y., S.K., A.Y., Analysis or Interpretation: B.Y., Literature Search: B.Y., Writing: B.Y.

Conflict of Interest: No conflicts of interest were declared by the authors.

Financial Disclosure: This study received no financial support.

References

1. Bhattacharjee K, Misra DK, Deori N. Updates on upper eyelid blepharoplasty. Indian J Ophthalmol. 2017;65:551-8.
2. Choi KL, Sauder DN. The role of Langerhans cells and keratinocytes in epidermal immunity. J Leukoc Biol. 1986;39:343-58.
3. Karnaz A, Katircioglu YA, Ozdemir ES, et al. The histopathological findings of patients who underwent blepharoplasty due to dermatochalasis. Semin Ophthalmol. 20;33:407-11.
4. Nagi KS, Carlson JA, Wladis EJ. Histologic assessment of dermatochalasis: elastolysis and lymphostasis are fundamental and interrelated findings. Ophthalmology 2011;118:1205-10.
5. Ko AC, Korn BS, Kikkawa DO. The aging face. Surv Ophthalmol. 2017;62:190-202.
6. Naylor EC, Watson RE, Sherratt MJ. Molecular aspects of skin ageing. Maturitas. 2011;69:249-56.
7. Cosgrove MC, Franco OH, Granger SP, Murray PG, Mayes AE. Dietary nutrient intakes and skin-aging appearance among middle-aged American women. Am J Clin Nutr. 2007;86:12-31.
8. Bikle DD. Vitamin D: newer concepts of its metabolism and function at the basic and clinical level. J Endocr Soc. 2020;4:bvz038.
9. Fischer F, Achterberg V, März A, et al. Folic acid and creatine improve the firmness of human skin in vivo. J Cosmet Dermatol. 2011;10:15-23.
10. Rasmussen HM, Johnson EJ. Nutrients for the aging eye. Clin Interv Aging. 2013;8:741-8.
11. Tisma VS, Basta-Juzbasic A, Jaganjac M, et al. Oxidative stress and ferritin expression in the skin of patients with rosacea. J Am Acad Dermatol. 2009;60:270-6.
12. Holick MF, Binkley NC, Bischoff-Ferrari HA, et al. Evaluation, treatment, and prevention of vitamin D deficiency: an Endocrine Society clinical practice guideline. J Clin Endocrinol Metab. 2011;96:1911-30.
13. Bocheva G, Slominski RM, Slominski AT. The impact of vitamin D on skin aging. Int J Mol Sci. 2021;22:9097.
14. Rostan EF, DeBuys HV, Madey DL, Pinnell SR. Evidence supporting zinc as an important antioxidant for skin. Int J Dermatol. 2002;41:606-11.
15. Wadhwa B, Relhan V, Goel K, Kochhar AM, Garg VK. Vitamin D and skin diseases: a review. Indian J Dermatol Venereol Leprol. 2015;81:344-55.
16. Aydemir E, Malkoç Şen E, Aksoy Aydemir G, Bayat AH, Karnaz A, Aydın Türk B. Relationship between histopathological findings of patients with dermatochalasis and vitamin D deficiency. Int Ophthalmol. 2024;44:309.

17. Halczuk K, Kaźmierczak-Barańska J, Karwowski BT, Karmańska A, Cieślak M. Vitamin B12-multifaceted in vivo functions and in vitro applications. Nutrients. 2023;15:2734.
18. Tiwari D, Rani A, Jha HC. Homocysteine and folic acid metabolism. In: Dubey GP, Misra K, Kesharwani RK, et al., editors. Homocysteine metabolism in health and disease. Singapore: Springer Nature Singapore; 2022. p. 3-36.
19. Aşkın Ö, Uzunçakmak TKÜ, Altunkalem N, Tüzün Y. Vitamin deficiencies/hypervitaminosis and the skin. Clin Dermatol. 2021;39:847-57.
20. Mirza GE, Sevim DG. Ocular symptoms as the initial signs of zinc deficiency. J AAPOS. 2016;20:77-8.
21. Wright JA, Richards T, Srai SK. The role of iron in the skin and cutaneous wound healing. Front Pharmacol. 2014;5:156.
22. Lips P, de Jongh RT, van Schoor NM. Trends in vitamin D status around the world. JBMR Plus. 2021;5:e10585.
23. Bocheva G, Slominski RM, Slominski AT. Neuroendocrine aspects of skin aging. Int J Mol Sci. 20:2798.
24. Jacobs LC, Liu F, Bleyen I, et al. Intrinsic and extrinsic risk factors for sagging eyelids. JAMA Dermatol. 2014;150:836-43.