Original Article

Dermoscopy of Oral Labial Mucosa According to Age and Sex in Healthy Adults: First Observational Dermoscopic Study

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Abstract

Background/Aim: Information on dermoscopy of the labial mucosa is limited to dermoscopic examination of several dermatological diseases of the labial mucosa. In this study, we investigated whether dermoscopic features of labial mucosa differ in age and sex in healthy individuals. **Materials and Methods:** The study included 152 healthy individuals (76 females and 76 males) aged between 20 and 83 years who applied to the outpatient dermatology department. For the evaluation of dermoscopic features, the patients were divided into two groups as age under 40 years (Group 1) and over 40 years (Group 2). Dermoscopic data were analyzed by age and sex. **Results:** In Group 1, clear reticular arrangement (40.4% vs. 13.8%, $P = 0.001$) and honeycomb appearance (7.4% vs. 0%, $P = 0.033$) were significant. In Group 2, mixed reticular arrangement (61.7% vs. 82.8%, $P = 0.006$), grouped hairpin vessels (48.9% vs. 69%, $P = 0.016$), yellow background areas (87.2% vs. 98.3%, $P = 0.018$), dotted vessels (33% vs. 62.1%, $P = 0.000$), matchstick hairpin vessels (6.4% vs. 19%, $P = 0.017$), microaneurysm (3.2% vs. 32.8%, $P = 0.000$) were significant. While clear reticular arrangement and purple areas were more common in females, mixed reticular pattern and grouped hairpin vessels were more frequent in males. **Conclusion:** In this study, significant differences were found in dermoscopic features according to age and sex in healthy individuals. These results will serve as the basis for studies on the effect of systemic diseases on oral labial mucosa and studies on localized mucosal diseases.

Keywords: Dermoscopy, labial mucosa, oral mucosa

Introduction

The oral mucosa should be considered as a complex structure consisting of various anatomical and histological structures that share the same embryonic origin and the same anatomical localization. Indeed, different localizations of the oral mucosa have unique histological structures due to their characteristics such as differences in the number of cellular layers, the presence or absence of keratinized layer on the surface, and differences in mucosal thickness. All these differences are well known, and it is common practice to use terms such as labial mucosa, buccal mucosa, gingival mucosa, alveolar mucosa, or lingual mucosa when referring to the oral mucosa.[1,2]

The information about the vascular structures in the oral mucosa has been revealed by studies on capillaroscopy. Accordingly, the vessels in the labial mucosa are evaluated according to the direction of the loops and Curri's classification is used. In Curri Type 1, the direction of the loops is parallel to the surface, whereas in Curri Type 2, the surface is perpendicular. Curri Type 3 has both parallel and perpendicular loops.[3] The capillaries are arranged in a structure parallel to the surface. Its visibility is probably the best in the oral region. Therefore, the labial mucosa is the most suitable area for capillaroscopic examination of the oral mucosa.[3] Although there have been studies on capillaroscopic examination of the oral mucosa, no comprehensive studies have been conducted on dermoscopy of the labial mucosa. In this study, dermoscopic examination of oral labial mucosa of healthy individuals was performed.

Submission: 23-10-2019 **Revision:** 11-11-2019
Acceptance: 20-11-2019 **Web Publication:** 29-11-2019

Access this article online

Quick Response Code:

Website: www.tjdonline.org

DOI: 10.4103/TJD.TJD_33_19

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How to cite this article: Ayhan E, Öztürk M, An I, Araç E. Dermoscopy of oral labial mucosa according to age and sex in healthy adults: First observational dermoscopic study. Turk J Dermatol 2019;13:135-9.

Materials and Methods

The study included 152 (76 females and 76 males) individuals aged 20–83 years who applied to outpatient dermatology department. Individuals with a history of smoking, have diseases that could affect microcirculation such as diabetes, hypertension, hyperlipidemia, and individuals receiving medical treatment were not included in the study. For the evaluation of dermoscopic features, the patients were divided into two groups as age under 40 years (Group 1) and over 40 years (Group 2). However, the patients were divided into groups according to their sexes and the data were evaluated.

This study includes three stages including dermatological and dermoscopic examination of the lesions, macroscopic and dermoscopic photographing (Dermatoscope Delta 20; Heine, Herrsching, Germany; Handyscope Fotofinder Systems), and evaluation of the findings. Macroscopic (at least 2) and dermoscopic (at least 15) pictures of all lesions in the study were taken and data were recorded. Vascular structures and nonvascular structures were defined as dermoscopic. To increase the picture quality and the visibility of the structures, the contact plate was wetted with saline before the dermoscopic images were taken. The pressure on the lesion was relieved to prevent collapse of the vascular structures.

All patient data were uploaded to SPSS 21.0 for Windows statistic application software (SPSS Inc., Chicago, IL). Data were analyzed with the Student's *t*-test for independent samples with regard to parametric data, and with the Mann–Whitney U-test with regard to non-parametric data. $P < 0.05$ was considered as indicating statistical significance.

Results

A total of 152 healthy individuals were enrolled in the study (76 men and 76 women; female mean ± standard deviation (SD) age 37.01 ± 16.70; male mean ± SD age 38.43 ± 17.28; all patients range 20–83).

The mean age of Group 1 (47 males and 47 females) was 26.22 ± 6.35 years; the mean age of Group 2 (29 males and 29 females) was 56.36 ± 11.15.

In all patients included in the study, the rate of superficial vascular network was 98% (n = 149), deep vascular network was 96.7% (n = 147), yellow background areas were 91.4% (n = 139), mixed reticular arrangement was 69.7% (n = 106), grouped hairpin vessels were 56.6% (n = 86), dotted vessels were 44.1% (n = 67), clear reticular arrangement was 30.3% (n = 46), purple areas were 27% (n = 41), hemorrhagic dot was 23.7% (n = 36), targetoid brown round areas were 22.4% (n = 34), yellowish-white streaks were 20.4% (n = 31), microaneurysm was 14.5% (n = 22), chain-shaped hairpin vessels were 14.5% (n = 22), hyperkeratosis was 14.5% (n = 22), macthstick hairpin vessels were 11.2% (n = 17), white dots were 9.2% (n = 14), honeycomb appearance was 4.6% (n = 7), glomerular vessels were 3.9% (n = 6) and microulceration was 3.3% (n = 5) [Figures 1-5].

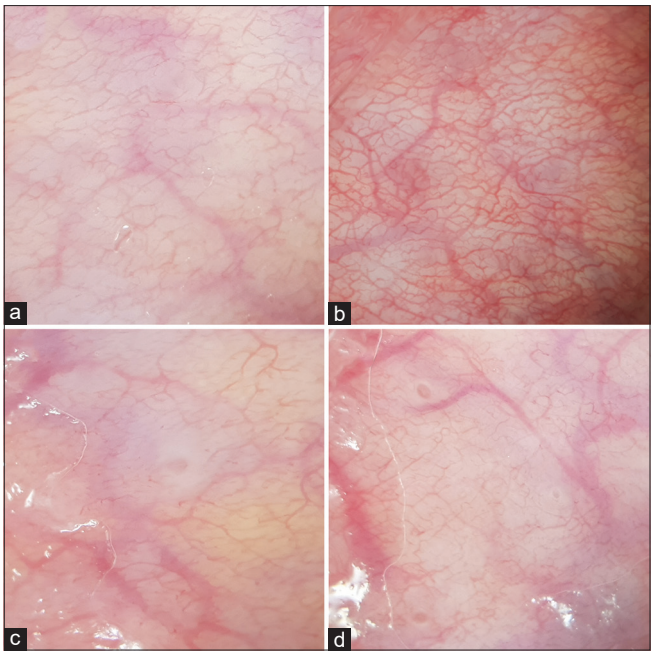

Figure 1: Clear reticular arrangement (a-d). Targetoid brown round area is seen in the middle (c) and in the upper left corner (d)

When the dermoscopic features of the labial mucosa of all patients were evaluated in terms of gender, the clear reticular arrangement was significantly higher in women (29 patients, 38.2%) than men (17 patients, 22.4%) (P = 0.034). Purple areas were significantly higher in women (27 patients, 35.5%) than men (P = 0.018). Grouped hairpin vessels were significantly more frequent in males (49 patients, 64.5%) than females (37 patients, 48.7%) (P=0.050). It was significant that mixed reticular arrangement was more common in males (60 patients, 78.9%) than females (46 patients, 60.5%) (P = 0.013).

When all patients were evaluated, there was no statistically significant difference between (respectively) males and females in terms of hemorrhagic dots (25% vs. 22.4%, P = 0.703), targetoid brown round areas (19.7% vs. 25%, P = 0.436), matchstick hairpin vessels (13.2% vs. 9.2%, P = 0.440), microulceration (3.9% vs. 2.6%, P = 0.649), microaneurysm (17.1% vs. 11.8%, P = 0.356), deep vascular network (96.1% vs. 97.4%, P = 0.649), superficial vascular network (97.4% vs. 98.7%, P = 0.560), chain shaped hairpin vessels (19.7% vs. 9.2%, P = 0.065), yellow background areas (92.1% vs. 90.8% P = 0.772), dotted vessels (50% vs. 38.2%, P = 0.141), glomerular vessels (5.3% vs. 2.6%, P = 0.405), white dots (9.2% vs. 9.2%, P = 1.0), honeycomb appearance (3.9% vs. 5.3%, P = 0.699), yellowish-white streaks (26.3% vs. 14.5%, P = 0.070), and hyperkeratosis (18.4% vs. 10.5%, P = 0.167).

In Group 1, clear reticular arrangement (40.4% vs. 13.8%, P = 0.001) and honeycomb appearance (7.4% vs. 0%, P = 0.033) were significant. In Group 2, mixed reticular arrangement (61.7% vs. 82.8%, P = 0.006), grouped hairpin

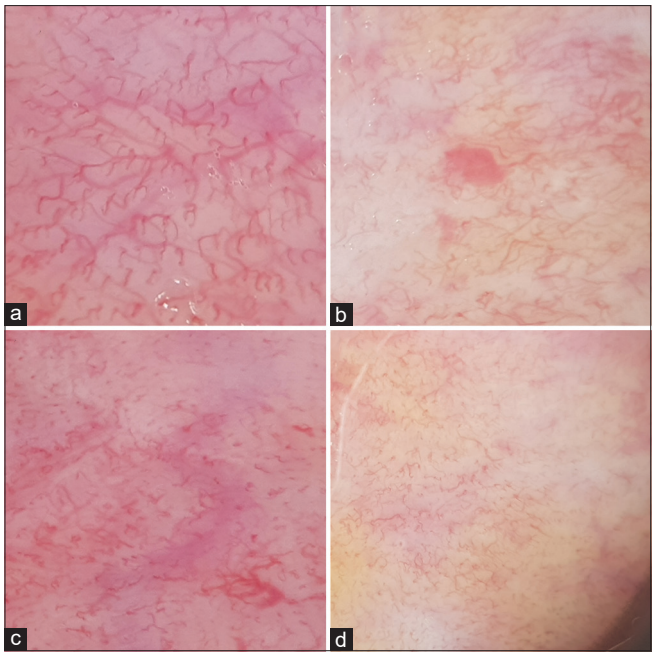

Figure 2: (a-d) Chain-shaped hairpin vessels and microaneurysms are seen on the mixed reticular arrangement

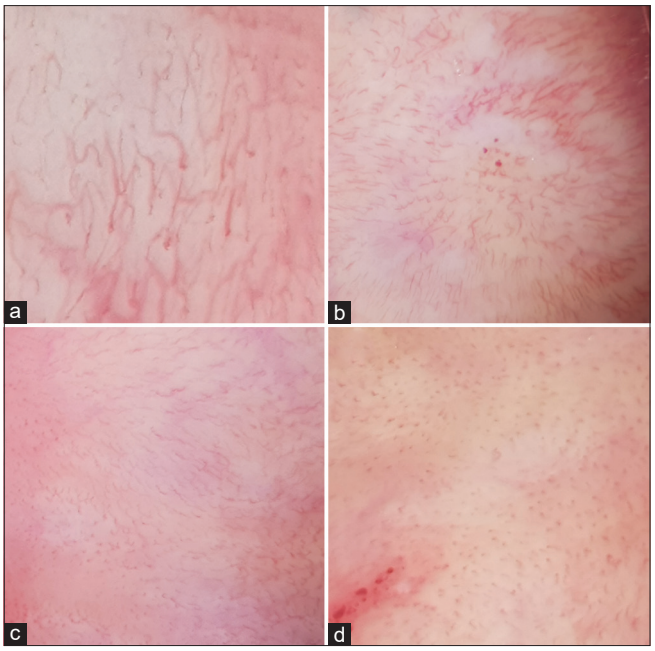

Figure 3: Matchstick hairpin vessels (a), hemorrhagic dot (b and d), hairpin vessels (b and c) and dot vessels (c and d) are seen on the mixed reticular arrangement

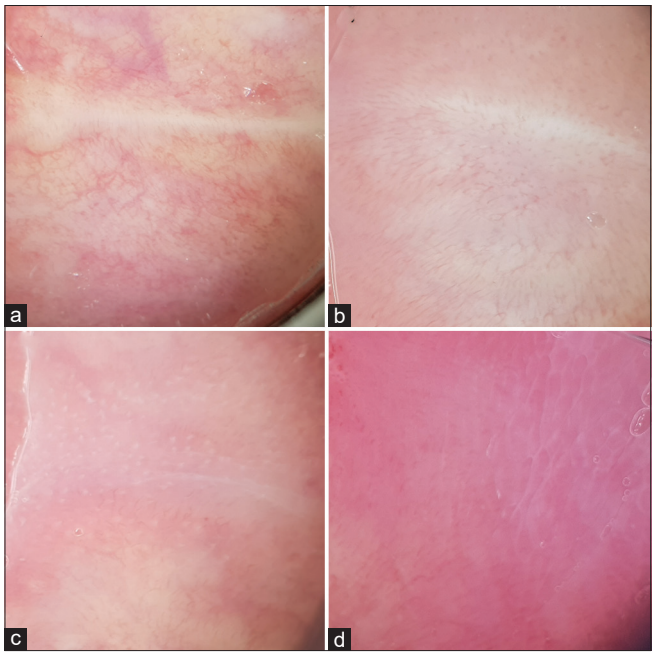

Figure 4: Dermoscopy shows yellowish-white streaks (a and b), white dots (c), and honeycomb appearance (d)

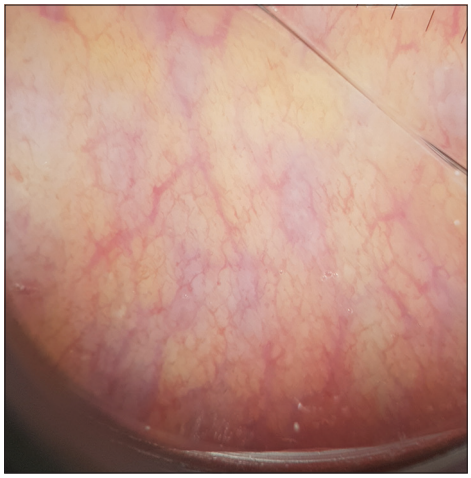

Figure 5: There are purple areas on the clear reticular arrangement

vessels (48.9% vs. 69%, P = 0.016), yellow background areas (87.2% vs. 98.3%, P = 0.018), dotted vessels (33% vs. 62.1%, P = 0.000), matchstick hairpin vessels (6.4% vs. 19%, P = 0.017), and microaneurysm (3.2% vs. 32.8%, P = 0.000) were significant.

There was no significant difference between Group 1 and Group 2 in terms of hemorrhagic dots (19.1% vs. 31%, P = 0.094), targetoid brown round areas (21.3% vs. 24.1%, P = 0.681), deep vascular network (96.8% vs. 96.6%, P = 0.931), superficial vascular network (98.9% vs. 96.6%, P = 0.305), chain-shaped hairpin vessels (18.1% vs. 8.6%, P = 0.177), purple areas (26.6% vs. 27.6%, P = 0.894), glomerular vessels (5.3% vs. 1.7%, P = 0.269), white dots (8.5% vs. 10.3%), P = 0.704), yellowish-white streak (13.8% vs. 15.5%, P = 0.774), and microulceration (2.1% vs. 5.2%, P = 0.307), respectively. All dermoscopic structures are shown in Table 1.

Discussion

The architectural framework of oral mucosal microcirculation is quite complex and is constantly changing with aging.[4,5] The properties in the capillary structures in the oral mucosa are probably a mirror of what happens in every organ of the

Table 1: Dermoscopic features of oral labial mucosa

Dermoscoic structures	Al l patients, *n* (%)	Female, *n* (%)	Male, *n* (%)	*P*	Group 1, *n* (%)	Group 2, *n* (%)	*P*
Deep vascular network	147 (96.7)	74 (97.4)	73 (96.1)	0.649	91 (96.8)	56 (96.6)	0.931
Superficial vascular network	149 (98)	75 (98.7)	74 (97.4)	0.560	93 (98.9)	56 (96.6)	0.305
Mixed reticular arrangement	106 (69.7)	46 (60.5)	60 (78.9)	0.013	58 (61.7)	48 (82.8	0.006
Clear reticular arrangement	46 (30.3)	29 (38.2)	17 (22.4)	0.034	38 (40.4)	8 (13.8)	0.001
Gruped hairpin vessels	86 (56.6)	37 (48.7)	49 (64.5)	0.048	46 (48.9)	40 (69)	0.016
Dot vessels	67 (44.1)	29 (38.2)	38 (50)	0.141	31 (33)	36 (62.1)	0.000
Chain shaped hairpin vessels	22 (14.5)	7 (9.2)	15 (19.7)	0.065	17 (18.1)	5 (8.6)	0.107
Microaneursym	22 (14.5)	9 (11.8)	13 (17.1)	0.356	3 (3.2)	19 (32.8)	0.000
Macthstick hairpin vessels	17 (11.2)	7 (9.2)	10 (13.2)	0.440	6 (6.4)	11 (19)	0.017
Glomerular vessels	6 (3.9)	2 (2.6)	4 (5.3)	0.405	5 (5.3)	1 (1.7)	0.269
Yellow background areas	139 (91.4)	69 (90.8)	70 (92.1)	0.772	82 (87.2)	57 (98.3)	0.018
Purple areas	41 (27)	27 (35.5)	14 (18.4)	0.018	25 (26.6)	16 (27.6)	0.894
Hemorrhagic dot	36 (23.7)	17 (22.4)	19 (25)	0.703	18 (19.1)	18 (31)	0.094
Targetoid brown round areas	34 (22.4)	19 (25)	15 (19.7)	0.436	20 (21.3)	14 (24.1)	0.681
Yellowish-white streaks	31 (20.4)	11 (14.5)	20 (26.3)	0.070	16 (17)	15 (25.9)	0.189
Hyperkeratosis	22 (14.5)	8 (10.5)	14 (18.4)	0.167	13 (13.8)	9 (15.5)	0.774
White dot	14 (9.2)	7 (9.2)	7 (9.2)	1.0	8 (8.5)	6 (10.3)	0.704
Honeycomb appearance	7 (4.6)	4 (5.3)	3 (3.9)	0.699	7 (7.4)	0 (0)	0.033
Microulceration	5 (3.3)	2 (2.6)	3 (3.9)	0.649	2 (2.1)	3 (5.2)	0.307

human body.[3] Morphological examination of microcirculation is essential. In fact, the microvascular bed is directly associated with both autoimmune etiopathogenesis pathologies and acute and chronic inflammatory etiopathogenesis pathologies.[6,7] Information on the dermoscopy of the labial mucosa is limited, and in the literature, dermoscopic examination has been performed in several dermatological diseases of the labial mucosa.[8,9] Information on the structure of oral mucosal vessels has been made possible over the last few years, thanks to modern techniques of *in vivo* capillaroscopic imaging.[10-13] *In vivo* capillaroscopy measures capillary loop caliber, length, and density of loops.[3] The density and length of capillary loops are, on average, higher in women than in men. Density tends to increase with aging in both men and women. In women, the density increases between the 5th and 7th decades and then becomes stable. In men between the 4th and 6th decades, the density decreases slightly and then increases almost to the 8th decade. At this time, the intensity becomes equal in both sexes.[3] That is, hormonal differences between the two sexes diminish during aging, leading to common vascular features in older men and women. Differences below the age of 50 are more pronounced.[3]

When the patients in our study were evaluated according to gender, it was significant that the superficial vascular network had a clear reticular arrangement and the presence of purple areas in women. The clear reticular arrangement was defined as a superficial vascular network in more than 90% of the labial mucosal area, and other vascular and nonvascular structures such as hairpin, dot, and glomerular vessels were very rare. It is thought that purple areas may be salivation ponds under the mucous membranes or reflections of vascular structures on the surface.

In males, it was found that superficial vascular network was in mixed reticular arrangement and grouped hairpin vessels were observed more frequently, and it was significant. Mixed reticular arrangement was defined as the structure where the dermoscopic image was not clear and the majority of the labial mucosal area was accompanied by other vascular and nonvascular structures, especially hairpin vessels, in addition to the superficial vascular network structure.

In our study, targetoid brown round areas were detected in 22.4% of all patients (n = 34). There was no significant difference in terms of gender and age. While the center of these dermoscopic structures was brown, there was a white ring surrounding it. We think that these structures are improving microulceration. However, the newly developed microulcerations were 3.3% (n = 5) in this study.

Yellowish-white streaks were present in 20.4% of all patients (31 patients). However, no significant difference was observed when analyzed by sex and age. We think that these structures are scarring secondary to trauma. These structures, which are generally linear, can be multiple and rarely starburst.

Microaneurysm was generally observed in 14.5% (n = 22) of the patients. There was no difference in terms of gender, but it was more significant in Group 2 patients. We believe that this may be due to the more fragile vascular structures in the elderly.

The vessels in the labial mucosa are evaluated according to the direction of the loops and Curri's classification is used. In Curri Type 1, the direction of the loops is parallel to the surface, whereas in Curri Type 2, the surface is perpendicular. Curri Type 3 has both parallel and perpendicular loops.[3]

However, it is not possible to adapt this classification used in *in vivo* capillaroscopy with ×200 to dermoscopy. Nevertheless,

hairpin vessels defined as vascular loop and classified parallel to the surface (Curri Type 1) were evaluated as chain-shaped hairpin vessels (14.5%, n = 22) and grouped hairpin vessels (56.6%, n = 86).

Among these structures, hairpin vessels were significantly seen in males and in Group 2 patients. On the other hand, dot vessels formed by vascular loops extending perpendicularly (Curri Type 2) to the surface were found to be 44.1% (n = 67) in our study, and it was significantly more frequent in Group 2. In our study, matchstick hairpin vessels were defined as the situation where the loop portion of the hairpin vessels were more swollen, darker, and more prominent than the branches. In the current study, it was observed in 11.2% (n = 17) and it was significant that it was seen more frequently in Group 2.

Hyperkeratosis was observed in 14.5% (n = 22) of all patients. White dots and honeycomb appearance are thought to be different variants of hyperkeratosis. Hemorrhagic dot was present 23.7% of all patients (n = 36).

Usually, the clinical diagnosis of oral disease is done by visual examination, tactile evaluation, and invasive biopsy. An endoscopic microscope can help to increase the detectable resolution on the mucosal surface;[14-16] however, it cannot access deeper structures or vessels that contain valuable information about the origin of the disease and how it develops. The recent development of photoacoustic microscopy (PAM) has shown promise in imaging microvascular properties in tissue *in vivo*.[17] However, the applicability of PAM in imaging of the oral mucosa has not yet been established. However, optical coherence tomography-based angiography has been reported to be very successful in imaging the vascular network structure in the oral mucosa.[14]

Conclusion

Although the diameter and density of the vessels cannot be measured in dermoscopy, we think that dermoscopy may help in the future studies of labial mucosa by evaluating the shape and arrangement of the vessels and nonvascular structures. In this study, oral labial mucosa of many healthy individuals was examined dermoscopically. These results will serve as the basis for studies on the effect of systemic diseases on oral labial mucosa and studies on localized mucosal diseases.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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