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The Prevalence of *Demodex folliculorum* on the Scrotum and Male Perineal Skin

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SUMMARY: *Demodex folliculorum* (*D. folliculorum*) is a human ectoparasite that resides in the pilosebasceous skin unit. Common sites of predilection are the skin of cheeks, forehead, nose, nasolabial fold and eyelids. Genital *D. folliculorum* inoculation case reports are extremely rare and depend on investigation of skin lesions. There is no study of genital skin without lesions, and, as far as we know, there is no literature on *D. folliculorum* prevalence in male genital skin. We examined *D. folliculorum* prevalence on the healthy scrotum and male perineum. One hundred males were examined for *D. folliculorum* on facial and genital skin. Samples were taken from cheek, forehead, scrotum and perineum by standard skin surface biopsy (SSSB) or hair epilation. The mean age was 53.5±13.0 (24-70) years. Eight percent of males had *D. folliculorum* on their facial skin. Mean Demodex density (Dd) of men with *D. folliculorum* positivity was 5.1± 2.9/ cm^2 (2-9/cm^2). Diagnostic results of both sampling methods were similar. No *D. folliculorum* was demonstrated on genital skin.

Key Words: *Demodex folliculorum*, genital, prevalans, skrotal

Demodex folliculorum'un Skrotum ve Erkek Perinesindeki Prevalansı

ÖZET: Bir ektoparazit olan *Demodex folliculorum* (*D.folliculorum*), deride pilosebase ünitede yerleşmektedir. Parazitin sık yerleştiği yerler yanak, alın, burun, nazolabyal katlantı ve kirpiklerdir. Genital bölgede *D.folliculorum* inokülasyonları çok nadir vaka sunumları şeklinde bildirilmiş olup, lezyonlu deri alanlarının incelenmesi ile bulunmuşlardır. Lezyonsuz perineal deride varlığı ile ilgili bir yayın olmadığı gibi, bilindiği kadarıyla, erkek genital derisinde *D.folliculorum* prevalansını inceleyen bir çalışma da bulunmamaktadır. Bu çalışmada sağlıklı erkeklerde *D.folliculorum*'un skrotum ve perinedeki prevalansı incelenmiştir. 100 erkekte yüz ve genital deride *D.folliculorum* varlığı araştırılmıştır. İnceleme amaçlı örnekler yanak, alın, skrotum ve perineden standart deri yüzey biopsisi (SSSB) veya kıl epilasyonu yöntemleri ile toplanmıştır. Ortalama yaş 53.5±13.0 (24-70) yıl olarak ve %8 erkekte yüz bölgesinde *D.folliculorum* varlığı saptanmıştır. *D.folliculorum* pozitif olan erkeklerdeki ortalama demodex dansitesinin (Dd) 5,1± 2,9/ cm^2 (2-9/cm^2) olduğu gözlenmiştir. İki örnekleme yönteminin tanısal sonuçları benzer bulunmuştur. Genital deride *D.folliculorum* saptanmamıştır.

Anahtar Sözcükler: Demodex folliculorum, genital, prevalence, scrotal.

INTRODUCTION

Demodex folliculorum (*D. folliculorum*) is an ectoparasite that resides in humans, firstly described in cerumen in 1840s (6). Adult *D. folliculorum* is 0.3 mm in length, has four pairs of small legs and are frequently found in the pilosebaceous unit in biopsy specimens of the facial skin (3). The sites of predilection are where large amounts of sebum is produced: the forehead, cheek, nose, nasolabial fold, and eyelids (2, 3, 19). Unusual sites have been reported on the scalp, chest, nipple, penis, mons veneris, buttock, and ectopic sebaceous gland in the buccal mucosa (2, 3, 5, 6, 11, 19). Breckenridge reported the only case of *D.folliculorum* found on the penis (6). Although perineal skin is rich in predisposing pilosebaceous units, no study on perineal *D. folliculorum* prevalence exists in literature. We investigated *D. folliculorum* prevalence on adult male genital skin.

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MATERIAL AND METHODS

One hundred adult male patients introduced to urology clinic of a university hospital were enrolled. *D. folliculorum* existence was investigated in both facial and genital skin. Individual informed consent was obtained as well as approval from local ethics commitee, and the rules of the Helsinki Declaration on human studies were followed strictly. Exclusion criteria were age less than 20 yrs and over 70 yrs, any suspicion of scrotal, perineal, perianal or penile skin disease of any kind,

any pre-treatment with acaricids or topical medications, systemic steroid therapy, oncological treatment, suspicion of immune suppression, diabetes mellitus, renal failure and malnutrition. Patients mainly had primary diagnosis of urinary stone disease, benign prostatic hyperplasia, erectility dysfunction or infertility. Any lesions on facial skin were noted.

Biopsies for *D. folliculorum* examination were obtained from facial, scrotal and perineal area of all patients. For facial examination, standardized skin surface biopsies (SSSB) of all patients were obtained from pre-determined cheek and forehead areas that are most commonly infested by the mite. Facial skin site to be biopsied was not prepped. Biopsy methodology of periscrotal area was mandated by hair status of the skin. If this area was shaven for hygienic purposes, SSSB was used, otherwise hair epilation was performed. Periscrotal sampling by SSSB was done from scrotum-skin junction bilaterally near both ends of tuberoischial line while sampling by hair epilation was performed at both sides of Rathke line and from upper portion of tuberoischial line, harvesting three hair follicles from each area. For SSSB, a microscope slide with cyanoacrylate adhesive on 1cm2 pen-marked area was pressed over the skin, applying the adhesive to the skin and leaving there for one minute. This ensured removal of the surface keratin layer, top of the pilosebaceous follicle and its content. It was then gently removed and clarified with 2-3 drops of glycerin and covered with a coverslip. In every slide, marked area was evaluated for parasite count by light microscope at x40 and x100 magnification (8, 9). Epilation was performed painlessly by picking the hair with a forceps one by one. Collected hair follicules were covered with glycerin over a slide and were examined by light microscopy (x40 and x100) for *D.folliculorum* count (10). Differential diagnosis of *D. folliculorum* with other members of *Demodex* spp. was done microscopical: cigar shaped long body with an abdomen forming two thirds of its lenght, short and obtuse legs and cone shaped termination of the body was diagnosed as *D. folliculorum* (Figure 1). All examinations were done within 1 hr of harvesting. Demodex density (Dd) was calculated as mean mite count in infested patients. All values were given as mean±standard deviation.

RESULTS

Mean age of the patients was 53.5±13.0 (24-70). Overall, 8 (8%) patients were shown to harbor *D. folliculorum* at facial skin while no samples from genital skin was positive (Table 1).

Mean Dd of infested patients was 5.1± 2.9/ cm^2 (2 – 9/cm^2). Overall, 53 patients underwent SSSB (group 1) and 47 patients underwent hair sampling (group 2); mean age being 51.5±12.4 and 55.6±13.3, respectively (p>0.05). Of the patients in Group 1, three and one had *D. folliculorum* positivity in cheek and forehead samples, respectively. In Group 2, four patients had cheek and two patients had forehead *D. folliculorum* positivity (Figure 1). Mean Dd of patients that had positive skin samples in Group 1 and Group 2 were 5.0±2.1/cm^2 and 5.2±1.2 /cm^2, respectively (p>0.05). The patient with 9 parasites/ cm^2 in cheek had papulopustular skin lesions, but yet did not have any perineal *D. folliculorum*. No parasites other than *D. folliculorum* was observed in any specimen.

Table 1. Patients with *D. folliculorum* positivity in any biopsy specimens

Biopsy Method	Age (yrs)	Perineal (n)	Cheek (n)	Forehead (n)
SSSB	60	0	4	0
	50	0	2	7
	70	0	2	0
	31	0	3	0
Hair epilation	59	0	6	0
	63	0	0	2
	40	0	9	0
	33	0	4	2

Figure 1. Adult *D.folliculorum*

DISCUSSION

Distribution of *D. folliculorum* in different parts of human skin is well defined, but scrotal and perianal skin of healthy males have not been studied yet. *D. folliculorum* colonizes areas that are rich in sebaceous glands and hair follicles and density of these skin tags on scrotal and perineal skin consists a significant risk for *D. folliculorum* infestation (3, 16, 19, 21).

Clinical importance of *D. folliculorum* has been studied extensively. Unidentified skin manifestations like unexplained pruritic lesions or seborreic dermatitis-like lesions of perineum should be examined for *D. folliculorum* infestation (13, 14). Since *D. folliculorum* is known to be associated with cutaneous disorders like pustular folliculitis and papulopustular erup-

tions similar lesions of genital area in which the etiology cannot be revealed with standard diagnostic studies and the symptoms worsen after topical steroid therapy, deserves *D.folliculorum* investigation (3, 4, 18).

Our study did not reveal any *D.folliculorum* on scrotal and perianal specimens harvested by either of two methods, whether sampling from facial skin was positive for the mite or not. Cause for this situation is obscured, but some rationale may be proposed from literature: Despite similarity of hair follicle and sebaceous gland distribution with *D.folliculorum* predilection sites, genital skin also contains apocrine sweat glands, which may be the major limiting factor for *D. folliculorum* colonization. Apocrine glands secrete an oily fluid which has a pH of 5.0 and 6.5 and is rich in odoriferous substances (cholesterol, triglycerides, fatty acids, cholesterol esters and squelene) and contains androgens, carbohydrates, ammonia and ferric iron (20). Among these, especially ammonia and ferric iron may limit mite growth. One conflict for this opinion may be that *D.folliculorum* is extremely rare among childhood, a period that is characterized by lack of apocrine glands, but both extremely rare pilosebaceous units and low sebaceous activity in children may explain this situation (12, 17).

Another factor may be the cross-sectional structure of our study, since a significant number of males with healthy looking perineal skin were enrolled. Patients with papulopustular skin lesions and dermatitis in genital area worths *D.folliculorum* investigation.

Biopsy methodology is not considered to have any impact on our results, since both SSSB and hair epilation were reported to be effective methods in *D. folliculorum* diagnosis (2, 3, 5, 9, 10, 16, 23). For a prevalence study that is performed in healthy skin, these might be sufficient to search for the mite, and invasive sampling like scraping or punch biopsies should be reserved for diseased skin that cannot be diagnosed otherwise (11, 13). Skin sampling with cellophane-tape is also reported to determine *D. folliculorum,* but this was an incidental occasion of *E. vermicularis* investigation (20).

Lastly, our group has *D.folliculorum* positivity of 8%, similar to the control groups of various studies that did not have any symptoms or signs (10, 15, 22, 23). Also, patients with skin lesions and symptoms were shown to harbor the mite to a much higher extent (1). Although not investigated before, study populations with facial skin lesions related to *D.folliculorum* are candidates for research in genital skin.

Rare penile and scrotal *D.folliculorum* occasions in the literature may have self-inoculation origin (6, 13).

In rosacea and rosacea-like lesions, *D.folliculorum* should also be investigated as an etiologic factor (7).

Scrotal and perineal pilosebaceous unit of males having healthy-looking facial and genital skin did not harbor *D.folliculorum*. Yet, inoculation of the mite to diseased genital skin is probable and this association should be investigated especially in patients with diseased skin of these areas.

REFERENCES

1. **Aycan ÖM, Otlu GH, Karaman Ü, Daldal N, Atambay M**, 2007. Çeşitli hasta ve yaş gruplarında Demodex sp. görülme sıklığı. *Türkiye Parazitol Derg*, 31(2): 115-118.
2. **Aylesworth R, Vance JC**, 1982. *Demodex folliculorum* and *Demodex brevis* in cutaneous biopsies. *J Am Acad Dermatol*, 7: 583–589.
3. **Baima B, Sticherling M**, 2002. Demodicidosis revisited. *Acta Derm Venereol*, 82: 3-6.
4. **Basta-Juzbasić A, Subić JS, Ljubojević S**, 2002. *Demodex folliculorum* in development of dermatitis rosaceiformis steroidica and rosacea-related diseases. *Clin Dermatol*, 20(2): 135-140.
5. **Bonnar E, Eustace P, Powell FC**, 1991. *Demodex* mite in normal skin. *Lancet*, May 11; 337: 1168.
6. **Breckenridge RL**, 1953. Infestation of the skin with *Demodex foliculorum*. *Am J Clin Pathol*, 23: 348-352.
7. **Erbagci Z**, 2005. Rosacea: Current thoughts on classification and ethiopathogenesis. *Turkiye Klinikleri J Dermatol*, 15:105-116.
8. **Forton F, Germaux MA, Brasseur T**, et al., 2005. Demodicosis and rosacea: epidemiology and significance in daily dermatologic practice. *J Am Acad Dermatol*, 52: 74-87.
9. **Forton F, Seys B**, 1993. Density of *Demodex folliculorum* in rosacea: A case-control study using standardized skin-surface biopsy. *Br J Dermatol*, 128: 650-659.
10. **Gao YY, Di Pascuale MA, Li W** et al., 2005. High prevalence of *Demodex* in eyelashes with cylindrical dandruff. *Invest Ophthalmol Vis Sci,* 46: 3089-3094.
11. **García-Vargas A, Mayorga-Rodríguez JA, Sandoval-Tress C**, 2007. Scalp demodicidosis mimicking favus in a 6-year-old boy. *J Am Acad Dermatol*, 57: 19-21.
12. **Hoekzema R, Hulsebosch HJ, Bos JD**, 1995. Demodicidosis or rosacea: what did we treat? *Br J Dermatol*, 133: 294-299.
13. **Hwang SM, Yoo MS, Ahn SK, Choi EH**, 1998. Demodecidosis manifested on the external genitalia. *Int J Dermatol*, 37: 634-636.
14. **Karincaoglu Y, Bayram N, Aycan O, Esrefoglu M**, 2004. The clinical importance of *Demodex folliculorum* presenting with nonspecific facial signs and symptoms. *J Dermatol*, 31: 618-626.
15. **Kulac M, Ciftci IH, Karaca S, Cetinkaya Z**, 2008. Clinical importance of *Demodex folliculorum* in patients receiving phototherapy. *Int J Dermatol*, 47: 72-77.

16. **Norn MS**, 1971. *Demodex folliculorum*: Incidence, regional distribution, pathogenicity. *Dan Med Bull*, 18: 14-7.

17. **Patrizi A, Neri I, Chieregato C, Misciali M**, 1997. Demodicidosis in immunocompetent young children: report of eight cases. *Dermatology*, 195: 239-242.

18. **Purcell SM, Hayes TJ, Dixon SL**, 1986. Pustular folliculitis associated with *Demodex folliculorum*. *J Am Acad Dermatol*, 15: 1159-1162.

19. **Rufli T, Mumcuoglu Y**, 1981. The hair follicle mites *Demodex folliculorum* and *Demodex brevis*: Biology and medical importance. *Dermatologica*, 162: 1–11.

20. **Saygı G, Marufi M, Köylüoğlu Z**, 1984. Biri selofanbant preparatı ile saptanan üç *D. folliculorum* olgusu. *Türkiye Parazitol Derg*, 7(1-2): 137-144.

21. **Schaller M, Plewig G**, 2004. Structure and function of ecrine, apocrine, apoeccrine and sebasceous glands. In: Bolognia JL, Jorizzo JL, Rapini RP eds Dermatology. 4th Ed; London; Mosby, p.525-586.

22. **Sibenge S, Gawkrodger DJ**, 1992. Rosacea: A study of clinical patterns, blood flow, and the role of *Demodex folliculorum*. *J Am Acad Dermatol*, 26: 590- 593.

23. **Yagdiran Düzgün O, Aytekin S**, 2007. Comparison of *Demodex folliculorum* density in haemodialysis patients with a control group. *J Eur Acad Dermatol Venereol*, 21: 480- 483.