

Relationship between Itching and the Presence of Demodex Species in the External Auditory Canal in Patients with Chronic Ear Itching

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ABSTRACT

Objective: The aim of this study was to investigate the relationship between ear itching and Demodex and to reveal the presence of Demodex in the aetiology of ear itching. Our study will contribute to this area, where there is a limited number of studies in the literature, and treatment planning can be provided by considering this aetiology in patients with chronic ear itching.

Material and Methods: Fifty-two patients with chronic ear itching and 51 patients without itching were included in the study. The patients' itching severity was assessed with the VAS (visual analog scale). A sample with the plug was taken from the external auditory canal. Demodex mites were investigated by examining the obtained samples using a light microscope.

Results: There was no statistically significant difference between the groups with and without ear itching in the presence of Demodex mites ($p=0.09$). However, Demodex positivity was found to be higher in the patient group with itching (53.8%). There was no statistically significant relationship between the presence of Demodex and VAS scores measuring itching severity ($p=0.89$).

Conclusion: In our study, the presence of Demodex mites was found to be numerically higher in patients with chronic ear itching. We believe that Demodex mites play a role in the aetiology of ear itching.

Keywords: Demodex, ear itchiness, external auditory canal

INTRODUCTION

The external auditory canal is covered with skin formed by keratinised stratified squamous epithelium (1). The skin on the bone forming the outer part of the canal contains hair follicles and cerumen-producing apocrine glands. The cerumen secretion produced by these glands serves to protect the external auditory canal against infections (2). However, in cases such as exposure to external trauma or use of local medication, the epithelial structure is disrupted and the skin flora may change. When the protective function is disrupted, there is an increased tendency of infection and complaints may develop (3). Ear itching has become a chronic problem that bothers many patients today. The aetiological causes of chronic ear itching are not fully understood, and a patient

group called "itchy ear syndrome" has begun to emerge (4). Patients complain of persistent itching, burning, and pain despite the use of various medications. The intensity of itching and discomfort varies (4). These patients are usually evaluated considering the presence of contact dermatitis (5). Demodex is a type of mite found especially on the face of humans. These mites, which commonly settle in hair follicles and sebaceous glands, are found on the nose, nasolabial region, forehead and cheeks (6). Demodex mites can be found at a density of <5 mites/cm² on normal skin. Clinical symptoms occur when the density of Demodex increases (7). It causes diseases such as pityriasis folliculorum, rosacea, acne vulgaris, blepharitis and folliculitis (6).

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The aim of this study was to investigate the relationship between ear itching and Demodex and to reveal the role of Demodex in the aetiology of ear itching. Our research will contribute to this area, where there is a limited number of studies in the literature, and allow treatment planning to be provided by considering this aetiology in patients with chronic ear itching.

MATERIAL AND METHODS

This study was planned as a prospective, randomised controlled trial. Patients who applied to the ENT outpatient clinic of Malatya Training and Research Hospital between October 2022 and April 2024 were included in the study. A total of 103 people were included in the study, 52 of whom had complaints of ear itching for more than a month, and 51 of whom did not have ear itching. The control group was selected from patients who visited the ENT polyclinic with complaints other than ear itching and who had an earwax plug detected in the external auditory canal. Patients with skin diseases, eardrum perforation, and acute and chronic ear infections were not included in the study. Patients over the age of 18 years with normal eardrums were included in the study. Patients with ear itching were asked to score the severity of itching using the Visual Analog Scale (VAS) (8). Patients scored the severity of itching on a scale of 1-10, with 1 point for very mild itching and 10 points for very severe itching. Patients with 5 points were considered to have moderate itching, and patients with >5 points were considered to have severe itching. The duration of itching was asked and recorded. During the routine ear examination, a plug was taken from the external auditory canal with the help of a curette. While the plug was being cleaned, a sample was taken from the skin, including a scraping. The samples were delivered to the Malatya Training and Research Hospital Microbiology Laboratory within 2 h.

A slide-coverslip preparation was made from the samples, and microscopic examination was performed at x10 and x40 magnifications by dropping immersion oil (Figure 1). The presence of Demodex was detected and the results were



Figure 1: microscopic Demodex mite image

recorded. Samples were also taken from the control group without ear itching using the same method and were examined.

The study was reviewed and approved by the Clinical Research Ethics Committee of the Malatya Turgut Özal University (Date: 18.08.2022, No: 2022-39). All participants provided written informed consent. The study was conducted according to the principles expressed in the Declaration of Helsinki.

Statistical analysis

The data obtained in the study were evaluated in a computer environment using the SPSS “Statistical Package for Social Sciences v. 22.0 (IBS SPSS Corp., Armonk, NY, USA)” program. Ratios were calculated for the qualitative variables, and the mean, standard deviation, median, minimum and maximum values were calculated for the quantitative variables. Variables were evaluated using the Mann–Whitney U test from non-parametric tests when Kolmogorov-Smirnov test was $p < 0.05$, and the Independent Samples Test from parametric tests when Kolmogorov-Smirnov test was $p > 0.05$. The Pearson chi-square test was used for the comparison of qualitative variables. The results were taken at 95% confidence interval, and the statistical significance level was $p < 0.05$.

RESULTS

Of the 103 patients included in the study, 52 were in the patient group with ear itching and 51 were in the control group without ear itching. In the patient group, 34.6% ($n=18$) were female, 65.4% ($n=34$) were male, and in the control group, 51% ($n=26$) were female and 49% ($n=25$) were male. No statistically significant difference was found between the patient and control groups in terms of sex ($p=0.09$) (Table 1).

The mean age of the patient group with ear itching was (52.51 ± 17.67), while the mean age of the control group was (51.41 ± 19.64). No statistically significant difference was found between the patient group and the control group in terms of mean age ($p > 0.05$) (Table 2).

Demodex spp. positivity was found to be 53.8% ($n=28$) in the patient group with the complaint of ear itching. The positivity rate was higher than the control group. However, no statistically significant difference was found between the patient and control groups according to the Demodex status ($p=0.09$) (Table 3).

Table 1: Comparison of the patient and control groups based on sex

	Patient group n=52		Control group n=51		p
	n	%	n	%	
Female	18	34.6%	26	51%	0.09
Male	34	65.4%	25	49%	

Table 2: Comparison of the patient and control groups based on age

	Patient group n=52		Control group n=51	p
	Age		Age	
Mean±SD	52.51±17.67		51.41±19.64	0.88
Median	56.50		52	
Min-max.	17-86		18-80	

SD: Standard deviation

Table 3: Comparison of the patient and control groups based on the Demodex status

	Patient group n=52		Control group n=51		p
	n	%	n	%	
Demodex negative	24	46.2%	32	62.7%	0.09
Demodex positive	28	53.8%	19	37.3%	

In the patient group, no statistically significant difference was found in terms of the degree of itching VAS score, itch duration, and sex based on Demodex positivity and negativity ($p>0.05$) (Table 4). In patients with Demodex positivity, the itch duration was 8 months on average. The mean VAS score indicating the itch severity was determined to be 4.4, which was moderately severe.

The mean age of Demodex-negative patients was calculated as (48.95±16.28) while the mean age of Demodex-positive patients was calculated as (55.57±18.52). No statistically significant difference was found between Demodex-negative and Demodex-positive patient groups based on the mean age ($p=0.18$).

DISCUSSION

In our study, the rate of use of Demodex in patients with ear itching was found to be 53%, higher than that in the healthy control group. We believe that we have shown that Demodex mites may play a role in chronic ear itching.

Demodex mites are a type of parasite found on the skin of many healthy people. Although Demodex mites are currently considered as the cause of many skin diseases, their pathogenic effects remain controversial. The high rate of occurrence in healthy people without complaints causes this debate. It is thought that symptoms may appear as the density of the Demodex mites increases (9).

In a study conducted in China, the presence of Demodex in the external ear canal secretion was investigated. In this study conducted with 613 students, it was observed that the Demodex positivity rate was 11.58%. It was determined that 67% of the students with Demodex detected in the external ear canal had complaints of ear itching, and this rate was higher than the students who were Demodex negative (10). In our study, Demodex mites were found in 37.3% of healthy individuals. No significant difference was observed between the Demodex positivity in the patient group and healthy individuals, but the Demodex incidence rate was higher in the patient group at 53.8%.

Demodex mites are frequently observed in the facial area and settle particularly in hair follicles and glands. These mites play a role in the aetiology of rosacea, pityriasis folliculorum, perioral granulomatous dermatitis, and hyperpigmented lesions on the skin (11). Demodex mites are also commonly observed in eyelash follicles (12). Because the entrance of the external ear canal is adjacent to the skin, Demodex mites can settle in the external ear canal. Therefore, it can be considered that Demodex mites may play a role in the aetiology of external ear itching. In the study by Bilal et al., the relationship between the severity of itching in chronic ear itching and the presence of Demodex mites was investigated. In this study, a statistically significant relationship was found between the severity of ear itching and the presence of Demodex mites, which are thought to play a role in the aetiology of ear itching. Demodex positivity was found in 50% of the patients with ear itching. The average duration of itching in patients was found to be 36 days, and no significant relationship was found with Demodex (13). In our study, although no significant relationship was found between the severity of ear itching and Demodex positivity, Demodex was found to be positive in 53.8% of patients with ear itching. The average VAS score in the Demodex-positive patients was

Table 4: Comparison of itching severity and duration according to the Demodex status in the patient group

	Demodex negative n=24		Demodex positive n=28		p
	n	%	n	%	
Degree of itching					0.89
0-5	15	62.5%	18	64.3%	
6-10	9	37.5%	10	37.5%	
Itching duration					0.45
1-6 months	13	54.2%	18	64.3%	
6 months and over	11	45.8%	10	35.7%	
Sex					0.17
Female	18	75.0%	16	42.9%	
Male	6	25.0%	12	57.1%	

found to be 4.4. No significant relationship was found between the duration of itching and Demodex positivity, and the average duration of itching was determined to be 8 months.

Demodex positivity is generally seen more frequently in women than in men (14). In our study, we also found it to be more common in women (52.9%). Another study conducted in our region found Demodex positivity in women to be 49%, which supports our study (15).

During puberty, with the increase in sebaceous secretion, there is an increase in the number of Demodex mites (16). In a study conducted with individuals between the ages of 3 and 96, Demodex was seen in 34% of individuals between the ages of 19 and 25, while this rate increased with age, and it was detected in 95% of individuals between the ages of 71 and 96 (7). In the study conducted by Cheng et al., the mean age was found to be 52.1 years in the Demodex-positive group (17). Similarly, in this study, the mean age was found to be 55.5 years in the Demodex-positive patients, and no significant relationship was found between age and Demodex positivity.

The external ear canal secretion contains substances such as lactoferrin and lysozyme. This cerumen protects the external ear canal against external factors and microorganisms (3). Traumatic factors or factors that disrupt the secretion prevent the protective function. It is thought that local steroid use may disrupt the protective barrier and increase the rate of Demodex mites in the external ear canal. In a study conducted by Çevik et al., the frequency of Demodex mites in patients using local steroids due to ear itching was found to be statistically significantly higher compared to patients not using steroids. Demodex positivity was found to be 5.8% in the patients included in the study. The Demodex positivity rate was 7.6% in patients with ear itching. It was observed that 66% of the patients with Demodex mite positivity had local steroid use (18). In our study, these factors were excluded by obtaining samples from patients who had not used local steroids in the last 2 months and had no immune problems. However, our Demodex positivity rate (53%) was significantly higher in patients with ear itching. It may be thought that steroid treatment applied with the consideration of contact dermatitis may increase Demodex settlement and cause itching complaints again.

The small sample size is a limitation of our study. Further studies can be conducted with larger patient groups from different regions.

CONCLUSION

While studies on Demodex are mostly with regard to the skin, it has not yet been clarified whether the Demodex mite causes skin diseases. There are very few studies in the literature showing the prevalence of Demodex in the external ear canal. Based on the findings of our study, it can be said that Demodex colonisation in the skin of the external ear canal may be widespread. Although its relationship with ear itching could not be determined significantly, the Demodex positivity was found to be higher in people with chronic ear itching. In addition,

incorrect diagnosis and treatment may increase Demodex colonisation and cause itching complaints again. Therefore, it is essential to clarify the aetiology of chronic ear itching. According to the results of our study, it can be concluded that the presence of Demodex mites in the external ear canal may be the cause of treatment-resistant ear itching. This result may contribute to the application of the correct treatment.

Ethics Committee Approval: This study was approved by the Malatya Turgut Özal University (Date: 18.08.2022, No: 2022-39).

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Peer Review: Externally peer-reviewed.

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