

Periodontal and Oral Status in a Group of Patients With Idiopathic Anterior Uveitis: A Pilot Study

İdiyopatik Anterior Üveitli Bir Grup Hastada Periodontal ve Oral Durum: Bir Pilot Çalışma

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Abstract

Aim: Uveitis is an inflammatory disease of the middle layer of the eye, and the most common form is anterior uveitis. It has been observed that almost half of the anterior uveitis cases may be idiopathic in origin. Many systemic diseases are associated with the oral cavity. Periodontal diseases are often at the forefront of discussions, particularly in relation to their significant impact on overall health. The term uveitis has been regarded as a primary focus in previous studies on the oral cavity. This discussion focuses on cardiovascular conditions, pregnancy, and diabetes. We believe that evaluations should be considered not only under the disease's main title, but also according to the anatomy, disease factor, and clinical duration. Therefore, it was thought that this subject should be re-examined, considering the growing knowledge and classifications that have become widespread. The current literature generally belongs to earlier periods and includes only a few recent studies and case reports. Thus, this study aims to investigate possible periodontal-dental factors in a group of patients with idiopathic anterior uveitis.

Material- Methods: Thirty patients [15 patients with idiopathic anterior uveitis-study group (SG): 7 female-8 male; 15 healthy control group (CG): 8 female-7 male] were included in this pilot study. For each individual, the gingival index (GI), plaque index (PI), probing depth (PD), and clinical attachment level (CAL), which are used in routine periodontal examination and help to determine periodontal status, were measured. The decayed-missing-filled teeth index (DMFT) was recorded to reveal their current dental status. Mucosal changes (ulceration, hyperplasia, etc.) and abnormal conditions, if any, were noted in the individuals. This study investigated possible differences in periodontal-dental parameters

Öz

Amaç: Üveit, gözün orta tabakasının iltihabi bir hastalığıdır. En sık görülen formu anterior üveittir. Anterior üveit vakalarının neredeyse yarısının idiyopatik kökenli olabileceği belirtilmiştir. Birçok sistemik hastalık ağız boşluğu ile ilişkilidir. Özellikle bu ilişkilerde periodontal hastalıklar sıklıkla tartışılmaktadır. Bu tartışma kardiyovasküler durumlar, gebelik ve diyabet üzerine yoğunlaşmaktadır. Üveit ve ağız boşluğu üzerine yapılan önceki çalışmalarda üveit teriminin genelde ana başlık olarak ele alındığı görülmektedir. Kanaatimizce değerlendirmeler sadece hastalığın ana başlığı altında değil, anatomi, hastalık faktörü ve klinik sürenin de gözetilmesi gerektiğini düşündürmüştür. Bu nedenle artan bilgi ve yaygınlaşan sınıflandırmalar ışığında bu konunun yeniden incelenmesine karar verilmiştir. Genel olarak mevcut literatür eski dönemlere ait olup, az sayıda güncel çalışma ve olgu sunumu mevcuttur. Bu çalışmanın amacı idiyopatik anterior üveitli bir grup hastada olası periodontal-dental faktörleri araştırmaktır.

Gereç ve Yöntem: Bu pilot çalışmaya, otuz hasta [idiyopatik anterior üveitli 15 hasta-çalışma grubu (SG): 7 kadın-8 erkek; 15 sağlıklı kontrol grubu (CG): 8 kadın-7 erkek] dahil edilmiştir. Her bir birey için rutin periodontal muayene de kullanılan ve periodontal durum tespiti yapmaya yarayan gingival indeks (GI), plak indeksi (PI), sondlama derinliği (PD), klinik ataşman seviyesi (CAL) ölçülmüştür. Çürük-eksik-dolgu dişler indeksi (DMFT) kayıt edilerek, kişilerdeki mevcut dental durumlar ortaya konulmaya çalışılmıştır. Bireylerde ayrıca varsa mukozal değişiklikler (ülserasyon, hiperplazi vb.) ve anormal durumlar not edilmiştir. Bu çalışmada, SG ve CG grupları arasındaki periodontal-dental parametrelerdeki olası



between the SG and CG groups. In statistical evaluations, a p-value of <0.05 was accepted as significant.

Results: The mean PI, PD, and CAL values were significantly higher in the SG ($p<0.05$). GI and DMFT indices failed to show any differences between SG and CG.

Conclusion: Current research is exploring the potential connection between idiopathic anterior uveitis and various periodontal parameters. Preliminary findings suggest that there may indeed be a relationship worth investigating further.

Keywords: anterior uveitis, oral health, dental clinics, focal infection.

farklılıklar araştırılmıştır. İstatistiksel değerlendirmelerde p değeri <0.05 önemli olarak kabul edilmiştir.

Bulgular: Ortalama PI, PD ve CAL değerleri SG’de önemli ölçüde daha yüksekti ($p<0,05$). GI ve DMFT indekslerinde SG ve CG arasında herhangi bir fark izlenmemiştir.

Sonuç: Bu konu araştırmaya açıktır. Ancak, ön bulgular, idiopatik anterior üveit ile periodontal parametreler arasında bir ilişki olabileceğini göstermektedir.

Anahtar Kelimeler: anterior üveit, oral sağlık, dental klinik, fokal enfeksiyon

1. Introduction

The oral cavity, with its characteristics and role as part of the whole body, requires particular attention in examining systemic diseases. Several systemic diseases are associated with the oral cavity. This association can be bidirectional (1,2). Systemic diseases or disorders may produce oral manifestations, or oral disorders may impact systemic health. The relationship between certain systemic issues (e.g., diabetes, cardiovascular diseases, metabolic syndrome, preterm birth) and periodontal disease has been thoroughly discussed (3).

Uveitis is a disease of inflammatory origin in the middle layer of the eye. The classification (anatomic), considering the “Standardization of Uveitis Nomenclature (SUN) Working Group,” identified four uveitis groups: anterior, intermediate, posterior, and panuveitis (4). “International Uveitis Study Group (IUSG)” generates a categorization for uveitis (5). Hereunder, uveitis is discussed as infectious, non-infectious, and masquerade. Uveitis is divided into three types according to the duration: acute (limited duration-sudden onset), chronic (constant, relapse <3 months after discontinuing therapy), or recurrent (repetitive episodes with periods of inactivity without treatment ≥ 3 months duration) (4).

Anterior uveitis may include iritis, anterior cyclitis, and iridocyclitis (4). It is the most common form of uveitis (6). This form has typical symptoms, including pain, blurred vision, redness of the eye, photophobia, and headache (7). It may occur alongside different ocular conditions such as keratitis, scleritis, vasculitis, or other forms of uveitis. Approximately half of the cases of anterior uveitis may be of idiopathic origin (8,9). The diagnosis of idiopathic uveitis is possible only if other causes (systemic or traumatic etiology) are ruled out.

Three pathways have been proposed that can link oral infections to secondary systemic diseases. The spread of oral infections can occur through temporary bacteremia, metastatic toxicity, and immunological injury (10, 11). Oral bacteria-related metastatic inflammation may be responsible for the development of uveitis (10,12). According to this mechanism, it has been suggested that periodontal disease may cause uveitis (13).

The available literature on the term “uveitis” is limited; it was either considered a single term or not entirely defined. Therefore, revisiting this issue is necessary. This study aims to investigate the periodontal-oral findings in patients with idiopathic anterior uveitis and compare them with those without uveitis symptoms.

2. Material-Methods

Idiopathic anterior uveitis patients were recruited from the Department of Ophthalmology, Faculty of Medicine. A control group (CG) was provided from patients sourced from the Department of Periodontology, Faculty of Dentistry. These patients were randomly selected due to age- and sex-matched controls. For the study group (SG), all dental examinations and treatments were conducted after the acute phase. Following an ophthalmic examination, a dental evaluation was performed. It was confirmed that the CG did not have any eye complaints or disease. Individuals were informed about the details of the study. Ethical approval was obtained from the local ethical committee (Decision Number [605/364] 2009/23). The ethical standards of the Helsinki Declaration were respected throughout the research. Participants gave informed



consent.

Non-smokers aged 18 and over were included in the study. Patients with acute or chronic systemic diseases (especially autoimmune) known to cause uveitis, those who are pregnant or nursing, individuals with Behçet's disease, immune deficiencies, intellectual disabilities, and gastrointestinal diseases were excluded from the research. Subjects who used antibiotics within three months or any drugs that affect bone metabolism were also excluded.

SG and CG periodontal clinical measurements were conducted using a manual periodontal probe (Hu-Friedy, Chicago, IL, USA). The evolution of probing depth (PD) and clinical attachment level (CAL) was assessed at six gingival sites (mesio-, disto-, mid-buccal, and lingual sites, measured in millimeters). Moreover, the gingival index (GI) and plaque index (PI) were recorded for four tooth surfaces (mesial, distal, buccal, and lingual, on a scale of 0-3) (14). The decay-missing-filled teeth index (DMFT) scores for the dentition were documented (15). Third molars were excluded from the dental examination.

Mucosal changes (ulceration, hyperplasia, etc.) and any abnormal conditions were noted. Additionally, panoramic radiographs and/or periapical radiographs were obtained when necessary to assess oral therapy needs.

Statistical analysis

Statistical analysis was conducted using IBM SPSS Statistics 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics for the study parameters were examined. Distribution was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Normally distributed variables were compared between groups using the independent sample t-test, while those not normally distributed were compared with the Mann-Whitney U test. A p-value < 0.05 was considered statistically significant.

3. Results

This cross-sectional pilot study included 30 patients. The SG included 15 idiopathic anterior uveitis patients

Table 1 Descriptive data on the age, number of teeth, and sites in the groups

	SG	CG
	Mean \pm S.D.	Mean \pm S.D.
Age (year)	38.40 \pm 8.29	37.10 \pm 11.60
Teeth (Number)	331	342
Sites (PI-GI)	1324	1368
Sites (PD-CAL)	1836	2052

[7 females and 8 males with a mean age of 38.40 \pm 8.29 (23 to 51 years)], while the CG comprised 8 females and 7 males with a mean age of 37.10 \pm 11.60 (21 to 65 years) (Table 1). Tables 2 and 3 present descriptive data on PD, CAL, PI, GI, and DMFT scores in SG and CGs.

The groups were compared regarding clinical periodontal indices and the DMFT index (Table 4). Although DMFT and GI scores did not show statistically significant differences between the groups, the periodontal indices (PI, PD, CAL) differed significantly. The mean values for PI, PD, and CAL were significantly higher in the SG (p= 0.01, p= 0.00, p= 0.00, respectively).

The mean PD value of the surveyed areas in the SG was 2.79 \pm 0.68 mm. Among the studied areas, 232 tooth sites exhibited PD measurements greater than 3 mm. In the CG, the mean PD was 1.50 \pm 0.47 mm, and 61 tooth sites had a PD of \geq 3 mm. Ten of the fifteen patients in the SG did not present sites with PI=0, and only 61 of 331 teeth were plaque-free (PI=0). In contrast, seven subjects in the CG did not display plaque-free sites, and 70 of 342 teeth had a score of 0. Table 5 lists mucosal changes (ulceration, hyperplasia, etc.) and other conditions in both groups.

**Table 2** Descriptive data on the study parameters in the anterior uveitis group

Patient	Sex	Age	Individual Mean PI	Individual Mean PD (mm)	Individual Mean GI	Individual Mean CAL (mm)	Individual DMFT	D	M	F
1	Female	48	1.58	1.90	0.80	1.90	5	1	4	0
2	Female	51	0.20	2.03	0.15	2.30	18	1	8	9
3	Female	31	2.00	3.40	1.60	3.40	6	0	1	5
4	Male	45	1.95	2.30	0.34	2.70	7	0	4	3
5	Female	34	0.23	2.00	0.15	2.00	2	0	2	0
6	Male	37	1.82	3.00	0.36	3.40	7	1	6	0
7	Male	23	0.71	2.80	0.50	2.80	2	2	0	0
8	Male*	35	0.95	3.30	1.05	3.34	23	0	7	16
9	Female	25	1.46	2.49	0.51	2.49	4	2	2	0
10	Female	36	2.35	2.60	0.66	2.60	12	2	10	0
11	Male	36	2.50	2.60	2.00	2.80	7	3	4	0
12	Female	49	1.80	2.75	1.75	3.64	5	0	5	0
13	Male	41	3.00	4.53	1.75	4.53	12	2	10	0
14	Male	42	3.00	3.40	3.00	4.63	23	1	22	0
15	Male**	43	3.00	Measurements could not be performed because of excessive calculus formation-mobility	3.00	Measurements could not be performed because of excessive calculus formation-mobility	3	0	3	0

*Plaque index (PI), probing depth (PD), gingival index (GI), clinical attachment level (CAL), and decay-missing-filled teeth index (DMFT).

Before the complete resolution of the dental problems in patient 8, a second attack of uveitis was observed. PD measurements could not be performed in this patient because of excessive calculus formation.

Table 3 Descriptive data on the study parameters in the control group

Patient	Sex	Age	Individual mean PI	Individual mean PD (mm)	Individual mean GI	Individual mean CAL (mm)	Individual DMFT	D	M	F
1	Male	40	1.19	1.53	1.19	1.35	5	2	0	3
2	Female	47	1.15	1.6	1.03	2.13	14	1	11	2
3	Female	61	1.27	1.2	1.41	2.23	14	0	14	0
4	Male	65	1.1	2.2	1.45	1.47	23	0	23	0
5	Male	22	0.3	1.1	0.07	1.12	3	1	1	1
6	Female	29	1.42	1.14	0.37	1.1	2	1	0	1
7	Female	23	0.71	1.24	0.7	1.07	6	0	0	6
8	Female	25	0.57	1.01	0.71	1.22	9	7	0	2
9	Female	33	0.59	1.41	0.89	1.17	10	2	6	2
10	Female	21	0.97	1.4	1.17	1.3	4	0	1	3
11	Male	30	1.22	1.8	1.34	2.04	4	2	2	0
12	Male	21	1.33	1.15	1.25	1.07	0	0	0	0
13	Male	29	0.37	1.16	0.41	1.16	6	6	0	0
14	Male	49	1.75	2.67	1.64	2.76	19	2	17	0
15	Female	42	1.01	1.88	1.1	0.89	5	2	3	0

Plaque index (PI), probing depth (PD), gingival index (GI), clinical attachment level (CAL), and decay-missing-filled teeth index (DMFT).

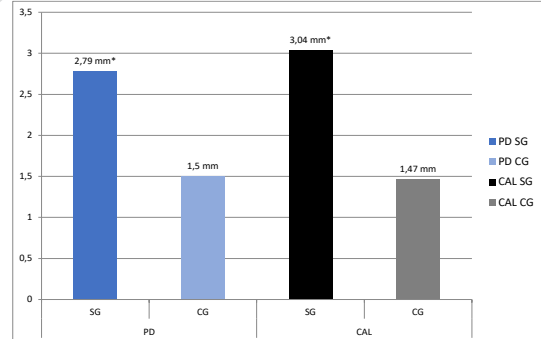
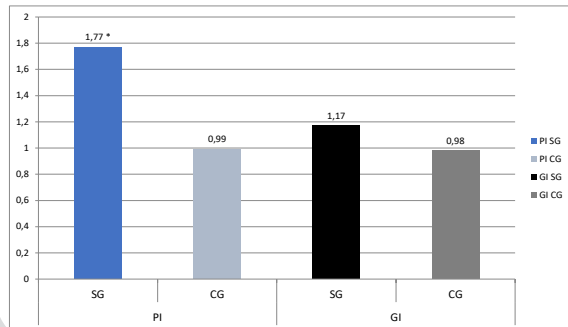
**Table 4** Comparison of study parameters between the two groups

	SG	CG	P
PI (0-3)	1.77 ± 0.94 (1.82)	0.99 ± 0.41 (1.10)	0.01*
PD (mm)	2.79 ± 0.68 (2.75)	1.50 ± 0.47 (1.40)	0.00*
GI (0-3)	1.17 ± 0.96 (0.80)	0.98 ± 0.45 (1.10)	0.97
CAL (mm)	3.04 ± 0.81 (2.80)	1.47 ± 0.55 (1.22)	0.00*
DMFT	9.07 ± 7.08 (7.00)	8.27 ± 6.57 (6.00)	0.74
D	1.00 ± 1.00 (1.00)	1.73 ± 2.12 (1.00)	0.51
M	5.87 ± 5.40 (4.00)	5.20 ± 7.47 (1.00)	0.19
F	2.20 ± 4.62 (0.00)	1.33 ± 1.72 (1.00)	0.49

Plaque index (PI), probing depth (PD), gingival index (GI), clinical attachment level (CAL), and decay-missing-filled teeth index (DMFT).rut * Indicates statistical significance (p<0.05).

Table 5 Other oral examination findings in the groups

SG	CG
Traumatic extraction history (37 region-remained tooth root), aphthous ulcer (lower lip)	Left linea alba hyperkeratotic lesion
Tooth abrasions, prosthetic restorations	Periapical infection (16)
-	Maxilla, mandibula anterior erythematous, desquamative lesion
Localized Periodontitis	Prosthetic bridges (13-16, 23-25)
Bruxism	-
-	Palatal mucosa hyperkeratotic lesion
-	-
Periapical infection (16), prosthetic restorations, radio-opaque lesion (36)	Periapical infection (34)
Remained tooth root piece (26), microdont (28)	-
Remained tooth root piece (46)	-
-	Bilateral hyperkeratotic ramus lesion, periapical infection (11,12)
-	-
Remained root piece (16), caries-severe crown damage (23, 24)	-
-	Remained root piece (24), deep caries (47), periapical infection (35)
Old temporary prosthetic restoration, excessive calculus formation	Bilateral hyperkeratotic buccal lesion

**Table 6-7** Graphs comparing periodontal statistics

4. Discussion

In this pilot study, PD, PI, and CAL showed statistically higher values in the SG, while GI and DMFT values were comparable in both SG and CG. Our study is novel in its methodology, as it examines idiopathic anterior uveitis patients. In our opinion, evaluations should not only be considered under the main title of the disease factor, and clinical duration. A weakness of the study is that it includes a small number of individuals. This pilot study's initial findings have been assessed. A limitation we faced was that many of the articles were outdated.

Microbial dental plaque, which contributes to the development of several significant oral diseases (periodontal disease, caries, etc.), releases a variety of bioactive products. Bacterial toxins are the primary products released, stimulating the host response. The release and production of cytokines such as interleukins (IL) (IL-1, IL-6, IL-8), prostaglandins, and tumor necrosis factor-alpha have been reported and suggested to play crucial roles in systemic disease pathways. Page (16) stated that lipopolysaccharides and Gram (-) bacteria in the biofilm may impact systemic conditions by increasing the pro-inflammatory cytokines produced in the inflamed periodontal tissues, which then enter the circulation in pathogenic quantities. Furthermore, periodontitis may influence systemic conditions in various systemic diseases. Therefore, it is essential to investigate the effect of the oral cavity on other systemic disorders.

In compliance with a recently published review article, inventive studies now indicate that non-ocular microbial dysbiosis may play a role in glaucoma, age-related macular degeneration, diabetic retinopathy, and uveitis. Thus, the rapid definition of extraocular etiology and the methodical realization of its host-microbial interactions and mechanisms are of great importance for therapeutic and preventive interventions (17).

A study conducted in the 1950s examined whether uveitis is of dental origin. In this study, periapical and periodontal parameters were evaluated. Periodontal disorders may be more common in patients with pan-uveitis. This article also discusses the issue of uveitis formation due to periapical pathologies (18).

A case report stated that toxins could reach target organs through the blood, and it was suggested that a non-vital tooth may cause uveitis (uveitis type not specified!) (19). Similar to this case report, it has been stated that dental pulp and periapex diseases can cause inflammatory reactions in the eyes (20). In a retrospective cohort study, it has been evident that periodontal disease is moderately linked with the risk of developing uveitis, infectious keratitis, and scleritis (21). Akcalı et al. (22) investigated the possible relationship among idiopathic uveitis patients. However, the anatomical localization of uveitis in this research is unclear. We examine the possible connection between idiopathic anterior uveitis and periodontal-dental parameters. Researchers found that differences in microbial plaque composition exist among idiopathic



uveitis patients. Additionally, they noted alterations in response to local and systemic cytokines. Anti-inflammatory cytokines like IL-10 and IL-17E decrease in idiopathic uveitis patients. Once again, Th-1 and Th-17 inflammatory responses change. This study is the only partially comparable study in the literature with our results. This research showed no significant distinction between the groups in terms of age, gender, and periodontal parameters, except for PI and GI. In our study, PD, PI, and CAL levels were superior in idiopathic anterior uveitis patients.

The uveitis-oral disease relationship, which is based on outdated knowledge and insufficient clinical literature, needs to be approached from a new perspective. Our study indicates that dental studies on idiopathic anterior uveitis should adopt a broad viewpoint and focus on various event types, uveitis resolution, uveitis anatomy, uveitis clinical duration, and disease factors. This can enhance our understanding of dental-periodontal diseases and their relationship to uveitis.

5. Conclusion

PD, PI, and CAL values were higher in the SG. DMFT and GI were comparable in both groups. These results warrant further clinical research to explore dental-periodontal diseases in patients with idiopathic anterior uveitis.

Received/Geliş Tarihi: 03.03.2025

Accepted/Kabul Tarihi: 26.04.2025

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