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CASE SERIES

CLINICAL, CYTOLOGICAL, AND HISTOPATHOLOGICAL ALTERATIONS OF DENTURE-BEARING ORAL MUCOSA IN WOMEN WITH CERVICAL CANCER USING REMOVABLE DENTURES: A RETROSPECTIVE CLINICAL CASE SERIESVahe Azatyan¹, Arpine Sargsyan², Marine Voskanyan³, Gagik Khachatryan⁴, Nvard Vanyan⁵

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ABSTRACT

Background: Cervical cancer remains among the most common malignant neoplasms affecting women worldwide. In addition to systemic complications, both the disease itself and its treatment may induce significant pathological alterations within the oral cavity. Patients using removable dentures are particularly susceptible to inflammatory and dystrophic changes of the denture-bearing mucosa due to chronic mechanical irritation, immune dysfunction, and treatment-related toxicity. The present study aimed to evaluate the clinical, cytological, and histopathological characteristics of denture-bearing oral mucosa in women with cervical cancer.

Methods: A retrospective clinical case series was conducted involving 17 women diagnosed with cervical cancer who used complete or partial removable dentures. Clinical examination, cytological assessment, and histopathological evaluation were performed according to standardized diagnostic protocols. Oral manifestations, denture-related factors, and microscopic tissue alterations were analyzed.

Results: The mean age of the patients was 63.4 ± 6.8 years. The most frequent clinical findings included diffuse erythema (88.2%), chronic inflammation (88.2%), xerostomia (82.4%), edema (76.5%), vascular abnormalities (76.5%), hyperkeratosis (58.8%), and epithelial atrophy (52.9%). Cytological examination demonstrated epithelial degeneration, neutrophilic infiltration, and parakeratosis. Histopathological analysis revealed acanthosis, parakeratosis, basal cell degeneration, chronic lymphoplasmacytic infiltration, vascular congestion, and connective tissue fibrosis. No cytological or histopathological evidence of malignant transformation was identified.

Conclusions: Women with cervical cancer using removable dentures frequently present with inflammatory, vascular, and dystrophic alterations of the denture-bearing mucosa. These changes most likely result from combined effects of malignant disease, anticancer therapy, salivary dysfunction, immune dysregulation, and chronic mechanical irritation associated with removable prostheses. Multidisciplinary management is essential to reduce complications and improve oral health-related quality of life.

Keywords: cervical cancer; oral mucosa; denture-bearing mucosa; removable dentures; prosthetic stomatitis

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INTRODUCTION

Cervical cancer remains one of the most significant malignant diseases affecting women worldwide and continues to represent a major cause of cancer-related morbidity and mortality despite substantial advances in prevention, screening, and therapeutic strategies¹⁻³. According to recent global cancer statistics, cervical cancer remains among the most frequently diagnosed malignancies in women, particularly in low- and middle-income countries where access to preventive healthcare services and organized screening programs is limited⁴⁻⁶.

Advances in surgical oncology, chemotherapy, radiotherapy, and combined chemoradiotherapy have significantly improved survival outcomes. However, treatment-related adverse effects continue to present a considerable clinical challenge. Among these complications, oral manifestations are frequently encountered and may persist long after completion of oncological therapy. Oral mucositis, xerostomia, opportunistic infections, and chronic inflammatory lesions of the oral cavity significantly affect patients' quality of life, treatment tolerance, and nutritional status⁷⁻¹⁰. The oral mucosa is a highly dynamic tissue characterized by continuous epithelial turnover and close interaction with the immune system and oral microbiota. Consequently, it is particularly vulnerable to pathological changes associated with systemic disease, immune dysfunction, metabolic disturbances, vascular impairment, and the toxic effects of cancer therapy^{11,12}. Numerous studies have reported that patients undergoing oncological treatment frequently develop oral complications, including mucositis, xerostomia, dysgeusia, opportunistic infections, periodontal deterioration, and chronic inflammatory lesions of the oral mucosa¹³⁻¹⁷.

These conditions may impair oral function, speech, nutritional intake, and the success of subsequent prosthetic rehabilitation^{18,19}.

In clinical practice, patients using removable dentures present additional challenges. The denture-bearing mucosa is continuously exposed to mechanical loading, frictional forces, microbial biofilm accumulation, and functional stress²⁰⁻²³. Under physiological conditions, adaptive mechanisms maintain tissue integrity; however, in systemic disease and immunocompromised states, the ability of oral tissues to respond to chronic irritation may be significantly reduced, leading to inflammatory and degenerative changes in the supporting mucosa. Immune dysregulation associated with malignant disease plays a crucial role in the development of oral complications²⁴. Both cancer and anticancer therapies affect cellular immunity, cytokine balance, epithelial turnover, and

tissue repair mechanisms. Chemotherapeutic agents exert cytotoxic effects on rapidly proliferating epithelial cells, whereas radiotherapy induces vascular injury, fibrosis, salivary gland dysfunction, and reduced regenerative capacity²⁵⁻²⁷. Collectively, these factors increase susceptibility to mucosal injury and delay healing processes.

Xerostomia is one of the most common oral complications in oncology patients and is frequently associated with significant functional impairment²⁸⁻³⁰. Reduced salivary secretion compromises lubrication, buffering capacity, antimicrobial defense, and mucosal protection. In denture wearers, xerostomia increases frictional trauma, promotes microbial colonization, and contributes to denture-associated stomatitis and chronic mucosal inflammation³¹⁻³³.

Previous studies have demonstrated that chronic denture-related irritation may lead to epithelial hyperplasia, acanthosis, parakeratosis, dyskeratosis, inflammatory infiltration, and connective tissue remodeling³⁴⁻³⁶. In patients with a history of cancer and oncological treatment, these pathological processes may be further intensified by immune dysfunction and treatment-related tissue toxicity. Although oral mucositis and cancer therapy-related oral complications have been extensively investigated^{13-19,41}, relatively little attention has been given to the specific clinical and histopathological alterations of denture-bearing mucosa in women with cervical cancer. A more detailed understanding of these changes may facilitate early detection, improved prosthetic management, and development of preventive strategies.

Therefore, the aim of this retrospective clinical case series was to evaluate the clinical, cytological, and histopathological alterations of denture-bearing oral mucosa in women with cervical cancer using removable dentures.

MATERIALS AND METHODS

Study Design and Patient Population

This retrospective clinical case series was conducted at the Department of Prosthodontics and Oral Pathology between January 2021 and January 2025. The study aimed to evaluate clinical, cytological, and histopathological alterations of denture-bearing oral mucosa in women with cervical cancer using removable dentures.

A total of 17 female patients with histologically confirmed cervical cancer were included in the study. All participants had completed oncological treatment before dental evaluation and were referred for assessment because of oral symptoms and mucosal alterations associated with removable prosthetic rehabilitation.

Table 1. Baseline Characteristics of the Study Population (n = 17)

Variable	Value
Number of patients	17
Sex	Female (100%)
Mean age, years (range)	61.8 (54–72)
Histologically confirmed cervical cancer	17 (100%)
Previous radiotherapy	17 (100%)
Previous chemotherapy	17 (100%)

Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Female sex	Autoimmune oral diseases
Histologically confirmed cervical cancer	Uncontrolled diabetes mellitus
Use of complete or partial removable dentures for ≥1 year	Non-denture-related oral infections
Presence of oral symptoms or mucosal lesions	Previous head and neck malignancies
	Active tobacco use

Clinical Assessment

All patients underwent a comprehensive oral examination performed by experienced prosthodontists and oral pathologists. Clinical evaluation included assessment of mucosal erythema, edema, hyperkeratosis, epithelial atrophy, petechial hemorrhages, salivary flow reduction, denture stability, and denture hygiene status. Standardized intraoral clinical photographs were obtained for documentation and comparative assessment.

Cytological Assessment

Exfoliative cytological samples were collected from representative mucosal lesions using a cytobrush technique. Smears were processed according to standard cytological protocols and examined microscopically. Particular attention was directed toward epithelial degeneration, inflammatory cell infiltration, keratinization abnormalities, epithelial maturation disturbances, and the presence of cellular atypia.

Histopathological Examination

Incisional biopsy specimens were obtained from representative lesions when clinically indicated. Tissue samples were fixed in 10% neutral-buffered formalin, routinely processed, embedded in paraffin, sectioned at 4 μm, and stained with hematoxylin and eosin.

Histopathological evaluation focused on epithelial thickness, acanthosis, parakeratosis, basal cell degeneration, inflammatory infiltration, vascular alterations, connective tissue fibrosis, and other structural changes of the oral mucosa.

RESULTS

Clinical Findings

All 17 patients reported oral discomfort, burning sensation, xerostomia, denture intolerance, and varying degrees of chronic mucosal irritation. Clinical examination demonstrated a high prevalence of inflammatory and dystrophic changes affecting the denture-bearing mucosa. Diffuse erythema and chronic inflammatory changes were the most common findings, each observed in 15 of 17 patients (88.2%). Xerostomia was present in 14 patients (82.4%), while edema and vascular abnormalities were identified in 13 patients (76.5%). Hyperkeratosis and epithelial atrophy were observed less frequently but remained common findings within the study population. Localized traumatic lesions were most commonly associated with poor denture hygiene, prosthetic instability, or occlusal discrepancies.

Clinical findings in denture-wearing women with cervical cancer

Clinical finding	n (%)
Diffuse erythema	15 (88.2)
Chronic inflammation	15 (88.2)
Xerostomia	14 (82.4)
Edema	13 (76.5)
Vascular abnormalities	13 (76.5)
Hyperkeratosis	10 (58.8)
Epithelial atrophy	9 (52.9)
Petechial hemorrhages	8 (47.1)
Traumatic lesions	7 (41.2)

Note: Traumatic lesions were predominantly associated with poor denture hygiene, prosthetic instability, and occlusal discrepancies.

Cytological Findings

Cytological examination demonstrated predominantly degenerative epithelial changes accompanied by moderate inflammatory activity. The most common findings included epithelial cell degeneration, neutrophilic infiltration, and parakeratosis, along with impaired epithelial maturation. No cytological evidence of epithelial dysplasia or malignant transformation was observed in any case.

Table 3. Cytological findings in denture-bearing mucosa

Cytological parameter	n (%)
Epithelial degeneration	15 (88.2)
Neutrophilic infiltration	13 (76.5)
Parakeratosis	12 (70.6)
Disturbed epithelial maturation	11 (64.7)
Macrophage accumulation	7 (41.2)
Cellular atypia	0 (0)
Malignant cells	0 (0)

Note: No cytological evidence of dysplasia or malignancy was detected.

Histopathological Findings

Histopathological analysis revealed a consistent pattern of chronic inflammatory and dystrophic alterations in the denture-bearing oral mucosa. The most frequent microscopic features included acanthosis, parakeratosis, chronic lymphoplasmacytic infiltration, vascular congestion, and connective tissue fibrosis. Additionally, basal cell degeneration and focal epithelial atrophy were observed in a subset of patients, reflecting persistent mucosal irritation and impaired tissue homeostasis.

Table 4. Histopathological findings in denture-bearing oral mucosa

Histopathological feature	n (%)
Acanthosis	15 (88.2)
Parakeratosis	14 (82.4)
Chronic lymphoplasmacytic infiltration	14 (82.4)
Vascular congestion	13 (76.5)
Connective tissue fibrosis	12 (70.6)
Basal cell degeneration	11 (64.7)
Epithelial atrophy	9 (52.9)

Overall, the histopathological findings were consistent with chronic inflammatory-dystrophic alterations of the denture-bearing oral mucosa, reflecting the combined effects of chronic prosthetic irritation, xerostomia, impaired tissue regeneration, and previous oncological treatment.

REPRESENTATIVE CLINICAL CASE

To illustrate the clinical, cytological, and histopathological findings observed in the study cohort, a representative case is presented below. This patient was selected because the observed manifestations closely reflected the most common clinical and morphological features identified among the women included in the present case series.

A 61-year-old woman was referred to the Department of Prosthodontics with complaints of persistent oral burning sensation, mucosal tenderness, xerostomia, and discomfort during mastication associated with the use of a complete maxillary removable acrylic denture. The symptoms had gradually progressed over the preceding six months and had significantly affected oral comfort, masticatory function, and prosthesis tolerance. The patient's medical history was notable for stage IIIB cervical cancer diagnosed three years earlier. She had undergone combined oncological treatment consisting of external beam radiotherapy and platinum-based chemotherapy. A complete maxillary removable denture had been worn continuously for approximately three years. No history of diabetes mellitus, autoimmune disease, or tobacco use was reported.

Clinical Examination

Intraoral examination revealed extensive pathological alterations involving the denture-bearing mucosa of the maxilla. Diffuse erythema and edema were present throughout the palatal mucosa and were associated with marked tenderness on palpation. Multiple hyperkeratotic plaques were observed in the hard palate region, while several areas demonstrated focal epithelial atrophy characterized by thinning of the mucosa and reduced tissue resilience.

Numerous petechial hemorrhages were identified within the denture-bearing area, suggesting increased vascular fragility and disturbances of local microcirculation. Clinical evaluation also demonstrated a pronounced reduction in salivary secretion, which corresponded with the patient's subjective complaints of persistent oral dryness.





Figure 1a,b. Denture-bearing oral mucosa demonstrating diffuse erythema, petechial hemorrhages, xerostomia-related changes, and chronic mechanical irritation associated with prolonged denture use.

Examination of the removable denture revealed inadequate hygiene with visible plaque accumulation, signs of occlusal imbalance, and insufficient adaptation of the prosthetic borders. These factors were considered potential contributors to chronic mucosal irritation and ongoing inflammatory changes.



Figure 2. Complete maxillary removable denture showing inadequate hygiene, plaque accumulation, and occlusal discrepancies contributing to chronic prosthetic trauma.

Overall, the clinical findings were consistent with a chronic inflammatory-dystrophic process affecting the denture-bearing mucosa. The observed alterations were likely influenced by the combined effects of previous oncological treatment, treatment-related xerostomia, impaired tissue regeneration, and persistent prosthetic irritation.

Cytological Findings

Exfoliative cytological examination demonstrated numerous degenerative epithelial cells exhibiting nuclear and cytoplasmic alterations. Moderate neutrophilic inflammatory infiltration was present, accompanied by scattered macrophages. Focal areas of parakeratosis and disturbed epithelial maturation were also identified.

No cytological evidence of dysplasia or malignant transformation was observed.

Histopathological and Morphological Findings

Incisional biopsy specimens obtained from representative areas of the palatal mucosa were submitted for histopathological examination. Microscopic evaluation revealed pronounced acanthosis of the stratified squamous epithelium with irregular epithelial thickening. Focal areas of parakeratosis were present, indicating abnormal keratinization associated with chronic irritation.

In contrast, other regions demonstrated epithelial thinning and focal atrophy, suggesting impaired regenerative capacity. Degenerative alterations of the basal cell layer were characterized by cytoplasmic vacuolization and disruption of normal cellular organization.

The underlying connective tissue exhibited moderate chronic lymphoplasmacytic inflammatory infiltration. Prominent vascular alterations were observed, including vascular dilation and congestion consistent with impaired microcirculation. Areas of connective tissue fibrosis were also identified, reflecting long-standing inflammatory activity and chronic tissue remodeling.

Taken together, the microscopic findings demonstrated a combination of inflammatory, vascular, and dystrophic alterations characteristic of chronic prosthetic stomatitis in a patient with a history of cervical cancer and previous oncological treatment.

The differential diagnosis included denture-associated stomatitis, chronic traumatic mucositis, oral candidiasis, contact hypersensitivity reactions, and potentially premalignant epithelial lesions. Histopathological examination excluded dysplastic and malignant epithelial changes.

Final Diagnosis

Clinical diagnosis: Chronic prosthetic stomatitis associated with treatment-related xerostomia and impaired mucosal adaptation following cervical cancer therapy.

Histopathological diagnosis: Chronic inflammatory-dystrophic lesion of the denture-bearing oral mucosa characterized by acanthosis, parakeratosis, epithelial atrophy, basal cell degeneration, chronic lymphoplasmacytic inflammation, vascular congestion, and connective tissue fibrosis.



Figure 3. Histopathological features of a chronic inflammatory-dystrophic lesion of the denture-bearing oral mucosa demonstrating acanthosis, parakeratosis, focal epithelial atrophy, chronic inflammatory infiltration, vascular congestion, and stromal fibrosis (H&E stain, original magnification $\times 100$).

Treatment

A comprehensive multidisciplinary treatment approach was implemented. Temporary reduction of denture-wearing time was recommended during the acute inflammatory phase. Professional cleaning and disinfection of the prosthesis were performed, followed by adjustment of traumatic denture borders and correction of occlusal discrepancies.

Topical antiseptic and anti-inflammatory therapy was prescribed to reduce mucosal inflammation. Salivary substitutes and moisturizing oral gels were recommended for management of xerostomia. Detailed instructions regarding denture hygiene and oral self-care were provided. Continued follow-up by both dental and oncology specialists was advised.

Clinical Outcome

At the six-week follow-up examination, substantial clinical improvement was observed. Mucosal erythema and edema had markedly decreased, oral comfort had improved, and the patient reported significant reduction in burning sensation and pain. Denture tolerance improved considerably following prosthetic adjustment and implementation of preventive measures.

Clinical Implications

The findings observed in this representative case reflect the broader pattern of clinical and histopathological alterations identified throughout the study cohort. Women with cervical cancer who use removable dentures may be particularly susceptible to chronic inflammatory and dystrophic changes of the denture-bearing mucosa due to the combined effects of prosthetic irritation, xerostomia,

impaired tissue regeneration, and cancer-related immune dysfunction.

Regular dental examinations, meticulous denture hygiene, timely correction of prosthetic deficiencies, and early investigation of persistent mucosal lesions are essential for preventing complications and improving long-term oral health outcomes in this patient population. Close interdisciplinary collaboration among prosthodontists, oral medicine specialists, pathologists, and oncologists remains crucial for comprehensive patient management.

DISCUSSION

The present retrospective case series evaluated clinical, cytological, and histopathological alterations of denture-bearing oral mucosa in women with cervical cancer using removable dentures. The findings demonstrated a consistent pattern of chronic inflammatory and dystrophic changes, accompanied by vascular alterations and epithelial degeneration. These results suggest a multifactorial pathogenesis involving systemic oncological status, anticancer therapy, salivary dysfunction, immune dysregulation, and chronic mechanical irritation from prosthetic appliances.

The oral mucosa represents a highly responsive tissue characterized by rapid epithelial turnover and close interaction with the immune system and oral microbiota. Consequently, it is particularly vulnerable to systemic diseases and oncological treatments. Chemotherapy and radiotherapy are well documented to induce a spectrum of oral complications, including mucositis, xerostomia, opportunistic infections, and chronic inflammatory lesions, primarily through impaired epithelial regeneration and disrupted immune homeostasis^{13–19,25–27,41}. The present findings are consistent with these previously reported mechanisms.

Xerostomia and salivary dysfunction emerged as key clinical features in the study population. Saliva is essential for maintaining mucosal integrity through lubrication, antimicrobial activity, and facilitation of tissue repair. Its reduction leads to increased frictional trauma, impaired denture retention, and heightened susceptibility to chronic inflammation and denture-related lesions^{28–33}. The high prevalence of erythema, edema, and epithelial atrophy in this cohort underscores the central role of salivary hypofunction in mucosal pathology.

Cytological analysis revealed degenerative epithelial changes, inflammatory infiltration, and disturbances in keratinization without evidence of dysplasia or malignancy. These findings indicate persistent epithelial stress and regenerative impairment. Importantly, the absence of cytological atypia supports the non-neoplastic nature of the observed lesions, although chronic

inflammatory conditions may clinically mimic premalignant changes in medically compromised patients^{24,37}. Cytology may therefore serve as a useful adjunct in long-term monitoring of oral lesions in oncology patients with prosthetic rehabilitation.

Histopathological examination confirmed chronic inflammatory-dystrophic remodeling characterized by acanthosis, parakeratosis, lymphoplasmacytic infiltration, vascular congestion, and connective tissue fibrosis. These features are consistent with denture-associated stomatitis; however, the additional presence of epithelial atrophy and basal cell degeneration suggests a more complex tissue response beyond localized mechanical irritation^{34–36}. This likely reflects systemic treatment-related toxicity and impaired mucosal repair capacity.

Vascular alterations, including congestion and microcirculatory disturbances, may further contribute to tissue hypoxia and delayed healing. Endothelial dysfunction induced by cancer therapy can significantly compromise mucosal resilience and perpetuate chronic inflammatory changes (25,38,40). In parallel, immune dysregulation associated with malignancy and anticancer treatment may enhance cytokine-mediated tissue injury and sustain chronic lymphoplasmacytic infiltration^{12,24–27}.

Alterations in the oral microbiome may also play an important role. Cancer therapy-induced dysbiosis, combined with denture biofilm accumulation and reduced salivary clearance, may promote opportunistic microbial colonization and amplify inflammatory responses^{22,33,43}. These interacting factors likely contribute to the persistence and severity of mucosal lesions observed in this cohort.

Compared with denture-related mucosal changes in otherwise healthy individuals, the lesions observed in this study appear more extensive and multifactorial, suggesting that systemic oncological conditions amplify local prosthetic effects and exacerbate tissue damage.

From a clinical perspective, these findings highlight the importance of regular oral examination in denture-wearing women undergoing treatment for cervical cancer. Preventive strategies, including optimization of denture hygiene, management of xerostomia, early detection of mucosal changes, and multidisciplinary collaboration, are essential to minimize complications and improve quality of life^{26,44}.

LIMITATIONS

This study has several limitations. Its retrospective design limits causal inference regarding the relationship between cervical cancer, its treatment, and oral mucosal changes. The relatively small sample size and absence of a control group restrict generalizability. Additionally, heterogeneity in cancer stage, treatment regimens, and duration of denture use may have influenced the findings. The lack of immunohistochemical and molecular analyses further limits mechanistic interpretation. Nevertheless, the combined clinical, cytological, and histopathological assessment provides valuable insight into denture-associated mucosal alterations in this patient population.

CONCLUSION

Women with cervical cancer wearing removable dentures demonstrate a consistent pattern of inflammatory, vascular, and dystrophic changes in the denture-bearing oral mucosa. These alterations are likely driven by a combination of mechanical trauma, salivary dysfunction, treatment-related tissue injury, immune dysregulation, and microvascular impairment.

Histopathological findings, including acanthosis, parakeratosis, chronic inflammatory infiltration, vascular congestion, and connective tissue fibrosis, support the presence of a chronic inflammatory-dystrophic process rather than isolated mechanical irritation.

These results emphasize the need for systematic oral monitoring, timely prosthetic adjustment, and interdisciplinary management involving prosthodontists, oral medicine specialists, pathologists, and oncologists. Future prospective studies with larger cohorts and molecular-level investigations are warranted to further elucidate the underlying mechanisms and improve preventive and therapeutic approaches.

DECLARATIONS

Conflict of Interest

The author declare no conflict of interest.

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Ethical Approval

Informed consent was obtained from patients. Clinical case approved in accordance with ethical standards.

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