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METHODS OF EXAMINATION IN COMPLETE EDENTULISM

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Abstract. Complete edentulism remains an important clinical and social problem in modern dentistry because it affects chewing efficiency, speech, facial aesthetics, temporomandibular function, nutrition, psychological comfort, and general quality of life. Proper examination of a completely edentulous patient is the foundation for successful prosthodontic rehabilitation, because the clinical outcome depends not only on the fabrication of a denture, but also on the accurate assessment of mucosa, residual alveolar ridges, jaw relationships, muscle attachments, salivary status, radiographic findings, systemic background, and patient expectations. The aim of this study was to evaluate the diagnostic value of comprehensive examination methods in patients with complete edentulism and to determine the most frequent clinical and radiographic findings influencing prosthetic treatment planning. The study included 84 completely edentulous patients examined at the Department of Orthopedic Dentistry and Orthodontics of Andijan State Medical Institute. All patients underwent structured history taking, extraoral and intraoral examination, evaluation of residual ridges, assessment of the mucosa and prosthetic field, functional tests, panoramic radiography, and prosthodontic diagnostic classification. The results showed that residual ridge atrophy, mucosal changes, reduced prosthetic support area, previous denture-related trauma, and radiographic findings such as retained roots or impacted teeth were common factors requiring careful consideration before prosthetic treatment. Moderate and severe residual ridge resorption was more frequent among patients with a long duration of edentulism. The study concludes that examination of completely edentulous patients should be systematic, multidisciplinary, and individualized. A combined clinical, functional, and radiographic approach improves diagnosis, reduces prosthetic complications, and helps select the most appropriate rehabilitation plan.

Keywords: complete edentulism, examination methods, prosthodontics, residual ridge, complete denture, panoramic radiography, oral mucosa, prosthetic rehabilitation, dental diagnosis

МЕТОДЫ ОБСЛЕДОВАНИЯ ПРИ ПОЛНОЙ АДЕНТИИ

Аннотация. Полная адентия остается актуальной клинической и социальной проблемой современной стоматологии, поскольку она влияет на эффективность жевания, речь, эстетику лица, функцию височно-нижнечелюстного сустава, питание, психологический комфорт и качество жизни пациента. Правильное обследование пациента с полной адентией является основой успешной ортопедической реабилитации, так как результат лечения зависит не только от изготовления полного съемного протеза, но и от точной оценки слизистой оболочки, остаточных альвеолярных гребней, соотношения челюстей, прикрепления мышц, слюноотделения, рентгенологических данных, соматического состояния и ожиданий пациента. Целью данного исследования явилась оценка диагностического значения комплексных методов обследования у пациентов с полной адентией и определение наиболее частых клинических и рентгенологических признаков, влияющих на планирование ортопедического лечения. В исследование были включены 84 пациента с полной адентией, обследованные на кафедре

ортопедической стоматологии и ортодонтии Андижанского государственного медицинского института. Всем пациентам проводились сбор анамнеза, внешний и внутриротовой осмотр, оценка остаточных альвеолярных гребней, слизистой оболочки и протезного ложа, функциональные пробы, панорамная рентгенография и ортопедическая диагностическая классификация. Результаты показали, что атрофия остаточных альвеолярных гребней, изменения слизистой оболочки, уменьшение площади протезной опоры, травмы от ранее использованных протезов и рентгенологические находки, включая остаточные корни и ретинированные зубы, являются частыми факторами, требующими обязательного учета перед протезированием. Умеренная и выраженная резорбция альвеолярного гребня чаще встречалась у пациентов с длительным периодом отсутствия зубов. Сделан вывод, что обследование пациентов с полной адентией должно быть системным, комплексным и индивидуализированным. Сочетание клинического, функционального и рентгенологического подходов улучшает диагностику, снижает риск осложнений и помогает выбрать оптимальный план ортопедической реабилитации.

Ключевые слова: полная адентия, методы обследования, ортопедическая стоматология, остаточный альвеолярный гребень, полный съемный протез, панорамная рентгенография, слизистая оболочка полости рта, ортопедическая реабилитация, стоматологическая диагностика

INTRODUCTION

Complete edentulism is the condition in which all natural teeth are absent in one or both jaws. Although modern preventive dentistry and restorative methods have reduced the frequency of tooth loss in many regions, complete edentulism remains common among older adults and socially vulnerable groups. Tooth loss develops mainly as a result of dental caries, periodontal disease, trauma, poor access to dental care, systemic diseases, and delayed treatment. The World Health Organization emphasizes that oral diseases affect nearly 3.7 billion people worldwide and that oral health is closely connected with general health and quality of life.

In prosthodontic practice, complete edentulism should not be considered only as the absence of teeth. It is a complex anatomical, functional, and psychological condition. After tooth extraction, the alveolar bone gradually undergoes resorption. The shape and height of the residual ridge change, the mucosa may become thinner or traumatized, the vestibular depth may decrease, and muscle attachments may approach the crest of the ridge. These changes reduce denture retention, support, and stability. Therefore, the success of complete denture treatment depends strongly on the quality of diagnostic examination performed before prosthetic treatment begins.

The burden of oral disorders remains high globally. A 2025 Lancet analysis based on the Global Burden of Disease 2021 data reported that untreated caries, severe periodontitis, edentulism, and other oral disorders affected an estimated 3.69 billion people in 2021. This global evidence shows that edentulism is not only an individual dental problem, but also a public health issue requiring prevention, early treatment, and high-quality rehabilitation.

Examination of patients with complete edentulism must include several components. A dentist should evaluate the patient’s general health, oral hygiene history, previous denture experience, neuromuscular coordination, facial profile, temporomandibular joint function, oral mucosa, salivary flow, residual ridge morphology, interarch space, jaw relationship, and radiographic status of the jaws. The American College of Prosthodontists developed the Prosthodontic Diagnostic Index for complete edentulism, which uses diagnostic findings such as mandibular bone height, maxillomandibular relationship, maxillary residual ridge morphology, and mandibular muscle attachments to classify the difficulty of treatment.

Radiographic examination also has important diagnostic value. Panoramic radiography can reveal retained roots, impacted teeth, radiolucent or radiopaque lesions, foreign bodies, severe alveolar atrophy, sinus changes, and the position of the mental foramen. Previous studies have shown that panoramic radiography is useful for detecting asymptomatic findings in edentulous jaws, especially before fabrication of complete dentures.

The aim of this study was to evaluate the diagnostic importance of comprehensive examination methods in patients with complete edentulism and to identify the most frequent clinical, functional, and radiographic findings among 84 patients examined before prosthetic rehabilitation.

MATERIALS AND METHODS

This clinical observational study was conducted among 84 patients with complete edentulism who applied for prosthodontic consultation and rehabilitation. The patients were examined at the Department of Orthopedic Dentistry and Orthodontics of Andijan State Medical Institute. The study included adult patients with complete absence of natural teeth in both jaws and patients who required complete removable prosthetic rehabilitation. Patients with acute oral infections requiring emergency treatment, severe maxillofacial defects, active malignant disease of the oral cavity, or incomplete diagnostic records were not included.

The age of the examined patients ranged from 48 to 82 years. The mean age was 64.7 ± 8.3 years. There were 46 women and 38 men. The duration of complete edentulism varied from less than one year to more than ten years. For analytical interpretation, patients were divided into three groups according to the duration of edentulism. The first group included patients who had been edentulous for less than two years. The second group included patients with edentulism lasting from two to five years. The third group included patients who had been edentulous for more than five years.

All patients underwent a structured diagnostic examination. The first stage included history taking. Particular attention was paid to the causes of tooth loss, duration of edentulism, previous denture experience, complaints related to chewing and speech, pain under old dentures, aesthetic dissatisfaction, systemic diseases, medication use, smoking, oral dryness, and psychological expectations from prosthetic treatment.

The second stage consisted of extraoral examination. Facial symmetry, lower facial height, nasolabial folds, support of the lips and cheeks, mandibular movements, temporomandibular joint symptoms, and the condition of perioral muscles were assessed. Signs of overclosure, reduced vertical dimension, angular cheilitis, and habitual mandibular displacement were also recorded.

The third stage included intraoral examination. The oral mucosa was assessed for redness, ulceration, hyperkeratosis, denture stomatitis, inflammatory hyperplasia, traumatic lesions, and flabby tissue. The residual alveolar ridges were evaluated according to height, width, contour, undercuts, resilience of the mucosa, and resistance to pressure. The palate, maxillary tuberosities, retromolar pads, vestibular depth, frenula, floor of the mouth, and tongue size were examined because these structures directly influence denture retention and stability.

The fourth stage included functional tests. Tongue movement, cheek and lip activity, swallowing pattern, speech movements, and neuromuscular control were evaluated. The stability of the mandibular prosthetic field was assessed during opening, speaking, swallowing, and lateral movements. In patients who had previously used complete dentures, old dentures were examined for vertical dimension, occlusal wear, border extension, retention, stability, pressure zones, and hygiene condition.

The fifth stage included panoramic radiography. Radiographs were analyzed for retained roots, impacted teeth, radiolucent and radiopaque lesions, foreign bodies, severity of residual

ridge resorption, maxillary sinus pneumatization, mandibular canal position, and mental foramen proximity to the ridge crest. Panoramic radiography was selected as a routine screening method because it provides a broad view of both jaws and may reveal clinically silent pathology in edentulous patients.

The sixth stage included prosthodontic diagnostic classification. Patients were evaluated according to clinical criteria related to residual ridge anatomy, mandibular bone height, muscle attachments, maxillomandibular relationship, interarch space, and expected prosthetic difficulty. The examination results were summarized using descriptive statistics. Associations between duration of edentulism and severity of residual ridge resorption were evaluated through comparative clinical analysis. The threshold of statistical significance was considered at $p < 0.05$.

RESULTS

Among the 84 examined patients, the most common complaints were difficulty in chewing, dissatisfaction with facial aesthetics, poor retention of previous dentures, speech discomfort, and pain or burning sensation under old prostheses. Chewing difficulty was reported by all patients. Aesthetic dissatisfaction was recorded in 45 patients, which represented 53.6 percent of the study group. Speech-related discomfort was reported by 35 patients, or 41.7 percent. Pain, pressure, or mucosal irritation associated with previous dentures was found in 31 patients, or 36.9 percent. Symptoms of oral dryness were reported by 18 patients, or 21.4 percent.

The duration of complete edentulism had a visible influence on the clinical condition of the prosthetic field. Twenty-one patients had been edentulous for less than two years. Thirty-one patients had been edentulous for two to five years. Thirty-two patients had been edentulous for more than five years. Patients with longer duration of edentulism had more pronounced residual ridge resorption, lower mandibular ridge height, shallower vestibules, and greater instability risk during mandibular denture planning.

Intraoral examination showed that healthy and resilient mucosa was present in 46 patients, or 54.8 percent. Mucosal redness compatible with chronic denture-related inflammation was observed in 20 patients, or 23.8 percent. Traumatic ulcers and pressure marks were found in 10 patients, or 11.9 percent. Flabby ridge areas, fibrous hyperplasia, or excessive movable tissue were detected in 8 patients, or 9.5 percent. These findings demonstrate that almost half of the patients had mucosal or soft-tissue changes requiring correction, treatment, or special impression techniques before final prosthetic rehabilitation.

Assessment of residual alveolar ridges showed that favorable ridge anatomy was not present in the majority of patients. Twelve patients, or 14.3 percent, were classified as having mild anatomical difficulty. Thirty patients, or 35.7 percent, had moderate prosthetic difficulty. Twenty-seven patients, or 32.1 percent, had advanced ridge resorption and unfavorable mandibular support conditions. Fifteen patients, or 17.9 percent, had severe anatomical limitations, including markedly reduced mandibular ridge height, high muscle attachments, shallow vestibules, and unstable denture-bearing areas.

The severity of ridge resorption was associated with the duration of edentulism. Among patients who had been edentulous for more than five years, moderate or severe mandibular ridge atrophy was observed more frequently than among patients who had been edentulous for less than two years. This association was statistically significant with $p = 0.012$. The clinical meaning of this finding is that delayed prosthetic rehabilitation and prolonged use of poorly adapted dentures may contribute to progressive loss of prosthetic support.

Extraoral examination revealed reduced lower facial height in 29 patients, or 34.5 percent. Deepening of nasolabial folds and insufficient lip support were found in 37 patients, or 44.0 percent. Temporomandibular joint symptoms, including clicking, discomfort during movement, or fatigue of masticatory muscles, were recorded in 21 patients, or 25.0 percent. These findings

were more common among patients who had used old dentures for a long time without correction or replacement.

Functional examination showed that the mandibular denture-bearing area was more problematic than the maxillary area. Hyperactive tongue movement, shallow floor of the mouth, and unfavorable muscle attachments were detected in 26 patients, or 31.0 percent. In these patients, standard denture fabrication without functional border molding would probably increase the risk of denture displacement during speech and swallowing. This result confirms the importance of functional examination before impression taking.

Panoramic radiography showed no significant pathological findings in 53 patients, or 63.1 percent. However, 31 patients, or 36.9 percent, had one or more radiographic findings requiring attention. Retained root fragments were found in 12 patients, or 14.3 percent. Impacted teeth were detected in 5 patients, or 6.0 percent. Radiopaque or radiolucent changes requiring differential evaluation were observed in 4 patients, or 4.8 percent. Severe maxillary sinus pneumatization or marked posterior maxillary atrophy was identified in 10 patients, or 11.9 percent. These radiographic findings were clinically important because they could influence the choice of prosthetic design, surgical preparation, or referral for additional diagnostic assessment.

Previous complete dentures were available for examination in 57 patients. Among them, 34 dentures had insufficient retention, 29 had visible occlusal wear, 24 had overextended or underextended borders, and 19 were associated with mucosal trauma. Poor denture hygiene was observed in 22 patients. The presence of mucosal inflammation was significantly associated with poor denture hygiene and long-term use of old prostheses, with $p = 0.018$. This finding indicates that examination of old dentures should be considered an obligatory part of diagnostic work in completely edentulous patients.

Overall, the most diagnostically valuable methods were combined intraoral examination, residual ridge assessment, functional tests, and panoramic radiography. History taking helped clarify patient expectations and previous prosthetic problems. Extraoral examination helped identify vertical dimension changes and facial support deficiency. Intraoral examination revealed the condition of the prosthetic bed. Functional tests predicted possible denture instability. Radiography detected hidden pathology and anatomical limitations. Prosthodontic classification helped determine the expected complexity of treatment and the need for preliminary preparation.

DISCUSSION

The results of this study show that complete edentulism requires much broader examination than simple inspection of the oral cavity. The edentulous patient presents with anatomical, functional, radiographic, psychological, and systemic factors that influence prosthodontic success. If these factors are not identified before treatment, even technically correct dentures may fail because of poor retention, pain, instability, mucosal trauma, or patient dissatisfaction.

Residual ridge resorption was one of the most important findings in the examined group. The mandibular ridge was especially vulnerable. This is clinically expected because the mandibular denture has a smaller support area and is influenced more strongly by tongue, floor-of-mouth, and cheek movements. Severe mandibular ridge atrophy reduces denture stability and may require special impression methods, neutral zone technique, implant-supported overdenture planning, or surgical consultation in selected cases.

The study also confirmed the importance of mucosal evaluation. Almost half of the patients had some degree of mucosal change. Denture stomatitis, traumatic ulcers, flabby tissue, and inflammatory hyperplasia may reduce the accuracy of impressions and cause pain after denture insertion. Therefore, final impressions should not be taken until acute inflammation, traumatic lesions, and hygiene-related problems are treated. In some cases, tissue conditioning and temporary correction of old dentures may be necessary before definitive prosthetic work.

The findings related to old dentures are also clinically relevant. Many patients continue to use complete dentures for many years without correction. During this time, residual ridges resorb, occlusal surfaces wear down, vertical dimension decreases, and denture borders no longer correspond to the functional anatomy of the oral cavity. This creates a cycle in which an old denture accelerates mucosal trauma and ridge discomfort, while the patient adapts to an increasingly unfavorable prosthetic situation. Examination of old dentures therefore gives valuable information about the causes of failure and helps avoid repeating the same errors in new prostheses.

Panoramic radiography proved useful in detecting hidden findings. In the present study, more than one third of patients had radiographic changes that required clinical attention. This is consistent with previous literature showing that panoramic radiographs in edentulous patients can reveal retained roots, impacted teeth, foreign bodies, radiolucent or radiopaque lesions, and other findings not always visible during routine examination. For this reason, radiographic screening should be considered an important part of examination before complete denture fabrication, especially in patients with long-term edentulism or unknown extraction history.

The Prosthodontic Diagnostic Index is valuable because it allows the dentist to estimate the complexity of complete denture treatment before starting clinical procedures. The American College of Prosthodontists classification system is based on objective diagnostic criteria and helps distinguish patients who can be treated with conventional methods from those who need advanced prosthodontic planning. In educational settings, such classification is also useful for assigning cases according to difficulty and for training students to think diagnostically rather than mechanically.

A comprehensive examination also has psychological importance. Many completely edentulous patients have previous negative denture experience. Some expect that new dentures will function like natural teeth, while others are anxious because of pain or instability experienced in the past. Careful interview allows the dentist to understand patient expectations, explain realistic treatment outcomes, and build trust. This is especially important because patient adaptation is a key factor in complete denture success.

From a practical point of view, the examination of completely edentulous patients should follow a consistent clinical sequence. First, the dentist should collect general and dental history. Then extraoral and intraoral examination should be performed. After that, the prosthetic bed should be assessed in detail, including ridge anatomy, mucosal resilience, vestibular depth, frenula, maxillary tuberosities, retromolar pads, and tongue position. Functional tests should follow, because static examination alone does not show how tissues move during speech, swallowing, and mastication. Finally, radiographic evaluation and prosthodontic classification should be used to complete the diagnostic picture.

The study has some limitations. The sample included 84 patients from one clinical setting, so the findings may not fully represent all regions or age groups. The study used panoramic radiography as the main imaging method. Cone-beam computed tomography may provide more detailed information in implant planning, severe atrophy, suspected pathology, or complex anatomical cases, but it was not used routinely in all patients. Another limitation is that long-term treatment outcomes after denture insertion were not included in this analysis. Future studies should compare diagnostic findings with post-treatment satisfaction, denture retention, chewing efficiency, mucosal health, and quality of life.

Despite these limitations, the study shows that comprehensive examination is essential in complete edentulism. A dentist should not rush directly to impression taking without understanding the patient's anatomy, function, radiographic status, systemic background, and

expectations. The more accurate the diagnostic stage is, the more predictable the prosthetic treatment becomes.

CONCLUSION

Complete edentulism is a complex clinical condition that requires systematic and individualized examination. In the present study of 84 patients, the most frequent findings influencing prosthetic treatment planning were residual ridge atrophy, mucosal inflammation, traumatic lesions related to previous dentures, reduced lower facial height, unfavorable mandibular muscle attachments, and radiographic findings such as retained roots and impacted teeth.

The diagnostic process should include history taking, extraoral examination, intraoral examination, evaluation of the residual ridges and mucosa, functional testing, assessment of old dentures, panoramic radiography, and prosthodontic classification. Each method provides different but complementary information. Clinical examination shows the condition of the prosthetic field. Functional tests reveal the stability risk during movement. Radiography detects hidden anatomical and pathological findings. Diagnostic classification helps determine case complexity and select the most appropriate treatment plan.

The results support the conclusion that successful prosthodontic rehabilitation in complete edentulism begins before denture fabrication. It begins with accurate diagnosis, careful interpretation of clinical findings, and realistic communication with the patient. A comprehensive approach can reduce complications, improve denture retention and comfort, and increase patient satisfaction with complete removable prosthetic treatment.

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