

REVIEW ARTICLES

PREGLIEDNI ČLANCI

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Review article
Pregledni članci
UDK 616.31-084-053.9-056.24
<https://doi.org/10.2298/MPNS1812383P>

DENTAL TREATMENT OF THE ELDERLY PEOPLE WITH DISABILITIES

STOMATOLOŠKI TRETMAN STARIH LJUDI SA HENDIKEPOM

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Summary

Introduction. The growing population of the elderly people and a proportional increase in the number of the elderly with different types of disabilities, necessitates a multidisciplinary approach to the assessment of their oral health and dental treatment. The ultimate aim is to retain a pain-free functional dentition and decrease the risk of future disease. **Material and Methods.** A PubMed search was performed and the authors contributed their experience in implementing preventive and therapeutic measures. **Oral health problems of the elderly with disabilities.** Two main factors influence the oral health: multimorbidity and polypharmacy. Oral health problems expected in this population are teeth abrasion, teeth fractures, root caries, periodontitis and problems with wearing dentures due to stomatitis caused by *Candida albicans*. **Oral health assessment and treatment guidelines.** This article provides guidelines for assessment and treatment planning, taking into consideration multimorbidity, polypharmacy, dementia and capacity of caregivers. **Preventive measures.** Preventive measures are crucial for long-term oral health of this population, and this paper provides guidelines for preventive treatment depending on the degree of functional dependence. **Prosthetic treatment.** Although some elderly with disabilities are suitable for conventional prosthetic treatment, often there are contraindications and specific considerations that must be taken into account. **Conclusion.** Oral health needs of the elderly people with disabilities should not be neglected and the success of treatment depends on the education of dental professionals and cooperation with other health professionals of the medical team.

Key words: Dental Care; Disabled Persons; Patient Care Planning; Dental Care for Aged; Oral Health; Dementia; Risk Assessment; Preventive Dentistry; Prosthodontics; Aged

Introduction

The elderly population has been growing all over the world and there is a trend towards the reduction in edentulism. European countries have reported a

Sažetak

Uvod. Zbog rastuće populacije starih ljudi i proporcionalnog povećanja učestalosti broja starih ljudi sa različitim tipovima hendikepa, multidisciplinarni pristup proceni njihovog oralnog zdravlja je neophodan. Krajnji cilj je postići funkcionalnu denticiju bez bolova i smanjiti rizik od budućih oboljenja. **Materijal i metode.** Pretraživanje literature u bazi *PubMed* je obavljeno, ali je takođe iskustvo autora u primeni preventivnih i terapijskih mera uzeto u obzir. **Problemi oralnog zdravlja starih ljudi sa hendikepom.** Dva glavna razloga imaju uticaj na oralno zdravlje: multimorbiditet i polifarmacija. Problemi oralnog zdravlja koji se očekuju u ovoj populaciji su abrazija zuba, frakture zuba, karijes korena, parodontopatija i problemi sa nošenjem proteza usled stomatitis uzrokovanog kandidom (*Candida albicans*). **Procena oralnog zdravlja i smernice za planiranje tipa tretmana.** Ovaj članak obezbeđuje korisne smernice za procenu i planiranje tretmana, uzimajući u obzir multimorbiditet, polifarmaciju, demenciju i kapacitet negovatelja. **Preventivne mere.** Preventivne mere su ključne za dugotrajni uspeh oralnog zdravlja ove populacije i ovde su prikazane smernice za preventivne mere u zavisnosti od stepena funkcionalne zavisnosti. **Protetski tretman.** Iako su neki stari ljudi sa hendikepom pogodni za konvencionalni protetski tretman, većina ovih pacijenata ima neke kontraindikacije i specifičnosti koje treba uzeti u obzir. **Zaključak.** Potrebe za oralnim zdravljem starih ljudi sa hendikepom ne smeju biti zanemarene, a uspeh tretmana zavisi od edukacije stomatologa kao i saradnje sa ostalim specijalistima medicinskog tima.

Ključne reči: stomatološka zaštita; osobe sa posebnim potrebama; planiranje tretmana pacijenta; stomatološka zaštita za stare osobe; oralno zdravlje; demencija; procena rizika; preventivna stomatologija; protetika; stare osobe

reduction in edentulousness from 28% to 6% since the late '70s [1]. In Serbia, the prevalence of edentulous patients is still very high, but in the last decade this has started changing [2]. Namely, the elderly population is increasingly retaining their natu-

ral teeth. That is a new challenge which requires knowledge and skills of dental professionals and oral health services. They mostly deal with dental pathology which occurs more frequently in the elderly (due to previous treatment throughout the years) and complex medical needs specific for this population.

The majority of the elderly patients are treated similarly to younger ones, including complex treatments such as endodontic treatment, prosthetic rehabilitation and dental implants. However, 10 – 14% of the elderly (depending on source) are defined as frail or as the elderly with disabilities [3–5]. Frailty has been defined as a dynamic state affecting an individual who experiences loss of one, or more than one domain of human functioning (physical, psychological, social), caused by the influence of a

range of variables increasing the risk of adverse outcomes [6]. Disability is defined differently, but with similar outcome. People with disability experience negative aspects of interaction between their environmental and personal context as well as any functional impairments, activity limitations and participation restrictions that they may present [7]. Mostly, the elderly with disabilities experience difficulties with mobility, as a consequence of osteoporosis, osteoarthritis or stroke. Also, disabilities are also consequences of eyesight or hearing impairment and dementia. Guidelines for treating patients affected by the listed conditions provide useful overviews for dental teams. Older patients with frailty or other disabilities may hold different attitudes towards dental care [1], and therefore need to be assessed in a comprehensive and holistic manner.

Table 1. Assessment of oral care and treatment planning for the elderly with disabilities
Tabela 1. Procena oralne nege i planiranja tretmana za starije osobe sa invaliditetom

		Level of dependency/Nivo zavisnosti		
		Low/Nizak	Medium/Srednji	High/Visok
Assessment Procena	Identify cause of increasing dependency (stroke, polypharmacy, dementia) <i>Identifikovati uzrok rastuće zavisnosti (moždani udar, polifarmacija, demencija)</i>		Consult other medical specialists to assess health risks, generally <i>Konsultovati se sa ostalim medicinskim specijalistima u opštoj proceni zdravstvenog rizika</i>	Identify patients' physical, cognitive and social barriers to emergency palliative and elective oral care <i>Ustanoviti fizičke, kognitivne i socijalne barijere pacijenata za pružanje hitne, palijativne i elektivne oralne nege</i>
			Reassess oral health-related prevention <i>Ponovo proceniti prevenciju povezanu sa oralnim zdravljem</i>	Monitor the burden of oral care on the patient and health professionals <i>Pratiti teškoće u oralnoj nezi pacijenta i negovatelja</i>
Treatment Tretman	Identify, repair or replace strategically important teeth guided by the principle of the 'shortened dental arch', with or without implants <i>Identifikovati, popraviti ili nadoknaditi strateški značajne zube vodeći se principom skraćenog dentalnog luka, sa implantatima ili bez njih</i>		Repair and maintain strategically important teeth with conservative treatment (i. e., atraumatic restorative technique with fluoridated glass-ionomer materials), and design oral prostheses to simplify oral hygiene and prevent infection <i>Popraviti i održavati strateški značajne zube konzervativnim tretmanima (npr. atraumatska restaurativna tehnika sa glas-jonomer cementom sa fluoridom) i planirati dizajn proteza na način koji olakšava oralnu higijenu i prevenira infekciju</i>	Palliative treatment on demand from the patient to control pain and infection and maintain social contacts and activities <i>Palijativni tretman na zahtev pacijenta zbog kontrole bola i infekcije kao i održavanja socijalnih kontakata i aktivnosti</i>
		Plan ongoing maintenance, including restorative and surgical treatment, in order to maintain function and prevent or control infection and pain <i>Planiranje daljeg održavanja oralnog zdravlja uključujući restorativne i hirurške tretmane radi održavanja funkcije i prevencije ili kontrole infekcije i bola</i>	Use prosthodontic attachments between overdentures and abutment teeth or dental implants to simplify hygiene and maintenance <i>Korišćenje atačmena u kompleksnom radu na zubima nosačima ili implantatima kako bi se pojednostavila higijena i održavanje</i>	

The purpose of this review was to discuss current literature data regarding oral health of patients with frailty or other disabilities and to list available preventive, prophylactic and dental treatment guidelines.

Material and Methods

A PubMed search, using combinations of keywords related to oral health care of the elderly with disabilities and dental treatment, was performed. All articles with available full texts were analyzed and divided in two large groups: preventive procedures and dental treatment procedures. Also, the authors contributed their experience in implementing preventive and therapeutic measures in the elderly people with disabilities.

Oral health problems of the elderly with disabilities

Two main factors influence the oral health: multimorbidity and polypharmacy [8, 9]. Multimorbidity is defined as the presence of two or more chronic conditions including mental health problems and chronic pain. The prevalence of multimorbidity is significant in the older population, affecting more than 60% of those aged 65–84 and 81% of those aged 85 and above [1, 9]. It points to the need to gather information from the relevant healthcare teams treating such patients and to cautiously consider approaches to treatment provision.

Due to the coexistence of multiple long-term conditions, an increasing number of patients experience polypharmacy; 44% of patients over 65 are taking 5 or more medications and 12% are taking 10 or more medications [2, 5, 10]. Multiple medications can influence both dental health and the oral health care delivery. Medications, such as bisphosphonates and anticoagulants, commonly impact the safety of dental treatment, including tooth extractions and small surgical treatments. Some medications, such as decongestants, antidepressants, antipsychotics and antihypertensive drugs may cause xerostomia. Further, xerostomia causes problems such as dysphagia, taste loss, and oral pain. It also increases the risk of dental caries and oral infections. Some studies reported synergistic effects of multiple xerostomia medications in the elderly patients taking multiple medications [10].

Oral health problems which are expected in this population are tooth wear, tooth fractures, root caries, periodontitis and problems with wearing removable dentures due to Candida induced stomatitis. Oral diseases are progressive and cumulative due to additional complex factors, such as difficulties with mobility, polypharmacy, chronic diseases and cognitive impairment [4, 5]. Over 90% of the elderly have periodontitis and in frail and ones with disabilities it happens in almost in 100% [11], especially in those who neglect oral hygiene at younger age. As they become frail, their oral health rapidly deteriorates. Dental problems in older people are a

common cause of speech impairment, eating difficulties, and pain. Tooth loss, poorly fitting dentures and oral infections can result in poor nutrition because it can affect appetite, food enjoyment and ability to chew.

Just like poor general health and above listed conditions have an impact on the oral health, poor oral health is linked to increased risk of some potentially fatal conditions. It has been proven that oral diseases may cause cardiovascular diseases, stroke and aspiration pneumonia. Also, chronic oral infection can complicate the medical management of diabetes, chronic heart failure, and respiratory diseases [12].

Oral health assessment and treatment guidelines

The ultimate aim for the elderly patients is to retain a pain-free functional dentition, while managing the risk of future diseases. Assessment of oral health should be comprehensive and treatment planning carefully conducted having in mind general health, medications, level of disability, cognitive impairment, access to dental services and capacity of caregivers.

The Seattle Care Pathway is a very useful health care program which contains guidelines for treatment planning (**Table 1**) [5, 13]. This concept divides older patients into 5 categories based on the level of their dependency. The first two categories will not be discussed here, since they are aimed for older people without disabilities, labeled as “no dependency” and “pre-dependency”. “Low dependency” is the next category, which includes people with identified chronic conditions that affect oral health, but who currently receive oral treatment or do not require help to access dental services or to maintain oral health. These patients are not really dependent, but their disease symptoms are affecting them (Porter, 2015). “Medium dependency” includes people with an identified chronic condition that currently impacts their oral health. This category includes patients who demand to be seen at home or at a nursing home, or who need transportation to a dental office. “High dependency” includes people who have complex medical problems affecting their mobility preventing them from moving to receive dental care at a dental office. They differ from patients categorized as medium dependent because they cannot be moved and must be seen at home or the nursing home.

Generally, in those with higher dependence (or more significant comorbidities or frailty), active invasive dental treatment becomes less appropriate and it may interfere with medical and social factors. When a patient is experiencing pain or infection, an intervention is certainly necessary. For asymptomatic older individuals, the balance of risk and benefit of changes must be assessed, while full mouth reconstruction is often not feasible. As the dependency grows, the treatment should be less invasive and palliative, but that does not mean that basic dental treatment options should not be considered for the

elderly who can come to a dental office with the caregiver's help, especially those without cognitive impairment.

Specificities of dental treatment for the elderly with dementia

There are some specific considerations in the elderly with dementia. The rate of dementia progression is unpredictable and there can be benefits in providing proactive dental disease management to prevent need for intervention at a later, more advanced stage of the disease, when the risks of treatment may be greater.

At the early stages, it is important to undertake an oral health risk assessment and plan preventive strategies on mitigating the future risk. For example, assess the oral hygiene, risks of different medications and impact of xerostomia [14, 15]. At this stage, most types of dental care are still possible. The dentist should plan the treatment, keeping in mind that the person will eventually be unable to carry out hygiene procedures. Factors to consider in oral health assessment at this stage are:

- Caries risks – number of exposed root surfaces, xerostomia, diet and nutrition, oral hygiene;
- Periodontal disease risks: presence of active disease, diabetes, smoking;
- Manual dexterity;
- Dependency: family member or residential care;
- Drugs and comorbidities such as Parkinson's disease and diabetes.

The elderly with early dementia may be best treated in general dental practice and it can be highly beneficial for detection of early cognitive changes and get used to them during treatment. Patients will be more relaxed in a familiar environment and with a dentist with whom relationship of trust has been established. Rigorous preventive measures are highly recommended in order to prevent further gum disease and restorative treatment should be high quality and low maintenance. Key teeth should be identified and restored such as canines, molars and occluding pairs [15, 16]. Prosthetic treatment such as crowns, bridges and implants should be considered only if someone is prepared to carry out daily brushing for that person at a stage when they cannot do this for themselves. Shortened dental arch can be the aim, to secure adequate function and nutrition. If patients become edentulous, consideration may be given to two-implant retained overdentures [14, 16].

The middle stage dementia implies cognitive decline and sometimes alterations in behavior such as agitation and aggression. The focus of treatment is likely to be on prevention of further dental disease, from restoration to maintenance. The decision on the type of treatment should be based on the ability to cooperate, dental treatment needs, general health and social support. As dementia progresses, comprehensive clinical and radiographic examination can be difficult and pain identification can be particularly challenging [14].

At a later stage, the patients may lose the ability to clean their teeth, may stop understanding that their teeth need to be kept clean or may lose interest in doing so. Health care professionals may need to take over this task. At this stage, treatment focuses on prevention of dental disease, maintaining oral comfort and provision of emergency treatment if needed. Dental interventions should be as non-invasive as possible, for examples Carisolv gel for caries removal, atraumatic restorative techniques such as glass-ionomer cement restorations and preventive measures. In advanced dementia, the decline in cognition can lead to limited cooperation for treatment under local anesthesia, and dental team needs to consider use of anesthetist-led sedation or general anesthesia for treatment of pain or infection [17–20].

Preventive measures

Preventive treatment is crucial for oral diseases risk reduction. It is important for the elderly with minor disabilities, but also for those with high dependency and for residents of nursing homes. Preventive measures include treatment at the dental office, but also recommendations for care givers [21–23]. Recommendations for oral health of the elderly with disabilities are:

- Toothbrush every morning and every evening, the toothbrush should be soft, the tongue should be cleaned as well, and the tooth paste should be with a high concentration of fluoride (5000 ppm);
- Antibacterial product after lunch (mouth rinses etc.);
- Cut sugar intake down;
- Keep mouth moist; Lip balm should be water-based and not petroleum-based because of the risks for aspiration pneumonia and in the elderly with disability who use oxygen.
- Denture cleaning should be done using a special brush, better with a liquid soap than with toothpaste because it can be very abrasive. Patients should not wear removable dentures over night. Denture disinfection is recommended once a week with sodium-hypochlorite or chlorhexidine. Chlorhexidine is a safer option since it can be used both for acrylic dentures alone or acrylic dentures with metal frameworks. Sodium-hypochlorite can cause metal components to corrode. Denture tablets are also suitable, although instructions must be read to see recommendations for dentures with metal frameworks. It should be taken into consideration that denture tablets often contain persulfate which can cause severe allergic reaction.

It is obvious that for a certain number of older people with disabilities oral care on daily basis is conducted by caregivers, especially for those in nursing homes and those with dementia. However, caregivers mostly have insufficient knowledge about the importance of oral health and oral care. A study conducted in [22] residential homes in Serbia showed that most caregivers had no formal medical education (70.7%). Only one third (36.2%) of them

passed some training or courses related to prevention of oral diseases, and 78% considered them useful in practice. Most caregivers learned oral hygiene techniques from their colleagues (41.4%). When asked to evaluate the level of residents' oral health, 69% of them thought it was low or very low, which was proved by clinical examination by dental professionals. Lack of time of caregivers was indicated to be the main barrier of oral hygiene maintenance, since most of the caregivers (84.5%) were responsible for over 20 residents. It is obvious that comprehensive strategy for improving oral health of the elderly with disabilities is needed in Serbia, and education of caregivers in residential homes may be the first step of improvement.

Prosthodontic treatment

Some elderly with disabilities are suitable to receive a full range of dental procedures, including prosthodontic treatment. This mostly refers to the elderly with movement disability, who can visit the dental office with a caregiver, who can give informed consent for treatment and who have previous positive experience with prosthodontic treatment. However, some patients may be more likely to experience diseases or poorer oral hygiene which may contraindicate specific treatments and that should be taken into consideration. Due to the risk of intervention as opposed to the complexity itself, there must be a clear justification for providing complex treatment or using complex approaches. Therefore, even in patients who can receive prosthodontic treatment, it should be minimally invasive, simple and with low maintenance demands to be sure that the caregivers can take over all oral hygiene procedures at later stages of the disease, if necessary [23].

As stated previously, maintaining shortened dental arch can provide secure mastication and nutrition, if there are enough occluding pairs of teeth (more than 8 in total). Therefore, the replacement of a full dental arch is not necessary and may outweigh the positive risk-benefit ratio [24]. In edentulous patients, two implants with overdenture can be a good solution in those without cognitive impairment and without contraindications for surgical treatment such as anti-angiogenic or anticoagulant medications, osteoporosis and patients who received radiation.

In cases when the existing dentures must be replaced, it should be done with minimum visits and adaptation problems. In that respect, denture copy technique is very useful. It is done when patients have old dentures, which no longer fit well, move a lot during mastication, make ulcers on mucosa and therefore elicit both nutrition problems and psychological problems. The copy technique is a production of new dentures, as accurate as possible, but with changes to aspects which cause problems to patients. In the copy technique procedure, the existing dentures are used as an individual tray, with wax rims and for teeth set up. One of the greatest advantages is the reduction of clinical phases. The original meth-

od implies first phase as clinical examination and duplication of the existing denture. This copy denture is then modified by removing denture teeth and by placement of wax rims, and that modified denture copy is further used for functional impression and records of inter-maxillary relationship. However, this standard procedure can be even shorter in patients with disabilities; the existing dentures can be used as an individual tray and wax rims without copying, only with modifications necessary for the following phases. Denture flanges that are too long due to alveolar ridge atrophy need to be shortened, sharp edges rounded and denture teeth removed in order to make wax rims. The use of a copy technique is proved to reduce complications and to shorten the adaptation period for new dentures [2, 11].

In patients with low dependency and without cognitive impairment, removable partial dentures with double crowns may be a good solution. Older patients often have only few teeth left, but sometimes the remaining teeth are of good biological value (canines and/or first molars). In that case, a conventional removable partial denture can be less suitable as a treatment option, because clasps fractures and low level of denture retention are frequent. The remaining teeth are usually extruded which elicits additional difficulties in adjusting occlusion and well-fitting of a denture. Dentures retained by double crowns ensure reliable retention, stability, and better distribution of occlusal forces than conventional partial removable dentures. Due to a good retention, double crown-retained dentures are comfortable for patients and may be very long-standing [25]. However, in patients with disabilities, some new materials should be taken into consideration, such as zirconia for inner and outer crowns. They can be manufactured quickly and with great precision. For the outer crown and a removable partial denture, polymers such as polyoxymethylene may be suitable, because such dentures are metal-free, light in weight, with good retentive properties to metal alloys and zirconia, low cost and manufactured quickly.

In patients with old fixed restorations with evidence that the existing crowns cause the periodontal disease, worsen gum inflammation, elicit tooth sensitivity due to gum retraction, the clinician may decide to remove the restoration. The main reason for the removal of the existing fixed denture is prevention of further gum destruction and repercussions on general health. If the level of dependency is low or medium, old fixed restoration can be taken off quickly under local anesthesia, but the clinician might be worried whether a patient can withstand complex clinical procedures with a new fixed partial denture. In such cases, some materials for temporary restorations can be taken into consideration. Improvements have been made in temporary materials in terms of a resistance to occlusal forces and increased durability. Such materials are mostly a combination of acrylic resin and composite materials, and can be produced in a dental laboratory using conventional techniques or a computer-aided design/computer-

aided manufacturing technology. The main advantages of such materials are in their low cost and fast production. Their durability can be up to one year, but even more, especially when antagonistic teeth are removable partial or complete dentures.

Treatments feasible in older patients with greater dependency are those that aim to improve the existing fixed or removable dentures, such as denture relining, occlusal adjustments, teeth replacement and clasp replacement or activation [12, 15, 26]. The manufacture of a new denture is not recommended, and treatment is based on rigorous preventive measures and emergency interventions in cases of infection and pain.

Conclusion

The safety and suitability of dental treatment varies to a great extent in the elderly. Some older people with disabilities are able to entirely receive a routine dental treatment. Others, with a more complex medical background, reduced cognitive status and cooperation, may not be suitable for dental/oral rehabilitation. A decision not to perform any treatment can be entirely appropriate. In all treatment options, risks and benefits should be carefully weighed to ensure the safety of patients during any treatment.

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