

INTERDISCIPLINARY MANAGEMENT OF PATIENTS WITH DENTAL PATHOLOGY USING THE METHOD OF TELEMEDICINE: CASE REPORT

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Our duty, as doctors, is to offer to our patients the best possible solutions at the moment. However, there are moments when we are ready and willing to offer the best, but because of the circumstances, we are unable to do that. This paper describes the possibility of effectuating consultation with our remote colleagues. The process has been termed teleconsultation and it has been made possible by the advent and development of new information and telecommunication technologies. The paper describes three of our cases which could best demonstrate the operation of the process of telemedicine in routine dentistry practice. Telemedicine consultation in the field of management of patients with dental pathologies is a rapid, effective, and reliable method of resolving therapeutic doubts and confirmation of management decisions. *Acta Medica Medianae* 2012;51(1):49-55.

Key words: telemedicine, XPA3 Online, teeth, prosthesis, dentistry

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Introduction

Our duty, as doctors, is to offer to our patients the best possible solutions at the moment. However, there are moments when we are ready and willing to offer the best, but because of the circumstances, we are unable to do that. Perhaps the most important adverse treatment consequences result from wrong diagnosis and wrong and improperly conducted treatment. Even though the intention is good, errors are not uncommon, being the result of uncertainties and omissions.

Our attitude is that doctors should not be blamed for such mistakes, but our firm opinion is also that they should be helped so that these faults could be minimized and eradicated. It is a known fact that if we focus on a problem, we often fail to notice many other things, though they are very transparent; however, our conceit often prevents us to realize and admit that even to ourselves. We can here present an event witnessed by one of the authors: a colleague has admitted a patient with an already placed intraosseous implant for the placement of a suprastructure. An unusual angle of the implant

required careful consideration as to the prosthetic suprastructure solution. A team of several experts gave their opinion inspecting the intraoral situation and a retroalveolar x-ray. The solution was found in the use of a special abutment and the management plan was devised. However, in the last moment, one of the colleagues noticed an impacted tooth, the crown of which was partly shown in the image; without its being surgically extracted the whole implantation management would have been impossible. What would have happened if the suprastructure was made and then removed because of the surgery of impacted tooth? What would have been the patient's reaction? And all that was yet simple. Just imagine how many patients have lost their vital organs or organ parts because of their doctors' mistakes. How many have been handicapped and how many dead?

On the one hand, we are doctors – those who observe, decide, and sometimes notice and sometimes don't. On the other hand, we are also patients (or our parents, brothers and sisters, children). Should the conceit of medical professionals overpower the reason and truth? It has been said long ago that only after we notice the log in our own eye, we should look at the speck in someone else's eye (1).

The duty of all of us is therefore to seek a second opinion even in clear situations, let alone in dubious ones. The more eyes, the better to see. Any advice from an experienced colleague cannot be redundant. Consultation with peers or interspecialist consultation seems to be the

solution to many clinical problems. The purpose of this paper is to inform the interested public about the possibility of rapid consultation with remote colleagues. The process is termed teleconsultation and it has been made possible by the advancement of information and telecommunication technologies, mainly the Internet, mobile telephony, digital photography, and electronic documentation services. A doctor is nowadays able to contact another doctor at a distance and ask for advice and suggestions, informing the consultation response by binary transmission of complete patient history, clinical examination findings, and other information. That is the essence of telemedicine.

The World Health Organization (WHO) has defined telemedicine as a way of provision of health care service, using telecommunication and information technologies, regardless of the geographical location of the health care provider, patient, medical information or equipment (2). Telemedicine is a means of transmission of medical data from one place to another, using up-to-date telecommunication and information technologies, enabling health care provision regardless of the physical location of doctors and their patients. It is, in fact, icing on the cake, related to the medical information systems constituting its infrastructure. Telemedicine applications involve telediagnosis, teleconsultation, telemonitoring, telecare, telecouncils, and remote access to information stored in one or several data bases.

The concept of remote health care provision brings us back to the beginning of the 20th century, when the first attempts were made to establish diagnosis from a distance using the transmission of information containing heart beat and pulmonary function. Even earlier, there had been attempts to utilize telemedicine, but with the courier as an intermediary and not by phone. In the modern sense of the word, telemedicine appeared first in 1948, when the transmission of x-rays took place via the phone lines connecting West Chester and Philadelphia, Pennsylvania, USA, at a distance of 24 miles. During the 1980s, telemedicine extended to involve surgery, especially in the area of live broadcasting of surgical interventions (3,4).

Significant reduction of the price of information technology equipment, rapid growth of telecommunication technologies, and enormous growth of the Internet, have revolutionized economics, media, arts, medical sciences, and dentistry as well. Diagnosis, consultations, and continued education of students, doctors, support personnel, as well as research, administration, management, planning, and improvement of population health have got a new and powerful tool in teledentistry (5).

The establishment of the Center for Teledentistry at the Faculty of Medicine in Priština – Kosovska Mitrovica, and development of the

central telemedicine server XPA3 Online (Milan Miladinović, Niš, Srbija) have made possible the co-operation and teleconsultation of different specialist teams from Serbia, Republic of Srpska (BiH), and Montenegro.

The work on the above system is based on the access to Internet. A doctor who is seeking a consultation collects clinical and anamnestic information about the patient, takes digital photographs, targeted x-rays and ortopan-tomograms, and logging in to the system site stores the information on the central server. After that, he chooses the available teleconsultants and determines the level of urgency (from low, normal, to urgent consultation). The central server via the SMS informs the selected teleconsultants about the received request. Teleconsultants log in to the system via their PCs or smartphones, and give their opinion about the best way to solve the presented problem. The system informs the requesting doctor about the received responses, enabling, if necessary, even direct contacts with teleconsultants (6).

The report of the following cases should demonstrate in the best way the operation of the system in routine dentistry practice.

Case 1

A female patient, aged 33 years, visited the Department of Prosthetics, Dentistry Clinic, Faculty of Medicine in Priština – Kosovska Mitrovica, in order to resolve the problem of partial edentulousness in her right lateral upper jaw. The therapist noticed an unclear status of the second premolar in the region, which was evidently ablated in the preparation for prosthetic replacement, but also with clear signs of dentine destruction and visible suprastructure over the entire dental crown. In the available x-ray, ortopan, the situation was not clear enough, so the therapist sought interdisciplinary teleconsultation support: the opinion of an endodontist about the possibility of revision, and the opinion of an oral surgeon about subsequent resection of the dental root tip. The therapist collected the available patient history data, wrote down his own clinical findings, took photographs of the present situation in the mouth, and attached the x-ray. Via the Center for Telemedicine, Faculty of Medicine in Priština – Kosovska Mitrovica, these documents, in electronic form, were transferred to the central server www.xpa3.com, together with the request for teleconsultation with the mentioned specialists (Figure 1). In the requested period of time of 24 hours, three out of five contacted teleconsultants gave their opinions. The first one, endodontist, suggested tooth extraction because of the assessment of possible treatment failure in the primary or any later phase, risking in that regard the entire prosthetic replacement.


Уважене колеге,

Молим Вас за помоћ и мишљење око одлучивања да ли зуба 15 укључити у мост или га екстрахирати. Пацијент не зна када је и где урађена надоградња на том зубу. Нема болова или других симптома.


Унапред захвалан

ФАЈЛОВИ КОЈИ ПРАТЕ ЗАХТЕВ

1 **Информације о снимку**
Зуб 14 је скоро извађен



2 **Информације о снимку**



3 **Информације о снимку**
Зуб 14 је скоро извађен




Figure 1. Teleconsultation request considers the treatment of the tooth 15 and its inclusion in the dental prosthetic replacement

Case 2

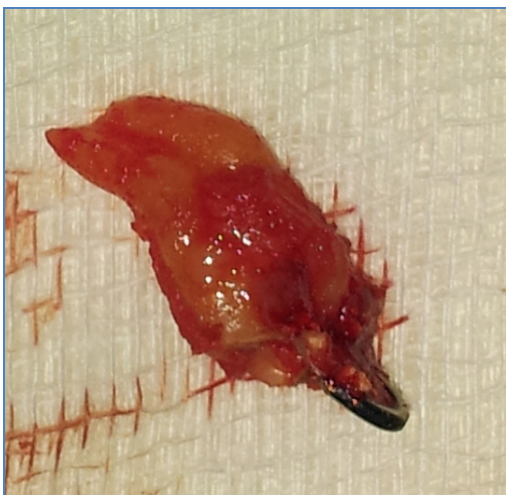


Figure 2. Tooth 15, the object of teleconsultation, after extraction

A female patient aged 59 years visited the Department of Oral surgery, Dentistry Clinic, Faculty of Medicine in Priština – Kosovska Mitrovica, with pain in the region of 33 tooth. Clinical examination revealed the presence of fixed prosthetic replacement (bridge) in the region from 35 to 43, with abutments 31, 33, 41, 42, and two appendices medially and distally. The fornix region of tooth 33 was painful on palpation and red, indicating the presence of infection. It was established anamnestically that the bridge was less than a year old. Orthopantomography showed periapical lesions in the regions of 41 and 31 teeth, as well as retained tooth roots in the regions of 42 and 33. The therapist encountered the bridge fabricated without any regard to the basic principles of statics and dynamics of such bridges (Figure 3).

However, in order to avoid possible mistakes, the therapist decided to request subspecialist consultation regarding the possibility of preserving the existent prosthetic work, consulting the specialists in oral surgery, endodontics, and dental prosthetics via the Teledentistry Center in Priština – Kosovska Mitrovica. Digital intraoral photographs were taken at different angles and aspects, and the ortopantomogram was digitalized. After accessing the Internet and opening the domain www.xpa3.com, authentication and authorization was performed, and a new teleconsultation request was opened. The system immediately informed relevant teleconsultants, who had 24 hours to respond and give their opinions and suggestions. The teleconsultants sent their responses in time.

All of the teleconsultants thought that the removal of the old prosthetic replacement was necessary, with the extraction of the remaining teeth and appropriate prosthetic management of the patient. One of them suggested that perhaps one of the central incisors could be temporarily kept in place for the purpose of fixation of an acrylate prosthesis, if that would be the chosen prosthetic solution. After careful consideration of the received responses, the therapist decided to

remove the bridge and extract all the teeth under the prosthesis.

Case 3

A male, 61 years old patient was referred by a specialist in skin diseases to the Department of Oral Surgery, Dentistry Clinic, Faculty of Medicine in Priština – Kosovska Mitrovica. The referral reason was a possible dentogenous cause of alopecia areata barbae. The patient was clinically examined and an ortopantomogram was taken. It was noticed at once that tooth 12 had a parodontal abscess and that it was loose. Tooth 12 was extracted, and teeth 17 and 11 were declared suspicious by the therapist; the teeth could be associated with periapical changes according to the ortopantomogram, in spite of the reaction to the vitality test. Poor dental hygiene was conspicuous, with larger amounts of hard deposits on almost all teeth. The therapist uploaded all the available information and sent a teleconsultation request via the system at www.xpa3.com, requesting the consultation of specialists in oral surgery, oral medicine and parodontology, endodontics, dermatovenerology, and maxillofacial surgery (Figure 4).

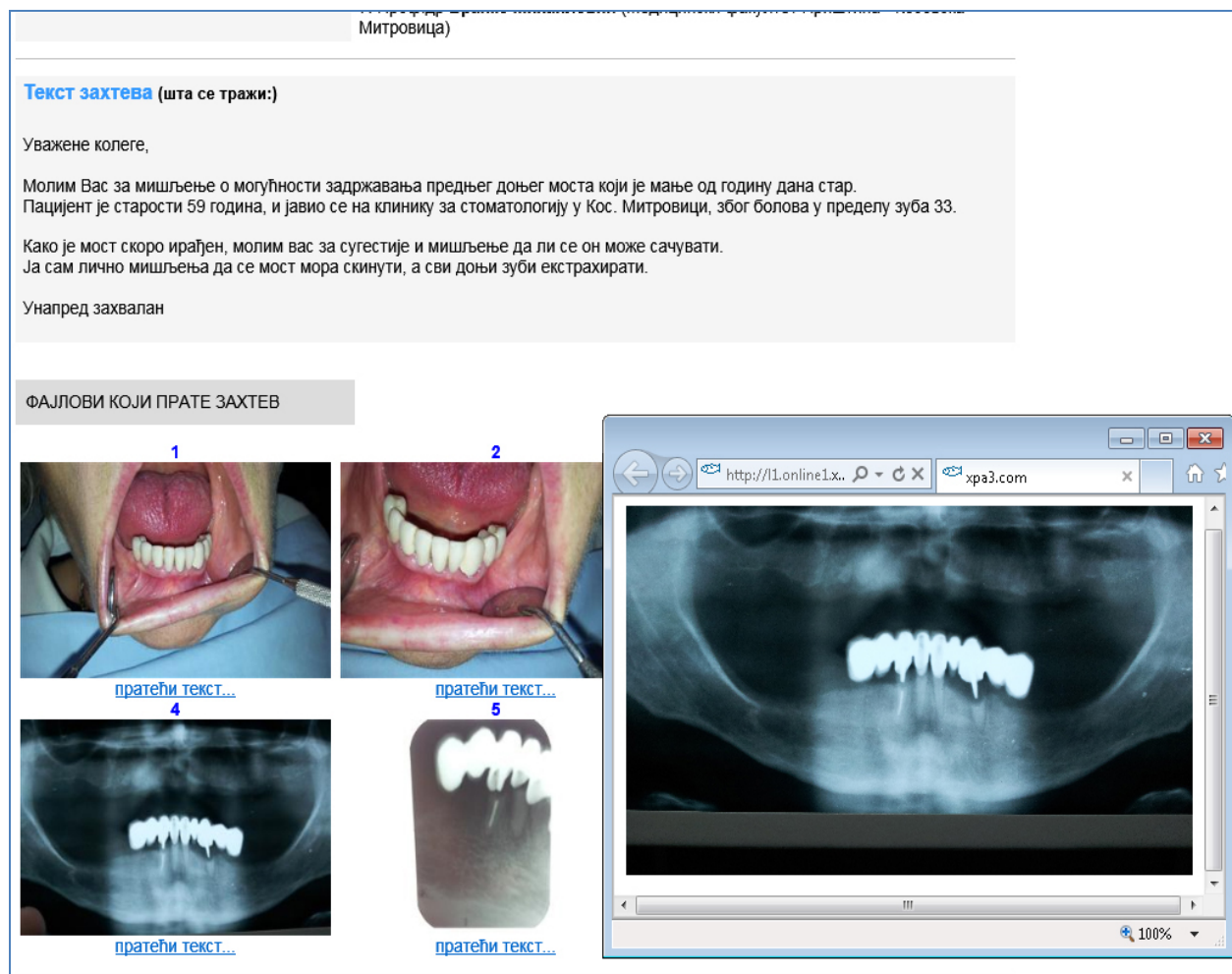


Figure 3. If the basic principles of dental prosthetics have not been abided by, one year is too long a period for this expensive bridge to endure.

Пацијент је послат од кожног лекара коме се јавио због "опадања длака са дела браде".

Као претпоставку узрока алопеције од стране жаришта у устима, урадио сам ортопан и одамах извадио зуб 12.

Сматрам да се треба извадити и 17, док мије зуб 11 сумњив на радикуларну цисту. Овај зуб је електротестом показао виталност на праг надражаја индекса 5.

Молим Вас за мишљење

Уз велику захвалност
Др Миладиновић

ФАЈЛОВИ КОЈИ ПРАТЕ ЗАХТЕВ



Figure 4 – Interdisciplinary consultation – oral surgeon, endodontist, parodontologist, and maxillofacial surgeon, under the guidance of dermatovenerologist.

The received responses were detailed, to the point, and in accord with one another. The dentists gave a unanimous reply: all avital teeth should be extracted, all concretions should be removed, and the patient should be referred back to his dermatovenerologist; in case of further problems, possible tonsillar or nasopharyngeal chronic processes should be sought (by maxillofacial surgeons). The dermatovenerologist gave the advice that as soon as the patient was dentally managed, he was to return for dermatovenerological treatment; he also suggested the treatment usually administered for such cases. Based on the received opinions, retroalveolar x-ray of the tooth 12 and tested vitality of all teeth, the therapist decided to extract the tooth 17, referred the patient to the Department of Oral Medicine and Parodontology, and then returned the patient to the dermatovenerologist.

Discussion

The report of case 1 demonstrated all the advantages of teleconsultation: speed, cost-effectivity, simplicity, and maximum therapeutic gain (7). The patient was spared the troubles of going to endodontist and the unnecessary treatment attempts. Tooth extraction was immediately suggested as the safest and best long-term solution, which proved quite correct. The extracted tooth could not be endo-dontically managed, and inclusion in the bridge in that condition carried the risk of subsequent problems with the tooth, i.e. the bridge removal.

The question in this teleconsultation was reasonable, expressing an almost everyday dilemma in the weighing of conservative against radical approaches in these and similar clinical problems. The teleconsultants confirmed the severity and seriousness of the dilemma – two

out of three opted for extraction rather than possible re-treatment. All the consultants understood the clinical problem, involved medical risks, and social background associated with several considered theoretical solutions. They also offered some prosthetic solutions. A very rapid feedback to this teleconsultation request helped significantly the therapist in his decision-making, indicating that this form of consultation was obviously purposeful and effective in routine dentistry practice.

The clinical problem presented in case 2 was all the time associated with the social background; although the therapist requiring consultation was acknowledged with and supported the radical approach, he wanted to get the confirmation of his decision, since the solution was associated with an investment by the patient in a new prosthetic replacement in a year or so (8). This teleconsultation could serve as a typical example of the usefulness of such form of communication and co-operation, helping the therapist to explain his decision to the patient (rather unexpected, in this case). The consultation did not deal with the cause of the problem (after a year of complex and expensive prosthetic work), but the general consensus of all consultants supported the therapist in his initial evaluation.

The report of case 3 described the teleconsultation that developed after the question being asked, depicting in the best way the essence and purpose of telemedicine. Comprehensive, detailed discussions, reasonable suggestions, considering the problem from the point of view of several specialties, were done in a very short period of time, revealing a complex problem. The results of such a form of communication prove that further growth and development of the telemedicine project is fully justified.

A real problem was resolved in accordance with the teleconsultant suggestions, and the results were monitored and validated, keeping the consultants informed in real time. Alopecia areata itself represents a heterogenous clinical syndrome of non-scarring alopecia, occurring in genetically predisposed individuals. Clinically, alopecia is a complete hair loss from a spot or several round, clearly delineated spots on the scalp or face (alopecia barbae). If the process progresses, the spots may coalesce. In more severe cases hair loss can be total or universal. Although rare, alopecia can be a diffuse process from the start (8). The etiology of alopecia areata has not been sufficiently elucidated, but many cases occurred after a severe emotional stress. Earlier, all the disease cases had been investigated in relation to the supposed foci, such as dental foci, chronic tonsillitis and sinusitis (9). Since the treatment of the condition involves the focus management, the reported teleconsultation demonstrates an appropriate interspecialist help of all branches of dentistry involved with the pathology, but also a constant surveillance and management by the principal specialty – dermatovenerology in this case.

Conclusion

Telemedicine consultation, the purpose of which is management of the patients with dental pathology, is a rapid, effective, high quality, and a reliable method of resolving clinical doubts of a therapist, but it can also confirm his firm decisions. Telemedicine consultation should enter everyday clinical practice and become a routine tool in almost all disciplines of medicine, aiming to prevent doctors' mistakes, to improve general health care, and improve cost-effectiveness of treatment.

This paper has been created and published in the name of our Lord and our Savior Jesus Christ.

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INTERDISCIPLINARNO ZBRINJAVANJE PACIJENATA SA STOMATOLOŠKOM PATOLOGIJOM METODOM TELEMEDICINE - PRIKAZ BOLESNIKA

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Dužnost nas lekara je da pacijentu pružimo najviše što možemo u datom trenutku. Međutim, postoje trenuci kada mi želimo i hoćemo da pacijentu pružimo najviše, ali zbog niza uticaja nismo to u stanju da uradimo. Ono o čemu želimo da vas upoznamo ovim radom jeste mogućnost da u kratkom roku ostvarite konsultaciju sa kolegom koji je udaljen od vas. Takav proces zove se telekonsultacija i omogućen je napretkom informacionih i telekomunikacionih tehnologija. U radu su prikazana tri slučaja koji će na najbolji način pokazati funkcionisanje telemedicinskog procesa u svakodnevnoj stomatološkoj praksi. Telemedicinska konsultacija sprovedena u cilju zbrinjavanja pacijenata sa stomatološkom patologijom predstavlja brz, efikasan, kvalitetan i pouzdan metod za rešavanje neodumica terapeuta, ali i potvrdu njegovih sigurnih stavova. *Acta Medica Medianae 2012;51(1):49-55.*

Ključne reči: telemedicina, XPA3 Online, zubi, proteza, stomatologija