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Case report

Teleconsultation in Dentistry Using the XPA3 Online System: Case Report

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SUMMARY

Telemedicine represents interactive audio-visual communication between doctors and their patients. The Center for Telemedicine in Kosovska Mitrovica organizes and manages the process of teleconsultation using the computer-medical system XPA3 Online. This paper explains the procedure of posting teleconsultation requests by doctors, consultation seekers, and the procedure of responding to teleconsultation requests by doctors who provide consultation. Two practical cases were reported, where interspecialist dentistry teleconsultation was effectuated. In both cases, the patients were successfully managed after effectuated consultations, without being referred to other dentistry specialists for examination and advice. The XPA3 Online teleconsultation system is a convenient and comfortable way for rapid and high quality management of dentistry patients.

Key words: telemedicine, XPA3 Online, teeth, dentistry, oral surgery

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INTRODUCTION

Telemedicine represents interactive audio-visual (multimedial) communication between medical professionals from one institution and their patients, and/or other remote health care institution using a system able to provide simple and rapid work, with the aim to get/ give advice, to make correct diagnosis, and exchange relevant information, regardless of geographical distances (1). Modern Internet communication represents the most convenient, most widespread, and cheapest telecommunication service for data/information transmission in telemedicine consultation (2). The Center for Telemedicine of the Faculty of Medicine, University of Priština - Kosovska Mitrovica manages and co-ordinates telemedicine consultations at the national level, enabling peer-to-peer consultations among specialists in the same or different fields of expertise (interspecialist consultation). The Center makes use of the XPA3 Online application telemedicine system and a central telemedicine server. The XPA3 Online transmits, stores, and processes audio-visual data: images, video recordings, electronic documents, digital patient histories, and other relevant digital medical information.

The Center for Telemedicine of the Faculty of Medicine in Priština - temporarily seated in Kosovska Mitrovica engages prestigious teleconsultants - teachers and specialists in various fields from Serbia, the Republic of Serbska (BiH), and Montenegro, who are able to offer effective help to remote peers, consultation seekers, and patients requiring medical help. The possibility of remote consultation carries so much advantages regarding routine clinical work, that it will soon be impossible to imagine health care without it.

From the practical point of view, this means that:

- when a doctor has doubts, unclear, or complicated clinical situations, or a case requiring multidisciplinary approach,
- when a doctor wants to get the confirmation of his own decision to be on the safe side and prevent clinical faults,
- when a doctor is less experienced and needs a guidance in a particular clinical situation,
- when a doctor is physically isolated and cannot organize patient transport (immobile patients, natural catastrophes, states of emergency, wars, etc.),
- when a doctor has a patient with special needs, he/ she is able to form, via the Internet, an electronic teleconsultation request in this Center and get rapid and high quality expert help in the form of advice, recommendation, suggestion, or guidance through a diagnostic/therapeutic procedure.

It is worthwhile mentioning that this help is effectuated free of any charge-teleconsultants do not charge for their work and do not have any material gain from their services. Regardless of that, they contribute with their expertise in a rapid and comprehensive way, engaging in a moment of time all their knowledge and experience.

The paper will introduce the readers into the procedure of posting a teleconsultation request, in case they need one, via the Center for Telemedicine, Faculty of Medicine in Priština-Kosovska Mitrovica and the XPA3 Online telemedicine system. Examples of practical use of the system will be shown, too.

PROCEDURE OF TELECONSULTA-TION REQUEST

The principal role of the Center for Telemedicine is organization and education, and the process of requesting teleconsultation is based on the application service XPA3 Online (Figure 1). The system engages teleconsultants equipped with mobile phones with the full options of Internet browsing and searching (smartphones), or they are situated close to PCs with permanent Internet access. When a doctor needs a consultation, he accesses the Internet and logs on to the XPA3 Online system via the address www.xpa3.com. Using the access data (user ID and password) he logs on to the system and opens a new teleconsultation request. The first thing he enters is his patient's Unique Master Citizen Number. If the patient is new to the teleconsultation system, the doctor is required to enter the patient's full name and surname. After that, the teleconsultation request form can be filled in by the doctor; he enters the consultation title (a clear and short description of the request topic), chooses the level of urgency (low, normal, or urgent), and the expected time to teleconsultant response (from 30 minutes to several weeks). The doctor also chooses among the available teleconsultants, writes down the request itself with the problem description, describes the expected response, and available information such as clinical findings or patient history. The request is accompanied by attachments such as patient photographs, x-rays, video material, and other pertinent patient documentation. The request is thus completed and stored on the central server; the process of contacting teleconsultants may then commence (Figure 2). After receiving the request, the central server informs the chosen teleconsultants about the request via the SMS service or by phone (Figure 3). Regardless of their engagement at the moment, the teleconsultants are informed about the request. According to the level of urgancy and expected time to response, they can plan their consultation. Using the closest PC or a smartphone, they access the Internet, open the address www. xpa3.com, and log on to the system using their access data. One or more awaiting consultation requests they can open by a click on the request title. Then they can access everything the requester stored on the system: photographs, x-rays, other medical documentation. Based on the information they initiate their teleconsultation response, entering their opinion, advice, etc., storing it in the system. The system then informs the consultation requester via the SMS service or by an automated phone call about the received response. The requester is then able to access the system and read the teleconsultation response.



Figure 1 . Scheme of the operation of the Center for Telemedicine and the system XPA3 Online

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Tekct saxteBa (WTa Ce Tp Pacijent muskog pola R.J fakulteta u Pristini - Ku Pre sest meseci je kod p preoperativnog konzervat: tako da je definitivna og je uklonjena u celosti I preoperativni test vital: kontinuiteta apeksnog neu Sada se klinickim nalazov rasklacenosti, zub nije j Trenutni klinicki nalaz	ажи) se javio na Odelenje oralne hirurgije Klinike posvska mitrovica zbog pojave fistule od pre ne acijenta dijagnostifikovana cista maksile u pre ivnog tretmana kanala korena zuba 22 doslo je d oturacija kanala uradjena intraoperativano, nak ucinjena resekcija vrha korena zuba 22. Zub 21 iteta bio pozitivan, a intraoperativni nalaz ni iro-vaskularnog snopa. n evidentira prisustvo fistule u predelu zuba 2 perkutorno osetljiv, a pacijent nema subjektivn je upotpunjen sa radiogramima koje saljem u pri	za stomatologiju Medicinskog koliko dana u predelu zuba 22. delu zuba 22. Prilikom o zalamanja kanalnog instrumenta on vadjenja stranog tela. Cista nije reseciran jer je je ukazivao na prekid 2, ne postoje znakovi ih tegoba. logu.
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Figure 2. Text of the telemedicine request and attachment of relevant explanatory files



Figure 3. XPA3 Online on receiving the request by a doctor, consultation-seeker, informs the available remote consultants, engaged in unrelated activities and in different locations

CASE 1

A male patient aged 52 years presented to the Department for Dental Diseases, Dentistry Clinic, Faculty of Medicine in Priština - temporarily seated in Kosovska Mitrovica, with intraoral changes in the upper jaw fornix on the left side. On clinical examination clearly delineated mucosal growths were identified in the fornix area of the edentulous ridge of the left upper jaw. The patient complained about poorly fabricated mobile prosthesis, which "has not been well fitted from the start".

The therapist decided to seek teleconsultation with specialists in oral surgery because of the appearance of the pathologic lesion. Using the *XPA3 Online* system, a teleconsultation request was created and posted, including the anamnestic data, description of sub-

jective complaints, clinical finding, and new photographs (Figure 4). Requested teleconsultants were quickly informed, responding to the request in time (up to 24 hours) and confirming the diagnosis of *Epulis fissuratum*; they unanimously declared that the cause of hyperplastic mucosal changes was this poorly fabricated total prosthesis. The suggested therapy involved abstaining from wearing a total prosthesis for 14 to 21 days, and after that excision of the change.

Pursuant to teleconsultant opinion, the therapist referred the patient to an oral surgeon, who put to work the plan suggested by the teleconsultants. After the oral surgery intervention, involving the excision of hyperplastic mucosa *en bloc* and plastic surgery of the buccal plica, the oral surgeon uploaded the description of his surgical intervention (pre-, intra-, and postoperative photographs of the surgical approach) (Figure 5).



Figure 4. Created teleconsultation request



Figure 5. The patient was surgically managed and information was sent to the requester

CASE 2

A male patient (initials R.J.) 27 years old presented to the Department of Oral Surgery, Dentistry Clinic, Faculty of Medicine in Priština - temporarily seated in Kosovska Mitrovica, with a fistula in the area of tooth 22.

Six months earlier, in the area of tooth 22 a maxillary cyst had been diagnosed in this patient. During the preoperative conservative treatment of tooth 22 root canal, the canal instrument broke, so that the removal of corpus alienum and final canal obturation were done intraoperatively. The cyst was removed en bloc, and the tip of tooth 22 was resected. Since the preoperative vitality test for tooth 21 was positive, and intraoperative findings did not indicate any interruption in continuity of the neurovascular complex, the root of tooth 21 was not resected. Present findings revealed the presence of a fistula in the area of tooth 22, without any clinical signs of looseness. The tooth was not sensitive to percussion and the patient had no subjective complaints. For the purpose of diagnosis, x-rays were taken (ortopantomography and retroalveolar x-ray). However, even after these, the oral surgeon was not sure why the treatment of this periapical lesion failed; he decided to seek teleconsultation with some renown experts in the fields of oral surgery and dental diseases.

The surgeon created a teleconsultation request, with a detailed description of anamnestic data and clini-

cal findings, a set of intraoral photographs and radiograms taken before the first intervention and during the present examination. The request was sent to teleconsultants in Kosovska Mitrovica, Niš, and Podgorica, and they were immediately informed about the request (Figure 6). The period of time they had to respond (and give their expert opinion and recommend further therapy) was 48 hours. The consultants were not unanimous in their responses, both regarding the failure of the earlier conservative-surgical intervention, and in connection with the plan of further management. As a possible source, they suggested the existence of another dental root canal which had been left untreated, a longitudinal root fracture, disturbed healing of bone defect, and a developmental anomaly (*dens invaginatus*).

One of the teleconsultants opened another request with the existing one because of the suspicion of pathologic changes in the frontal upper jaw he noticed in one of the x-rays, which were unrelated to the present complaints of the patient (Figure 7). The teleconsultants gave their opinions about this new problem as well, and the oral surgeon performed one more clinical examination and uploaded the results for consultation. The conclusion was that the observed change was in fact an ortopantomography artefact.



Figure 6. Uncertainty of the oral surgeon was submitted for interdisciplinary consideration and help in the form of a teleconsultation request



Figure 7. During the teleconsultation, one of the consultants noticed a possible pathologic lesion in another part of the panoramic x-ray

DISCUSSION

Telemedicine consultation presented for these two cases confirmed the purposefulness of the tool in view of the help to dentists in diagnosis, elimination of doubts related to treatment, and in the consideration of available treatment options. The first case reported here explained the way general dentists may effectively obtain the requested consultation from remote teleconsultants via the "Store And Forward" telemedicine system XPA3 Online (3). It was shown that renown experts in oral surgery could be effectively informed about a clinical problem, and that they could respond in time with the requested advice. Based on general dentist's request, via the above system, not only that we can obtain the advice about diagnosis and therapy, but also make an appointment for an oral surgery intervention in the appropriate centers. In this way, more rapid treatment of the initial disease was made possible, and also the period of time needed until the final prosthetic management was markedly reduced.

In the second case, the possibility of use of the telemedicine system XPA3 Online for the purpose of consultation between dentists of the same and different specialties was shown in the resolution of doubts related to differential diagnosis and treatment plan. The difference in opinions was striking as to the reasons for failure of the earlier surgical treatment and the occurrence of the present problem. Although the difference may be attributed to an incomplete insight into the situation using the method of telemedicine, we believe that it was nevertheless the consequence of different attitudes of doctors themselves, regardless of the method of remote consultation (4). This is further corroborated by the fact that none of them explicitly reported the need for direct clinical examination, i.e. for additional information.

The second case demonstrated that targeted teleconsultation could be of much use in the detection of unrelated diseases/conditions. In such cases, teleconsultants may become consultation-seekers, creating additional teleconsultation requests, which can involve new specialists to be consulted. The significance of such a request type lies in the fact that for each individual patient a comprehensive evaluation of dental health is obtained, including the adjacent anatomic structures as well. The teleconsultation confirmed the clinicians' need for differentiation of real pathologic changes from artefacts, which can often accompany dental panoramic x-rays (5).

The reported cases illustrate the range of telemedicine solutions not only in the communication of various dental specialists, but also point out the possible use of telemedicine for counciliar examinations, diagnosis, and treatment plan formulation at a distance. We are daily in the situation of encountering "interesting" borderline cases in our clinical practice, and even ample clinical experience may not be sufficient for us to resolve the doubts related to certain pathologic entities and treatment options. The systems of telemedicine enable us to share our doubts, uncertainties, and experience as well, with remote colleagues in other centers, and thus do our best for the patient well-being. The cost-effectiveness of dental care delivered with the support of such systems should not be neglected either.

CONCLUSION

The use of telemedicine consultation via the *XPA3 Online* system is a valuable tool in the management of dental patients, facilitating diagnosis and treatment planning, reducing the costs of interdisciplinary consultation, and saving the costs of referral of our patients to other specialists. The method is especially convenient for young dentists and those living and working in remote areas.

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References

- Jevtović I. Telemedicine the future that has already begun. Kragujevac: School of Medicine Kragujevac; 2008. (Serbian)
- Mihailović B, Miladinović M, Vujičić B. Telemedicine in Dentistry (Teledentistry). In: Graschew G, Roelofs T, editors. Advances in Telemedicine: Applications in Various Medical Disciplines and Geographical Regions, ISBN: 978-953-307-161-9, Rijeka: InTech; 2011. p. 215-30.
- Kokesh J, Ferguson AS, Patricoski C. The Alaska Experience Using Store-and-Forward Telemedicine for ENT Care in Alaska. Otolaryngol Clin North Am 2011; 44 (6):1359-74.

http://dx.doi.org/10.1016/j.otc.2011.08.010 PMid:22032488

- Marotti JD, Glatz K, Parkash V, Hecht JL. International Internet-based assessment of observer variability for diagnostically challenging endometrial biopsies. Arch Pathol Lab Med 2011;135(4):464-70. PMid:21466363
- 5. Venkatraman S, Gowda JS, Kamarthi N. Unusual ghost image in a panoramic radiograph. Dentomaxillofac Radiol 2011;40(6):397-9.

http://dx.doi.org/10.1259/dmfr/63151190 PMid:21831982

TELEKONSULTACIJA U STOMATOLOGIJI PREKO *XPA3 ONLINE* SISTEMA: PRIKAZ SLUČAJA

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Sažetak

Telemedicina predstavlja interaktivnu audiovizuelnu komunikaciju između lekara i pacijenata. Telemedicinski centar u Kosovskoj Mitrovici organizuje i upravlja procesom telekonsultacije koristeći kompjutersko-medicinski sistem *XPA3 Online*. Ovaj rad objašnjava proceduru postavljanja telemedicinskog zahteva od strane lekara zahtevalaca konsultacije i proceduru odgovora lekara davalaca telekonsultacije. Prikazana su dva slučaja iz prakse gde je ostvarena interspecijalistička stomatološka telekonsultacija. U oba slučaja pacijenti su nakon ostvarenih telekonsultacija uspešno zbrinuti bez da su upućivani kod stomatologa druge specijalnosti na pregled i mišljenje. Telekonsultacija *XPA3* Online sistemom predstavlja veliku pogodnost i konfor za brzo i kvalitetno zbrinjavanje stomatoloških pacijenata.

Ključne reči: telemedicina, XPA3 Online, zubi, stomatologija, oralna hirurgija