

Dentistry in Russia: Past and Presence

Keywords

Dentistry; Oral health; Dental caries; Gingival recession; Minimally invasive dentistry

Abstract

Objectives: The aim of this review was to analyze the development of dentistry in Russia since the 1970s with special reference to the diagnosis and treatment of caries. In this connection, the concept of minimally invasive dentistry is discussed.

Study Design: This is a narrative review based on the Russian and international literature.

Methods: The search of international literature was performed using PubMed. Russian-language publications were searched in the Internet, in libraries and the electronic database eLibrary.ru.

Results: The motto of the Soviet healthcare was priority of prophylaxis, realized by medical checkups (so-called dispensarizations) at schools, factories and institutions. Initial and sometimes questionable caries was treated by dry cutting. The necessity to spare dental tissues has been undervalued. Early start of the restoration cycle, together with suboptimal quality of filling materials, caused enlargement of cavities and eventually led to fractures and extractions. Consent for the treatment was not always asked especially from children and adolescents or their parents. The overtreatment tendency of dental caries has been preserved until today. Besides, treatments potentially contributing to gingival recession are discussed. The large-scale privatization of dentistry since 1990 created new problems. Some practitioners avoid conservative treatment of advanced lesions in favor of prosthetics.

Conclusion: Economical re-routing of dental practices is necessary, so that they could survive using preventive and minimally-invasive methods more extensively. Improvements in ethical standards of healthcare providers and use of foreign expertise are needed.

Introduction

This review analyzes development of dentistry in Russia since the 1970s with special reference to dental caries. In this connection, minimally invasive dentistry (MID) is discussed. The concept of MID applied for the caries treatment includes modified methods of tooth preparation based, as far as possible, on individual evaluation of the caries progression rate [1-5]. This concept is applicable also to periodontal conditions [6,7]. In the Russian-language literature, the term MID first appeared in articles translated from English but today it is often used. The necessity and possibility to spare dental tissues have been undervalued. The motto of Soviet healthcare was the priority of prophylaxis, realized by medical checkups (so-called dispensarizations) at schools, factories and institutions [8,9]. The approach to dispensarizations was rather formalistic. Among drawbacks were paternalistic attitude to patients, insufficient quality control and occasional disregard for the principle of informed consent. Last time, it has been proposed to revitalize the program of dispensarizations [9]. Patients at dental polyclinics providing free treatments (except prosthetics) are requested to sign in advance a form certifying their blanket consent to unnamed diagnostic and

therapeutic procedures. At the same time, a tooth preparation can be started during examination without asking for consent.

Dental caries

An early start of the restoration cycle and suboptimal quality of filling materials caused progressive enlargement of cavities: the restorations failed, the cavities were further enlarged. This led to fractures and extractions often at a relatively young age. Initial and questionable carious lesions found at dispensarizations or occasional visits were treated by dry cutting, sometimes with dull rotary instruments, which led to excessive removal of hard tissues. At schools, dental dispensarizations were recommended to be performed twice yearly [10]. The consent for the treatment at dispensarizations was often not asked especially from children and adolescents or their parents. Understandably, the checkups and treatments were performed under the time pressure. The explorer fixation in a pit or fissure (stickiness), enamel surface roughening and discoloration were regarded as diagnostic criteria of caries. Today, the probing of suspected lesions with the checking of stickiness is regarded to be obsolete, since it achieves no gain of sensitivity and can cause damage [11-13]. Dark spots on fissures are regarded to be useless for prediction of dentinal caries of permanent teeth [14]; it has not been shown to improve the diagnostic accuracy of caries [12]. Apparently, the over diagnosis of dental caries has been continued until today: "The prevalence of dental caries in 3-year-old children was 67%, in six-years olds 87% and in 12-year olds 92%" [15]. Even a 100% (55.73% in need of treatment) prevalence of caries was reported in all age groups (≥ 35 years) in a study of 1030 reserve and retired army officers [16]. Corresponding figures in the international literature are generally lower [17-21]. Dental dispensarizations have been largely abandoned in the 1990s; but the large-scale privatization of dentistry created new problems (discussed below).

Superficial caries was defined as a lesion limited to the enamel without involvement of the enamel-dentin junction [22-25]. Mechanical preparation and restoration was recommended for superficial occlusal caries and for superficial caries in general [24-28]; this recommendation was sometimes stressed as obligatory [24]. Individual anatomic features of pits and fissures as a possible cause of the explorer stickiness were not discussed in handbooks and monographs [12]. Erosion as an entity to be distinguished from caries



Jargin SV*

Department of Pathology, People's Friendship University of Russia, Russian Federation

***Address for Correspondence:** Jargin SV, Department of Pathology, People's Friendship University of Russia, Clementovski per 6-82, 115184 Moscow, Russia, Tel: 7 495 9516788; E-mail: sjargin@mail.ru

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was either not discussed or only briefly mentioned without specifying therapeutic consequences. Admittedly, erosion and its therapy has appeared in recent editions along with a general adjustment of the Russian literature to international prototypes. In some manuals, mechanical preparation was recommended also for larger areas of enamel discoloration with an intact surface: "Mechanical preparation of hard dental tissues and filling can be performed without waiting for the cavity formation" [24]. Accordingly, many "lesions" treated by mechanical preparation were anatomic variations of the grooving, fissures and pits, pigmented fissures, erosions etc. First restorations were usually placed in childhood. Exploration with a probe was often performed with excessive force, which could be partly explained by the fact that "enamel softening" was presented in handbooks as a diagnostic criterion of early caries [28]. It is known that demineralized but non-cavitated enamel lesions can be remineralized [29]. Recent studies suggested that demineralized but structurally intact dentin can be remineralized as well [3]. Nonetheless, the traditional use of the probe has been recommended also in a recent monograph [30]. Due to the early start and acceleration of the restoration cycle, extensive dental prosthetics at an age around 30 years have been usual. As for the endodontic therapy, it can be seen on radiograms that the quality of root canal treatment was often inadequate; and sometimes only traces of filling materials are visible in the roots. Not all dentists have sufficient skills to perform endodontic treatments [31]. Procedural quality was additionally impaired by the limited availability of effective anesthesia. Pulpitis treatment and endodontic manipulations were usually performed without local anesthesia, after arsenic trioxide devitalization of the pulp until the mid 1990s and in places also later. Dental anxiety, real phobia in many cases, prevented from asking professional help after restoration failures and tooth fractures so that some patients waited for pulpitis or periodontitis, which eventually ended with extractions.

The traditional approach to the caries treatment (extension for prevention) has not been questioned until recently. The current consensus that carious dentin does not need to be completely removed has not been uniformly accepted [2,32-34]. According to the National manual of therapeutic stomatology (2021) "it is necessary to remove all damaged tissues" [35]. With this approach, a removal of hard dental tissues may be inevitable. The Manual of pediatric therapeutic stomatology recommends removing only demineralized tissues, mentioning the possibilities of de- and re-mineralization especially in children [36]. On other pages of the same book, a "maximal removal of pathologically changed dental tissues" is advised [36]. A complete removal of non-viable, carious and pigmented dentin has been usually recommended [30,37-40]. Insensitivity of dentin during diagnostic preparation ("drill test") is considered as a sign of its non-viability, "which is important for determining the extent of preparation" [39]. In the international literature, a non-selective removal to hard dentin is not recommended as an approach to the carious tissue removal. For deep lesions, complete caries excavation is considered an overtreatment [32]. Recent research supports less invasive strategies, highlighting that a complete removal of soft dentin may not be always necessary or desirable [32,33]. Selective removal of soft dentine in deep lesions leaving it on the cavity surface adjacent to the pulp is often indicated [32,41].

The term MID appears increasingly often in Russian-language

publications, although recommendations are sometimes vague. Some authors depict MID as a time-consuming individual approach practicable only at expensive private clinics [40]. Note that MID often implies avoidance of mechanical preparation, observation and/or topical treatment, which may be neither exceedingly expensive nor time-consuming. Some papers about MID have no references being in fact aimed at promotion of certain products or services [42,43]. Caries treatment has not been commented in publications on ethics in dentistry [44-46]; a fragmentary discussion was found only in one recent monograph [31]. Caries risk and progression assessment aimed at the treatment individualization has been rarely discussed, while the proposed criteria - number of cavities, restorations, missing and/or devitalized teeth [16,47] - are questionable because the role of iatrogenic factors is difficult to assess retrospectively. Thanks to the Internet, the Russian-language literature is adjusting to the international prototypes, the above-mentioned topics being elucidated more and more comprehensively. Certain foreign books have been translated but many internationally used manuals are unavailable now as before [34,41,48].

Controversies of caries treatment in Russia give rise to questions that should be answered on the basis of scientific evidence: which dental lesions, in children and in adults, must be treated by mechanic preparation and which ones can be left for observation or non-invasive treatment. The research must be nonbiased and not commercially influenced. The general deceleration of tooth decay because of the widespread use of fluorides [49], better oral hygiene and more conscious diets are arguments in favor of less extensive preparations. Besides, assessment of caries risk for the treatment individualization remains an important topic for research and practice. Along with other criteria of the caries risk, individual histories should be taken into account [4,512,13]. If a patient does not notice any tooth decay over years, despite preceding restoration failures or tooth fractures, it can be considered as an argument in favor of less extensive preparation. Apparently, frequent gingival bleedings i.e. blood in the oral cavity tends to inhibit tooth decay due to bactericidal properties of blood, frequent mouth washing and more conscious diet. Patients should be involved in treatment decisions in a meaningful way, with due consideration given to their needs, desires and possibilities [50]. Dental treatments at state polyclinics, providing free care to patients with obligatory medical insurance, should be performed on the state-of-the-art level.

Gingival recession and periodontal disease

Gingival recession (GR) is characterized by a displacement of the gingival margin apically from the cement-enamel junction [51]. The prevalence of GR increases with age; it varies from 8% in children up to 100% after 50 years [52]. According to another estimate, in the young age group (15-25 years), the prevalence was 26.9%; and among those 45-60 years old - 70.27% [53]. A patient may present with symptoms including sensitivity of exposed dentin, root caries and esthetic concerns [54-56]. GR is distinguished from periodontal pocketing; however, both types of the gingival attachment loss can be found in the same patient [57]. There is a consensus that GR is not an inevitable process of ageing but is caused by cumulative effects of inflammation and trauma [58]. Among predisposing and precipitating factors listed in the literature are dental plaque and calculus, destructive periodontal

disease, mechanical trauma including excessive brushing, root prominence, tooth malpositions, malocclusion and other anatomical factors, margins of gingival restorations, dentures, piercing, smoking and viral infections [53,56,59,60]. There has been a number of studies confirming an association between the dental plaque index and GR [57,61,62]. There is an opinion, however, that the plaque and calculus itself has little or no impact on the gingival attachment [63]. It can be reasonably assumed that subgingival plaque and calculus are secondary to the attachment loss and not vice versa. No association between calculus and GR was found in adolescents [64]. An argument about plaque as a source of germs might be plausible in case of inflammation, although the varied microflora is a norm for the oral cavity, whereas most plaque bacteria are not described as pathogens [65]. The relationship between plaque/calculus and GR differs among social classes [56,57,61,66]. In people with insufficient oral hygiene and access to the dental care, subgingival calculus is more extensive and correlates with the periodontal attachment loss, while in those with adequate oral hygiene the relation of GR to periodontitis is less evident [52,63,67]. The concept of oral hygiene is sometimes not well defined as it is mixed up with esthetics. There are statements in the Russian literature that are not supported by scientific evidence, for example: “Hard-bristled toothbrushes do not damage the gums and exert a therapeutic effect on periodontal tissues, reducing GR due to the effect of mechanical stimulation” [68]. This is generally at variance with the international literature [69,70]. Along the same lines, recommendations of gum massage with fingers and laser therapy of GR appear doubtful. The damaging effect of such treatments may be masked by a placebo effect. Like other types of electromagnetic radiation, laser causes warming at lower doses and injury at higher absorbed energies. Although low-energy lasers are used for the periodontal treatment, several systematic reviews have found no proven clinical benefits, while some studies have shown controversial results and questioned effectiveness [71]. Theoretically, a non-thermal photochemical antimicrobial effect of laser is possible; but studies with temperature measurements are needed to prevent thermal damage of atrophic tissues. The supposed “promoting tissue repair” [72] by laser may be a part of an injury-and-repair sequence potentially unfavorable for atrophic tissues. Other laser applications (photoablative, photodynamic therapy, removal of diseased pocket lining epithelium, etc.) are beyond the scope of this review [71-73]. Furthermore, the calculus removal (scaling and root planing) is often provided. The scaling has been associated with damage to enamel and soft tissues, excessive tooth sensitivity and GR [74,75]. The scaling has sometimes been performed in conditions of suboptimal quality assurance [31]. In the author’s opinion, the mechanical calculus removal is not indicated at least for older patients with GR. From the viewpoint of general pathology, being an atrophic condition, GR can advance due to repeated injury. Besides, it has been reported that excessive tooth brushing not only contributes to GR, but also can damage enamel. Among tooth brushing factors associated with cervical lesions (notched enamel and/or dentin) are frequency and manner of brushing as well as hardness of the bristles [69].

Tooth extraction

The above considerations pertain also to exodontia with a curettage of tooth sockets. In the international literature a gentle curettage is recommended [76]; the socket curettage is not always listed among

recommended procedures [77]. In Russia the curettage has been often performed intensely, aiming at a complete removal of granulation tissue [78-81]. Admittedly, in one of the recent monographs the socket curettage is not advised in the presence of purulent discharge to prevent the spread of infection [82]. The following was typically recommended: “After a tooth extraction, pathological granulation tissue and remaining granuloma are removed with a spoon-shaped curette” [83]. These tissues might be visually hardly distinguishable from normal gingiva. In this regard, the histological examination of curettage material could be a topic of research. In case of marked gingival atrophy and retraction, excessive curettage of the socket may contribute to a root denudation of neighboring teeth, leading to enhanced sensitivity and pain sometimes intensive enough to entail a next extraction. In a previously reported case, a patient with GR underwent extraction of the tooth 16. Intensive socket curettage was performed in spite of the patient’s protests. After the extraction, marked GR remained in the area of neighboring teeth, with increasing root sensitivity [84]. Subsequently, an extraction of the tooth 17 became necessary. A complaint was written to the healthcare authority, which was replied with the argumentation that “the treatment was performed in accordance with the diagnosis and in required volume.” It should be commented that a method, even if extensively used, may be not in accordance with modern standards of care, and that practitioners should replace outdated methods with improved ones [85].

In earlier Russian-language literature GR was often discussed within the scope of periodontitis i.e. together with cases characterized by marked inflammation of gingival pockets. Accordingly, GR was sometimes regarded as an inflammatory condition of predominantly infectious etiology, which is not the case for GR without inflammation. The latter was also referred to as periodontal atrophy or involution [86]. Today, GR is seen as a standalone entity. As generally in case of age-related atrophy, the prevailing approach must be avoidance, as far as reasonably possible, of traumatizing manipulations such as subgingival and socket curettage, minimization of soft-tissue damage, gentle handling of tissues in periodontal surgery. The treatment of GR should be seen within the framework of minimally invasive periodontal therapy and MID in general. The surgical treatment of GR is beyond the scope of this review [6,87].

Privatization of Russian dentistry: ethical challenges

The large-scale privatization of Russian dentistry in the 1990s created new problems. Some practitioners avoid conservative treatment of advanced lesions and manipulate patients towards extractions and prosthetics. Dentists often choose treatment plans based on commercial considerations rather than clinical indications [88], which is acknowledged in private conversations. Catch phrases are used: “Your tooth has a hairline fracture;” “the alveolar bone has been dissolved, you will lose your tooth soon”, or alike. In case of a tooth extraction, some dentists at state polyclinics offer a choice: “Do you want a paid or free injection?” The payment is unofficial i.e. under-the-counter. Anesthesia after the free injection is incomplete. These tactics can have the following consequences: (1) the patient would abstain from the socket curettage in the presence of indications; (2) after a painful extraction, the patient may decide in favor of paid services, especially if multiple teeth have to be extracted. Pain should

not be used for manipulation towards paid services. According to the WMA Resolution on the access to adequate pain treatment, the pain treatment is a human right [89]. Formally, the obligatory insurance in Russia covers basic dental treatments (except prosthetics); but some personnel at polyclinics accept under-the-counter payments. In conditions of legitimacy and high ethical standards, market economy stimulates a sound competition of constructive ideas, innovations and treatment quality. In conditions of disrespect for laws, regulations and ethics, the competition turns towards discrediting the free healthcare, manipulation towards paid services, harassment of non-paying patients. In dentistry, this included examinations with a probe applying excessive force, hints about poor quality of filling materials, inadequate anesthesia etc. Harassment and unfriendly attitude towards non-paying patients in Russian governmental medical institutions has been noticed since the economical reforms of the 1990s. Especially some aged persons perceive such attitude as insulting and don't seek medical help even if they have symptoms or a chronic disease. Obviously, this is one of the reasons of the relatively short life expectancy in Russia [90]. War veterans enjoy advantages in the healthcare and everyday life; however, there are misgivings that the veteran status has been awarded gratuitously to some individuals from the privileged milieu. Those participating in the current conflict in Ukraine, factually or on paper, will obtain the war veteran status hence acquiring privileges over fellow-citizens.

Conclusion

The concept of MID needs to be used in Russia more extensively. Entering the tooth restorative cycle should be avoided as long as reasonably possible [2]. The relevant foreign literature and expertise must be studied. An economical re-routing of dental practices is needed, so that they could survive using preventive and minimally-invasive methods more extensively [7,91]. Dental treatments at the polyclinics, providing free care to patients with obligatory medical insurance, must be performed on the state-of-the-art level. Improvements in ethical standards of healthcare providers and managers of all levels are needed. For this scenario to be realized, the first step that needs to be taken includes the exchange of experience through the implementation of temporary programs for Russian dentists to go abroad and authorized foreign advisers to come to Russia. The ongoing international conflicts and terrorism must be discontinued to facilitate international cooperation [92], otherwise the backlog in the healthcare in some parts of the world including Russia will deepen [93]. Finally, but not of least importance, law and ethics are fundamental to the practice of dentistry underpinning relationships with the profession and patients. Probity lies at the heart of professionalism [94]. The way to improvements must be propagation of medical ethics: "Dentistry for the patient" instead of the "dentistry for the dentist" [95].

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