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Review Article

Temporomandibular Joint Disorder from a Perspective of Gerodontology

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Abstract

The final years of the current decade (2000-2010), which were dedicated to bone and joint diseases by the World Health Organization, are the right time to pay attention to musculoskeletal diseases of the orofacial system. A basic concept related to TMDs is the attempt to include musculoskeletal disorders of the stomatognathic system into the functional schematics of disorders appearing elsewhere in the body. Apart from the general knowledge on ageing, undergraduate dental students should be taught about anticipating needs, planning and implementing treatment and the subsequent care of the elderly prosthodontic patients. The clinical picture of TMJ functional disturbances may range from physiological variability of joint structures functioning (sometimes painless joint sound) to painful condition with pronounced clinical signs of TMJ disorder.

Keywords: Temporomandibular joint; Education; Elderly; Gerodontology; Magnetic resonance imaging

Abbreviations

CBCT: Cone Beam Computerized Tomography; MRI: Magnetic Resonance Imaging; TMD: Temporomandibular Disorders; TMJ: Temporomandibular Joint

Introduction

Geriatric dentistry was defined as that portion of the dental medicine which deals with special knowledge, attitudes, and technical skills required in the provision of oral health care to older adults [1]. Besides general medicine, Temporomandibular Disorders (TMDs) are an umbrella term for certain myogenic and arthrogenic diagnoses [2,3]. Apart from the teeth and the supporting structures, masticatory muscles and temporomandibular joints are some of the most important parts of the functionally and topographically connected organs and tissues which form the stomatognathic system. Numerous dental branches (periodontology, endodontics, prosthodontic, implant prosthodontics, etc.) have, from a dental perspective, the goal of preserving not only oral health but also general health of the patients [4].

TMDs as the orofacial form of these musculoskeletal disorders are not the most frequent group of diseases in geriatric dentistry practice, unlike problems related to restorative dentistry, especially prosthodontics [5,6]. Musculoskeletal disorders are typical of old age, and there is no doubt that ageing affects the structure and function of Temporomandibular Joints (TMJs) [7]. The final years of the current decade (2011-2020), which were dedicated to bone and joint diseases by the World Health Organization. Musculoskeletal diseases are a public health issue which, in its patient management, also includes gerodontology. Even in the previous decade between the years 2000-2010 which was dedicated to bone and joint diseases, it was included into the European and Croatian National Action Network [8,9].

The aim of this study was to identify the current status of the relationship between geriatric dentistry and medical disciplines (particularly rheumatology and physical medicine) in the management of TMDs of the elderly.

Geriatric Education Regarding Dental Medicine

It is of importance to motivate students to enable them to work with the elderly, which will eventually provide and improve oral health of the older population [10]. Geriatric educational and research activities in medicine developed during the 1960s and the 1970s. Nordic countries established a collaboration regarding the issues of geriatric medicine through the Nordic Gerontological Federation in 1974 [11]. Almost simultaneously, activities concerning geriatric dentistry were being carried out in the same region of Europe [11,13].

Kossioni et al. [14] stressed that the educational goal of gerodontology is to raise awareness about the barriers to care and to prepare dental students, in terms of knowledge, attitudes, ethics and skills, to provide appropriate oral health care for the older adults. The American Dental Education Association presented (in collaboration with Glaxo Smith Kline) innovative models in geriatric dentistry based on the need for interdisciplinary models and integration with special needs patient care [15].

In some U.S. dental schools, geriatric dentistry courses have been developed within the curriculum [1]. There were no special lectures and courses in Austrian dental schools in 2004. In contrast, it was

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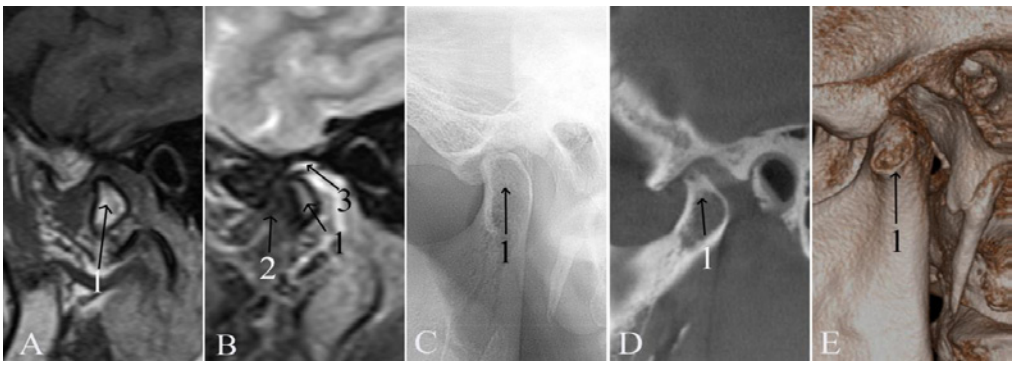

Figure 1: The same left temporomandibular joint of a 62-year-old female patient with osteoarthritic changes on mandibular condyle (arrow with 1), anterior disc displacement (arrow with 2) and effusion (arrow with 3) imaged with various radiological modalities: a – magnetic resonance imaging (T1-weighted image), b – magnetic resonance imaging (STIR sequence), c – temporomandibular joint view on orthopantomogram, d – cone beam imaging (left reconstruction in parasagittal section), and e – cone beam imaging (three-dimensional reconstruction).

revealed that a special lecture or practical course in gerodontology has been provided in all Swiss and a few German schools [16]. In the UK, there is a large number of departments which are especially devoted to geriatric or special care dentistry [17]. Japan's dental educational system is a 6-year undergraduate students' program of education. In Japan geriatric dentistry is taught in almost a third of the schools at geriatric dentistry departments [18]. Brazil, on the other hand, was the first country to recognize the specialty of geriatric dentistry in 2001 [19]. It is of importance to motivate students to enable them to work with the elderly, which will eventually provide and improve oral health of the older population.

In Croatia, the share of elderly population was 15.62% in 2001 and it grew to 16.64% in 2004 [20]. In Croatia, knowledge on geriatric dentistry, TMDs, and occlusion is a part of dental undergraduate education curriculum. In the year 2008, geriatric dentistry became an obligatory undergraduate course at the Dental Department, School of Medicine, University of Rijeka. At the School of Dental Medicine in Zagreb, geriatric dentistry was an obligatory course until 2005. Since then it has been an elective course for students attending the last semester of their college education. So far, TMDs have not been recognized as special problematic of the elderly population [21].

Rheumatological View on TMJ-disorder

Some describe TMDs as a form of extra-articular rheumatism, which is only partially true. Pain and TMJ function disorder are intra-articular problems. Inflammatory rheumatic diseases – most often rheumatoid arthritis – are present in 1.5% of women and 0.5% of men of active working population. These percentages of the causes of rheumatic disturbances and/or TMJ diseases can be expected to potentially increase with age, thus multiplying physiatric treatments [22]. On the other hand, osteoarthritis is a low-inflammatory arthritic condition that results in various degenerative joint changes clinically manifested as joint crepitation, arthralgia, and limited opening of the mouth [23]. Radiologically supported studies showed a controversy with respect to the relationship with disc displacement without reduction and clinical and radiological confirmed signs of osteoarthritis of TMJ [24,25].

The effects of osteoporosis, the most common rheumatologic-metabolic disease of our times, on the stomatognathic system are mostly related to pathologic changes on the periodontium of preserved teeth and the edentulous residual ridge. Osteoporosis is one of the major health problems affecting middle-aged and older individuals, especially women. It is associated with several risk factors. Some of them, such as age, smoking, sex, systemic diseases, medications and genetic factors are common for periodontal disease [26]. Osteoporosis affects 10-15% of European Caucasian population. In Croatia, 15% of postmenopausal women have osteoporosis and 30% have osteopenia. Osteoporosis should always be kept in mind since its relation to the development of osteoarthritis has not been fully explained, including the TMJs [27,28].

Concept of TMD

A basic concept related to TMDs is the attempt to include musculoskeletal disorders of the stomatognathic system into the functional schematics of disorders appearing elsewhere in the body. On the contrary, for example, the Gnathologic School and their concepts of etiopathogenesis related to occlusion-TMJ-masticatory muscles did not accept diagnostic methodology and systems of classification applied to other musculoskeletal systems in the body. Traditional dental diagnostics combined with secondary data gathering about the oral status did not provide useful information [29].

Diagnostics of TMDs are based on a standardized clinical examination. The Diagnostic Criteria for TMD as a diagnostic system has become standard in scientific studies, wherein the clinical term TMDs has been divided into separate diagnoses [30]. Thus, there is a distinction between a muscular disorder and TMJ disorder: osteoarthritis and anterior disc displacement. However, the generally accepted terminology does not explain all clinical aspects of temporomandibular pain as the most important clinical sign and symptom of the illness [31].

Understanding biomechanics enables the examination of anatomic structures of TMJ using procedures wherein the patient actively (dynamic compressions and translations) and passively (passive compressions) performs mandibular movements. The psychological factor in musculoskeletal diseases, differential diagnosis of orofacial pain and chronic systemic diseases and the medications used in treatment should be taken into account [33].

Radiolog of TMJ

Magnetic Resonance Imaging (MRI) is the gold standard of radiological diagnostics, a non-invasive and non-ionizing examination of soft and hard TMJ tissues (Figure 1a). Imaging of both the articular disc and the most common type of discopathy, i.e., anterior disc displacement, is the greatest achievement in the field of x-ray radiological methods [34,35]. Another important TMJ pathology is the occurrence of more or less expressed collection of exudates within a relatively small intraarticular space [36]. The most common radiological method of jaw, teeth and TMJ imaging is the panoramic radiogram (Figure 1b).

Since the osteoarthritic changes are most visible on x-ray images, Cone Beam Computerized Tomography (CBCT) is the gold standard for hard tissues, although its use is still restricted, due to relatively high doses of radiation (Figure 1c). In the case of inflammatory exudates and/or disc displacement, CBCT is an inefficient diagnostic method if there are no changes in the osseous structures of the joint. MRI has proved to be an efficient method for confirming clinical diagnostics; however, its high cost prohibits its use in everyday dental practice [37].

Treatment Modalities for TMJ

The occlusal splint is the most common and efficient treatment procedure of arthrogenic and/or myogenic forms of TMDs. The occlusal stability is established by specific morphology of the splint which is placed on the teeth alignment of one jaw thus serving as an orthopedic means of TMJ stabilization [38].

Nonsteroidal Antirheumatic drugs are the most commonly used medications in general and therefore it is necessary to supervise their usage with respect to the achieved analgesic effect and their potential serious adverse drug reactions (gastrointestinal, cardiovascular, renal and hypersensitivity reactions) [39].

Within TMD treatment modalities, physical therapy has shown efficiency in its unique methods as well as in those indicated for other musculoskeletal disorders. The role of physical therapy in the treatment of musculoskeletal pain is unquestionable, and its application in the stomatognathic system is useful and logical [40,41]. Namely, the basic principle of improving the function while removing pain is seen in mobilization exercises wherein the patient is directly involved.

Discussion

Dental and general health care for the elderly are gaining more importance as the share of elderly population increases together with the average age of the entire population. Preshaw et al. [42] reported that most European dental schools included geriatric dentistry education in their dental curriculum. A clinical component of geriatric dentistry within the curriculum was reported by 61% of dental schools, and 18% reported operating a specific geriatric dentistry clinic within the school. Out of 82 dental schools from 27 countries, 7% of schools did not teach geriatric dentistry at all. There are studies which evaluate knowledge and clinical skills related to TMD of undergraduate students as well as in the population of general practice dentists [1,16].

Osteoarthritis is a major public-health issue and has been especially prominent in the recent decade which the World Health Organization dedicated to musculoskeletal diseases. Symptomatology, clinical and radiological diagnostics as well as creating the most effective treatment methods and rehabilitation of other joints in the body have been researched more and given a lot of attention compared to the specialized field of the stomatognathic system and TMDs [43].

TMJ pathology was relatively unknown until the early 1990s due to poor diagnostic possibilities and it was often related to erroneous etiopathogenic models (for example, Costen's syndrome) and also to otological symptomatology due to topographic proximity [6]. Conversely, the involvement of TMDs in systemic musculoskeletal (polyosteoarthritis, rheumatoid arthritis, psoriatic arthritis, etc.) and other diseases of the general type (fibromyalgia) is well known [22].

The field of geriatric dentistry could be relevant to TMD patients: Ogura et al. [48] found significantly more disc displacements with osteoarthritis in 18.2% of TMD patients over the age of 50 comparing with the total sample of TMD patients. In our own research [45], we determined a share of 22% of patients over the age of 60 in the total sample of patients with TMJ disorders.

Undergraduate students should recognize TMD-patients and, if necessary, refer them to a subspecialist practice. Steenks [46] pointed out the great difference between scientific facts and general practice dentists' knowledge of TMD and orofacial pain. Priority is given to noninvasive and reversible treatment methods where the occlusal splint plays a key role in dental, that is, initial occlusal therapy [38].

Within the framework of personalized dentistry as a multidisciplinary branch of various TMD treatment modalities, physical therapy and oral exercises can be individually adjusted to each patient, and, after a physiatrist examination, they can also be modified if indicated, which will help achieve the goal of removing musculoskeletal disturbances from the body. Exercises which the patient performs at home instructed by an expert – active and passive jaw movement exercises, correction of body posture, and relaxation techniques – represent a part of the cognitive-behavioral therapy [47].

Therefore, when observing certain diagnoses with osteoarthritis of TMJ, the mean age moved to between 50 and 60 (49). TMD patients are mostly women of reproductive age (according to Mafredini et al. (83.4%), between 20 and 40 years old [5,44]. Nevertheless, even in this subgroup of osteoarthritis diagnosis, the share of patients decreases over the age of 80 (50). Although, in general, OA of TMJ is considered to be related to increase in age, it was only partially determined in our sample. Our study included somewhat older subjects (median age 53) [44].

Conclusion

The confidence which dental students in Croatia showed concerning their knowledge on diagnostics and treatment of elderly patients and their orofacial pain problems should be strengthened by a clinical component of geriatric dentistry. From today's perspective, it can be concluded that, in the past decades, there was no unified development and practice of undergraduate teaching about elderly patients in dentistry. MRI is the most sensitive radiological method of intra-articular examination, in particular of soft tissues, which has also been successfully applied in TMJ examination.

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