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CAD/CAM SYSTEMS IN DENTISTRY: CURRENT STATUS AND DEVELOPMENT PROSPECTS

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The purpose of the study: to study the advantages of CAD / CAM technology in orthopedic treatment.

Summary. The emergence of CAD / CAM systems has become an important stage in the development of dentistry, which has simplified many stages of the manufacture of dentures. The article describes the main components of modern CAD/CAM systems: scanners, software and prototyping methods. For each of the components, various applications are presented with their advantages and disadvantages. The possibilities of the software operation are presented not only for modeling the structures of fixed and removable dentures in orthopedic dentistry, but also for the manufacture of surgical templates in implantology and various devices in orthodontics. Much attention is paid to various options for prototyping finished products using both milling technologies and modern additive methods.

Keywords: CAD/CAM system, scanner, software, rapid prototyping, 3D printing.

Dentistry has always been closely associated with new materials and technologies. Over the past century, in its development, it has gone through several revolutionary leaps, each of which determined the position of the specialty for decades to come. Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) are terms that entered our practice in the 1980s. Due to the exponential growth of computer power, more and more new and advanced systems appear on the market every year. So, some companies offer us to completely abandon the use of impression material and replace it with digital impressions that can be sent to any dental laboratory in the world via the Internet. Other manufacturers offer the

manufacture of an all-ceramic crown or several restorations at once in one visit. Of course, the pioneer in the field of digital dentistry is the Sirona company, which back in 1987 introduced the CEREC CAD / CAM system for creating ceramic inlays for the patient's chair. To date, a large number of different CAD / CAM systems have appeared on the market that can solve a wide range of tasks, from designing all types of dentures to templates for implantation.

Regardless of the manufacturer, any modern CAD/CAM system includes the following elements. Scanner - a device that allows you to convert the geometry of an object into digital data. Software (software) for product modeling (denture, template, individual abutment, skull bones). Production technology (milling unit, 3D printer), which transforms digital data into a finished product.

This system can be strictly closed or open. In closed systems, the software works only with the manufacturer's router and scanner.

Scanners. Prosthetic bed scanning is the first step in the manufacture of a dental prosthesis using any CAD/CAM system. The development of the first intraoral dental scanner dates back to the 1980s.

All scanners according to the principle of operation can be divided into 3 groups: optical, laser and photometric. In dentistry, optical and laser scanners have gained particular popularity.

According to their purpose, scanners are conditionally divided into clinical (intraoral) and laboratory ones. Intraoral scanners (Intraoral scanning) are gaining more and more popularity in dentistry. The number of manufacturers of intraoral scanners is steadily growing. The reason for this is the numerous advantages of using this technique in the daily practice of a dentist over the classical technique of taking an impression. The existence of the possibility of endless replenishment and updating of patient data at minimal cost in case of unsatisfactory quality of the resulting digital model is also one of the positive features of this method.

The work of modern intraoral scanners is based on non-contact optical technologies: confocal microscopy, optical coherence tomography, photogrammetry, active and passive stereoscopy and triangulation, interferometry and phase shift principles. To reduce such interference from scanned objects as transparency and reflection of materials, humidity (especially the oral mucosa) and random movements of the patient, some devices combine various methods for obtaining information about the relief of the object.

All intraoral scanners can be presented as a separate special computer module or connected to a regular personal computer manually.

Conclusion

Every year, digital technologies are increasingly being introduced into the practice of dentists, simplifying many stages of patient rehabilitation. CAD/CAM systems were most widely used in orthopedic dentistry, where they allowed not only to simplify many clinical and laboratory stages of manufacturing dentures, but also to abandon some stages altogether. Most researchers even predict the disappearance of such a specialty as a dental technician, and its replacement with a specialist in computer modeling.

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THE STATE OF THE ORAL CAVITY IN PATIENTS WITH CHRONIC HEPATITIS

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Relevance. Viral (parenteral) hepatitis is one of the most serious and urgent problems of medical science and practical health care, as it is characterized by a continuously increasing incidence, poor outcome and mortality.

Key words chronic hepatitis, liver cirrhosis, oral cavity.

Hepatitis in connection with the breadth of distribution, the incidence rate, the severity of the course and the frequency of development of chronic forms are also considered as a socially significant problem. This is especially true for parenteral viral hepatitis B and C, the complications of which pose a serious threat to humanity, since many deaths are practically associated with them. According to WHO data, more than 1 billion people are infected in different countries of the world, in connection with which, in all regions of the world, a tense epidemiological situation associated with social and economic issues is stated.

In chronic hepatitis, patients most often complain of a perversion of taste sensations, a feeling of bitterness in the mouth, especially in the morning, a burning sensation and tingling in the tongue and lips. A burning sensation and soreness of the oral mucosa is often combined with a sensation of itching, especially pronounced in the sky. When examining the oral cavity, an icteric shade of the mucous membrane of the soft palate is noted, hemorrhagic phenomena, vascular "stars" are revealed on the oral mucosa, the mucous membrane of the gums becomes cyanotic. The course of hepatitis, especially hepatitis C, is accompanied by the development of extrahepatic manifestations of the disease. So, one of the frequent extrahepatic manifestations of viral hepatitis C is Shigren's syndrome, which is an autoimmune lesion of the exocrine (primarily salivary and lacrimal) glands. Sialoadenitis is detected in 14-57% of patients with chronic hepatitis. It is important to note that such patients exhibit manifestations of at least one of the two symptoms of Shigren's disease. The development of non-Hodgkin's

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