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What Is Meant by Digital Dentistry?

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Abstract: Polymers (from poly... + Greek meros — fraction, part) — substances, the molecules (macromolecules) of which consist of a large number of repeating units. Polymers are the basis of plastics, chemical fibers, rubber, paint and varnish materials, adhesives. At the same time, there are 2 main mechanisms for obtaining polymers: through polyaddition and polycondensation.

Keywords: Plastics, chemical fibers, rubber, paint and varnish materials.

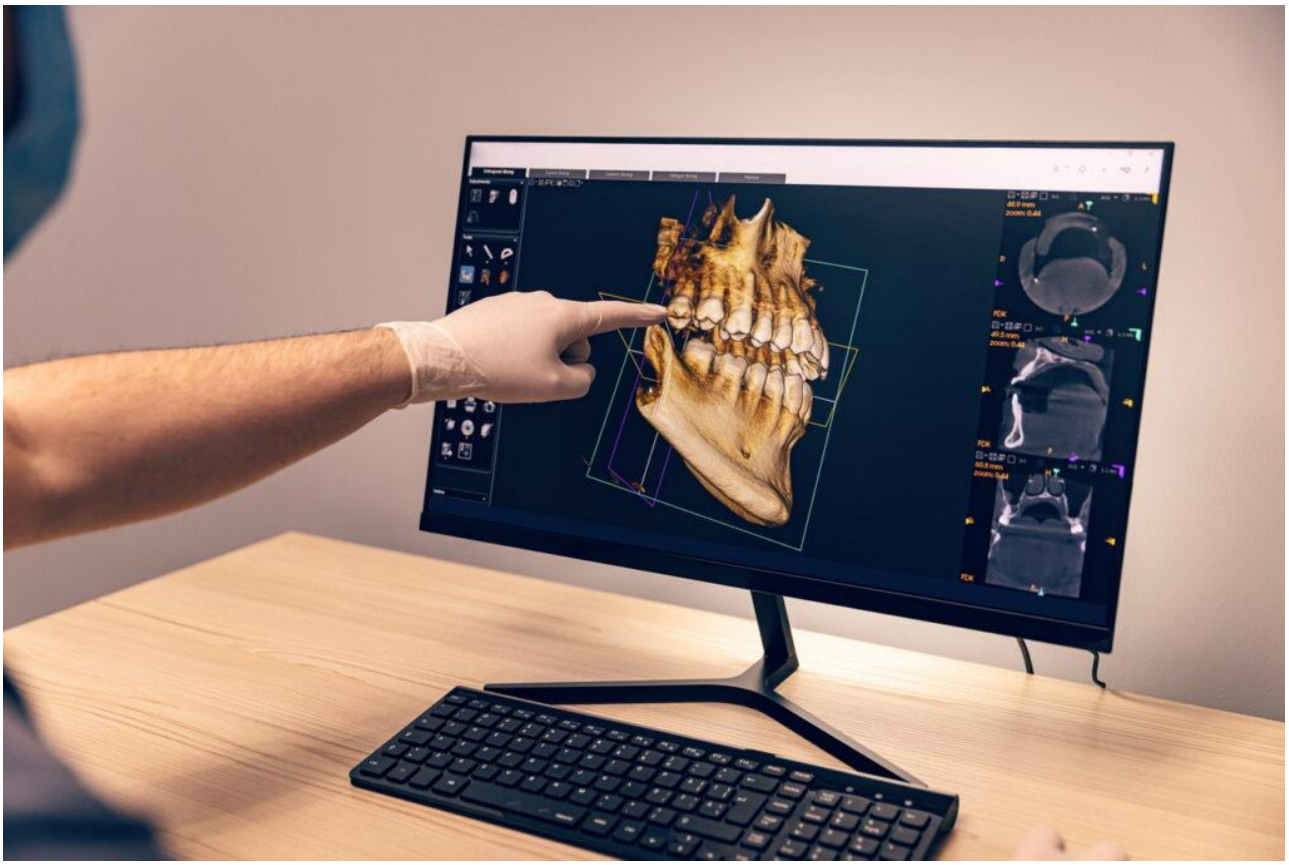
Introduction: Digital dentistry is a new direction in the diagnosis and treatment of dental problems. Performing procedures using computer systems and 3D technologies helps to obtain fast, high—quality results. In addition, it facilitates the study of research results and treatment planning.

Advantages

Among the positive qualities of digital dentistry, it is necessary to single out the accuracy of diagnosis. Three-dimensional images help visualize all anatomical structures of the maxillofacial region, identify destructive changes, cysts, and tumors. The size of the neoplasms, their localization and prevalence are also assessed during computed X-ray.

Other advantages of digital technologies include:

- reduction of time during treatment planning;
- the ability to create structures of the chewing apparatus with high anatomical accuracy;
- comfort for doctor and patient;
- absence of human factor, low risk of medical error;
- Price.



Equipment

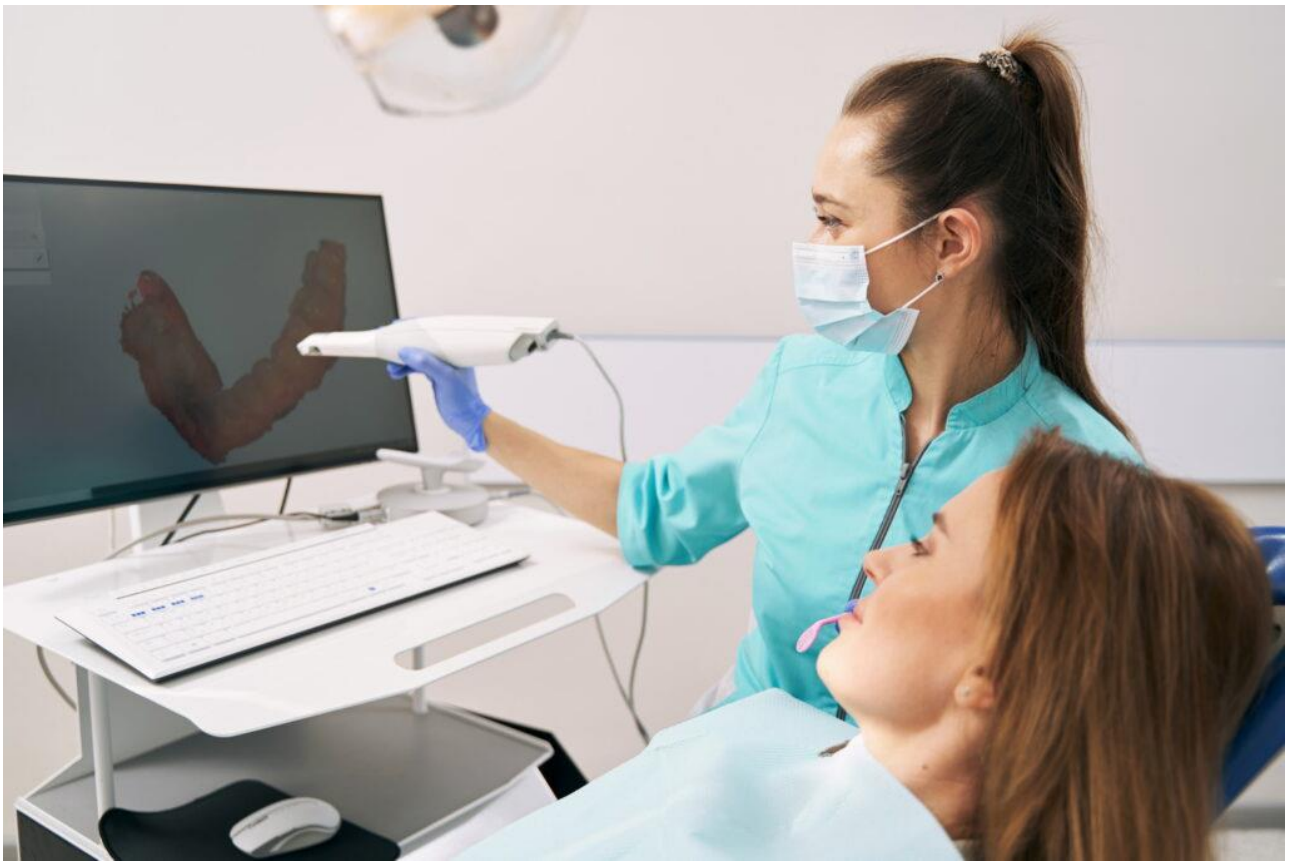
The choice of diagnostic method, treatment planning, and manufacture of orthodontic and orthopedic structures depends on the tasks set:

• CAD/CAM is a system for modeling and manufacturing products (veneers, crowns, abutments, and implants) using 3D technologies. The model is transferred to the milling machine module, which processes the restoration, polishes, and grinds. The functionality of the machine depends on the number

of axes. The more axes there are, the more opportunities there are to create products with high anatomical precision.

• Intraoral scanning is an alternative to impressions (casts), which makes it possible to obtain a digital copy of the prosthetic bed and teeth. The dentist inserts the instrument into the patient's mouth, points the pen at the area under study, a section of the jaw or a row of teeth. The light signal is transmitted to the computer for processing. It is transformed into a three-dimensional image of the cavity displayed on the monitor. This allows you to observe the anatomical structures of the mouth in real time.

• A 3D printer is a machine that prints products using a pre-prepared digital template. The dental technician's work is minimal in this case. He programs the equipment, monitors the printing, grinds, polishes the product.



Technology in diagnostics

In order to make a diagnosis and plan treatment, the doctor needs to assess the condition of the soft and hard tissues of the CHLO. An instrumental examination gives a subjective assessment, because a number of dental diseases have a latent course. Outdated diagnostic methods also do not provide sufficient information about the condition of teeth, periodontal tissues, bones, and the temporomandibular joint. Digital dentistry makes it possible to diagnose problems at different degrees of their development, demonstrate them to the patient, and save the results of the study in a computer file. It will not get lost or disappear under any circumstances. CBT and MRI play a special role in the detection of CHLO diseases.

Areas of application

Digital dentistry has been used in therapy, surgery, orthopedics, and orthodontics. Doctors actively use technologies that improve the quality of medical services.

Implantation

3D images of jaws help dental surgeons determine indications and contraindications for implantation, plan, and produce surgical templates. The doctor determines the location of the implant and its angle of inclination. The thickness and length of the product are also calculated using a computer method.

After modeling the implant and its structural elements,

the dental laboratory starts printing the design on 3D equipment. The surgeon fixes the finished product during the operation using a template. This reduces the likelihood of medical errors, the risk of injury to the walls of the maxillary sinus, nasal passage, and mandibular canal. Depending on the type of implantation, the crown or bridge is fixed during and a few weeks after the operation. Orthopedic structures can be made using a similar method even when planning treatment.

Orthopedics

At the consultation, the dentist scans the dental arches and sends the results to the technicians. They, together with the doctor, model the structure (lining, veneer, crown, bridge, removable plate device). After milling on 3D printing, manual polishing, the prosthesis is sent to the clinic for packing and fixing in the mouth.

Therapy

Restoration of the anatomy of a destroyed tooth in therapeutic dentistry is carried out using light-curing composites. Despite their positive qualities, composite materials have a low service life (3-5 years), shrink over time, and change in color. An alternative to classical sealing is fixing the linings. They are durable, similar to the natural tissues of the tooth. They are produced after digital modeling and printed on 3D equipment.

Orthodontic treatment

In 96% of cases, the diagnosis and planning of bite correction take place on digital equipment. Artificial intelligence offers several treatment options and shows the results of therapy in each clinical case. This helps the doctor and the patient to choose a method of dental alignment, as well as to estimate the approximate timing of correction. The manufacture of orthodontic products, as well as orthopedic prostheses, is carried out on a 3D printer. Aligners can also be created using digital technology, based on digitized jaws.

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