

TUTORIAL

ESSENTIALS OF OPERATIVE DENTISTRY

Министерство науки и высшего образования РФ

Рекомендовано Координационным советом по области образования «Здравоохранение и медицинские науки» в качестве учебного пособия для использования в образовательных учреждениях, реализующих основные профессиональные образовательные программы высшего образования уровня специалитета по направлению подготовки 31.05.03 «Стоматология»

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Chapter 3

ORGANIZATION OF DENTAL SERVICE

Dental medical service in Russia is planned and controlled by the Ministry for Public Health of Russian Federation. Dental care is provided at the following types of clinics:

- ▶ federal dental polyclinic (out-patient department);
- ▶ municipal or district polyclinic;
- ▶ dental clinics and departments incorporated in multidisciplinary medical center;
- ▶ private dental practice;
- ▶ clinics of training and research institutes.

Although private dental practices became widespread over last decades and continues to grow, the main source of dental care for the greater part of population in Russia is *dental polyclinic*.

ORGANIZATION OF DENTAL POLYCLINIC

The main objectives of dental polyclinic as municipal establishments of health care are as follows:

1. Prevention of dental disease in the population.
2. Providing high-qualified dental care in all dental specialties.
3. Providing statistics, calculation and reports about the incidence of dental disease among the population.
4. Investigation and implementation of new methods of prevention, diagnosing and treatment of dental diseases.
5. Improving the skills and knowledge of the entire medical staff.
6. Providing consultations to the population, issue of medical assessments and other documents.

Depending on their size dental polyclinics could include the following departments:

- ▶ Restorative Dentistry.
- ▶ Dental Surgery.

- ▶ Prosthetic Department with Dental Laboratory.
- ▶ Physiotherapy.
- ▶ Radiographic Department or single room.

Besides, a dental polyclinic could incorporate the following departments: anesthesiology department (or single room), periodontology, department of mucosa diseases, implantology, prevention and oral hygiene, clinical laboratory and centralized sterilization.

Some federal and regional polyclinics are equipped with mobile dental units to provide care to population in far countryside.

Most dentists at polyclinics work in two shifts (before lunch and after lunch). Thus, if a dentist works on Monday, Wednesday and Friday from 8.00 a.m. till 14.00 p.m., on Tuesday and Thursday he/she will work from 14.00 till 20.00. Usually in one session a dentist is able to see 8–12 patients.

Requirements for dental polyclinics

According to Provision No 30 of the Russian Federation Law on Health Care each patient has a right to diagnostics, treatment and sojourn in appropriate conditions that meet all sanitary and hygienic requirements. Basic sanitary and hygienic requirements for dental clinics and polyclinics are stated in the Directive of Head Sanitary Doctor of Russian Federation *Approval of Sanitation and Hygienic Requirements 2.1.3.2524–09 of 07.07.2009* No 48. These guidelines and requirements (as well as all further requirements described in this chapter) are obligatory for *all dental polyclinics, clinics and private dental offices*. The main points of requirements are as follows:

1. It is allowed to house dental clinics and polyclinics including radiological and physiotherapy departments not only in separate buildings (fig. 3.1, a) but also in adapted premises incorporated in an apartment building (fig. 3.1, b), as well as on ground floors of apartment buildings (fig. 3.1, c). In case of incorporating a dental polyclinic in an apartment building it is mandatory to provide a separate entrance.
2. It is allowed to place rooms for sterilization on underground floors.
3. It is allowed to place sterilization equipment in the same room with dental units in case there are not more than three dental units per one room (fig. 3.2).

For treatment of children it is necessary to organize a pediatric dentistry department. If polyclinic/clinic is small and there is no possibility or no need to organize a department, it is mandatory to provide pediatric care separately from adults. It can be a dental office designated for children only; or dental

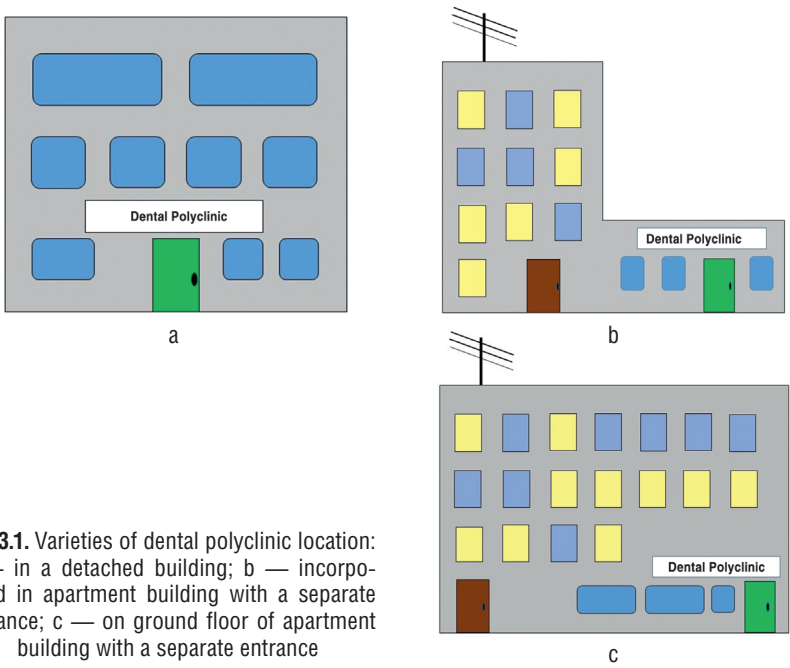


Fig. 3.1. Varieties of dental polyclinic location: a — in a detached building; b — incorporated in apartment building with a separate entrance; c — on ground floor of apartment building with a separate entrance

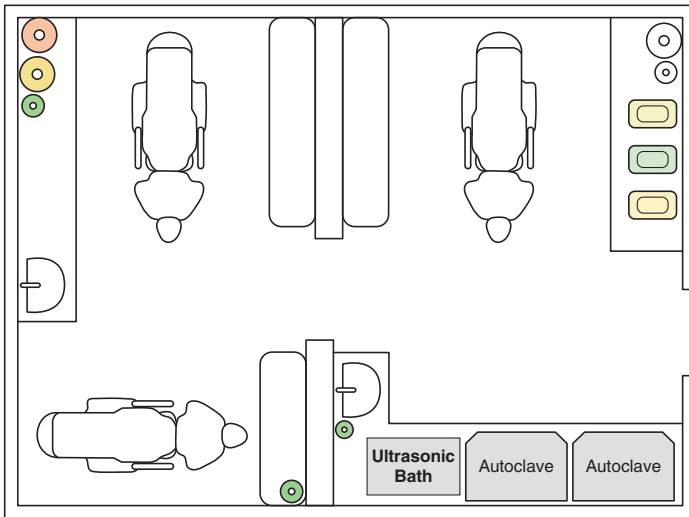


Fig. 3.2. Dental surgery with three dental chairs and corner with sterilization equipment

care can be carried out in two sessions — half of a day adults only, and half of a day children only. Other rooms can be common for all patients but as far as possible a separate waiting room and a toilet should be allocated for children.

Standards of dental polyclinic construction

Dental polyclinic can be placed in a detached building or incorporated in adapted and build-in placements of apartment and public buildings. In case a new building is planned to be constructed, it is necessary to take into account the environmental situation, neighborhood of plants and factories, transport availability. In case a dental polyclinic is placed in an apartment building, it should be located on the ground floor and have a separate entrance.

Dental polyclinics should have hot and cold running water as well as sewerage.

On the underground floor it is allowed to allocate only cloakrooms, showers, toilets, storage rooms, ventilation rooms, compressor systems, sterilization equipment but not dental offices.

The amount and function of premises depends on the polyclinic size, its facilities and specialization.

Every dental clinic or polyclinic should have at least the following premises:

1. Hall with a minimal area of 10 meters.
2. Dental surgery: minimal area should be 14 meters for one dental unit plus 10 meters for every additional dental unit (in case there is more than one dental unit in surgery). Dental offices in educational organizations (schools, colleges, kinder gartens, etc.) are an exception; they are allowed to have an area of only 12 meters.
3. Room for staff members (minimal area — 6 meters, with a cloakroom).
4. Toilet with a minimal area of 3 meters.
5. Storage for medicaments and instruments (minimal area 3 meters).

If there are more than three dental units in a clinic or polyclinic, it is necessary to organize the following:

- ▶ room for sterilization (minimal area — 6 meters);
- ▶ several dental offices for dentists of different specialties: endodontists, prosthodontists, dental surgeons, orthodontists, pediatric dentists, etc.;
- ▶ separate toilets for patients and staff.

At large dental polyclinics the following compartments could be included:

- ▶ professional oral hygiene office (minimal area — 10 meters);
- ▶ surgical unit, including preoperation room, operation room, and a room for patients after surgery;

- ▶ radiography room;
- ▶ dental laboratory (the main room should have a minimal area of 7 meters) and specialized premises (plaster room with a minimal area of 4 meters, etc.);
- ▶ additional offices for administrator, head nurse, etc.

INTERIOR OF DENTAL OFFICE

Walls. The walls of dental office should be at least 2.6 m high. The distance from the window to the opposite wall — no more than 6 meters. The walls should be covered with glazed tiles at least 1.8 m high. The walls of the surgery and sterilization room should be tiled full height.

Ceilings. In dental offices, operating rooms, preoperative room, sterilization room and dental laboratory the ceiling should be painted with water-based or other approved paint. It is possible to use suspended ceilings with a smooth surface without perforations resistant to detergents and disinfectants.

Color. The color of the walls and floor in the dental office and dental laboratories should be in neutral light shades, so as not to interfere with the color evaluation of teeth (both natural and artificial), mucous membranes, skin, restorative materials.

Central heating, ventilation and air conditioning systems should meet the requirements for public buildings and provide optimal parameters of microclimate, including the microbiological criteria. Permanent working place where medical staff spends more than 50% of working time or more than 2 hours of continuous work should be provided with the following microclimate parameters:

- ▶ relative humidity of air: 40–60%;
- ▶ air circulation rate: 0.2 m/s;
- ▶ temperature in a cold season (when the average daily temperature outdoor is 10 degrees Celsius and below): 18–23 degrees above zero (Celsius);
- ▶ temperature in a warm season (if the outdoor temperature exceeds 10 degrees Celsius): 21–25 degrees above zero (Celsius).

It is allowed to use air conditioning devices, including split systems designed for health care organizations. Fine filters have to be changed once every 6 months, unless otherwise recommended by manufacturers.

If a dental polyclinic has no more than three dental units, it is allowed to carry out ventilation just through open windows and air vents or by means of exhaust ventilation.

In surgery units, dental laboratories, sterilization, radiography rooms and toilets it is mandatory to have autonomous ventilation systems.

Regardless of mechanical ventilation systems in all rooms except for surgery operation rooms, it is necessary to have easy-opening air vents.

Lighting. All dental offices and dental laboratories (rooms with permanent working places) have to have natural lighting. Tables of dental technicians should be placed relative to windows so as to provide left-sided natural lighting. The windows should be metal or plastic blinds (in the surgery room — between window frames).

Besides natural lighting, all premises at a dental polyclinic must have electric lighting. General lighting is provided through fluorescent lamps with the spectrum of light that does not distort perception of color. In addition to general lighting it is necessary to provide local and individual lighting sources:

- ▶ dental light (fig. 3.3) incorporated into dental unit;
- ▶ shadowless ceiling lamp above each dental unit and in surgery room;
- ▶ individual lamp for each dental technician's working place.



Fig. 3.3. Dental light

Illumination level of local and individual sources should not exceed general illumination more than 10 times. All lighting sources should be available for wet cleaning.

EQUIPMENT IN DENTAL OFFICE

Dental units in an office with one-side natural lighting (window/windows in one wall) should be located along a wall with windows.

In case there is more than one dental unit in an office, it is required to divide the room with non-transparent partitions 1.5 meters high or more.

There are the following equipment and furniture in a dental office:

- ▶ dental unit (fig. 3.4) consists of dental chair, compressor, mounted units of doctor and assistant (fig. 3.5, a, b), dental light;
- ▶ chairs for dentist and assistant;
- ▶ table worktop and drawers;
- ▶ cabinets for disinfectants, materials, instruments, etc.;
- ▶ UV-storage chamber with incorporated ultraviolet lamp for storage of sterile instrument;
- ▶ first-aid kit.



Fig. 3.4. Dental unit for four-handed dentistry

Besides, a dental office should have sinks for hand washing and others for washing instruments.

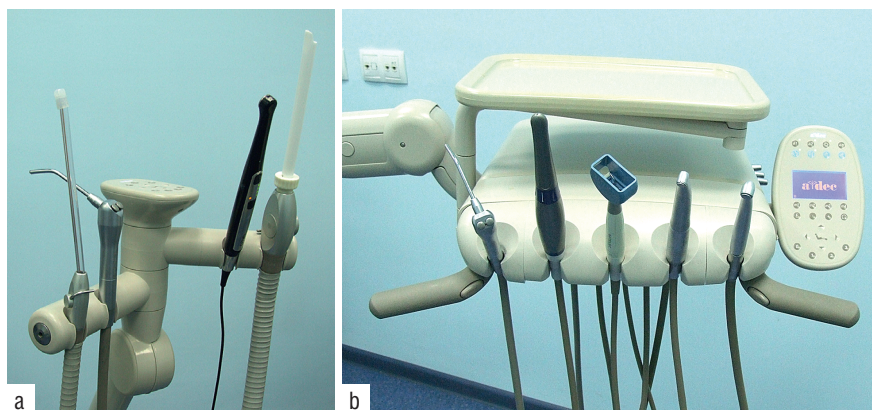


Fig. 3.5. Variants of doctor and assistant units: a — assistant's unit (from left to right): saliva ejector, air-water syringe, polymerization lamp, high volume evacuator; b — doctor's unit (from left to right): air-water syringe, intraoral camera, ultrasonic scaler, low-speed contra-angle handpiece, high-speed (turbine) handpiece

Along with sanitary and anti-epidemic measures ultraviolet bactericide irradiators (lamps) should be installed in dental office (see more in Chapter 6).

Instruments, materials and devices in dental offices of dentists of different specialties (e.g. apex locator, photopolymerization lamp, electric pulp tester, etc.) will be described in further chapters.

References

1. Григорьян А.С., Грудянов Н.А., Рабухина Н.А. и др. Болезни пародонта. Патогенез, диагностика, лечение. М. : МИА, 2004. 320 с.
2. Кузьмина Э.М. Профилактика стоматологических заболеваний : учебное пособие. М. : Поли Медиа Пресс, 2001. 216 с.
3. Снегирев М.В. Клинико-лабораторное обновление применения медицинского озона при лечении пульпита и периодонтита : автореф. дис. ... канд. мед. наук. М., 2010. 29 с.
4. Сурдина Э.Д. Состояние пульпы интактных зубов при генерализованном пародонтите тяжелой степени : дис. ... канд. мед. наук. СПб., 2007. 146 с.
5. Терапевтическая стоматология : учебник для студентов медицинских вузов / под ред. Е.В. Боровского. М. : Медицинское информационное агентство, 2004. 840 с.
6. AboutDSOs. Association of Dental Support Organizations.
7. Home-Association of Dental Support Organizations. TheADSO.org. Association of Dental Support Organizations. TheADSO.org. Retrieved 2016-05-18.

8. Dugan A. (November 30, 2015). Cost Still Delays Healthcare for About One in Three in U.S.
9. Oral Health Quality improvement in the era of accountability. Kellogg Foundation. December 2011.
10. Picard J. Competition's latest battlefield — the practice of dentistry. The Hill. Retrieved 2016-03-21.
11. Quality Measurement in the New Era of Dentistry and Healthcare. University of New Mexico, Department of Medicine.
12. Vagner V.D. Tutorial Guide in Dentistry. Omsk, 2000.
13. Winegarden W/ (December 8, 2015). The Health Care Sector Needs Innovation, Not Regulation. Forbes.
14. Winegarden W. Benefits Created by Dental Service Organizations. Pacific Research Institute.
15. Opravin A.S. et al. Organization of Dental Service to Population. Arkhangelsk, 2011.