

Original Research Article

Dental equipment - a factor for competitiveness of dental practice

Abstract:

Introduction: Maintaining a competitive level in the market of dental services in modern working conditions requires a new approach and updated equipment in the dental practices. **Objective:** To analyze the importance of updating the equipment for profitability of the dental practice in the conditions of market mechanisms. **MM:** Anonymous survey is conducted among the Doctors of Dental Medicine (DDM) on the territory of the 28 regional Offices of the Bulgarian Dental Association (BgDA) / 2011-2013. Data is processed with SPSS 16.0. **Results:** Most of the offices show tendency to be supplied with more modern equipment. The modernization of the equipment is going at an uneven pace for the individual groups. 72.62% of the doctors under 30 and 68.48% from 31-40 years old work with units purchased after 2000. 55.1% of the dental units are Bulgarian-made in opposition to 24.8% which are imported. The data show: 11.21% of participants are working in newly purchased dental offices, 22.66% - with new dental units, 4.79% (59 DDM) - with new X-ray machines, and 54.51% (671) have purchased other new equipment. **Conclusion:** Gradual planned renewal of modern dental practices. Enrichment of additional technical resources.

Key words: dental equipment, dental practice, dental office, new dental purchases

Introduction

Modern working conditions and maintaining a competitive level in the market of dental services requires a new approach and updated equipment in the practice. The changed socio-economic conditions require maximum attention to every detail of the accoutreatments, the design, the appearance of the practice (**Error! Reference source not found., Error! Reference source not found.**). Financial projects for new equipment, new opportunities and associated risks are important (**Error! Reference source not found.**). A new challenge is the dilemma of buying or renting an office - how profitable it is to own your own commercial space (**Error! Reference source not found.**). Significant knowledge of ergonomics and its practical application is vital for the prevention of musculoskeletal disorders. The role of ergonomics in equipment to prevent those work-related diseases is worthy of attention (**Error! Reference source not found.**).

Aim and Purpose

To analyze the importance of updating the equipment for the competitiveness of dental practice in the conditions of market conditions.

To establish the age of the machinery and its renewal

To establish work with imported and domestically produced units.

To identify the usage of additional equipment in the dental practices.

Material and Methods

The monitoring was conducted in the form of a direct anonymous survey as of 2011-2013. A representative sample of the dentists registered with the 28 regional regional offices of the Bulgarian Dental Association was included.

The actual study was preceded by a pilot study. Data were collected as follows: for the pilot study September-December 2011; for the real one - in the period January 2012 - September

2013. The data were processed with SPSS. Of the 1,900 questionnaires distributed, proportionally in all districts of the country, 1,331 (including 175 pilots) attended the postgraduate seminars of the RO of the BgDA¹, which is 16.15% of the total number of DDM², with 95% confidence interval (15.40% ÷ 17.00%), with a response rate of 70.10%.

Results

The available dental units were divided into two groups. The continuous improvements of the dental technology are leading to development of the market. Parallel to that, modernization of the dental equipment is observed. At the moment, the use of Bulgarian units is still prevailing. In order to specify, without defining the brands, the used equipment is conditionally included in two groups. Each group is divided into two subgroups. The first group is including machines placed in service before 1990, and subgroups - before and after 1980. The second group includes machines purchased and installed in offices from 1991 to 2011. In this group the subgroups are: 1991-2000 and after 2000 (Table1).

Table 1 Distribution of DDM depending on the year of production of the dental unit

The year of production of the dental units, used in dental office			
Before 1990 r.		After 1991 r.	
Before 1980 r. n (%)	1981-1990 r. n (%)	1991-2000 r. n (%)	After 2001 r. n (%)
64 (6, 17%)	150 (14, 46%)	295 (28, 45%)	528 (50, 92%)
TOTAL I-st group: 214 (20,63%)		TOTAL II group: 823 (79,37%)	
TOTAL: 1037 (100%)			

Most of the offices show tendency to be supplied with more modern equipment (823 machines purchased after 1991, compared to 214 purchased before 1990). This is an indicator that would lead to more rational, efficient and modern dental care for patients.

The data show that the modernization of the equipment is going at an uneven pace for the individual groups. The largest number of units made between 1991 and 2000 are purchased from dentists with age 41 and plus years old, while those made after 2000 are purchased from the dentists with age until 40.

A statistically significant relationship is established between the renewal of the units and the age group of the dentists who have worked in those dental practices. Sixty-one (72.62%) of the doctors in the first age group and 126 in the second group (68.48%) work with units purchased after 2000. This is related to the desire to improve the quality of dental care among young colleagues and at the same time only 28.43% (29 doctors) of over 60 years old renew their machinery with units after 2000. The trend is reversed with the old machinery: with machines made before 1980 work 1.19% of DDM from the age group under 30 and 15.69% of those over 60 (Table2).

¹ Regional offices of the Bulgarian Dental Association (RO BgDA)

² Doctors of Dental Medicine (DDM)

Table 2 Distribution of DDM depending on the year of production of the dental unit and the age group

Age group Which year is the dental unit, you're working with?	≤ 30 n (%)	31 ÷ 40 n (%)	41 ÷ 50 n (%)	51 ÷ 60 n (%)	> 60 n (%)	Total n (%)
< 1980	1 (1,19)	8 (4,35)	9 (2,95)	30 (8,45)	16 (15,69)	64 (6,21)
1981-1990	14 (16,67)	13 (7,07)	41 (13,44)	65 (18,31)	17 (16,67)	150 (14,56)
1991-2000	8 (9,52)	37 (20,11)	80 (26,23)	127 (35,77)	40 (39,22)	292 (28,35)
> 2001	61 (72,62)	126 (68,48)	175 (57,38)	133 (37,46)	29 (28,43)	524 (50,87)
Total	84 (100,00)	184 (100,00)	305 (100,00)	355 (100,00)	102 (100,00)	1030 (100,00)

The data presents that 747 (55,10%) of the participants are working with Bulgarian made units, 337 (24,80%) – with imported ones and 273 (20,10%) give a vague answer "Other". Important fact is that 669 of the machines, made in Bulgaria, are older models (Media, US-5, US-7) and 78 are more contemporary - "Micromotor", "Anvita". The biggest part of the imported machines are Hirana – 91, and second and third are respectively Siemens - 65 and KAVO - 42.

In the present study the data about the distribution of additional equipment in dental offices shows that one thousand three hundred and four of the participants answered with more than one answer. One thousand one hundred and eighty one DDM are using photopolymer lamp (90.57%), 1086 DDM are using autoclaves (83.28%), 918 DDM are using ultrasound machine (70.40%), 339 DDM are using laser devices (26%) (also includes doctors who use a laser located in a foreign office). X-ray machines in offices are becoming more and more common, despite the complicated procedure for their legalization. Two hundred and forty-nine of the respondents (19.10%) indicate that the office in which they work also has an X-ray for segment graphics and it can be assumed that some of them gave such an answer in the sense that they rely on X-rays (Fig.1).

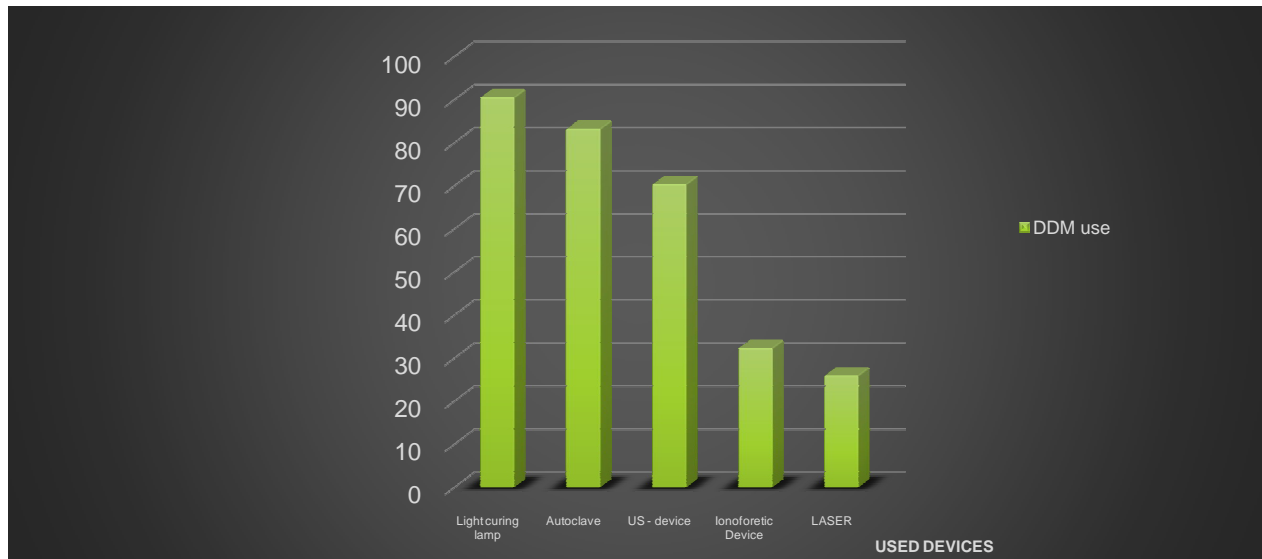


FIG. 1 Distribution of additional equipment in dental offices

The complexity of the reports and the requirement of the NHIF³, the use of newer technologies and communications have led to widespread use of computer technology. In the last three years, 692 computers were purchased, which represents 56.21% of the responding dentists.

Out of 1261 respondents, who gave more than one answer, it is clear that not every employee has a computer, but under a contract with the NHIF he is obliged to use this technique and probably relies on his colleague. The number of those doctors who use additional medical equipment outside the offices where they work is significantly higher. All respondents use various radiographs, adequate to the requirements for accurate diagnosis of the disease.

All participants (excluding those, working only in the field of oralsurgery) are using the services of dental technician. The number of dental clinics with their own dental technician laboratories is insignificantly small (Fig.2).

³ National healthcare Insurance Fund - NHIF

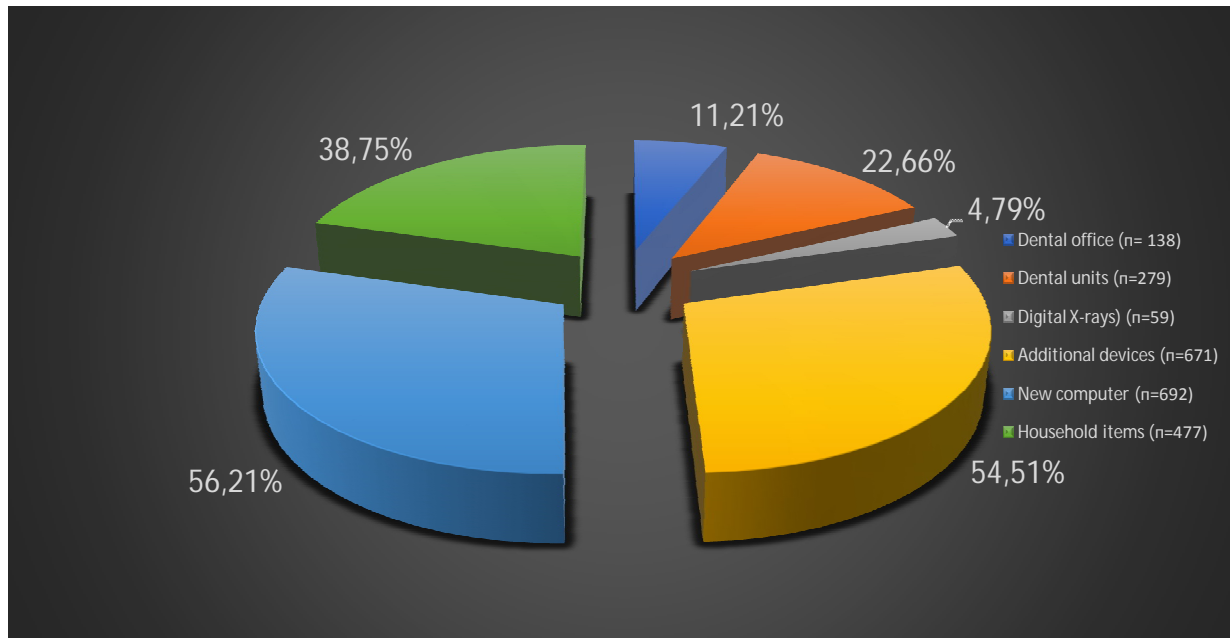


FIG. 2 Distribution of DDM by newly purchased equipment for the practice during the last three years

There is a clear tendency to buy computer equipment and accessories in all age groups. There is a steady trend for the purchase of household items (cleaning and disinfecting agents, towels and other aids). The big interest in buying of new dental units among the dentists of age of 60 years old and over is most likely in anticipation of a future dentist in the family. Desire to buy a new dental office, among dentists above 41 years decreases, reaching almost zero in at the age over 60 years (Fig.3).

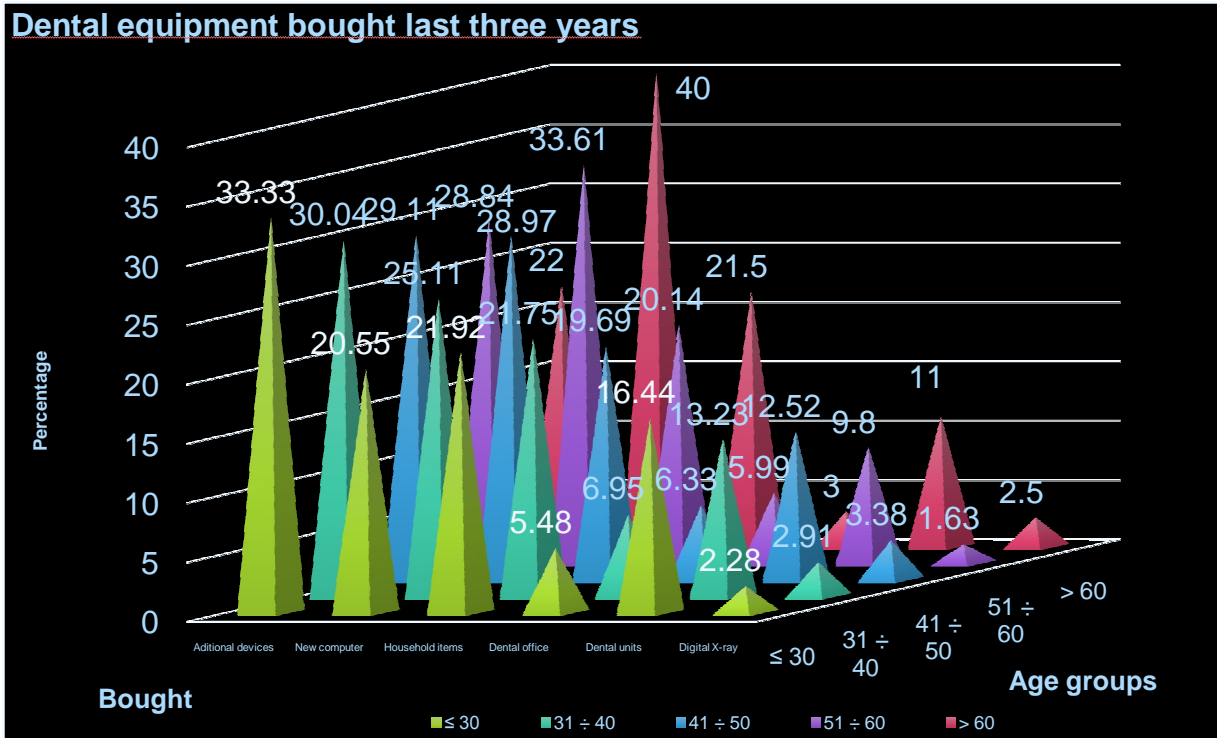


FIG. 3 Distribution of DDM by new equipment purchased in the last 3 years and age group

From the present study the trend to update equipment in private dental offices is clear. This is definitely dictated by the conditions set by the market economy. Without these conditions, competitiveness decreases, which reduces revenues and makes it much more difficult for the cabinet to self-finance (Fig.4).

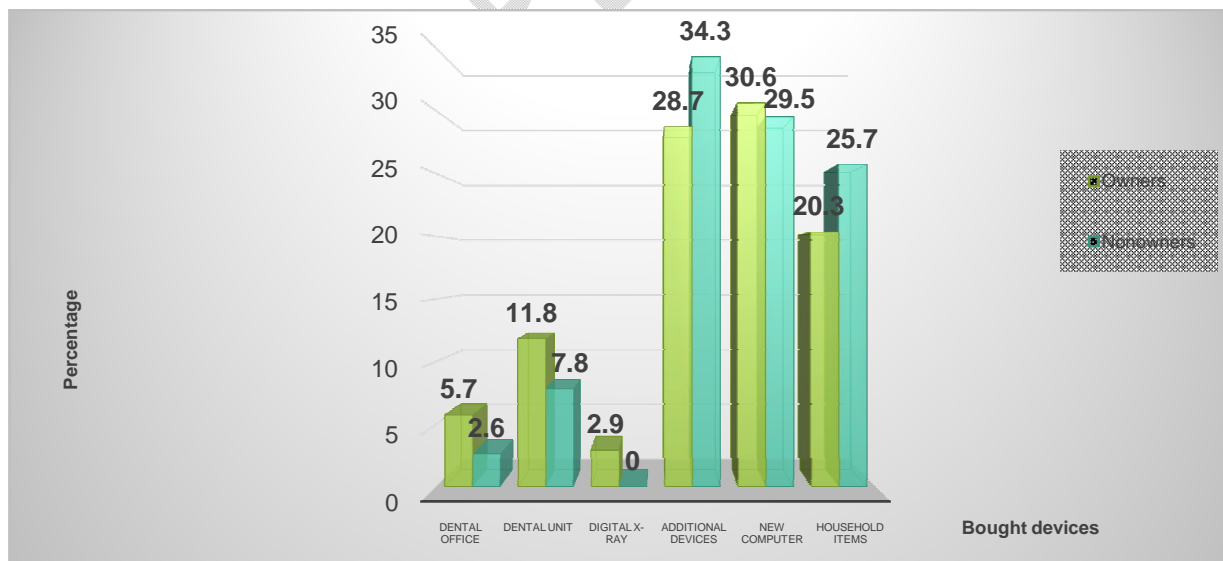


FIG. 4 Distribution of the renewed dental property according to ownership

The difference in the attitude of those who are owners and those who work as employees, at a percentage or rent is impressive. Owners are more likely to invest in a dental office, dental

unit, computer equipment and X-ray equipment. This is the basis of their development and work in modern conditions and maintaining good dental practice. At the same time, non-owners are more inclined to buy other equipment and household items – just to maintain their work.

Discussion and conclusion

The equipment is also the basis for improving productivity, especially in the conditions of market-economic relations. Its renewal and improvement are part of the world's technological progress in every era (**Error! Reference source not found.**). On the Bulgarian market there is a gradual renewal of machinery most of which is imported equipment (**Error! Reference source not found., Error! Reference source not found.**). With the increasing use of social networks and computer technology, it leads to an increasing saturation of dental practices with computers of the latest generation. At the same time, communication between doctors and patients is improving, as well as between doctors themselves and them and commercial companies and other institutions. This determines at the same time the standard of good dental practice (**Error! Reference source not found., Error! Reference source not found.**).

It is important to take into account the differences between the modern market and the previous - planning environment. With the change of the role of DDM, from employed by the state on a salary to being the responsible and interested in the development of his practice. In the condition of planned economy, complex and expensive equipment is purchased and maintained by the state. The government has also been paying for other consumables - electricity, water, heating, materials. And in these conditions, a better equipped office together with a more qualified doctor lead to a better quality of treatment. However, in those conditions the possibility of a discrepancy between the limited state resources and the initiative of the doctor is great. We have a contradiction between what the dental specialist wants as equipment and what the state provides.

In the conditions of 100% private practice, modernization depends on the financial capabilities of the doctor himself. From his initiative and entrepreneurship. Of course, here again we can see a discrepancy between what he wants and the possibilities for providing it. The costs in this case are solely at the expense of the practitioner. Therefore, the existence and development of dental practice depends primarily on profit, or income and expenditure balance (**Error! Reference source not found.**). The private practitioner is required to know the legal requirements in the field of funding (**Error! Reference source not found.**).

Seema Sharma states that for good modern dental practice, "business acumen is as important as clinical experience." According to her, dental practice has two goals: to provide excellent patient care and to generate income for the people who work in it. For the owner of the practice there is an additional goal: to invest in the sustainable development of the business, which may be sold at some point in the future. Modern dental practice needs:

- Increase in its capacity and production at all times to maintain and raising revenue;
- Reducing possible losses and maintaining and increasing profits;
- The dentist as a team leader to have an active approach to continuous training and improvement of their own and the staff's skills (**Error! Reference source not found., Error! Reference source not found.**).

From the above, the tendency for modernization of the equipment in the private dental offices is clear. This is definitely dictated by the conditions set by the market economy. Without these conditions, competitiveness decreases, which reduces revenues and makes it much more difficult for the cabinet to self-finance.

The gradual increase in the number of owners of dental offices logically leads to the renewal of equipment and improvement of the material base - large private offices, new units, X-ray machines, etc. are been purchased. Modern dental practice is equipped with a growing range of equipment: ultrasound machine, autoclave, photopolymer lamp, iontophoresis machine, laser machine and others. The trend for technological innovation, staffing and development of the dental team is confirmed by other studies (**Error! Reference source not found., Error! Reference source not found.**). In newly purchased dental offices have been working 11.21% (138 respondents). With new dental units are working 22.66% (279 of the answers), 4.79% (59 DDM) are using new X-ray machines and 54.51% (671) have purchased new other equipment. The number of practices relying on computer data processing and web transfer is increasing sharply. With new computers have been working 671 (56.21%). This trend is also observed in other European countries (M. Nasser) (**Error! Reference source not found.**).

References

1. Demaree H, Reshaping your space, J Mass Dent Soc, PMID: 9709591, 2006;55(1):32-4
2. Winter L, Office facelift: new look improves practice, Dent Econ, • PMID: 6945167, 1998 Mar;88(3):58-62, 100
3. Catalano David, Financial pitfalls of expansion projects (and how to avoid them), Today's FDA, PMID: 16683512, Nov-Dec 2011;23(7):40-1, 43
4. Cirrus Consulting Group, Buying or leasing--the dental dilemma: why owning your own commercial space is not as profitable as you might think, Dent Mater, PMID: 22413584, 2012 Jan;28(1):3-12, doi : 10.1016/j.dental.2011.10.014. Epub 2011 Nov 26
5. Rajeswari S Raja 1, Triveni M Gowda 1, Tarun Ab Kumar 1, Kanchan Arya 1, Dhoom Singh Mehta 1, Assessment of interns and postgraduate dental student's knowledge regarding equipment ergonomics, DOI: 10.4103/0970-9290.186246
6. Caribashev, Kr. Organization of dental care. S., Med. and physics, 1989; 230
7. Katrova L. Professional-demographic aspects of structural reform in dentistry. - Stomatol. Review, 1998; 29 (2): 11-28
8. Katrova L. Kr. Tsokov. Current status of the dental practice in Bulgaria. Meta-analysis. - J. IMAB - Annual Proceeding. 2012; 18 (2): 181-187. DOI: 10.5272/imab.2012182.181
9. Popov, M. Health reform in Bulgaria. Sb. lessons I ч. MZ, ES, progr. PHARE, Macedonia pres. 1997, 380 s.
10. Celeste R.K., P. Nadanovsky J. Fritzell Trends in socioeconomic disparities in the utilization of dental care in Brazil and Sweden. - Scand. J. Public Health, 2011; 5; 39: 204-212; doi: 10.1111/j.1600-0528.2010.00585
11. Gehshan S., Snyder A. Why public policy matters in improving access to dental care. - Dental Clinics of North America, 2009 Jul. 53 (3): 573-589
12. Katrova L., Kr. Cokov and Cv. Katrova. Changes in the social-professional status of dentists in Bulgaria in the course of health reform. IMAB. 2002; 8 (1): 18-21
13. Seema Sh. Clinical governance and the role of the dental nurse. – Dental Nursing, Nov. 2010; 6 (11): 648-665.
14. Seema Sh. Financial management: Know your numbers, know your business. – Dental nursing, Nov. 2010; 6 (11): 644-646.
15. Nasser M., Z. Newton, et al. Patients record systems: effects on dental practice and patient oral health outcomes (Protocol). Cochrane Database of Systematic Reviews. 2010; 7.
16. World Bank. Knowledge for Development. World Development Report 1998-1999. Oxford University Press; in 1999