PRELIMINARY STUDY CONCERNING LABOR CAPACITY ENHANCEMENT THROUGH KINETOTHERAPY OF DENTAL TECHNICIANS

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Abstract: *Dental technician profession and working conditions are very difficult. Harsh working conditions (working position, extended static physical effort etc.) and living environment (climate) orient us toward explaining the occurrence of some physical deficiencies, occupational diseases caused by pollutants from work, which can lead to cardiovascular, respiratory, digestive, mental and other diseases. Considering the need to undertake such a study, we proposed the assessment of effort capacity of this professional category (dental technician), as it enables testing of multiple functions of the body: cardiovascular, respiratory, metabolic, muscular strength and endurance, articular amplitude, psycho-volitional states. The engagement of body in various dynamic and sustained efforts through application and compliance of strategies for practicing physical training, proved to be crucial for improving the cardio-respiratory functional performance, respectively improve aerobic fitness of dental technicians.*

INTRODUCTION

It is well known that the dental technician is the provider of a professional activity carried out most of the time in a seated position with static physical effort (labor), for long periods.

This is a very complex situation and it is doubled by the effective work in some very unfavorable ambient conditions. Temperature and high humidity of air, the presence of various physico-chemical factors (professional powders, biological pathogenic factors passed on through various tray, occlusal rims, dental wax templates between clinical compartment and dental laboratory), and also exposure to vibrations make the dental technician to be at risk of disease and body related decline.(1-5)

Thus, in the last two decades, the increase of respiratory morbidity and cardiac disease among dental technicians generated a continuous concern of specialists in the field to reduce them. Specifically, latest advancements in Kinesiology, managed to keep up with the dynamics of morbidity, in the history of this medical specialties being mentioned discoveries that have revolutionized in their time this quite controversial field through efficiency, both prophylactic and therapeutic.

In order to combat the body deterioration among dental technicians due to sedentary lifestyle, work under certain adverse conditions related to the environment, as well as growing older, it requires the implementation of an active and healthy lifestyle. In this regard, by its basic means - physical exercise (aerobic exercise), Kinetotherapy accomplished an important objective in improving respiratory and cardiac functions, improve strength and duration of muscle contraction and body immunity.(6,7) The purpose of this study is to establish efficient and effective methodology for evaluation and monitoring of dental technicians as well as complex physical training individualized to each subject.

PURPOSE

The aim of this study, presenting a preliminary character, is represented by finding methods to help improve health and enhancing performance at work of dental technicians by improving motor skills and effort capacity.

MATERIALS AND METHODS

Research hypotheses addressed in this study are described as follows:

- **Hypothesis 1:** We believe that physical training is vital for improving aerobic fitness of specialists in dental technology, with important contributions in improving their health.
- **Hypothesis 2:** We consider that practicing aerobic workouts on a regular basis is a means with significant neuro-psychic valence through important decrease of mental tension, educating the will, increase motivation, substantially contributing to improve the quality of life of practitioners from dental laboratory.

Specific research methods of applied kinesiology and the purpose of their use are:

- Conversation method (anamnesis interview) - to obtain important information regarding the living and working conditions, the number of hours assigned for professional activity, physical activity level of the subject, the type of physical activity practiced, the psycho-emotional state, elements that have decreased effort capacity of subjects in certain daily activities;
- Observation method - sensing characteristic aspects such as attitude, anthropometric and somatoscopic characteristics, constitutional type, participation in kinetic programs of subjects;
- Experimental method - confirmation or rejection of the assumptions related to the effects of chosen kinetic

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programs and comparison between the two study groups through the effects on established parameters;

- Statistical and mathematical method - highlighting the functional gain obtained by dental technicians, the effectiveness of programs proposed by us versus achieved benefits, as well as comparative analysis of the two groups - control and experimental;
- Graphical method - comparative evolution representation of both experimental and control groups.

Presenting the study group

The study group submitted to research consisted of 40 dental technicians, divided into two groups, experimental and control group, each group consisted of 20 subjects each. The selection of subjects was based on the agreement for inclusion in one of the research groups (experimental or control).

The differentiation between the experimental group and the control group was made through the different kinetic program applied: the control group was implemented a Classic program at gyms, with a frequency of 2 times a week, and a new built kinetic program was applied to the experimental group, with a frequency of 3 times a week. The differences of aerobic workout applied to experimental group consisted of both the grading of effort and the types and modalities of application of exercises, after establishing certain functional parameters of the subjects.

The main kinetic operational objectives are presented as follows: muscle toning, blood circulation stimulation, increase of respiratory capacity, increased of effort capacity, increased participatory role and active involvement, improved quality of life, and improve overall health.

In creating exercise programs with the main specific objective of developing aerobic capacity of the dental technician body , was taken into account their professional activity and thus we considered useful the combination of exercises for postural muscles toning with a role in keeping the spine straight and to stabilize the body. Regarding aerobic training modalities, most commonly used were the exercises of walking, running, exercises stepper, bicycle and treadmill.

RESULTS

Description of study groups

Both control and experimental group were each consisting of 20 subjects, dental technicians.

Analysis of demographic characteristics

Regarding gender feature, the experimental group consisted of 11 female subjects and 9 male subjects and the control group consisted of 13 female subjects and 7 male (table no. 1).

Table no. 1. Table of Frequency - Gender of subjects

	Experimental Group		Control Group	
	Absolute frequency	Relative frequency (%)	Absolute frequency	Relative frequency (%)
Male	9	45%	7	35%
Female	11	55%	13	65%
Total	20	100%	20	100%

Regarding the age of subjects, for to experimental group the age was between 26 and 49 years, with an average of 36.5 years and a standard deviation of 7.5, and in the control group between 24 and 49 years with a mean of 38.6 years and a standard deviation of 8.8 (table no. 2).

Table no. 2. Table with descriptive statistical indicators - Age of subjects

Indicator	Experimental Group	Control Group
Average	44,6	38,6
Median	36,5	40,5
Standard deviation	7,5	8,8
Minimum	26	24
Maximum	49	49

Regarding living environment, most subjects, in both groups, have originated in urban areas (table no. 3).

Table no. 3. Table of Frequency - The living area of the subjects

	Experimental Group		Control Group	
	Absolute frequency	Relative frequency (%)	Absolute frequency	Relative frequency (%)
Urban	17	85%	15	75%
Rural	3	15%	5	25%
Total	20	100%	20	100%

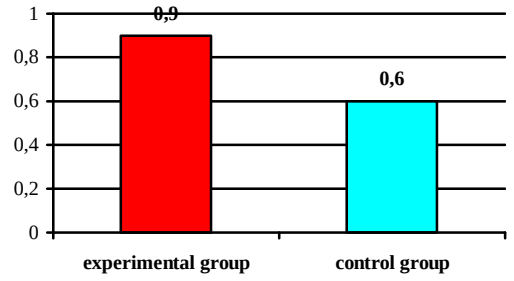
Evolution of chest perimeter measurement

Relaxed thoracic perimeter in both groups is presented as follows:

- for to experimental group, the mean of the relaxed chest perimeter was in the initial testing, 92.3 cm, with a minimum of 84 cm and a maximum of 100 cm and a standard deviation of 5.2, and in the final testing was 93.2 cm, with a minimum of 85 cm and a maximum of 101 cm and a standard deviation of 5.2;
- for the control group, the mean of the relaxed thoracic perimeter was in the initial testing, 89.3 cm, with a minimum of 82 cm and a maximum of 96 cm and a standard deviation of 4.2, and in the final testing was 89.9 cm with a minimum of 83 cm and a maximum of 96 cm and a standard deviation of 4.3.

Comparative analysis of the difference between the means of the two groups revealed that the evolution of experimental group was better, the difference between the experimental group average being 0.9 and 0.6 for the control group (figure no. 1).

Figure no. 1. Relaxed chest perimeter



Further, to understand the sequence conducted in this preliminary study, the term of “chest elasticity” must be described. This represents the difference between the chest perimeter in maximum inspiration and in maximum exhalation.

Chest perimeter in maximum inspiration and maximum exhalation

- Experimental group:
  - The average for the *chest perimeter* in the maximum inspiration was in the initial testing, 94.9 cm, with a minimum of 85 cm and a maximum of 103 cm, and in final testing was 95.9 cm, with a minimum of 86 cm and a maximum of 104 cm;
  - The average for the *chest perimeter* in maximum exhaling was in the initial testing 90.3 cm, with a minimum of 82 cm and a maximum of 98 cm, and in the final testing, was 90 cm, with a minimum of 81 cm and a maximum of 98 cm.
- Control group:
  - The average for the *chest perimeter* in maximum inspiration was in the initial testing, 92.4 cm, with a minimum of 84 cm and a maximum of 98 cm, and in the final testing was 93 cm, with a minimum of 84 cm and a maximum of 98 cm;
  - The average for the *chest perimeter* in maximum exhalation in the initial testing was 87.8 cm, with a minimum of 80 cm and a maximum of 94 cm and in the final testing, remained unchanged at 87.7 cm, with a minimum of 80 cm and a maximum of 94 cm.

Comparing the difference between the means of the two groups revealed that a better evolution was recorded in the experimental group, respectively:

- For chest perimeter in maximum inspiration the difference between the means for the experimental group was 1, and for the control group was 0.6 (figure no. 2);
- For chest perimeter in maximum exhalation, the difference between the means for the experimental group was 0.3, while for the control group was 0.1 (figure no. 3).

Figure no. 2. Chest perimeter in maximum inspiration

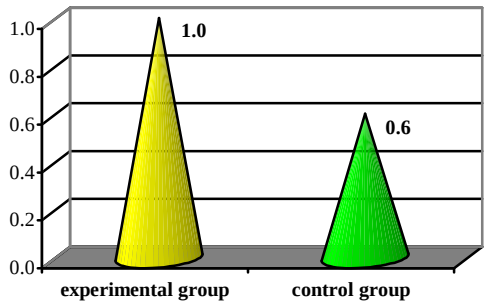
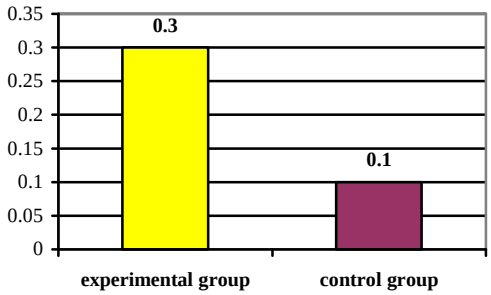


Figure no. 3. Chest perimeter in maximum exhalation

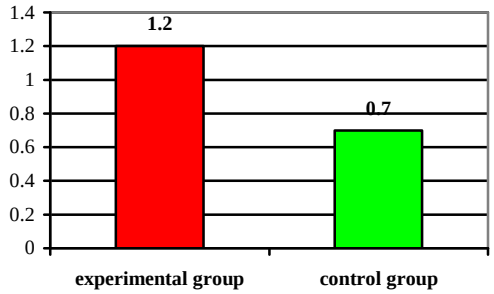


Making the difference between the chest perimeter in maximum inspiration and maximum exhalation, we obtained the following:

- for the experimental group, in the initial testing, the average of *chest elasticity* was 4.6 cm with a minimum of 3 cm and a maximum of 5 cm, and in the final testing the average was 5.8 cm with a minimum of 4 cm a maximum of 7 cm;
- for the control group, in the initial testing the average for the *chest elasticity* was 4.6 cm, with a minimum of 3 cm and a maximum of 6 cm, and in the final testing the average was 5.3 cm, with a minimum of 4 cm a maximum of 7 cm.

The comparative analysis of the difference between the means of the two groups resulted in a better evolution of the experimental group. This difference was 1.2 in the experimental group and 0.7 in the control group (figure no. 4).

Figure no. 4. Chest elasticity

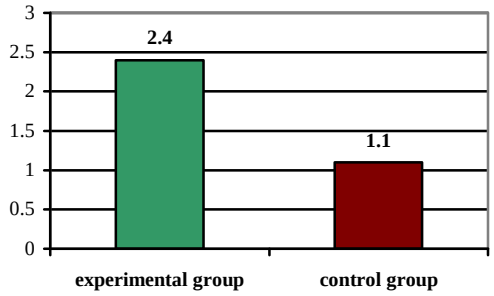


The efficiency of cardiovascular system index (Ruffier test index) was described as follows:

- For the experimental group, in the initial testing the average for *cardiac resistance* index was 8.7, with a minimum of 5.5 to a maximum of 13.2, and in the final testing the average was 6.3, with a minimum of 3.6 to a maximum of 10.6;
- For the control group, in the initial testing the average for *cardiac resistance index* was 8.7, with a minimum of 5.5 to a maximum for 13.2, and in the final testing average was 7.6, with a minimum of 5 and a maximum 11.6.

Comparative analysis of the averages of the two groups shows that, for *cardiac resistance index*, the experimental group had a better evolution. The difference between the means for the experimental group was 2.4, and for the control group 1.1 (figure no. 5).

Figure no. 5. Cardiac resistance index



DISCUSSIONS

Based on the results, we bring the following aspects:

1. The engagement of body in various dynamic and lasting efforts through implementation and compliance of strategies for practicing the physical training, has been crucial in improving the cardiac-respiratory functional performance, as evidenced by qualitative and quantitative leap, statistically significant, recorded from one stage to another of cardiac resistance index (increase the quality of aerobic fitness) in the experimental group of dental technicians, which are verifying the assumption No. 1.
2. Practicing physical training regularly has a favorable influence on health of the cardiovascular system with substantial contributions in improving the quality of life of dental technicians, which are verifying the hypothesis No. 2**.**
3. In this study, even if it has a preliminary character, no significant differences in improving effort capacity were found by gender of subjects.
4. To obtain favorable effects in implementing programs of kinesiology among dental technicians practitioners it should be take into account their professional activity, which involve decreased of physical activity, vicious positions, as well as clinical and functional status of each subject.
5. The education and regular physical activity contribute to the primary prevention of many chronic conditions such as cardiovascular diseases, hypertension, obesity, depression and osteoporosis, being associated with a lower risk of premature death.

CONCLUSIONS

Finally, it should be appreciated that the profession of dental technician, even if at first glance offers many advantages, particularly financial, in terms of health; it is extremely deficient, cardiac-respiratory affections among this professional category, being extremely frequent.

Thus, to combat body deterioration among dental technicians due to sedentary lifestyle, stress, work under certain adverse conditions related to the environment, as well as growing older, it requires the implementation of an active and healthy lifestyle. Specifically, we believe that physical training of any kind is vital for improving aerobic fitness of specialists in dental technology, with major contributions in improving their health status.

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