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STUDY OF BREATH HOLDING TIME AND LUNG FUNCTION TEST

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ABSTRACT :

Aim: To evaluate and compare the breath holding time and different lung function test in playing and sedentary group.

Material and method: This study was performs on 50 healthy male individuals. The age range is 20-32 years. It is divided in playing group and sedentary group. Each group has 25 individuals and performs breath holding time (BHTT) after normal and without forceful inspiration, deep inspiration (BDI) and hyperventilation (BHY) in chair sitting position at morning time. After completing BHT, performs lung function test i.e. FVC (Lit), FVC 0.5 (Lit.), FVC 1 (Lit.), FVC 3 (Lit.), PEFR (L/S), FEF 25-75 (L/S), FEF 2-12 (L/S), FEF 25%, FEF 50%, FEF 75% and MVV (L/Min) by computerized spirometry (MEDSPIROR). The data was analyzed by Graph pad in stat 3 versions by using unpaired student t test.

Results: On statistical study BHTT, BDI and BHY are very significant. The lung functions FVC (Lit), FVC 1 (Lit.), FVC 3 (Lit.), PEFR (L/S), FEF 25-75 (L/S), FEF 2-12 (L/S), FEF 25%, FEF 50%, FEF 75% and MVV (L/Min) are statistically significant but FVC 0.5 (Lit.) is not significant in playing than the sedentary.

Discussion: Improvement due to increase inhibitory stimuli, decrease airways resistance and oxygen consumptions in tissue. Improve the tone of smooth muscle and enhance the parasympathetic activity.

Conclusion: The breath holding time in normal inspiration, deep inspiration and hyperventilation is more in playing people than the sedentary people and same way lung function (objective parameter) were also more in playing people.

Key words: Breath holding time, sedentary, playing, lung functions

INTRODUCTION: Lung is a vital organ influencing the inspiration and expiration. Studies are performed in various COPD and other lung diseases. In healthy person, lung functions are also studied. The breath holding time is prolonging and better in residential student than non residential student by Khodnapur Jyoti et al.(1) In relation to athletes, yogis and sedentary life style Shivesh Prakash et. al. found that the athletes and yogis has better pulmonary function test than the sedentary life styles. (2) Lung function is different individuals according to age, sex, height, weight and physical working capacity. This study is design in educational institution having sedentary and playing both type of life style. This study tries to compare the breath holding time and various lung function test by computerized spirometry.

OBJECTIVE OF STUDY: To evaluate and compare the breath holding time and lung function test in sedentary and physical activity in relation to playing group.

MATERIAL AND METHODS: For the study sample size has 50 healthy individuals, divided in to two groups according to their sports interest and sedentary life. Both have mentally common working capacity in education. We selected 25 male in each groups. The playing groups are having regular playing the cricket, shooting ball, badminton and running. Age groups are 20 to 32 years old from Na-

tional Institute of Ayurveda, Jaipur from different part of country. The lung functions were performed by Medispiror Computerized spirometry. Statistical analysis was performed by Graph pad 3 in stat applying unpaired t test.

Exclusion criteria: Any person having physically distorted or congenital malformation, problems with cardio respiratory disorder, any type of sickness and non cooperative person.

Data collection: Data were obtained from sharir kriya department, NIA campus Jaipur. Selection of individuals is random by asking the outdoor game interest and observing the outdoor game participation. Sedentary group are those candidate who have not keen interest in outdoor game as well as not doing any physical exercise. We have selected 25 people in sedentary groups.

Breath holding time at tidal Volume: both groups were performed breath holding time at inspiratory tidal volume (BHTT), after deep inspiration (BDI) and at after hyperventilation (BHY) five times by providing five minute interval or as subject get relax and get ready to perform the experiments. As taking normal respiration, advised to subject, in routine respiration completing the inspiration and just starting of expiration start the stopwatch and hold the expiration as he desired. Stop the stopwatch just doing the expiration. Noted the time and repeated five times. The second step has done by taking deep inspiration forcefully and held the respiration as initiation of expiration and hold till desired by noting the time. Repeat the phenomenon five times by appropriate time. The third step is performed by hyperventilation. Repeated expiration and inspiration for one minute and ask him to hold the respiration as he desired for five times.

Pulmonary function test: Each individual were performed PFT analyzed by Medispiror computerized machine. The physically and mentally calm people were performed PFT. The parameters are FVC (Lit), FVC 0.5 (Lit), FVC1 (Lit), FVC3 (Lit), PEFR (L/s), FEF 25-75 (L/S), FEF 2-12 (L/S), FEF 25%, FEF 50%, FEF 75% and MVV (L/Min) in both groups playing and sedentary groups five times repetition.

Results: The BHTT, BDI and BHY have longer time in playing groups than sedentary group. The calculation is done by unpaired t test in online graph pad stat 3. Its p value is less than 0.0001. it is highly significance. (Table 1)The parameters are FVC (Lit), FVC1 (Lit), FVC3 (Lit), PEFR (L/s), FEF 25-75 (L/S), FEF 2-12 (L/S), FEF 25%, FEF 50%, FEF 75% and MVV (L/Min) all have significant except FVC 0.5 (litre). (Table2)

DISCUSSION: The breath holding time duration was increased in deep inspiration than normal inspiration because the volume of oxygen in deep inspiration is more than normal inspiration volume. The tidal volume is about 500 ml and deep inspiration is about 3300 ml, the volume of oxygen in hyperventilation is almost same as deep inspiration but duration is more than deep inspiration because during hyperventilation extra CO2 was washed out then Pco2 become lower side. The reflex from carotid bodies start to inspired air(3). A homologous study was performed by Khodnapur Jyoti P in residential and non residential school student, states that the BHT and endurance was good and significant in residential school. (1) Kulkarni et. al. worked out that the peak flow rate is more in residential school children than non residential. (4) Lakhera

SC et.al. states that physical exercises during growth may help in developing a reduced resistance to expiration and a greater endurance in respiratory muscles and same way the exercise play important role to enhance the BHT and lung function due to low mucosal resistance.(5) Chaudhari D et al has also found same result as worked by khodanpur jyoti P.(6) SHIVESH PRAKASH observed in their study that athletes has better lung function than sedentary life as parallel results were observed. Body tissue required low oxygen consumption in sedentary life.(7) During exercise Po2 in tissue decline from 23mmHg to 5mmHg, this active muscle becomes more oxygen negative and reach up to very low level. (8) The exercise gives stability in body and respiration also as mentioned in charak samhita.(9) Also mentioned the lengthen of respiration in character of vyayam.

CONCLUSION: The activity of lung function and breath holding time was good in playing group. The pulmonary function test by medispiror is better in playing group in all parameter except except FVC 0.5. The endurance and power of muscle increased.

Detail of abbreviations:

• Forced vital capacity in litre = FVC (Lit.)
• Forced vital capacity in litre at 0.5 second = FVC 0.5 (Lit.)
• Forced vital capacity in litre at 1 second= FVC 1 (Lit.)
• Forced vital capacity in litre at 3 second = FVC 3 (Lit.)
• Peak expiratory flow rate in Litre / second = PEFR (L/s).
• Forced expiratory flow 25% to 75% in Litre / second = FEF25-75 (L/S)
• Forced expiratory flow 2% to 12% in Litre / second = FEF2-12 (L/S)
• Forced expiratory Flow 25% = FEF 25%
• Forced expiratory Flow 50% = FEF 50%
• Forced expiratory Flow 75% = FEF 75%
• Maximum voluntary ventilation in Litre / minute = MVV (Lit./ Min.)

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