

УДК 617 (07.07)

DOI 10.11603/me.2414-5998.2020.2.11148

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## MASTERING ENDOSCOPIC SURGERY SKILLS BY SURGEONS

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## ЗАСВОЄННЯ ЛІКАРЯМИ ПРАКТИЧНИХ НАВИЧОК З ЕНДОСКОПІЧНОЇ ХІРУРГІЇ

**Abstract.** An informative experiment involved two groups of surgeons during the endoscopic surgery training. The first group comprised the doctors with left hemisphere dominant (right-handed); the second comprised the doctors with right hemisphere dominant (left-handed). Group 1 of doctors showed better and more effective practical skills in endoscopic surgery compare to group 2. According to the results of the educational experiment, it was established that the left-handed and right-handed doctors have different psychophysiological features and they comprehend the necessary practical skills in endoscopic surgery differently. For the effective and comprehensive development of practical skills in this discipline, more attention should be paid to persons with dominance of the right cerebral hemisphere.

**Key words:** practical skills; endoscopic surgery; psychophysiological state.

**Анотація.** Проведено педагогічний експеримент із двома групами лікарів хірургічних спеціальностей при вивченні ендоскопічної хірургії, які були поділені на дві групи. Перша група – лікарі з домінуванням лівої півкулі головного мозку («правші»), друга – лікарі з домінуючою правою півкулею головного мозку («лівші»). Встановлено, що лікарі першої групи краще та ефективніше засвоювали практичні навички з ендоскопічної хірургії порівняно з особами другої групи. На основі результатів проведеного педагогічного експерименту встановлено, що для ліворуких та праворуких лікарів-курсантів характерні різні психофізіологічні особливості і вони неоднаково засвоюють необхідні практичні навички з ендоскопічної хірургії. Для ефективного і повноцінного освоєння практичних навичок з даної навчальної дисципліни більшу увагу потрібно зосереджувати лікарям-курсантам із домінуванням правої півкулі головного мозку.

**Ключові слова:** практичні навички; ендоскопічна хірургія; психофізіологічний стан.

**Introduction.** In the training of a high skilled doctor, the full assimilation and mastering of a number of practical skills, related to the cell requests, is important. It allows performing the algorithms of various drug manipulations in full.

Today, there are significant technological changes in training, which necessitate search for new techniques. They would significantly accelerate the adequate training of experienced specialists with a qualitatively new level of knowledge [2, 3].

Recently, new surgical technologies have been intensively developing; endoscopic surgery is one of the greatest advances in clinical medicine among them. Endoscopic surgery is increasingly used by doctors of various surgical specialties, as it allows achieving the best results with minimal trauma. At present, surgical endoscopic methods are widely used in performing various surgical interventions: abdominal, thoracic, vascular, endocrine surgery, cardiac surgery, urology, obstetrics, gynecology. When studying endoscopic surgery, the search for innovative training methods

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is important. It allows efficient and comprehensive training of high skilled surgeons of specific specialties. At present, there are no adequate, comprehensive practical methods and systems for training high skilled specialists in endoscopic surgery.

**The aim** – to study the features of mastering endoscopic surgery skills by doctors depending on their psychophysiology.

**Theoretical framework.** A pedagogical experiment was conducted to evaluate the effectiveness of mastering practical skills in endoscopic surgery by surgeons. The experimental study involved 211 surgeon-trainees, who passed advanced training courses at the Endoscopic Surgery Unit of I. Horbachevsky Ternopil National Medical University. These trainees were divided into 2 groups. Group 1 comprised right-handed doctors, group 2 – the doctors with left hand dominant (left-handers). A Luhansk sensibilized questionnaire for left-handedness in children was used to determine right-handedness and left-handedness [5, 6].

Among the surveyed trainees 106 were right-handed (88.2 %), and 26 (11.8 %) – left-handed.

The following practical skills in endoscopic surgery were performed for evaluation:

1. Knotting with endoscopic tools.
2. Clipping.
3. Tissue separation using endoscopic devices.
4. Cholecystectomy.
5. Splenectomy.

These practical skills were assessed using a 12 point system. In the results analysis, the share of excellent, good, satisfactory and unsatisfactory grades, the results of doctors' anonymous survey were taken into account.

The analysis showed that the average score in the assessment of the practical skills mentioned above in the right-handed trainees was  $(8.40 \pm 0.12)$ , and in the left-handed persons –  $(7.18 \pm 0.09)$ . Thus, the figures presented with a statistically significant difference ( $p < 0.001$ ) differed from each other. In this case, the last digital value was lesser than the previous one by 14.5 %.

It was also established that the share of excellent grades in the trainees with a right hand dominant was 30.6 %, and in the persons with a left hand dominant – 20.0 %. There were more good grades compare to the excellent ones. Thus, 38.2 % of the right-handed trainees had got good marks for the performance of the skills listed. In the studied persons with the left-hand dominance, 8 persons had got good marks (32.0 %). The percentage of satisfactory

grades in this educational experience was 38.2 % and 32.0 % respectively. During implementation of these skills unsatisfactory assessment was also obtained. Consequently, 5.4 % of the trainees with right-hand domination got unsatisfactory grades as well as 20.0 % of the left-handed persons.

The results prove that the trainees with a right hand dominant have developed their skills and implemented them more proficiently than the left-handed ones.

Qualitative success in the assessment of the performance and mastering of the skills in the right-handed and left-handed doctor trainees also differed. Thus, in the right-handed individuals, qualitative success was  $(68.8 \pm 0.6)$  % and in the left-handed trainees  $(52.0 \pm 0.6)$  %. The figures reported were statistically significant at ( $p < 0.001$ ). In this educational experiment, the latter indicator was lower than the previous one by 16.8 %.

It is established that in recent years, educational science has been increasingly paying attention to and studying peculiar features of teaching, the efficiency and quality of mastering of disciplines and skills by right-handed and left-handed individuals [4–6]. Most researchers state that the psychophysiological differences of the right-handed and left-handed people are caused by differences in functions and dominance of the left and right cerebral hemispheres.

It is established that the left cerebral hemisphere, which dominates in the right-handed persons, is responsible mainly for development of sign information (counting, reading, languages, craft), the ability to analyze objects, processes and phenomena adequately: to decompose them into separate elements, to form and create logical chains. In the left-handed individuals, the right cerebral hemisphere predominantly dominates and tends mainly to generalization and synthesis, ensuring the integrity of perception [5, 6].

It should also be noted that the right and left cerebral hemispheres are interrelated. At the same time, the corresponding dominance of the right or left cerebral hemispheres determines the type of thinking of a person, their character, temperament, anxiety, degree of neuroticism, thinking promptness, memory, ability to concentrate and other psychophysiological features [6, 7]. It is also established that the left-handed individuals are more vulnerable, excitable and sensitive than the right-handed. The left-handed persons in stressful situations are often prone to pessimism and sadness. People with domination of the right brain hemisphere are characterized by weakness of will control, beha-

vioral control, they cannot easily restrain with emotions, including aggressiveness.

The part of the motor analyzer, by means of which the purposeful combined movements are carried out, is localized in the cortex of the left parietal lobe of the brain (precisely – in gyrus supramarginalis) in the right-handed people. In the left-handed persons with the dominance of the right cerebral hemisphere, the signal to perform and execute the targeted and combined movements is more prolonged and takes more time [4].

Thus, according to the results of the educational experiment and the literature analysis, the conclusion can be drawn that the effective implementation and assimilation of skills in the endoscopic surgery training depends on psychophysiological features of the trainees, to be precise, on the dominance of the left or right cerebral hemisphere. The trainees of the studied groups (right-handed and left-handed) are characterized not only by different psychophysiological features, but also by different perceptions and assimilation of educational information. Thus, in order to predict the effectiveness of skills mastering, the psychophysiological features of persons should be taken into account, i.e. right-handedness and left-handedness. However, some researchers claim that it is not easy for individuals with a left hand dominant to perform any task related to quick switching from one action or process to another [6, 7] that should be taken into account in practicing endoscopic surgery skills by the trainees.

It is also established that in the left-handed individuals, dysgraphia and dyslexia may be evidenced for a long time during training, i.e. persistent impairment of

reading, writing, and purposeful movements. Often this can return, due to the deficiency and the immaturity of higher mental functions involved in the actions necessary for performance and development of endoscopic surgery skills.

Thus, the attained results and the literature analysis suggest that the trainees with left-hand dominance, that is, with unstable materialization, experience more difficulties in performing endoscopic surgery skills than the right-handed ones. This requires individual approaches for comprehensive and effective development of practical skills. Therefore, in development and performing practical skills by the endoscopic surgery trainees, more attention should be paid to the left-handed individuals than to the right-handed ones. All these statements were confirmed by the results of anonymous questionnaire of the doctor trainees.

**Conclusions and Prospects for Research.** According to the results of the educational experiment, it was established that the left-handed and right-handed trainees are characterized by different psychophysiological features and they comprehend the necessary endoscopic surgery skills in a different way. For effective and comprehensive development of practical skills in this discipline, more attention should be paid to the trainees with dominance of the right cerebral hemisphere.

Broad study of psychophysiological features of the trainees and taking them into account while development and performing endoscopic surgery skills would promote to their comprehensive and effective mastering.

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Received 30.04.20  
Recommended 04.05.20

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