



Impact of extracurricular activities in Plastic Surgery on the knowledge and practical skills of medical students

Impacto da monitoria de Cirurgia Plástica no conhecimento teórico e nas habilidades práticas em estudantes de medicina

JUAN CARLOS MONTANO PEDROSO^{1*}
RODRIGO NGAN PAZINI¹
JOÃO PEDRO ROCHA BILÓ¹
NATASHA SALLUM¹
NEIL FERREIRA NOVO^{1,2}
PRISCILA DO AMARAL BRANDOLI^{1,3}
LYDIA MASAKO FERREIRA¹

■ ABSTRACT

Introduction: To assess the impact of extracurricular activities in plastic surgery on the knowledge and practical skills of medical students at the Federal University of São Paulo. **Methods:** Six students participating in extracurricular activities and eight students who did not participate were randomly selected and evaluated before and after the program by using multiple-choice tests and a Surgical Skills Assessment (SSA) instrument to assess their practical skills. **Results:** The study group obtained higher scores in the theoretical tests, when the scores before starting the program (average, 15.8; standard deviation, 2.7) were compared with those received after their participation in extracurricular activities (average, 21.8; standard deviation, 1.3) ($p = 0.02$). Similar results were obtained with the SSA instrument for the period before the start of (average, 9.8; standard deviation, 1.4) and after (average, 13.5; standard deviation, 1.6) ($p = 0.02$) the program. The control group did not show significant changes in the scores received for theoretical tests when the period from August 2010 (average, 14.0; standard deviation, 4.1) to June 2011 (average, 13.8; standard deviation, 2.6) ($p = 0.40$) was evaluated. Similar results were obtained with the SSA instrument for the evaluation period between August 2010 (average, 8.5; standard deviation, 2.2) and June 2011 (average, 9.6; standard deviation, 1.7) ($p = 0.18$). **Conclusion:** The students participating in extracurricular activities in plastic surgery at the Federal University of São Paulo improved their knowledge and acquired better practical skills compared with students who did not participate.

Keywords: Surgery; Plastic Surgery; Education; Teaching; Educational evaluation.

■ RESUMO

Introdução: Avaliar o impacto da monitoria em Cirurgia Plástica da Universidade Federal de São Paulo no conhecimento e nas habilidades práticas em estudantes de Medicina. **Métodos:** Seis acadêmicos participantes da monitoria e oito acadêmicos não participantes foram selecionados

Institution: Study performed at the Universidade Federal de São Paulo, São Paulo, SP, Brazil.

Article received: March 9, 2014.
Article accepted: August 31, 2014.

DOI:10.5935/2177-1235.2015RBCP0120

¹ Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil.

² Faculdade de Medicina, Universidade de Santo Amaro (UNISA), São Paulo, SP, Brazil.

³ Faculdade de Medicina, Universidade de São Paulo (USP), São Paulo, SP, Brazil.

aleatoriamente e avaliados antes e depois do programa, por meio de testes de múltipla escolha e através do instrumento *Surgical Skills Assessment (SSA)*, para avaliação das habilidades práticas. **Resultados:** O Grupo estudo obteve aumento significativo nas notas de prova teórica, entre o período antes do programa (média 15,8 e desvio padrão de 2,7) e após (média 21,8 e desvio padrão 1,3) ($p = 0,02$). Resultado semelhante foi encontrado com o instrumento SSA entre o período antes (média 9,8 e desvio padrão 1,4) e após o programa (média de 13,5 e desvio padrão 1,6) ($p = 0,02$). O grupo controle não obteve mudança significativa nos testes teóricos em agosto de 2010 (média de 14,0 e desvio padrão 4,1) e junho de 2011 (média de 13,8 e desvio padrão de 2,6) ($p = 0,40$). Resultado semelhante foi encontrado com o instrumento SSA em agosto de 2010 (média de 8,5 e desvio padrão 2,2) e junho de 2011 (média de 9,6 e desvio padrão 1,7) ($p = 0,18$). **Conclusão:** Acadêmicos participantes na monitoria de Cirurgia Plástica da Universidade Federal de São Paulo apresentaram melhor conhecimento e melhores habilidades práticas em relação aos não participantes.

Descritores: Cirurgia; Cirurgia Plástica; Educação; Ensino; Avaliação educacional.

INTRODUCTION

Extracurricular activities are a form of teaching and learning that aims to contribute to the education of students to what concerns activities related to teaching, research, and extension programs, and are included in undergraduate courses at the university. Their main objective is to improve undergraduate education by using teaching methods that encourage the integration of theory and practice, as well as foster close relationships between students and teachers.

Extracurricular activities in plastic surgery were established at the São Paulo Medical School (EPM), Federal University of São Paulo (Unifesp), in 1996, and are improved every year to attempt to provide medical undergraduate students with greater theoretical and practical knowledge about relevant topics in plastic surgery.

Undergraduate medical students of Unifesp establish their contact with plastic surgery for approximately 1 month only in their fourth year at the university; therefore, extracurricular activities started to become important for students to increase their knowledge and further develop their skills.

Once a year, six monitors are selected among volunteer third- and fourth-year students at the university, by analyzing their curricula and on the basis of interviews with the coordinator of extracurricular activities and the full professor of the plastic surgery course. Extracurricular activity programs are officially linked to the office of the dean of undergraduate studies of Unifesp; they start in August and end in June of the following year.

Extracurricular activities comprise both theoretical and practical components. Theoretical activities consist of reading and discussing scientific articles

on relevant topics in plastic surgery, such as local anesthetics, wound healing, techniques and principles of plastic surgery, malignant and benign skin lesions, and burns. These topics are presented in monthly seminars that are conducted by the monitors.

Practical activities are organized twice a year and carried out at the Laboratory of Surgical Technique and Experimental Surgery, where it is possible for students to train in suturing techniques and the production of skin flaps, both in artificial models and in cutaneous and subcutaneous human tissues from patients who underwent postbariatric plastic surgeries^{1,2}. In the Plastic Surgery Division of Unifesp, students perform minor surgical procedures in patients, such as nevus removal, with supervision, every 2 weeks.

After the end of each semester, theoretical tests are carried out on the different topics covered in the extracurricular activities.

In general, students who participated in extracurricular activities report that this program helped deepen their theoretical knowledge and improved their practical skills³. However, there are few studies in the literature about the real impact of extracurricular activities on the theoretical knowledge or the development of practical skills of students⁴. Therefore, the aim of this study is to assess the impact of extracurricular activities in plastic surgery on the theoretical knowledge and practical skills of medical students at the Federal University of São Paulo.

METHODS

This is a prospective, controlled, and blinded study (the main author and the evaluators of practical skills tests were blinded).

Six student monitors, comprising the extracurricular activities group 2010-2011 (from August 2010 to June 2011), were included in the study group. Of them, three were in the third year and three were in the fourth year of medical school at the Federal University of São Paulo. Eight undergraduate students who did not participate in extracurricular activities were selected as the control group by using a randomization website – www.randomization.com. Of these eight, four were third-year and four were fourth-year medical school students.

The students of the study group and the control group were evaluated at two different periods: August 2010 and June 2011, i.e., before the start and after the extracurricular activities.

The test for the theoretical evaluation consisted of 30 multiple-choice questions, with five alternative answers, taken from specialization contests in plastic surgery that cover the following subjects: local anesthetics, wound healing and techniques, and principles of plastic surgery. The performance score of each student could vary from 0 to 30 points, and higher scores indicate greater theoretical knowledge.

For practical evaluations, each participant is required to perform three simple sutures in an artificial model (Figure 1). For this purpose, we used a validated instrument for the assessment of plastic surgery skills, known as the *Surgical Skills Assessment (SSA)*⁵. This instrument consists of a theoretical question and three areas of suturing skills practice, e.g., suture location, realization of the point, and tissue management. The performance of each student is scored from 0 to 14 points, and higher scores indicate greater practical skills. The practical evaluation was performed by two doctors, both plastic surgeons who were previously trained in using the SSA. The final score was the average of the scores obtained by the two evaluating plastic surgeons. The evaluators were unaware if the student belonged to the study group or the control group. The leading author of this study did not assist in the theoretical and practical evaluations.

Statistical analyses were performed by using the Wilcoxon's test to compare the scores obtained before and after the extracurricular activities, for both the study group and the control group. The level of rejection of the null hypothesis was set at 0.05.

RESULTS

The study group showed a significant increase in the scores in the theoretical knowledge test when comparing the period before the start of extracurricular activities (average, 15.8; standard deviation, 2.7) and after (average, 21.8; standard deviation, 1.3) ($p = 0.02$). A significant increase in the study group was also observed in the scores in the practical test with the SSA instrument, comparing the period before the start of extracurricular activities (average, 9.8; standard deviation, 1.4) and after (average, 13.5; standard deviation, 1.6) ($p = 0.02$) (Figure 2).



Figure 1. Artificial model for sutures used by students in the academic surgery training program.

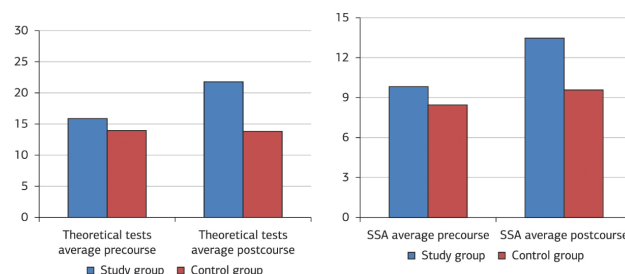


Figure 2. Average scores on theoretical tests and grades for the Surgical Skills Assessment (SSA) of the study group and the control group, before and after the course.

The control group showed no significant changes in the score in theoretical tests from August 2010 (average, 13.8; standard deviation, 2.6) to June 2011 (average, 13.8; standard deviation, 2.6) ($p = 0.40$). Similarly, no changes were observed in the control group in practical evaluations with the SSA, from August 2010 (average, 8.5; standard deviation, 2.2) to June 2011 (average, 8.5; standard deviation, 1.7) ($p = 0.18$) (Figure 2).

DISCUSSION

The training and teaching of plastic surgery have considerably progressed in the last years⁶. Each medical student is unique and requires a stimulating environment, associated with well-defined goals, adequate supervision, and extracurricular activities – all necessary for the theoretical knowledge and practical skills of the student⁷.

The teaching of plastic surgery usually has a minor role during graduation. However, it is common that medical students envisage pursuing a career in plastic surgery, for many because of the influence of media, thus demonstrating the importance of the

proper teaching of plastic surgery and its relevance even during graduation⁸.

Because of the difficulties inherent to changes in medical school curricula, a simple way to increase the theoretical and practical knowledge in plastic surgery is by carrying out extracurricular activities, an educational support service that aims to improve the development of technical skills and deepen the theoretical knowledge, thus aiding in the academic and professional development of the student^{3,4}. However, few studies have been published on the real impact of extracurricular activities on deepening the theoretical knowledge or the improvement of practical skills of participating students.

In a descriptive study, Haag et al.³ evaluated the impact of extracurricular activities on the teaching-learning process of nursing students by the using questionnaires. When asked about positive and negative aspects, 73.8% of the responses were positive, thus highlighting the greater ability, clarification of doubts, and care received by the extracurricular activity coordinators. Davis et al.⁴ evaluated the effect of a 1-day course on plastic surgery on 121 undergraduate students possessing the following four characteristics: knowledge in plastic surgery, awareness of the work of a plastic surgeon, basic surgical skills, and interest in a career in plastic surgery. After completing the course, a significant improvement was observed in these four areas.

Similarly, in this study, significant improvements were also observed in theoretical knowledge, as assessed by using a test of general plastic surgery knowledge, and in practical skills, as evaluated with the SSA instruments, in the students participating in extracurricular activities. The control group showed no significant changes over time. These results suggest that the activities performed during extracurricular activities in plastic surgery at the Unifesp improved the basic theoretical knowledge in plastic surgery and the essential surgical skills of the participant.

However, this study has some limitations. Few students were evaluated: six in the study group and eight in the control group. Nevertheless, the dean of undergraduate studies of Unifesp allowed the participation in extracurricular activities of only limited groups of students, with the aim to facilitate a more personalized monitoring of each student.

In this study, we did not evaluate the impact of extracurricular activities on the ability of students to carry out their research and scientific works, which is very much encouraged in the extracurricular activity program at Unifesp, thus being an interesting perspective for future work⁹.

On the other hand, this study presents important methodological features, such as its prospective and controlled design, and the blinded evaluators of the practical skills test with a validated instrument. Another limitation is that the members of the control group were randomly selected.

CONCLUSION

Extracurricular activities in plastic surgery at Unifesp improved the theoretical knowledge and practical skills of participating students.

REFERENCES

1. Turhan-Haktanir N, Sancaktar N. Useful material for skin flap training for inexperienced residents. *J Plast Reconstr Aesthet Surg.* 2007;60(10):1169-70. <http://dx.doi.org/10.1016/j.bjps.2007.06.033>. PMID:17707707.
2. Esteban D, Fraga MF, Shimba LG, Kikuchi W, Helene A JR. Basic plastic surgery training using human skin. *Plast Reconstr Surg.* 2009;123(2):90e-2e. <http://dx.doi.org/10.1097/PRS.0b013e3181959751>. PMID:19182597.
3. Haag GS, Kolling V, Silva E, Melo SC, Pinheiro M. Contribuições da monitoria no processo ensino-aprendizagem em enfermagem. *Rev Bras Enferm.* 2008;61(2):215-20. <http://dx.doi.org/10.1590/S0034-71672008000200011>. PMID:18572842.
4. Davis CR, O'Donoghue JM, McPhail J, Green AR. How to improve plastic surgery knowledge, skills and career interest in undergraduates in one day. *J Plast Reconstr Aesthet Surg.* 2010;63(10):1677-81. <http://dx.doi.org/10.1016/j.bjps.2009.10.023>. PMID:19926544.
5. Carroll SM, Kennedy AM, Traynor O, Gallagher AG. Objective assessment of surgical performance and its impact on a national selection programme of candidates for higher surgical training in plastic surgery. *J Plast Reconstr Aesthet Surg.* 2009;62(12):1543-9. <http://dx.doi.org/10.1016/j.bjps.2008.06.054>. PMID:18930701.
6. Pinder RM, Urso-Baiarda F, Knight SL. Decades of change in plastic surgery training. *J Plast Reconstr Aesthet Surg.* 2010;63(8):e662-3. <http://dx.doi.org/10.1016/j.bjps.2010.01.037>. PMID:20171947.
7. Staveley-O'Carroll K, Pan M, Meier A, Han D, McFadden D, Souba W. Developing the young academic surgeon. *J Surg Res.* 2005;128(2):238-42. <http://dx.doi.org/10.1016/j.jss.2005.09.006>. PMID:16243045.
8. Al-Nuaimi Y, McGrouther G, Bayat A. Modernizing medical careers in the UK and plastic surgery as a possible career choice: undergraduate opinions. *J Plast Reconstr Aesthet Surg.* 2006;59(12):1472-4. <http://dx.doi.org/10.1016/j.bjps.2006.04.026>. PMID:17113550.
9. Wan DC, Wang KC, Longaker MT. Training the contemporary surgeon-scientist. *Plast Reconstr Surg.* 2012;129(4):1023-5. <http://dx.doi.org/10.1097/PRS.0b013e31824421e8>. PMID:22456371.

*Corresponding author:

Juan Carlos Montano Pedroso

Universidade Federal de São Paulo (UNIFESP) - Rua Napoleão de Barros, 737, 4º andar - Vila Clementino - São Paulo, SP, Brazil Zip Code 04024-002
E-mail: juancmontano@gmail.com