What Is the Percentage of Use of Surgical Skills Assessment Tools in Orthopedic and Traumatology Residencies in Argentina?

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ABSTRACT

Objective: The primary objective was to evaluate the current application of surgical competency (SC) assessment tools in residencies accredited by the AAOT. There was also interest in knowing the types of assessment tools used, the knowledge of the different evaluation instruments and what type of evaluation they use for the promotion of the year. We analyzed whether there were differences in the characteristics between the residencies that evaluate SCs and those that do not. **Materials and Methods:** A descriptive study was carried out, for which a survey was developed focused on assessing how many residencies evaluate the SCs with a formal tool. In addition, through the survey it was possible to answer the secondary objectives. It was sent to the chief of residency of the 123 accredited residencies. **Results:** 105 (85.4%) responses were obtained, 59% (62) used some type of tool for the evaluation of SC. Only 12.9% (8/62) of the tools used evaluate the SC in a specific way but the majority assessed them with a general score. 61% (64/105) are aware of the tools available. For the promotion of the year, the majority use multiple periodic evaluations for clinical and surgical competencies (63.8% and 67.6% respectively). No significant differences were found in the characteristics of the residencies that evaluate SC and those that do not. **Conclusions:** 59% of the residencies implement some score or tool for the evaluation of SC, the majority perform the evaluation with a subjective global score. Only the 12.9% evaluate SC specifically.

Key words: Residency; Orthopedics; surgical competencies; assessment tools; Argentina.

Level of Evidence: IV

¿Cuál es el porcentaje de utilización de herramientas de evaluación de competencias quirúrgicas en las residencias de ortopedia y traumatología de la Argentina?

RESUMEN

Objetivo: El objetivo primario fue conocer la actual aplicación de instrumentos de evaluación de competencias quirúrgicas en las residencias acreditadas por la AAOT. Como objetivos secundarios, se describieron los tipos de herramientas utilizadas, el conocimiento de los diferentes instrumentos de evaluación y qué tipo de evaluación se utiliza para la promoción de año. Se analizó si existen diferencias en las características entre las residencias que evalúan las competencias quirúrgicas y las que no. **Materiales y Métodos:** Se realizó un estudio descriptivo, para lo cual se diseñó una encuesta enfocada en mostrar cuántas residencias evalúan las competencias quirúrgicas con una herramienta formal. Además, a través de ella, se logró responder a los objetivos secundarios. La encuesta se envió a los responsables docentes de las 123 residencias acreditadas por la AAOT. **Resultados:** Se obtuvieron 105 (85,4% respuestas, el 59% utiliza algún tipo de herramienta para evaluar las competencias quirúrgicas. Solo el 12,9% de las herramientas utilizadas evalúan las competencias quirúrgicas en forma específica y el resto lo hace con un pun-

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How to cite this article: Cafruni VM, Romagnoli J, Barcia S, Dello Russo B, Vivas MR, Herrera HS, et al. What Is the Percentage of Use of Surgical Skills Assessment Tools in Orthopedic and Traumatology Residencies in Argentina? *Rev Asoc Argent Ortop Traumatol* 2021;86(6):850-857. https://doi.org/10.15417/issn.1852-7434.2021.86.6.1294

taje general. Un 61% conoce las herramientas disponibles. Para la promoción de año, la mayoría utiliza evaluaciones periódicas múltiples para competencias clínicas y quirúrgicas (63,8% y 67,6%, respectivamente). No hubo diferencias significativas en las características de las residencias que evalúan las competencias quirúrgicas y las que no. **Conclusión:** El 59% de las residencias implementa algún puntaje o formulario para evaluar las competencias quirúrgicas, solo el 12,9% las evalúa en forma específica, y el resto lo hace con un puntaje subjetivo global.
Palabras clave: Residencia; Ortopedia; competencias quirúrgicas; herramientas de evaluación; Argentina.
Nivel de Evidencia: IV

INTRODUCTION

A residency is the result of the need and interest of a general practitioner to expand their professional development so that they can deepen their knowledge of a medical specialty.[1] The medical residency system constitutes the basis of graduate medical education and is the ideal educational process that allows the graduate student to transition from general practitioner to specialist.[2] This includes not only theoretical knowledge but also, in the case of surgical specialties, the acquisition of technical skills that are a central pillar in the training of every surgeon. Skill assessment is a primary feedback process for the training and education system, which enables continuous improvement. With regard to orthopedic and traumatology residencies in Argentina, each institution has the power to decide which assessment tools it will include in its training programs.[3] This is probably the reason why there is no uniform and standardized registry of the assessment instruments used to objectify the acquisition and improvement of the surgical skills acquired by the resident throughout their training program.

In our country, there is no clear record of the assessment instruments used in orthopedic and trauma residencies; For this reason, this descriptive study was carried out seeking to investigate the educational process of the residents. Our main objective was to know the current percentage of use of surgical skills assessment tools in the 123 residencies accredited by the *Asociación Argentina de Ortopedia y Traumatología* (Argentine Association of Orthopedics and Traumatology - AAOT).[4] As a secondary objective, we described the types of tools used to assess surgical skills, the acknowledgment of the different existing assessment tools, and what tool was used for the promotion to the next year of residency. In addition, we analyzed whether there are differences in the characteristics between residencies that evaluate surgical competencies and those that do not.

MATERIALS AND METHODS

A descriptive study was carried out to analyze the use of assessment tools for surgical competencies. A survey was designed through a Google Docs form. The survey was sent by email to the teaching managers of all residences accredited by the AAOT (n = 123 hospitals). It was sent during August 2020, twice, with an interval of 15 days. Responses were accepted up to and including September 30. Non-accredited residencies or duplicate responses were excluded from the analysis.

The survey was designed by the Research Committee and was subsequently validated through a consensus between the members of this committee and the AAOT Residency Committee.

The survey made it possible to identify the teaching position of the respondent within the residency, the type of hospital (financing: national, municipal, provincial or private), its geographical region, and whether it was associated with a university. On the other hand, the residency program was specifically investigated: its duration, if they have a concurrency system, the ratio between the head of residents/instructors and the number of residents, and the methods of periodic and annual evaluation of both theoretical and surgical competencies. In this way, we shed light on how many residencies currently evaluate surgical skills through a formal tool, the types of surgical skill assessment tools implemented, and the knowledge of the different existing tools.

Statistical analysis

Continuous variables are expressed as mean or median according to their distribution and categorical variables, as relative or absolute frequencies. The characteristics of the residencies that used assessment tools for surgical competencies were analyzed with a logistic regression model. The crude and adjusted odds ratios (ORs) are presented with their confidence interval and p-value. The statistically significant p-value was set at <0.05. The variables selected for the multivariate analysis were those statistically significant or considered relevant within the characteristics of the residencies (financing, university association, and region).

For data analysis, the STATA program, version 13 (Statacorp LP College Station Texas, USA) was used.

RESULTS

105 responses were included, 12 responses were excluded: one from a non-accredited residency and 11 that were repeated (Figure).

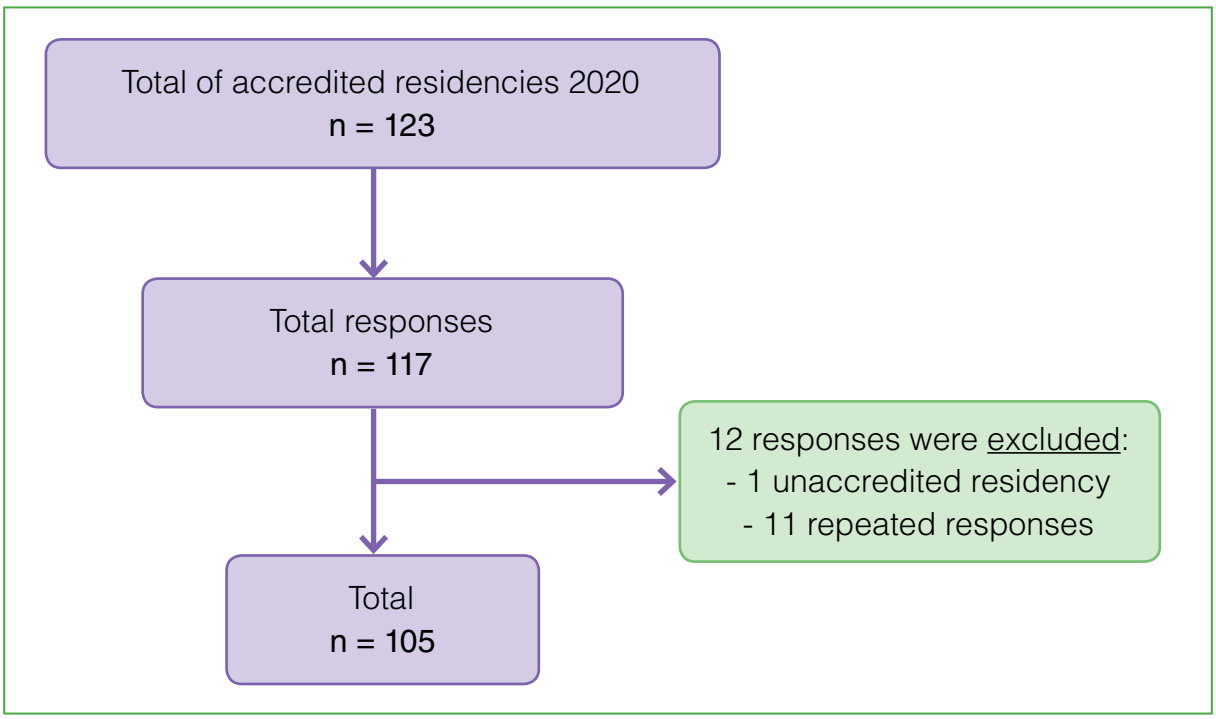

Figure. Survey flow diagram.

According to the 105 responses, 59% (62 residencies) use some type of tool for the assessment of surgical skills. 46.8% (29/62) of these residences use the tool granted by the Ministry of Health according to their region and 38.7% (24/62) use their own tool. But only 12.9% (8/62) of the tools employed evaluate the surgical competencies of a surgical procedure in a specific way—its "step by step"—and the rest do so with a general score that adapts to all surgical procedures (Table 1).

The teaching leaders were asked what surgical skill assessment tools they knew and 39% (41/105) did not know any of the aforementioned instruments. 61% (64/105) know the tools available for the evaluation of surgical skills, 59% (62/105) of the respondents use some score or form to evaluate their residents (Table 2).

Table 1. Types of evaluation of surgical competencies

Type of assessment	Residencies (n = 62)
Instrument given by the Ministry, n (%)	29 (46.8)
Tool given by the university associated with the institution, n (%)	9 (14.5)
Other or own, n (%)	24 (38.7)
Evaluates surgical skills:	
Globally (subjective score)	54 (87.1)
Specific (evaluates steps of a certain surgery)	8 (12.9)

Table 2. Knowledge of surgical skill assessment tools

Type of assessment	Global (n = 105)
Instrument of the Ministry of Health, n (%)	46 (43.8)
O-SCORE, n (%)	7 (6.7)
Rubric / Check-list, n (%)	25 (23.8)
GRS, n (%)	5 (4.8)
PFF, n (%)	6 (5.7)
PASS / FAIL, n (%)	7 (6.7)
DOPS, n (%)	15 (14.3)
None, n (%)	41 (39)

O-SCORE (Ottawa Surgical Competency Operating Room Evaluation), GRS (Global Rating Scale), PFF (Procedure Feedback Form), DOPS (Direct Observation of Procedural Skills).

For the promotion of the residency year, the majority referred to using multiple periodic evaluations for clinical and surgical competencies (63.8% and 67.6%, respectively) and theoretical written or oral evaluations at the end of the year (56.2%) (Table 3).

Table 3. Evaluations for the promotion of the residency year.

Type of assessment	Global (n = 105)
Theoretical written / oral at the end of the year, n (%)	59 (56.2)
Theoretical / practical at the end of the year, n (%)	20 (19)
Multiple and periodical for clinical competencies, n (%)	67 (63.8)
Multiple and periodical for surgical competencies, n (%)	71 (67.6)
None, n (%)	5 (4.8)
Other, n (%)	10 (9.5)

No significant differences were found in the characteristics of residencies that evaluate surgical competencies and those that do not. But from the results obtained, it can be interpreted that there is 28% more probability of being formally evaluated in surgical competencies in a provincial hospital than in a national one. In contrast, in private hospitals, there are 47% fewer probabilities to be evaluated in surgical competencies than in a national hospital. Likewise, there is a 65% more probability that surgical skills will be evaluated in the Patagonian region compared to the Pampas region (Tables 4 and 5).

Table 4. Characteristics of residencies that evaluate surgical skills and those that do not.

	Global (n = 105)	Residencies that DO NOT evaluate surgical skills (n = 43)	Residencies that DO evaluate surgical skills (n = 62)	ORc	CI95%	p
Teacher in charge surveyed, n (%)						
Chief of Residents	69 (65.7)	31 (72.1)	38 (61.3)			
Instructor or coordinator	35 (33.3)	12 (27.9)	23 (37.1)			
Head of Service	1 (1)	0	1 (1.6)			
Residency, n (%)						
National	8 (7.6)	3 (7)	5 (8.1)	Reference		
Municipal	18 (17.1)	8 (18.6)	10 (16.1)	0.75	0.14-4.13	0.74
Provincial	47 (44.8)	15 (34.9)	32 (51.6)	1.28	0.27-6.07	0.76
Private	32 (30.5)	17 (39.5)	15 (24.2)	0.53	0.11-2.6	0.43
Associated with University, n (%)	71 (67.6)	31 (72.1)	40 (64.5)	0.7	0.30-1.6	0.41
Region, (%)						
Pampas	48 (45.7)	17 (39.5)	31 (50)	Reference		
Autonomous City of Buenos Aires	39 (37.1)	18 (41.86)	21 (33.9)	0.64	0.27-1.52	0.31
Cuyo region	7 (6.7)	3 (6.98)	4 (6.45)	0.73	0.15-3.66	0.70
Northwest	5 (4.8)	4 (9.3)	1 (1.6)	0.14	0.1-1.33	0.09
Patagonia	4 (3.8)	1 (2.3)	3 (4.8)	1.65	0.15-17.07	0.68
Northeast	2 (1.9)	0	2 (2.3)	-	-	-
Concurrency, n (%)	36 (34.3)	11 (25.6)	25 (40.3)	1.97	0.84-4.61	0.12
Duration, n (%)						
3 years	3 (2.9)	2 (4.7)	1 (1.6)	Reference		1
4 years	99 (94.3)	39 (90.7)	60 (96.8)	3.08	0.27-35.1	0.37
5 years	3 (2.9)	2 (4.7)	1 (1.6)	1.00	0.33-29.8	1
Number of Chiefs of Residents, mean (SD)	1.6 (0.9)	1.6 (0.7)	1.55 (1.0)	0.94	0.61-1.42	0.76
Number of residents, mean (SD)	9.2 (5)	8.4 (3.7)	9.74 (5.6)	1.07	0.97-1.18	0.18
Evaluation at the end of rotations	59 (56.2)	20 (46.5)	39 (62.9)	1.24	0.64-2.42	0.52

ORc = crude odds ratio, CI = confidence interval, SD = standard deviation.

Table 5. Multivariate analysis of the characteristics of residencies that evaluate surgical competencies and those that do not.

Characteristics	ORc	CI95%	p	ORa	CI95%	p
Residency, n (%)						
National	Reference					
Municipal	0.75	0.14-4.13	0.74	0.81	0.14-4.58	0.81
Provincial	1.28	0.27-6.07	0.76	1.14	0.22-5.86	0.87
Private	0.53	0.11-2.6	0.43	0.50	0.1-2.55	0.40
Associated with University, n (%)	0.7	0.30-1.6	0.41	0.59	0.23-1.54	0.28
Region, n (%)						
Pampas	Reference					
Autonomous City of Buenos Aires	0.64	0.27-1.52	0.31	0.84	0.32-2.24	0.73
Cuyo region	0.73	0.15-3.66	0.70	0.65	0.12-3.37	0.61
Northwest	0.14	0.1-1.33	0.09	0.13	0.1-1.27	0.08
Patagonia	1.65	0.15-17.07	0.68	2.22	0.19-25.36	0.52
Northeast	-	-	-			

ORc = crude odds ratio, ORa = adjusted odds ratio, CI = confidence interval.

DISCUSSION

Although the tools for the evaluation of surgical skills have existed for a long time, their application in daily practice is not a constant in the evaluation process.[5] Currently, in Argentina, only a little more than half of the residencies accredited by the AAOT use some type of instrument to evaluate surgical competencies and the rest only have evaluations of clinical or exclusively theoretical competencies for the promotion of the year of residence.

Competencies have become the unit of planning for medical education in many parts of the world.[3,6] But when it comes to surgical competencies specifically, their assessment has always been rare. These continue to receive little attention among the competencies defined by the Canadian Medical Education Guidelines for Specialists (CanMEDS)[7] and by the Accreditation Council for Graduate Medical Education (ACGME).[8,9] Surgical competencies are disguised within the subcategory of "medical expert" in CanMEDS and "patient care" in ACGME.[8]

To analyze the surgical performance and competencies of the residents, different scores have been developed and validated, such as Ottawa Surgical Competency Operating Room Evaluation (O-SCORE),[9] Operative Rating System (OPRS),[10] the Zwisch scale,[11] and Direct Observation of Procedural Skills (DOPS).[12] As well as to evaluate performance in simulation, other scores have been validated, such as the Objective Structured Assessment of Technical Skills (OSATS).[13,14] Another powerful tool in surgical education is the implementation of the structured perioperative feedback on performance and points for improvement, which helps to identify the resident's strengths and weaknesses.[15-18]

However, no single tool adequately assesses the multiple dimensions of surgical competencies. Each assessment tool has its own limitations. For this reason, the use of multiple tools is recommended for the evaluation of the wide range of educational objectives.[8,9-21]

Today, a great variety of assessment tools are implemented in residency programs in Argentina. 46.8% (29/62) of these residencies refer to using the instrument provided by the Ministry of Health and 38.7% (24/62) use their own tool. 87.1% (54/62) of the tools used evaluate surgical skills with a subjective global score and not specifically for a particular procedure.

The most important limitation of this study is probably the obsequiousness bias, since the survey was issued by the AAOT, which is the regulatory authority in charge of the residencies' accreditation. A strength of this study is that a large number of responses were obtained from the teachers in charge (85.4%, 105/123). This work represents the first teaching research study on the use of tools for the assessment of competencies in orthopedic and trauma residencies in the country.

Given the results of this study, we consider it necessary to continue working for the creation and implementation of tools that allow a uniform evaluation of surgical competencies in orthopedic and trauma residencies, not only to standardize the surgical competencies to be achieved during the training program, but also to provide an optimal environment for education.

In conclusion, 61% (64/105) of the teachers surveyed know the tools available for the assessment of surgical skills, and 59% (62/105) implement some score or form in the evaluation. Among the teaching staff who assess surgical skills, only 12.9% (8/62) assess surgical skills specifically, and the rest do so with a global subjective score, both with various non-unified tools.

Conflict of interest: The authors have no conflicts of interest to declare.

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