

# Core Competencies Self-Assessment and Patient-Practitioner Orientation during the First Year of a Brazilian Orthopedic Residency

## *Autoavaliação de competências fundamentais e orientação paciente-médico durante o primeiro ano de residência ortopédica brasileira*

Kelly Biancardini Gomes Barbato<sup>1,2,3</sup> Luciana Santos de Carvalho<sup>4</sup> Viviani Barreira Marangoni<sup>4,5</sup>   
 Fábio de Souza<sup>1,6</sup> Marcella Martins de Vasconcelos Vaena<sup>7,8,9</sup>

<sup>1</sup> Internal Medicine Area, Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil

<sup>2</sup> Teaching and Research Division, Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil

<sup>3</sup> Escola de Medicina Souza Marques, Fundação Técnico-Educacional Souza Marques, Rio de Janeiro, RJ, Brazil

<sup>4</sup> Permanent Education Unit, Instituto Nacional de Traumatologia e Ortopedia, Rio de Janeiro, RJ, Brazil

<sup>5</sup> Integration activity - Basic Cycle, Centro Universitário Arthur Sa Earp Neto, Rio de Janeiro, RJ, Brazil

<sup>6</sup> Department of Cardiology, Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

Address for correspondence Kelly Biancardini Gomes Barbato, MD, MSc, Avenida Brasil, 500–São Cristóvão, Rio de Janeiro, RJ, Brasil. CEP 20940-070 (e-mail: kelbiancardini@gmail.com).

<sup>7</sup> Hemotherapy Diagnostic and Therapeutic Coordination, Instituto Nacional de Saúde da mulher, da criança e do adolescente Fernandes Figueira, Fundação Oswaldo Cruz, Rio de Janeiro, RJ, Brasil

<sup>8</sup> Department of Hemotherapy, National Cancer Institute, Rio de Janeiro, RJ, Brazil

<sup>9</sup> Campus Città Division, Estácio de Sá Medical Education Institute, Estácio de Sá University, Rio de Janeiro, RJ, Brazil

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### Abstract

#### Keywords

- ▶ medical residency
- ▶ orthopedics
- ▶ physician-patient relations
- ▶ self-assessment
- ▶ competency-based education

**Objective** Training a competent physician requires to direct the resident profile of graduate students for practice activities. We sought to identify the doctor-patient relationship orientation and the self-assessment of the core competencies, which they pointed out needed to be developed.

**Methods** All 56 orthopedic residents admitted between 2016 and 2019 participated in the present prospective observational study. The Patient Practitioner Orientation Scale (PPOS) and a self-assessment questionnaire were answered at the beginning and end of the first year of residency (R1) in Orthopedics and Traumatology. We calculated mean and standard deviation for PPOS items and scores and analyzed them through the paired t-test. Self-Assessment Questionnaire answer options were “yes” or “I need to improve it” and skills were classified in decreasing order of the frequency of “I need to improve it” responses with description of absolute number and percentage. We compared frequencies using

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Fisher Test. P-values  $< 0.05$  were considered statistically significant. GraphPad Prism 8.4.3 (GraphPad Software, San Diego, CA, USA) and Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) were used for statistical analysis.

**Results** In the period between the beginning and the end of R1, the total PPOS mean score significantly decreased from 4.63 to 4.50 ( $p = 0.024$ ), more biomedical-focused. Around one-third of the residents identified competencies of patient care, practice-based learning and improvement, and interpersonal and communication skills as needed to improve.

**Conclusions** The PPOS and self-assessment activities could promote reflection practices and are possible tools for learner-centered competency assessment. Biomedical guidance tends to prevail as the training of physicians progresses, and periodic self-assessments can be worked on to build a growth mindset.

## Resumo

**Objetivo** A formação de um médico competente requer direcionar o perfil de pós-graduação residente para atividades práticas. Buscou-se identificar a orientação de relacionamento médico-paciente e a autoavaliação das competências fundamentais que eles apontaram que precisavam ser desenvolvidas.

**Métodos** Todos os 56 residentes em ortopedia admitidos entre 2016 e 2019 participaram do presente estudo observacional prospectivo. A Escala de Orientação Médico-Paciente (Patient Practitioner Orientation Scale [PPOS, na sigla em inglês]) e um questionário de autoavaliação foram respondidos no início e no final do primeiro ano de residência (R1) em Ortopedia e Traumatologia. Calculamos o desvio médio e padrão para itens e pontuações de PPOS e os analisamos através do teste t emparelhado. As opções de resposta do Questionário de Autoavaliação foram "sim" ou "preciso melhorar" e as habilidades foram classificadas na ordem decrescente da frequência das respostas "preciso melhorar" com descrição de número absoluto e percentual. Comparamos frequências usando o teste de Fisher. Consideramos significativos valores  $p < 0,05$ . Os programas GraphPad Prism 8.4.3 (GraphPad Software, San Diego, CA, EUA) e Microsoft Excel (Microsoft Corporation, Redmond, WA, EUA) foram utilizados para análise estatística.

**Resultados** No período entre o início e o final do R1, a média total de PPOS diminuiu significativamente, de 4,63 para 4,50 ( $p = 0,024$ ), mais focada em biomédica. Cerca de um terço dos residentes identificou competências do cuidado ao paciente, aprendizagem e melhoria baseadas na prática e habilidades interpessoais e de comunicação, como necessitando melhorar.

**Conclusões** As atividades de PPOS e autoavaliação podem promover práticas de reflexão e são possíveis ferramentas para avaliação de competência centrada no aluno. A orientação biomédica tende a prevalecer à medida que a formação dos médicos progride e as autoavaliações periódicas podem ser trabalhadas para construir uma mentalidade de crescimento.

## Palavras-chave

- ▶ residência médica
- ▶ ortopedia
- ▶ relações médico-paciente
- ▶ autoavaliação
- ▶ educação baseada em competências

## Introduction

Professional competence is the habitual and judicious use of knowledge, communication, technical skills, clinical reasoning, emotions, values, and reflection in daily practice to benefit the individual and the community being served.<sup>1</sup> The development of skills depends on physicians considering their training and ability to continue learning throughout their life.<sup>2</sup>

In the early 1990s, the Royal College of Physicians and Surgeons of Canada developed a referential framework with six competencies to guide medical training that should be a goal to establish a commitment toward quality in healthcare. The competencies are Medical Expert, Professional, Health Advocate, Scholar, Leader, Collaborator, and Communicator.<sup>3</sup> These roles and competencies have been adopted by major accreditation bodies worldwide. In the U.S., the Accreditation Council for Graduate Medical Education (ACGME) has also recognized the importance of nonclinical skills and defined a

list of “core competencies” to be mastered by all residents: “patient care”, “medical knowledge”, “practice-based learning and improvement”, “interpersonal and communication skills”, “professionalism,” and “systems-based practice”.<sup>4</sup>

The National Curriculum Guidelines for Undergraduate Medical Schools were updated in Brazil in 2014. The graduate’s professional profile incorporated a sense of social responsibility and commitment to citizenship as a promoter of the integral health of human beings. This profile is based on several principles for healthcare, among which we highlight: comprehensive and humanized care, quality healthcare, safety, professional ethics, communication with empathy, sensitivity and interest, patient-centered care, and interprofessional work.<sup>5</sup>

Competency-based curricula are centered on the profile of the graduate, being structured for the results to be obtained at the end of the educational or training program.<sup>6</sup> The results to be brought into the competency curriculum direct the educational process. Thus, first the results are defined, then the necessary strategies to achieve them. The focus is given to what must be learned by the student and not to what has to be taught.<sup>7</sup> Students need to be prepared for learning throughout life and be provided with opportunities to develop the capacity to regulate their learning as they progress through higher education.<sup>8</sup>

For a truly accurate assessment of resident proficiency, multiple assessment tools and multiple assessors are necessary. One such assessment tool is “self-assessment.”<sup>9</sup> Self-assessment represents a vital teaching strategy that prepares students to rethink the results of their professional actions, reflect on what they have learned, assess how such learning prepared them to perform the expected tasks, realize their individual learning needs, and develop a coherent plan to deal with their difficulties, compare the new results with the previous ones and review and update their learning plan.<sup>10</sup> This ability to identify personal values and attitudes, recognizing their strengths and weaknesses, can be developed, improved, and modified by education.<sup>11</sup>

Although patient-centered care has been one of the most frequently discussed principles in medical practice over the past few decades, patient-centered attitudes of physicians may diminish over their medical education.<sup>12</sup> When we consider that patient-centered care is revealed in the doctor-patient relationship, several educational strategies can be adopted in the teaching-learning process aimed at improving it.<sup>13</sup>

Krupat et al.<sup>14</sup> developed the Patient Practitioner Orientation Scale (PPOS) to evaluate the attitude of medical students and the individual orientation of the patient. It is an instrument capable of assisting the self-perception of the actors involved in their responsibility in the care-health-illness process.<sup>14,15</sup> The PPOS was translated into Portuguese and validated.<sup>16</sup> Respondents complete 18 items using a 6-point Likert scale, resulting in a total score of 1 to 6. The scale reflects “sharing” and “caring” dimensions related to the patient. The subscore “sharing” assesses how much physicians should share the power (information and decisions) with their patients, and the subscore “caring” reflects the care that the doctor presents about expectations, feelings,

and emotions of patients.<sup>16,17</sup> The physician-centered attitude was defined by a cutoff point  $< 4.57$ , and values between 4.57 and 5.00 were medically patient-centered.<sup>18</sup>

The objectives of the present study were to identify, among the medical residents of Orthopedics and Traumatology, the orientation profile in the doctor-patient relationship during the 1<sup>st</sup> year of their training in this surgical specialty, as well as the self-assessment of the core competencies, pointed out by themselves as those needed to be developed more carefully.

## Methods

The present study was approved by the Human Research Ethics Committee under Certificate of Clearance number: CAAE-03353718.2.0000.5273.

A prospective observational study was carried out during the 1<sup>st</sup> year of the Medical Residency in Orthopedics and Traumatology at XXXX. It is the national reference service in high complexity orthopedic and trauma surgeries of the Brazilian Unified Health System (SUS, in the Portuguese acronym), which assists patients and receives medical residents from all over the Brazilian territory.

The 56 participants were residents of the first year of the residency program between 2016 and 2019. We applied the PPOS and a Self-assessment questionnaire to assess the resident in training at the beginning and end of the first year of residency (R1) in Orthopedics and Traumatology at National Institute of Traumatology and Orthopedics Jamil Haddad (INTO).

We created and contextualized the 18-items Self-Assessment Questionnaire to the conditions of INTO of in-service training to trigger a self-reflection on their behavior towards their professional performance and the development of the core competencies of “patient care,” “practice-based learning and improvement skills,” “interpersonal and communication skills,” and “professionalism”. The answer options were “yes” or “I need to improve it” and skills were classified in decreasing order of the frequency of “I need to improve it” responses, with the description of the absolute number and percentage, at the beginning and end of the 1<sup>st</sup> year of residence. The frequencies were compared using the Fisher test, with  $p < 0.05$  being considered statistically significant.

We calculated the mean and standard deviation (SD) for each PPOS item, the total score (18 items), and sharing and caring subscores (9 items each) at the beginning and end of the first-year orthopedic residency program. To determine if the differences between the two moments (beginning and end) means were greater than you would expect to see by chance, we analyzed it through the paired t-test, considering significantly different  $p < 0.05$ . We used GraphPad Prism 8.4.3 (GraphPad Software, San Diego, CA, USA) and Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) for the statistical analysis.

## Results

All 56 medical residents who entered our orthopedic residency program between 2016 and 2019 were included in the

**Table 1** Characteristics of the Participants

Characteristics of first year orthopedic residents	
AGE, years old	26
GENDER, n (%)	
Female	9 (16%)
Male	47 (84%)
ORIGIN, n (%)	
Rio de Janeiro	26 (46%)
Outside of the state	30 (54%)
TOTAL, n (%)	56 (100%)

present study and their characteristics are presented in ►Table 1.

### Patient-Practitioner Orientation Scale (PPOS)

In the period between the beginning of the residency program and the end of the R1, the mean of the total PPOS score significantly decreased from 4.63 to 4.50 ( $p=0.024$ ). The means of the caring and sharing subscores also showed a reduction during the 1<sup>st</sup> year, but without statistical significance ( $p=0.170$  and  $0.069$ , respectively) (►Table 2). The Kolmogorov-Smirnov test confirmed the normal distribution, both in the means at the beginning and the end of R1, in the total score, and the caring and sharing subscores.

There was no significant difference between genders or by class of admission to the residence. Of the 18 items of the PPOs, there was a significant difference between the answers obtained at the beginning and at the end of the 1<sup>st</sup> year for items number 5 and 15 (from the sharing subscore) and 6, 7, and 16 (from the caring subscore) (►Table 3).

### Self-Assessment Questionnaire

At the beginning of the 1<sup>st</sup> year, 98% ( $n=55$ ) of the residents answered the self-assessment questionnaire, and, at the end of R1, 100% ( $n=56$ ). ►Table 4 shows the classification in decreasing order of the skills addressed through the questions, according to the frequency of responses "I need to improve it" at the beginning and the end of R1, with no difference decreasing the time about the frequencies.

Among the core competencies signaled by orthopedic residents themselves as needed for better improvement during the 1<sup>st</sup> year of the residency program, we found

patient care, followed by practice-based learning and improvement and interpersonal and communication skills, all of these three competencies self-assessed by around one-third of residents, at the beginning as well as at the end of the first year. The professionalism competency was not so expressively self-assessed by them (►Fig. 1).

### Discussion

Our sample had only 16% of women, but 54% were outside the state where INTO is located.

The average PPOS total score was 4.63 at the beginning, with a statistically significant drop to 4.50 at the end of the 1<sup>st</sup> year of residence. This demonstrates a trend, already in the first year of residency, of changing an attitude, initially more patient-centered, to a doctor-centered, reflecting an even more biomedical model prevailing in practice.

Around one-third of the residents identified that the competencies of Patient care, Practice-based learning and improvement, and Interpersonal and communication skills needed to be developed by the self-assessment questionnaire.

Professional development of competencies is generally part of the "hidden curriculum" and not privileged in the teaching-learning process of medical residency courses. Orthopedic training bodies in countries such as Canada, Australia, and the United States have moved toward competency-based education.<sup>19</sup> Brazil has also been evolving and, in 2019, built its competence matrix for orthopedics and traumatology residence programs.<sup>20</sup> The Brazilian National Medical Residency Commission Resolution advises that 80 to 90% of the workload must be developed under the form of in-service training, with 10 to 20% earmarked for complementary theoretical activities but without discrimination on specific activities for the broad development of competencies of medical residents in training.<sup>21</sup>

Brazilian studies show that the total score on the PPOS of medical students and doctors is comparable to that in the United States and considerably higher than scores in Nepal, Greece, and Korea. However, the caring subscore, which measures the extent to which the importance of the emotions and lifestyle of the patients is considered, is higher among Brazilian medical students than in any other culture in which these subscores were reported.<sup>17</sup>

Similar to our study, Ishikawa et al.<sup>12</sup> found that Japanese resident patient-centered attitudes of physicians declined during their 1<sup>st</sup> year of residency. Although there

**Table 2** Patient-Practitioner Orientation Scale (PPOS), with mean and standard deviation of the total score and the caring and sharing subscores ( $n=56$ )

Score	R1 Beginning		R1 End		p-value
	Mean	SD	Mean	SD	
PPOS total score	4.63	0.78	4.50	0.80	0.024*
Caring subscore	5.05	0.69	4.99	0.64	0.170
Sharing subscore	4.20	0.65	4.01	0.62	0.069

Abbreviation: PPOS, Patient-Practitioner Orientation Scale.

**Table 3** Patient-Practitioner Orientation Scale (PPOS), with mean and standard deviation per questionnaire item, at the beginning and end of R1, and comparison by the t test, paired, with p-value ( $n = 56$ )

	Paired t test (parametric test)	Mean $\pm$ SD		Two-tailed p-value	
		R1 Beginning	R1 End		
1	The doctor is the one who should decide what gets talked about during a visit.	3.87 $\pm$ 0.88	4.04 $\pm$ 1.22	0.1397	
2	Although healthcare is less personal these days, this is a small price to pay for medical advances. The most important part of the standard medical visit is the physical exam.	4.14 $\pm$ 1.27	4.41 $\pm$ 1.26	0.266	
3	The most important part of the standard medical visit is the physical exam.	4.34 $\pm$ 1.33	4.25 $\pm$ 1.41	0.6393	
4	It is often best for patients if they do not have a full explanation of their medical condition.	5.07 $\pm$ 1.33	5.18 $\pm$ 1.21	0.6533	
5	Patients should rely on the knowledge of their doctors and not try to find out about their conditions on their own.	<b>4.91 <math>\pm</math> 1.16</b>	<b>4.52 <math>\pm</math> 1.40</b>	<b>0.0313</b>	*
6	When doctors ask a lot of questions about the background of a patient, they are prying too much into personal matters.	<b>5.84 <math>\pm</math> 0.42</b>	<b>5.66 <math>\pm</math> 0.58</b>	<b>0.003</b>	**
7	If doctors are truly good at diagnosis and treatment, the way they relate to patients is not that important.	<b>5.21 <math>\pm</math> 1.12</b>	<b>5.68 <math>\pm</math> 0.61</b>	<b>0.0025</b>	**
8	Many patients continue asking questions even though they are not learning anything new.	3.63 $\pm$ 1.34	3.48 $\pm$ 1.49	0.537	
9	Patients should be treated as if they were partners with the doctor, equal in power and status.	4.21 $\pm$ 1.49	4.07 $\pm$ 1.54	0.4287	
10	Patients generally want reassurance rather than information about their health.	4.09 $\pm$ 1.20	3.75 $\pm$ 1.47	0.1405	
11	If a the primary tools of the doctor are being open and warm, the doctor will not have a lot of success.	5.29 $\pm$ 0.62	5.30 $\pm$ 1.03	0.8901	
12	When patients disagree with their doctor, this is a sign that the doctor does not have the respect and trust of the patients.	4.86 $\pm$ 0.98	4.55 $\pm$ 1.26	0.0942	
13	A treatment plan cannot succeed if it is in conflict with the lifestyle or values of a patient.	5.27 $\pm$ 1.09	5.38 $\pm$ 1.05	0.5533	
14	Most patients want to get in and out of the doctor's office as quickly as possible.	4.93 $\pm$ 0.93	4.84 $\pm$ 1.08	0.4888	
15	The patient must always be aware that the doctor is in charge.	<b>4.80 <math>\pm</math> 1.10</b>	<b>4.29 <math>\pm</math> 1.49</b>	<b>0.0112</b>	*
16	It is not that important to know the culture and background of a patient in order to treat the person's illness.	<b>5.23 <math>\pm</math> 0.87</b>	<b>5.55 <math>\pm</math> 0.78</b>	<b>0.0253</b>	*
17	Humor is a major ingredient in the doctor's treatment of the patient.	4.13 $\pm$ 1.29	3.91 $\pm$ 1.53	0.3504	
18	When patients look up medical information on their own, this usually confuses more than it helps.	3.09 $\pm$ 1.31	2.91 $\pm$ 1.38	0.4777	

Abbreviation: SD, standard deviation.

were no differences between genders and caring and sharing subscores in our study, the Japanese one observed the most significant decline in men, especially in the caring subscore. Differences in the practice attitudes of males and females exist very early on in medical training as female medical students tend to be more patient-centered; besides, patient-centeredness and higher empathy scores have been positively associated with "people-oriented" specialties.<sup>14</sup> Our sample represents the 1<sup>st</sup> year of residency in a surgical specialty, with a small number of female students, which could partly explain our PPOS total score decline soon in the 1<sup>st</sup> of 3 years of this residency program. Even though we could find some studies with PPOS in surgical

specialties,<sup>22,23</sup> we have not found anyone examining PPOS in orthopedics yet.

Greater emphasis needs to be placed on nontechnical abilities, essential for good clinical practice but less easy to assess.<sup>24</sup> Optimal methods for assessing trainee performance have yet to be established, and the tools to assess the essential abilities of a competent clinician are lacking.<sup>25</sup> Residents value self-assessment and feedback, and by better understanding experiences of self-assessment of residents followed by feedback, educators may be able to tailor the feedback process, enhance clinical performance and ultimately improve patient care.<sup>26</sup> Triangulating feedback from multiple sources (for example, colleagues, supervisors,

**Table 4** Self-assessment questionnaire: absolute number and percentage of answers “I need to improve it” according to the skills, ranked in decreasing order of frequency (p-value not significant by the Fisher test).

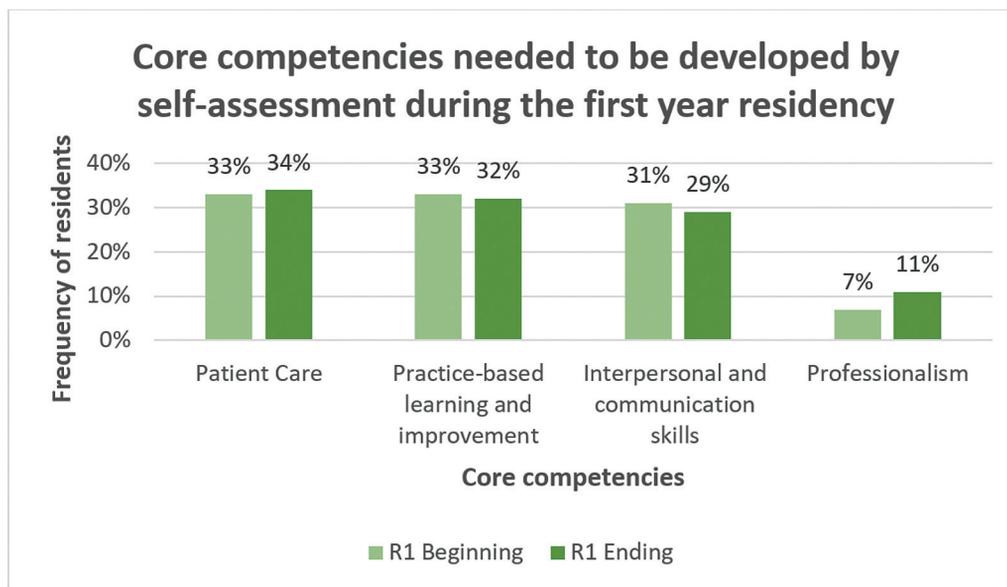
Competencies and self-assessment questions	n (%) of answers “I need to improve it” in the R1 BEGINNING	n (%) of answers “I need to improve it” in the R1 END
<b>Patient Care</b>		
Do I give appropriate guidance at discharge?	23 (42%)	28 (50%)
Do I individualize the treatment of each patient (regarding pain, thromboprophylaxis, request for PICC etc)?	22 (40%)	19 (34%)
Do I provide adequate perioperative guidance to the patient?	18 (33%)	23 (41%)
Do I care about patient safety?	9 (16%)	6 (11%)
<b>Total</b>	<b>72(33%)</b>	<b>76(34%)</b>
<b>Practice-based learning and improvement</b>		
Have I been able to study individually (self-learning)?	25 (45%)	27 (48%)
Can I learn from my performance in practice?	11 (20%)	9 (16%)
<b>Total</b>	<b>36(33%)</b>	<b>36(32%)</b>
<b>Interpersonal and communication skills</b>		
Do I practice quality registration on medical record?	44 (80%)	37 (66%)
Am I capable to communicate bad news?	23 (42%)	21 (38%)
Do I have the ability to communicate?	7 (13%)	10 (18%)
Can I work as a team?	6 (11%)	7 (13%)
Am I cordial to colleagues, staff, and professionals from the multi-disciplinary team?	4 (7%)	7 (13%)
<b>Total</b>	<b>84(31%)</b>	<b>82(29%)</b>
<b>Professionalism</b>		
Am I able to solve problems?	9 (16%)	5 (9%)
Do I feel empathy/compassion for the patient?	9 (16%)	4 (7%)
Am I available for whatever is needed?	4 (7%)	7 (13%)
Have I been assiduous?	3 (5%)	6 (11%)
Have I been punctual?	1 (2%)	16 (29%)
Do I feel committed to the service?	1 (2%)	5 (9%)
Do I perform my tasks?	1 (2%)	2 (4%)
<b>Total</b>	<b>28(7%)</b>	<b>45(11%)</b>

Abbreviation: PICC, peripherally inserted central catheter.

patients, and self) provides the most accurate picture of the performance of an individual.<sup>8</sup> This kind of assessment brings the resident into the center of their education, being themselves the critical and reflective actor in their lifelong learning process and skills development for their professional performance.

In research with both directors and residents, they thought patient care and medical knowledge ranked most important among the ACGME core competencies. At the same time, practice-based learning and systems-based practice were assigned the lowest ranks.<sup>27</sup> In our study, issues about medical orientation at hospital discharge, medical records, and self-learning ranked among the top three self-assessment questions. Training in practice-based learning and improvement should be a mandatory part of the post-

graduate curriculum and provides residents with the skills and knowledge necessary to reflect on their strengths and deficiencies, to identify their own learning needs, and to engage in learning for improvement.<sup>28</sup> So, the competencies of the residents pointed out as necessary to be improved can guide the creation and insertion of dynamics within the medical residency program. The objective is to promote the development of experiential learning related to the main difficulties of the practice of the resident physician, as well as their engagement in an individualized plan for its advancement during their training period. Some simple activities like these could be part of the curriculum focused on promoting residents' improvement in knowledge, skills, and attitudes related to other competencies than technical expertise, such as effective communication and shared decision making,



**Fig. 1** Core competencies self-assessed during the 1<sup>st</sup> year orthopedic residency program as needed to be improved, except medical knowledge. Frequency (percentage) at the beginning and end of R1.

safety of the patients, collaboration, and relationship-centered care, besides lifelong learning.

We suggest that a periodically performed self-assessment activity, followed by peer-to-peer and other sources of feedback, could promote the self-awareness and connection of residents to their continuum of professional learning processes. That is also an opportunity for developing a growth mindset<sup>29</sup> across the establishment of personal goals derived from this kind of reflective practice. Moreover, an instrument like the PPOS can guide the construction of a space for reflection during the training of residents, focusing on understanding the illness process in the biopsychosocial context, consistent with the practice of the patient-centered clinical method. We believe all teams involved in a residency program should construct together the specialist profile they would like to train, plan activities to achieve it during the program, and start from a competence matrix.

Our research has a small number of female residents and is confined to a unique orthopedic service. However, more than half of our residents come from other Brazilian states and regions. Another limitation is the time of only 1 year of follow-up, considering the orthopedic residency program in Brazil is a 3-year course. The self-assessment questionnaire was created by this group for the specific scenario of our service and was not validated as the PPOS.

## Conclusions

Patient-centered attitudes declined during their 1<sup>st</sup> year of residency. Residents' competencies of patient care, practice-based learning and interpersonal and communication skills were pointed out as necessary to be improved. So, validated scales such as the PPOS help assess the approaches of the residents, and periodic self-assessments contextualized to

the healthcare service are possible tools in the learner-centered competency assessment process aimed at improving the training of the medical resident and building a growth mindset.

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### Contributions of the Authors

Barbato K.: designed the study, performed the experiments and analysis, wrote the paper with input from all authors.

Carvalho L.: contributed to the paper analysis and writing. Marangoni V.: contributed to the paper analysis and writing.

Souza F.: gave substantial contributions to the analysis and interpretation of paper data and contributed to the paper writing.

Vaena M.: gave substantial contributions to the analysis and interpretation of paper data, contributed to the paper writing and revised the manuscript critically for important intellectual content.

All authors discussed the results and contributed to the final manuscript, which was read and approved by all.

### Conflict of Interests

The authors have no conflict of interests to declare.

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