

Direct Observation of Procedural Skills in Otorhinolaryngology Training

Original Investigation

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Abstract

Objective: To assess the experience on using direct observation of procedural skills (DOPS) by trainees and trainers and to evaluate its use during the training process of Otorhinolaryngology (ORL) residency.

Methods: This study was designed as a prospective educational research. For the quantitative assessment, the "construct validity" of the assessment tool was examined. For the qualitative assessment, the trainees and trainers' experiences regarding the use of DOPS in training process were investigated.

Results: A total of 55 DOPS assessment forms were filled during the study. The mean observation time was 7.14 ± 4.83 (range: 1-20) minutes, and the mean feedback time was 2.11 ± 2.01 (range: 0.5-10) minutes. A significant difference was detected between the first year trainees and the older ones, whereas no significant difference was observed between the third, fourth, and fifth year trainees. A statistically signifi-

cant, positive correlation was found between the years of education and the average score. According to the results of the qualitative assessment, the trainees stated that they realized their technical inadequacy in some procedures and it helped them to improve their skills during their residency training. The trainers confirmed that they gave feedback after each assessment. Both the trainers and trainees suggested that specific guidelines should be prepared for every procedure.

Conclusion: DOPS is a useful, valid, and fair tool for assessing Otorhinolaryngology trainees. The data obtained from the DOPS forms can be used for demonstrating the success of a training clinic and to evaluate the training program.

Keywords: Direct observation of procedural skills, workplace-based assessment, residency training, supervised learning events, feedback

Introduction

There is a worldwide tendency towards a transition from traditional time-based training to competency-based training in medical specialization. In Turkey, too, studies are being conducted under the leadership of the National Medical Specialty Council for replacing the current system with a competency-based system (1, 2). In competency-based training the areas trainees are expected to be qualified in are defined in the core program (1).

Competency-based training is a "learner centred" approach. In competency-based training the trainer observes the trainee as they perform the duties required by their residency training, and provides feedback based on their observations to enhance the professional development of the trainee. A range of assessment tools have been developed for

measuring the required skills and for providing effective feedback in this process. "Direct Observation of Procedural Skills" (DOPS) is among these tools. DOPS was first designed by the members of the Royal College of Physicians in the United Kingdom (3). In the broadest sense, DOPS is an assessment tool that can be used in the overall assessment of diverse procedural skills at different difficulty levels from vascular access establishment to endotracheal intubation, from nasogastric tube placement to arterial blood sampling (4-6).

DOPS is recommended to be used in formative assessment (4-6). Here, the purpose is not to make a pass/fail decision, but rather to identify how efficiently the trainee can perform the procedure, to specify any areas, if any, that need improvement and to enable the trainee to improve their perfor-



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Cite this article as: Kara CO, Mengi E, Tümkaya F, Topuz B, Ardıç FN. Direct Observation of Procedural Skills in Otorhinolaryngology Training. Turk Arch Otorhinolaryngol 2018; 56: 7-14.

This study was presented at the 39th Turkish National Congress of Otorhinolaryngology Head and Neck Surgery, November 8-12, 2017, Antalya, Turkey.

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Received Date: 27.11.2017
Accepted Date: 18.01.2018

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DOI: 10.5152/tao.2018.3065

mance by providing feedback. The DOPS process allows to collect quantitative and qualitative information on the performance of the trainee and to provide the student with effective feedback. Trainees file the results of all of their evaluations, including DOPS, in their "performance portfolio." In this way, while trainees can work on their procedural skills and monitor their own development based on the feedback they receive, authorities can track the development of each individual trainee. This also allows trainees to document their course of development, achievements and training process until graduation.

Direct observation of procedural skills is widely used in residency training (4). DOPS and other workplace-based assessment tools are routinely used in residency training in the United Kingdom, Ireland, Canada and Australia (7-10). In our review of the literature we did not identify any practices in Turkey that utilize the DOPS tool in residency training. The implementation we present in this study is the first example where the DOPS tool is used in residency training in Turkey. The study focused on the qualitative evaluation of the DOPS experiences of trainees and their trainers in otorhinolaryngology and explored the feasibility of DOPS in the residency training of Otorhinolaryngology residents. Quantitative assessment of its construct validity was also performed. A list of procedures proposed for DOPS in otorhinolaryngology was also planned at the end of the study.

Methods

The study was designed as a prospective educational study and conducted at the tertiary hospital for training and research of the Pamukkale University School of Medicine. First, the DOPS rating form to be used in the study was prepared after a review of the English and few Turkish examples available in the literature (Table 1). Then an informative presentation was made to the trainees and the trainers about competency-based training and workplace-based assessment. Also, the designed Turkish DOPS rating form was introduced and explained. The DOPS process was designed consistent with those reported in the literature and implemented in other countries: Each trainee, having selected their procedures, invited one of the trainers to observe their application, and the trainer, after observing the trainee's performance, filled out the DOPS rating form and provided feedback both verbally and in writing. In this process, whilst observing the trainee's performance, the trainer intervened when necessary to ensure proper application of the procedure as would be the case in routine practice. The trainer provided the trainee with verbal feedback after the procedure. Once the evaluation process is completed and the DOPS rating form filled out, the trainer delivered the document to the trainee for reviewing their scores and filing in their performance portfolio.

In the study, trainees and trainers were foreseen to repeat each procedure until they achieve sufficient experience to satisfactorily fulfill the requirements of the DOPS. The number of repetitions for the purposes of sufficient experience was defined

as minimum 10 DOPS rating forms filled out by each trainer and minimum 10 DOPS rating forms obtained by each trainee. Data collection period was defined as six months.

Analysis of the results of the study was planned in two parts: quantitative and qualitative. Quantitative assessment was planned for statistically demonstrating the "construct validity" of the DOPS rating form. The relationship between years of seniority and the mean scores achieved were observed, and whether years of seniority contributed to increased DOPS scores was evaluated under "construct validity". Differences among years of seniority were statistically assessed with the Kruskal-Wallis variance analysis test. Spearman's correlation was used for analyzing the relationship between the variables. A value of $p < 0.05$ was accepted as statistically significant in all statistical assessments. The assessment was performed using the Statistical Package for the Social Sciences 22.0 program (IBM Corp., Armonk, NY, USA).

For qualitative assessment, two meetings were held at the end of the implementation separately with the trainees and the trainers to inquire about their experiences with the implementation of DOPS. These meetings explored the experiences of the trainee and trainer groups in a semi-structured format through questions, among others, addressing their experience in the implementation of DOPS, whether or not it contributed to their training, and their views on the feasibility of the tool, and their feedback were recorded in writing. The feedbacks recorded during the sessions were reviewed immediately after the meeting to eliminate any omissions. Later these data were collectively reviewed by question and responses were summarized. To ensure the reliability of the qualitative study, evaluation results were shared with the participant trainees and trainers in the final phase to ask about any objections they might have. The headings given in the qualitative evaluation results correspond to the questions asked in the data collection process.

Ethics committee approval (nr. 60116787-020/379419) was obtained for the study and written consent was obtained from all participating trainees and trainers.

Results

Five residents and the faculty (3 professors and 2 associate professors) of the Otorhinolaryngology department of the Pamukkale University School of Medicine participated in the study. Fifty-five DOPS rating forms were completed in six months. Regarding the number of forms, one fifth-year resident was seen to have obtained 7 DOPS rating forms while the remaining four residents obtained minimum 11 and maximum 14 forms. A DOPS procedures list was created based on these DOPS rating forms (Table 2).

While 78.2% (n=43) of the DOPS procedures were performed in the outpatient clinic, 21.8% (n=12) were performed in the operating room. No DOPS rating forms were

Table 1. DOPS Rating Form

Direct Observation of Procedural Skills (DOPS) form

Trainee's Name Surname:			Patient Name Surname		
Clinical environment:	On-call: <input type="checkbox"/>	Outpatient clinic: <input type="checkbox"/>	Ward: <input type="checkbox"/>	Operating room: <input type="checkbox"/>	
Procedure				
Please assess the performance of the student in the areas given below	Below expectations 1	Borderline 2	Adequate performance 3	Above expectations 4	Not observed*
1. Demonstrates understanding of indications, relevant anatomy and technique of procedure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Obtains informed consent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Demonstrates appropriate pre-procedural preparation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Appropriate analgesia or safe sedation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Technical ability to perform skill safely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Aseptic technique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Seeks help where appropriate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Post-procedural management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Communication skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Consideration of patient / professionalism	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Overall performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*Please mark this column if you have not observed the behavior.

Assessors: Please make sure to provide verbal feedback to the trainee once you complete your assessment.

Please use this space to enter your suggestions about the trainee's areas of strength and areas for improvement.

.....

.....

Assessor:	Date:	Time taken for Assessment:
Signature:		Time taken for Feedback:

DOPS: Direct Observation of Procedural Skills

filled in for procedures performed during on-call hours or in the emergency room. Count of areas included in the forms and mean scores for each area are given in Table 3. Mean observation time for DOPS was 7.14±4.83 minutes (max: 20 - min: 1), and mean feedback time was 2.11±2.01 minutes (max: 10 - min: 0.5).

For statistical purposes, the last completed academic year of each trainee was accepted as their year of seniority. Residents participating in the study had 1, 3, 4 and 5 years of seniority. The Kruskal–Wallis test was used to identify whether the DOPS mean scores of the trainees showed any differences based on their years of seniority. While differences were found between one-year seniority and each of the higher seniorities (p<0.05), no statistical differences were found between seniorities of three, four and five years (p>0.05) (Figure 1). Also, a statistically sig-

nificant correlation and a favorable moderate correlation were found between the seniority years and the mean scores achieved in the test.

Qualitative assessment results are given below separately for trainees and for trainers.

Experiences of trainees

- **Did you encounter any difficulties in implementation?** “The massive patient load during the implementation period of the DOPS was the greatest difficulty. The intense pressure of having to care for patients makes it hard to spare time for such implementations. It keeps us from being able to invite the professors as trainers. This is because this kind of an implementation also slows down the work.”

Table 2. List of observed procedures

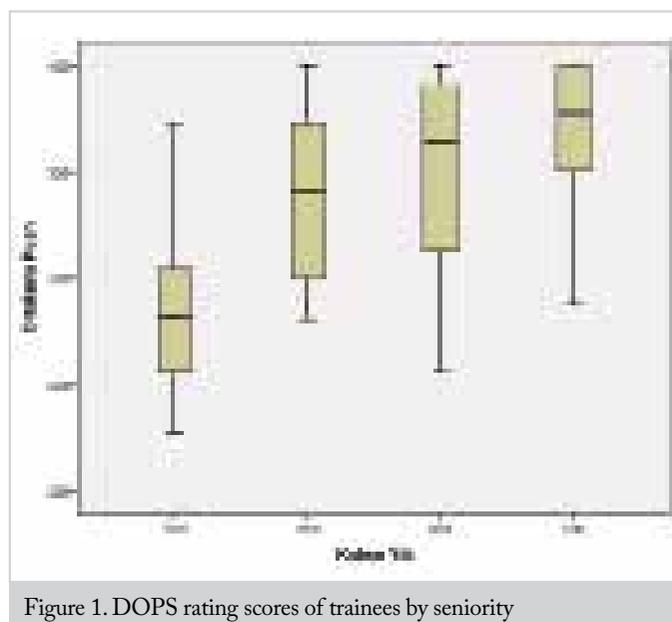
Description and count of procedures assessed in DOPS	
Adult nasal endoscopic examination	11
Endoscopic examination and aspiration of ear	4
Flexible nasolaryngoscopy examination of adult patient	1
Flexible nasolaryngoscopy examination of newborn patient	1
Radiofrequency ablation to the soft palate	1
Radiofrequency ablation to turbinates	4
Septal button placement	1
Intratympanic injection	4
Vertigo – positioning tests for diagnosis and treatment	8
Throat Swap	3
Biopsies	
Fine needle aspiration biopsy	2
Temporal artery biopsy	2
Endoscopic nasopharyngeal biopsy	1
Operating Room	
Paracentesis and ventilation tube placement	3
Tracheotomy	1
Direct laryngoscopy	3
Excisional biopsy from lower lip	1
Sleep endoscopy	4

DOPS: Direct Observation of Procedural Skills

Table 3. Mean scores achieved in DOPS by areas

Assessed DOPS areas	Mean of total scores
1. Demonstrates understanding of indications, relevant anatomy and technique of procedure	3.32±0.61
2. Obtains informed consent	*2.68±0.93
3. Demonstrates appropriate pre-procedural preparation	3.35±0.68
4. Appropriate analgesia or safe sedation	3.39±0.73
5. Technical ability to perform skill safely	3.45±0.53
6. Aseptic technique	3.29±0.51
7. Seeks help where appropriate	3.44±0.60
8. Post-procedural management	3.47±0.62
9. Communication skills	3.44±0.74
10. Consideration of patient / professionalism	3.58±0.53
11. Overall performance	3.49±0.63

DOPS: Direct Observation of Procedural Skills



- **Was the content of the Direct Observation of Procedural Skills Rating Form satisfactory?** “The DOPS rating form was satisfactory.”
- **Did you receive feedback?** “The trainers provided regular feedback in the course of the assessment. The DOPS allowed for a more systematic feedback process.”
- **In which areas were the highest number of deficiencies reported?** “In the area of communication and in obtaining informed consent from patients. This helped us to see our shortcomings. We improved our communication with patients in later implementations.”
- **How did it impact your training?** “It had a positive impact on our residency training. Being observed by our professors and receiving their feedback positively affects our training. That it enables us to see own development is also beneficial.”
- **Is the direct observation of procedural skills approach a fair assessment method?** “It’s a fair method, we did not see any unfair aspects. It helped us identify our shortcomings.”
- **What were the reactions of the patients?** “Some patients felt uncomfortable because they did not understand the process, but that was resolved after our explanation.”
- **Can the Direct Observation of Procedural Skills tool be used in residency training in our country?** “It can be used in residency training in otorhinolaryngology. However, it may not be effectively implemented in departments where there is a lack of communication between professors and residents. Some training departments would have to change their systems. It may not be effectively implemented even if mandatory. For instance, as medical students we have seen examples where the clinics of trainers and trainees are in different locations. Implementation can be a challenge under such conditions.”
- **What other challenges did you encounter during the DOPS implementation?** “Not every assessor uses the same technique when performing a given procedure. It would be

helpful in the training of residents if there were resources that show how the steps of each procedure should be performed. There are atlases for surgical procedures, but to our knowledge there are none for these kinds of procedures.”

Experiences of trainers

- **Did you find the DOPS tool easy to implement?** “DOPS can be implemented easily and quickly.”
- **Was the content of the observation form satisfactory?** “The DOPS rating form can be simplified by omitting some of the sections like the number of times the procedure was performed and the number of DOPS rating forms filled out by the assessor.”
- **Did you provide feedback?** “Feedback was given at every implementation.”
“The implementation helped both the trainees and us trainers to identify some of our shortcomings.”
- **What were the reactions of the trainees?** “We observed that the trainees felt shy in inviting some of the professors to the DOPS exercise.”
- **What were the reactions of the patients?** “Some patients felt uncomfortable.”
- **What was its impact on training?** “As trainers we are happy to have participated in this implementation and we felt as true educators.” “It is good that these kinds of skills can be measured and assessed in this way. Such skills are not evaluated under the core curriculum. It can therefore fill an important gap in residency training.”
- **Is the direct observation of procedural skills approach a fair assessment method?** “The DOPS rating form is clear. And fair as long as it is properly filled out. It is also good that it does not make a comparison between the trainees and there is no pass or fail decision. This is to say that the purpose is to assess the trainee individually. And to identify and allow the trainee to improve their deficiencies.”
- **What other challenges did you encounter during the DOPS implementation?** “It is possible that not all professors agree on the same technique for a given procedure. Therefore, either guidelines should be prepared for the procedures or professors should form a consensus.”
“Regarding the implementation, to ensure equal participation of all professors, DOPS rating forms printed with names of each professor can be provided to the trainees at the beginning of each academic year so that each trainee can have automatic access to all professors. In this way trainees will not choose their trainers.”

Discussion

The Direct Observation of Procedural Skills tool is an instrument used in competency-based training for workplace-based assessment. Review of the DOPS procedures list generated as part of this study shows that the tool can be used in many fields and for a host of procedures. DOPS can be used in outpatient clinics, and for relatively simple surgical procedures in

the operating room. There is only one DOPS procedures list reported for otolaryngology in the literature (11). Our list is seen to represent rather diversified areas of procedures and to also include the list used in the United Kingdom (Table 2). Being a general assessment tool that can be used in all types of procedures is the major benefit of the DOPS. It can be implemented even in minor surgical interventions performed in the operating room. Surgical Skills Rating Scales that involve specific steps, such as Objective Structured Assessment of Technical Skills or Procedure Based Assessment, are recommended in complicated surgical procedures. Besides the outpatient clinic and the operating room, DOPS can also be used for the procedures performed in the ward and during on-call hours. In this study, no DOPS rating forms were completed in the emergency room or during on-call hours, probably because of the working system of the clinic.

The DOPS rating form, to a large extent, lists the possible procedural steps in the order of performance. These are information (anatomic and technical knowledge about the procedure), obtainment of informed consent, pre-procedural preparation, analgesia and/or sedation induction, motor skills (technical proficiency), aseptic technique, teamworking and seeking help where necessary, post-procedural management, communication skills, professionalism and overall assessment steps (Figure 1) (10-13). Another major benefit of DOPS is that it uses the steps to assess the performance of the procedure not in an isolated manner, but rather in the complex environment of the real world together with the general requirements of the practice. Nevertheless, not all procedures may involve steps like analgesia induction or safe sedation. Such steps that are not part of the procedure are marked as ‘not observed’, hence omitted from assessment.

In the literature there are complex examples that include detailed descriptions of the assessment steps and detailed guidelines for assessors (14-16). To facilitate the implementation we designed a Turkish rating form based on the DOPS rating forms available in the literature and kept it as simple as possible (Table 1). Our aim was to facilitate ease of understanding and ease of completion. Review of the results show that the mean assessment time was 7.14 minutes and mean feedback time was 2.1 minutes. Overall, we found that one DOPS implementation lasted for 10 minutes on the average and believe that this time is acceptable given the massive service load involved in residency training in Turkey. That neither trainees nor trainers have given negative feedback on the observation and feedback times of the DOPS supports this idea. In clinics where trainees and trainers do not work in close locations these times can be longer.

Review of the feedback on the rating forms showed that neither the trainees nor the trainers proposed any steps that should be added to the DOPS rating form. However, segments like “difficulty of the procedure,” number of repetitions performed by

the trainee,” and “experience of trainer in DOPS” which we had initially included in the rating form were omitted from the form given in this article when trainers reported these to be unnecessary (Table 1). This has helped to achieve an efficient and compact rating form which both the trainees and the trainers found reasonable.

In addition to the verbal feedback requirement, a section was reserved for written feedback on the DOPS rating form to enable documentation. In this implementation, especially post-procedure feedback was occasionally discussed in the presence of the patients and this was seen to have made patients uncomfortable. Here, the purpose was to provide immediate feedback in a fast-paced patient care environment. We recommend that, in the future, the implementation should not be discussed in the presence of the patients. Furthermore, the feedback section on the DOPS rating forms were either completed with only one sentence or left blank. We believe that this was possibly due to the workload of the trainers. In fact, both the trainees and the trainers have indicated the difficulty of finding the time to exercise DOPS, given their intense workload. A study conducted in Ireland reports that this section was left blank in up to 25% of the rating forms (6). According to our experiences in this study, verbal feedback is faster since it is a face-to-face process applied on the spot. Yet, given the permanent nature of written documents, the feedback section should nevertheless be completed. Some professional organizations that value feedback are seen to have detailed feedback sections on their DOPS rating forms that they present in the literature (14, 15).

An assessment tool should be valid, reliable, useful and fair, and contribute positively to training outcomes (8, 12). Validity and reliability of DOPS have been explored in various studies (7, 11, 17). Analysis of trainee performances by their years of seniority showed statistical differences between one-year seniority and each of the higher seniorities (Figure 1). Also, a statistically positive correlation was found between the years of seniority and the mean DOPS ratings achieved. This is to say that the assessment tool is helpful in discriminating between the experienced and the inexperienced. Rating scores are seen to increase as seniority increases. Both results demonstrate the construct validity of this assessment tool.

In the statistical assessment of their DOPS rating scores trainees are observed to fall short in some respects, but they were found to be able to successfully perform the procedures required in otorhinolaryngology as of their third year. Based on this result, DOPS can be suggested to be implemented more frequently in the first years of residency training. Similar suggestions are also found in the literature (6, 11). Looking at this data we can say that all residents in our clinical department reach a satisfactory level of competency in DOPS-procedural skills.

An assessment tool should be useful. This definition involves properties like ease of use, ease of rating, facilitated interpretation of scores and cost efficiency. The major attribute of DOPS is its flexibility that allows it to be used for all types of procedures, from outpatient clinics to the operating room. Data on implementation times show application and observation times of the procedures, except for those performed in the operating room such as tracheotomy and direct laryngoscopy, to be very short (7.14 ± 4.83 minutes (max: 20 - min: 1)). Feedback time was 2.11 ± 2.01 minutes (max: 10 - min: 0.5). Apart from the short implementation time, trainers indicated the ease of rating and interpreting of the DOPS rating form.

An assessment tool should be fair. In their feedback trainees indicated that they identified their shortcomings through DOPS. And trainers pointed out that the tool, rather than comparing the performances among students, aimed at identifying and improving their shortcomings. Both the trainees and the trainers indicated that they found the DOPS rating form to be fair, a property in which its structured format is the major factor.

As understood from the experiences of the trainees and the trainers, the DOPS was accepted and acknowledged as an easy-to-use, useful and fair assessment tool.

With regards to the impact DOPS has on education, trainees indicated that this gave them the opportunity to obtain feedback from their trainers. They pointed out that DOPS helped them to identify some of their shortcomings, such as communication skills (Table 3).

Trainers, on the other hand, stated that they felt “as true educators” at the end of the process. Moreover, trainers’ attentions were drawn to the fact that these types of skills are indeed measurable and assessable, and they realized that workplace-based assessment was an aspect lacking in the core specialization curriculum set forth by the Medical Specialty Council. In the light of these data we can say that a DOPS implementation has a positive impact on the training process. Through DOPS, trainees and trainers regularly come together for learner centred training that is implemented in a structured format (18). That the process aims at determining the level of the trainee and giving feedback, rather than a pass/fail decision, is the major factor in why DOPS was embraced by the trainees. Studies strongly recommend that DOPS and other workplace-based assessment tools are not used for the purposes of pass/fail rating (6, 18, 19).

In this study, interestingly, trainees felt shy in inviting some of their professors to the DOPS exercise. There are studies in the literature which report similar complaints and indicate that both the trainers and the trainees would not embrace the exercise unless they fully comprehend the benefits workplace-based

assessment brings to training (18, 19). Especially negative feedback may keep trainees from participating in DOPS (6). These obstacles can be overcome in time through on-the-job training and by creating a kind of a the positive educational environment culture (9, 18, 19).

Participants' awareness about the exploratory nature of the implementation was the weakness of this study. The overall positive approach of the participants to the implementation may be due to the favorable training environment in the department. Future studies should explore the responses of both the trainees and the trainers in various clinical departments and particularly during routine practice. Also, different validity and reliability aspects such as "interrater reliability" of this Turkish DOPS rating forms should be studied. Cost analysis—an aspect not commonly addressed in the literature and one often disregarded in education processes in Turkey—is also recommended (20).

Given that competency-based residency training is presently required by the Medical Specialty Council, it is most likely that utilization of workplace-based assessment tools like DOPS will soon be mandatory. To allow for effective assessment practices, we suggest that arrangements should be made at this stage towards reducing especially the massive workload of care services and ensuring a certain time is spared for training. Similar suggestions for workplace-based assessment practices are reported in the literature (6, 18, 20).

Another aspect which is not reported in the literature but was brought up in this study is the lack of standardized guidelines for performing the procedures. This was brought up by both the trainees and the trainers. Specialist associations and authorities responsible for specialist training need to develop resources for this purpose.

Conclusion

The DOPS tool can be confidently used in otorhinolaryngology training in Turkey for workplace-based assessment and feedback. As a useful and fair assessment tool with proven construct validity DOPS will contribute positively to residency training. The data to be collected in this process can be further used in analyzing the success of the relevant clinical department in providing training, as well as in assessing the overall state of the training curriculum.

Ethics Committee Approval: Ethics committee approval was received for this study from the Ethics Committee of Pamukkale University Non-Interventional Clinical Trials (60116787-020/379419).

Informed Consent: Written informed consent was obtained from trainers and trainees who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - C.O.K., E.M., F.T., B.T., F.N.A.; Design - C.O.K., E.M., F.T., B.T., F.N.A.; Supervision - C.O.K., E.M., F.T., B.T., F.N.A.; Resource - C.O.K.; Materials - C.O.K., E.M.; Data

Collection and/or Processing - C.O.K., E.M., F.T., B.T., F.N.A.; Analysis and/or Interpretation - C.O.K., E.M.; Literature Search - C.O.K.; Writing - C.O.K., E.M.; Critical Reviews - F.T., B.T., F.N.A.

Acknowledgement: The authors would like to thank Mrs. Hande Şenol for her contributions to statistical analysis of their work

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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