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ENT surgical training in 2018: national cross-sectional study

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Abstract. *Objectives:* This study aimed to inventory current practical training from the surgical trainee point of view, identifying strengths and gaps in current training and potential tools to be developed.
Methodology: We conducted a broad national survey among ENT Belgian trainees from all universities in the country. The questions included self-assessment, training objectives, training quality, and training tools.
Results: Of 94 trainees contacted, the overall response rate was 59.5%. Of these, 35.7% evaluated their level of overall surgical competence at 3/5 compared to ideal mastery. More than half (55%) of respondents did not know the training objectives and 73% did not know the basic surgical procedures that a qualified ENT surgeon should be able to perform. The main mode of learning (41%) was the observation of a senior and repetition under supervision (companionship). The results showed mainly logistical and economic drawbacks that seem largely actionable using learning methods based on implementing organized training sessions, associated with different learning tools such as surgical and procedural simulation. Some of these are already available in Belgium but remain difficult to access or develop.
Conclusion: This study revealed real demand and motivation from trainees and could serve as a basis for a teaching scheme to improve skills and confidence of future surgeons. Additional studies are needed to identify the most effective ways for implementing this type of teaching within the constraints of the surgical curriculum and teaching hospital resources.

Introduction

The complementary master's degree curriculum in ENT surgery is currently spread over at least 5 years in Belgium after completion of medical school and varies from 4 to 5 years in other European countries.[1,2] During this period, a physician in training must acquire both theoretical knowledge and technical skills. In addition, education is only a small part of the lives of these doctors, whom hospitals employ to undertake day-to-day clinical responsibilities. These clinicians staff services round the clock and rotate among hospitals every 6–12 months. Learning and assessment methods are not standardized and remain heterogeneous across the European Union.[1,2] Because learning is focused on the patient, it is based mainly on observation and progressive companionship, as for other surgical specialties.[2] However, ideal training conditions based on companionship or apprenticeship seem to be realized rarely because of logistical, economic, and temporal reasons, which can lead to frustration and disappointment.[2,3,4] The first challenge is ethical: direct patient contact is needed to train surgeons, but patients expect their surgeries to be performed only by experienced surgeons. The second challenge is logistical with the development of increasingly complex surgical techniques to be taught without lengthening the duration of trainings. Studies on surgical training quality have already been conducted in different disciplines and countries, mainly in urology,[5,6] gynecology,[7] and gastrointestinal surgery.[3] These investigations have revealed the generalized nature of such issues, reporting varying degrees of dissatisfaction during training that seems to diminish with increasing experience.[2] In a broad European study published by Oker et al. in 2017, satisfaction with training, including support and guidance from seniors, was lowest in Italy. In Belgium, gaps were identified between the quality of teaching and feedback from seniors as well as the apprenticeship. The highest

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satisfaction with training was reported in France and Spain, followed by Austria. Thus, the European countries varied in terms of the analysed features.[2] Solutions proposed in the literature are based on cadaveric dissection or virtual simulation, synthetic laboratories or situations, and communication exercises, associated with debriefing sessions involving regular feedback.[7-9] In this study, we aimed to develop an inventory of current practical training from the Belgian trainee point of view, identifying strengths and gaps in current training and potential tools to be developed.

Material and methods

We conducted a broad national survey of the Belgian trainee population from all universities in the country. We constructed an online survey (*Google Forms*°) translated into French, English, German, and Dutch and sent it to all listed Belgian trainees (N=94) available at the official repertoire via their official email addresses. To increase the response rate, we also contacted the association of Belgian residents in otolaryngology (VA-NKO) and provided access via QR codes to be scanned by smartphones at several Belgian congresses. Participation was voluntary, and doctors in training returned the survey anonymously. The questionnaire stated that answering (or not) the questions would not alter a trainee's university or hospital relationships.

The survey consisted of 25 questions about trainees' perception of their surgery practical teaching, divided into five categories: general candidate data, candidate self-assessment, evaluation of training objectives, training quality, and training tools. Each category is detailed separately in the results section (https://goo.gl/forms/ij5uil8XBlC8ci1l2). Quantitative and qualitative data were grouped and analysed using *Google Forms*° software. Statistical analysis was carried out using the "R commander" software.

Results

General data

The overall participation rate was 59.5%, with a better rate among southern universities (76% versus 43% response rate for northern institutions; Table 1). There was a large female predominance in all universities (73%). The most represented university networks were the Catholic University of Louvain (19.64%), followed by the University of Liège and University of Brussels (17.8% and 16%, respectively) in the southern part and Catholic University of Leuven (25%), followed by the University of Ghent (12.5%) in the northern part. The main areas of interest reported were rhinology–allergology and sinus surgery (71.4%), followed by laryngology and head-and-neck surgery (57%), paediatric ENT (37.5%), and paediatric oto-vestibulology (37.5%). The vast majority of trainees did not engage in any research activity in Belgium (78%). According to the trainees, the three qualities most sought after in a clinical trainee are reliability and involvement (punctuality, availability, profitability), 91%; practical skills (procedural, ambulatory and surgical), 80%; and relational skills (within the team and with patients), 64.5%. Only 37.5% and 16%, respectively, cited theoretical and scientific knowledge as important. Responses from the northern and southern parts of the country were similar.

Self-assessment

Answers to this section depended on the training year, and showed a large range: 35.7% evaluated their level of overall surgical competence at 3/5 (on a 5-step scale) compared to what they viewed as an ideal mastery. Another 26% evaluated their level at 2/5; 19% put it at 1/5, and 17% at 4/5 (Table 2). Their assessment of their degree of autonomy regarding the surgical management of an urgent case was heterogeneous and also depended on the year of training. Communication skills were favourably rated; 62.5% rated themselves as 4/5 for patient communication and 46.43% as 4/5 for communicating with the medical team.

Training objectives

More than half (55%) of trainees did not know the training objectives according to their internship logbook (Table 3). More than half (73%) also did not know the basic surgical procedures that an ENT should be able to perform alone at the end of training. Most of them never received any form of information regarding these training objectives and did not base their objectives on items described in the internship logbook.

Table 1
ENT training in Belgium in 2018: summary of data from a national audit

General data		**n**	**%**
Sex			
	M	15	26.79
	F	41	73.21
Training level			
	1st year	10	17.86
	2nd year	12	21.43
	3rd year	10	17.86
	4th year	14	25.00
	5th year	8	14.29
Home university			
	University of Liège	10	17.86
	Catholic University of Louvain	11	19.64
	University of Brussels	10	17.86
	Catholic University of Leuven	14	25.00
	University of Ghent	7	12.50
	University of Antwerp	2	3.57
	Vrije Universiteit Brussel	2	3.57
Field of interest			
	Laryngology – head and neck surgery	32	57.14
	Rhinology–allergology – face and sinus surgery	40	71.43
	Otology–vestibulology	21	37.50
	Paediatric ENT	21	37.50
	Sleep apnoea	1	1.79
	All fields	1	1.79
Research activity			
	No	43	78.18
	Yes	12	21.82
Most required skills			
	Theoretical knowledge	21	37.50
	Reliability and commitment (punctuality, availability, profitability)	51	91.07
	Practical skills (procedural, ambulatory and surgical)	45	80.36
	Relational skills (within the team and with patients)	36	64.29
	Scientific skills (e.g., research, curiosity, publications)	9	16.07

Table 2
Self-assessment of Belgian trainees

Self-assessment	**Mean ± SD**
Overall skills in relation to what is ideal	2.52 ± 1.01
Current autonomy	2.59 ± 1.13
Communication skills with medical team	4.09 ± 0.84
Communication skills with patients	4.21 ± 0.62
Training quality	2.60 ± 1.10

Quality of training

We obtained highly variable answers regarding the quality of global surgical training in ENT, from 1/5 to 3/5 mainly (on a 5-step scale; Table 4). Practical skills were assessed in a largely mixed way in the operating room, followed by outpatient and inpatient clinics, or were not assessed at all in one third of cases. When these competencies were assessed, trainees did so informally and relatively

Table 3
Training objectives

Training objectives	n	%
Knowledge of internship training objectives		
Yes	25	44.64
No	31	55.36
Knowledge of the basic procedures that a specialist must be able to perform		
Yes	15	26.79
No	41	73.21
Ways objectives are communicated		
Not communicated	31	57.41
Orally	3	5.56
Written (e.g., mail)	14	25.93
Training plan	4	7.41
Website	2	3.70

randomly. Of the respondents, 32% said feedback could be found in the internship logbook at the end of the year, 59% had it in informal discussions with the supervisor, and there was no feedback in 23% of cases.

More than half of the doctors in training (54.5%) thought that the distribution of surgical activities was not adapted to the individual level over the entire training period. The other half did not have any suggestions or did not suggest that it could be better. The primary modes of learning in 73% of cases were observation of a senior and repetition with supervision from the senior (companionship). In 69.6% of cases, it was practical work performed outside the parent institution, and 67.8% cited practical work within the institution. Trial-and-error learning remained a training mode in 14.3% of cases.

Training tools

Regarding technical and surgical ENT procedures, more than half of trainees did not have the opportunity to train on anatomical-organic, synthetic, or virtual parts before performing these procedures in patients (Table 5; Fig. 1A). The other portion had access to these tools too rarely and expressed a wish for more training of this type. Most of the simulation experience that trainees had attempted throughout their medical training were dissections on corpses, followed by exercises on mannequins, exercises on anatomical parts, and role play of cases. We found that 10.7% of respondents had never had contact with this type of teaching. Most had had access to a cadaver dissection laboratory and some to a virtual simulation laboratory; 4.8% had access to a surgical laboratory on synthetic parts; and 3.5% had access to role-playing games with concrete situations (Fig. 1B). A large majority (91%) of respondents believed that a cadaver dissection laboratory was a preferred tool to improve learning, followed by more practical work on 3D synthetic parts, regular debriefing sessions with a supervision team, and better management and distribution of schedules.

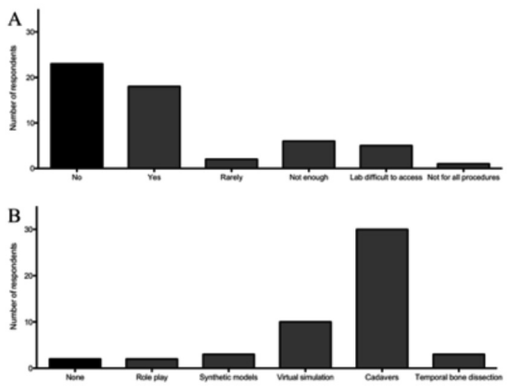

Figure 1

Training tools **A**. Do Belgian trainees have regular access to a lab for training? Almost half of doctors in training had access to a laboratory to learn and practice surgical procedures before performing these procedures in patients, although respondents expressed their wish to have more access to lab-based learning. **B**. On which kind of lab do Belgian trainees have the opportunity to train, if available (more than 1 answer possible)? When available, the most widespread learning modality was a cadaver laboratory. Alternative simulation-based experiential learning was not regularly available, and 16% of respondents had never had contact with this type of teaching.

Table 4
Training quality according to Belgian trainees

Training quality		**n**	**%**
Skills assessment			
	Not assessed	18	32.14
	In surgery room	22	39.29
	At bedside	4	7.14
	During patient appointment	9	16.07
	On virtual model	12	21.43
	Internship book	9	16.07
	With staging	20	35.71
	Oral adjustments	1	1.79
	On corpses	1	1.79
Frequency of assessment			
	Never	18	32.14
	Randomly	6	10.71
	Rarely	2	3.57
	Annually	10	17.86
	Monthly	5	8.93
	Weekly	6	10.71
	Daily	7	12.50
	Half-yearly	2	3.57
Type of feedback			
	No feedback	13	23.21
	Informal one-to-one discussion with the supervisor	33	58.93
	Oral report provided by one or several supervisors	7	12.50
	Delivery of a written report	3	5.36
	Via internship book at the end of the year	18	32.14
	Group discussion at meetings with various members	1	1.79
Relevance of the individual distribution of surgical activities			
	No	30	54.55
	Yes	13	23.64
	I don’t know	12	21.82
Main ways of learning			
	Learning alone by trial/error	8	14.29
	Observation of a senior and repetition alone	16	28.57
	Observation of a senior and repetition supervised by a senior (companionship)	41	73.21
	Various courses within my institution	38	67.86
	Various exercises outside my institution	39	69.64
	Following an oral presentation ex-cathedra, live, or online	12	21.43

Half of the respondents (50%) advocated practical work on virtual simulator and podcasts (33%). Some of them (10.71%) also thought that more inter-university exchange would be beneficial. Animal models, role-playing, and practical work on mannequins seemed less favoured (21.43%, 12.5%, and 19.6%, respectively). Some of the residents (26.8%) also thought that a practical anatomy examination could be beneficial.

Table 5
Training tools available in Belgium

Training tools	n	%
Experience with medical simulation		
Never	6	10.71
Dissection on corpses	47	83.93
Animal dissection with anatomical study, suture exercise, or endoscopic procedures	4	7.14
Resuscitation training on mannequin	26	46.43
Dissection on synthetic part	9	16.07
Virtual/augmented reality	5	8.93
Nursing (blood tests, infusion)	13	23.21
Role play and staging	13	23.21
Simulation on prosthetic models	1	1.79
Dissection at the beginning of medical studies	1	1.79
Team management and communication strategy via scenario	7	12.50
Complementary tools for learning		
Practical work on corpses	51	91.07
Practical work on animals	12	21.43
Practical work with virtual simulation	28	50.00
Practical work on 3D synthetic parts	26	46.43
Practical work with a mannequin	11	19.64
Practical exam on anatomical piece and specific staging	15	26.79
Role play and staging	7	12.50
Podcasts (online video, YouTube, Vimeo, other)	19	33.93
Ex-cathedra courses	11	19.64
Regular debriefing sessions with supervision	21	37.50
Better management and distribution of assistants and schedules of each	26	46.43
More inter-university exchanges	6	10.71
Supervised learning in the operating room (companionship)	1	1.79
Other: better communication of objectives	1	1.79

Discussion

Feedback from young doctors across the country indicated a positive response to the development of training tools to improve the surgical training. The main reported weakness in the current training program was a lack of communication, notably regarding training objectives. Our finding is in line with a previous study by Oker and colleagues in 2017.[2] The main reported strength was the use of alternatives to apprenticeship, with the majority of respondents having access to a cadaver dissection laboratory and some of them to a virtual simulation laboratory.

Several explanations are possible for the apparent contradiction between trainees having to fulfil a logbook with stated objectives and then having a lack of knowledge about those objectives. The logbook may not be adapted in the same way to every trainee, depending on the level of training, the hospitals, or the tutors. Some sections of the logbook may remain empty throughout the training because of logistical constraints. Available supervision and clinical activity may also vary from one hospital to another. Respondents pointed out a lack of concrete feedback. Our study highlighted a great variability in support for practical training within the different hospitals, with varying levels of satisfaction depending on the training sites. Differences were not related to the region of the country. Our findings showed that residents in the two linguistic communities of the country have

more in common than differences from each other.

Among the Belgian trainees, we observed that most of them were involved primarily in clinical activities, with few devoting themselves to a research activity. From our survey, technical and communicative capacities were valued comparably to scientific or theoretical performance. No communication difficulties were reported within the teams or with the patients, but the vast majority of trainees did not know the training objectives or the basic surgical procedures that a surgeon must be able to perform at the end of training. According to Bhutta and colleagues, the most important factors that encourage choosing ENT as a career include the variety of operative procedures, work–life balance, inherent interest in this clinical area, and inspirational senior role models. Thus, it seems important to focus on and improve these aspects during the training period.[10]

Belgian trainees showed a particular interest in rhinology and cervical and laryngeal surgery, followed by otology and paediatric ENT. To the best of our knowledge, this preference was not published before on a European or international scale, so we cannot speculate about whether it is a general finding or specific to Belgium. Vocations could be inspired by available information, representation of the subdiscipline during the training, ease of access to this specific discipline, or role models among supervisors.

In terms of practical learning, the degree of satisfaction of these respondents varies with year of training and the centre concerned. This observation seems homogeneous from one specialty to another, and the comments from our respondents are generally similar to those in other specialties.[3] In our study, trainees did not think that surgical activity was adapted to the individual scale through the whole training. Surgical training in Belgium, as elsewhere, is based on the apprenticeship model (observation/repetition), which has limitations in terms of performance learning.[11,12] Feedback from our respondents indicated that more access to "simulation-based teaching" would be favourable to improve learning, as would access to cadaver, virtual, and synthetic models adapted to targeted surgery, and better logistics for using their time according to a pre-established and tested model. Using simulation makes the initial ramp-up significantly easier, more efficient, and less frightening.[13,14] Given the scarcity, cost, and relative unavailability of cadaveric human tissue, physical models and virtual reality simulators have become available during training and beyond.[12,13,15,16]

Teaching methods based on simulation have proven their efficiency in surgical and practical learning.[7-9,17] Simulation is not limited to the ENT field and concerns surgical and medical specialties requiring technical skills, as well (e.g., abdominal or thoracic puncture, removal of hematopoietic marrow).[10,11,18] The proposed solutions are based mainly on various methods of procedural simulation that rely on adapted tools.[7,8,12,13,19] This field is growing in terms of learning, but most of the available tools have yet to attract interest and find a place in the learning curriculum, as technology should complement rather than replace clinical training.[8,19]

Conclusion

The results of this national cross-sectional study could assist faculty and students in improving their strengths and tracking the gaps in current ENT training. Logistical and organizational problems, from the trainee perspective, may be related to a lack of structured and pre-established training plans in an era of increasing constraints on time and money. Additional studies are needed to identify the most effective ways of implementing educational tools, such as cadaver dissection and simulation models, within the limitations of the surgical curriculum and teaching hospital resources.

References

1. http://orluems.com
2. Oker N, Naif H, Reichelt AC, Herman P, Bernal-Sprekelsen M, AlbersAE. European otorhinolaryngology training programs: results of a European survey about training satisfaction, work environment and conditions in six countries. *Eur Arch Otorhinolaryngol.* 2017;274:4017-4029.
3. Piessen G, Chau A, Mariette C, Bouillot JL, Veyrie N. Evaluation of training of residents and chief-residents in visceral and digestive surgery in France: results of a national survey. *J Visc Surg.* .2013;150(5):297-305.
4. Okera N, Escabasse V, Coste A, Albers AE. ORL residency in France: Satisfaction and training quality in 2013. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2011;132(6):327-32.
5. du Pouget L, Nouhaud FX, Blah M, Defortescu G, Ndangang M, Grise P, Pfister C. Interest of surgical companionship during the training period of robot-assisted radical prostatectomy. *Prog Urol.* 2017;27(5):297-304.

6. Haraux E, Ravasse P, Sharma D, Canarelli JP, Gouron R, Tillou X. Evaluation of a teaching tool for learning the surgical technique of inguinal orchidopexy. *Prog Urol.* 2016;26(9):507-16.
7. Usami T, Fujioka T, Yoshida A, Miyaue H, Yasuoka T, Uchikura Y, Takagi K, Matsubara Y, Matsumoto T, Matsubara K, Sugiyama T. Assessment of laparoscopic training for gynecological malignancies using Thiel-embalmed human cadavers. *Mol Clin Oncol.* 2018;9(5):511-514.
8. Sonya Malekzadeh, Simulation in otolaryngology, Otolaryngologic Clinics of North America Volume 50, Number 5. Elsevier, New-York: 2017.
9. Piromchai P, Avery A, Laopaiboon M, Kennedy G, O'Leary S. Virtual reality training for improving the skills needed for performing surgery of the ear, nose or throat *Cochrane Database Syst Rev.* 2015;9(9).
10. Bhutta M, Mandavia R, Syed I, Qureshi A, Hettige R, Wong BY, Saeed S, Cartledge J. A survey of how and why medical students and junior doctors choose a career in ENT surgery. *J Laryngol Otol.* 2016;130(11):1054-1058.
11. Mark S, Ward J, Irias N, Navedo A, Pollart J, Weinstock PH. Using Medical Simulation to Teach Crisis Resource Management and Decision-Making Skills to Otolaryngology Housestaff. *Otolaryngol Head Neck Surg.* 2011;145(1):35–42.
12. Glaser B, Schellenberg T, Koch L, Hofer M. Design and evaluation of an interactive training system for scrub Nurses. *Int J Cars*. 2016;11:1527–1536.
13. Shafiq Z, Mufti TS, Qayum I. Role of clinical skill centre in undergraduate medical education: Initial experience at Rehman Medical College Peshawar. *J Pak Med Assoc.* 2017;67(1):73-76.
14. Abou-Elhamd KA, Rashad UM, Al-Sultan AI. Applying problem-based learning to otolaryngology teaching. *J Laryngol Otol.* 2011;125(2):117-120.
15. George AP, De R. Review of temporal bone dissection teaching: how it was, is and will be. *J Laryngol Otol*. 2010;124,119–125.
16. Marglani O, Alherabi A, Al-Andejani T, Javer A, Al-Zalabani A, Chalmers A. Development of a tool for Global Rating of Endoscopic Surgical Skills (GRESS) for assessment of otolaryngology residents. *B-ENT.* 2012;8(3):191-195.
17. Al-Qahtani KH, Alkhalidi AM, Islam T. Tool for assessing surgical tracheostomy skills in otolaryngology residents. *B-ENT.* 2015;11(4):275-280.
18. Bakker NH, Fokkens WJ, Grimbergen CA. Investigation of training needs for Functional Endoscopic Sinus Surgery. *Rhinology.*2005;43:104-108.
19. Smith ME, Trinidade A, Tysome JR. The ENT boot camp: an effective training method for ENT induction. *Clin Otolaryngol.* 2016;41(4):421-424.

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