Liege, November 6, 2018

To Prof Ph. Eloy and Prof. M. Jorissen
B-ENT Editors

Dear Editors,

We would like to submit for publication in B-ENT the following paper entitled “Surgical ENT Training in 2018: National Survey”. We summarize the key findings of an unique survey across ENT registrars of all universities of Belgium, conducted in Vlaams, French and German, regarding their surgical training. Surgical training is based in Belgium as in the rest of the world on the apprenticeship model. This model leads to dilemmas for teaching surgeons permitting inexperienced trainees to operate on the patients, and the challenge of teaching more and more complex surgical techniques without lengthening the training’s duration.

Our study highlights the strengths and the gaps in our surgical training. We are convinced that our results will allow readers of B-ENT, trainees, supervisors, and training program directors to improve the quality while maintaining the strengths of our surgical training. Trainees who are not, or who believe they are not, progressing as expected need to be identified early on and offered targeted training.

By the present letter we attest that each author has participated to the data collection, analysis and/or the paper writing. The present paper has not been submitted elsewhere for publication. We do not have any financial issue/conflict of interest to disclose. We thank you very much for your attention to our work.

Yours sincerely,

Florence Rogister
Séverine Camby
Edward Ansari
Philippe Lefebvre
Anne-Lise Poirrier

ENT Surgical Training in 2018: National Cross-sectional Study

Authors: Florence Rogister M.D., Séverine Camby, Edward Ansari M.D.,Philippe Lefebvre M.D. Ph.D., Anne-Lise Poirrier M.D. PhD.

Department of Otolaryngology-Head and Neck Surgery, University Hospital of Liege, Belgium

Running Title: Belgian ENT training in 2018

Address for correspondence: Florence Rogister, MD, ENT department, University Hospital of Liege, Sart-Tilman B35, B4000 Liege, Belgium. Phone +3243667269. Fax +3243667525. frogister@student.uliege.be

Abstract :

Objectives: This study aimed to draw up an inventory of the current practical training from the surgical trainees' point of view, identifying strengths and gaps of current training and potential tools to be developed. Methodology: We conducted a broad national survey among ENT Belgian trainees from all universities of the country. The questions included self-assessment, training objectives, training quality and training tools. Results: There were 94 trainees contacted and the overall response rate was 59.5% ; 35.7% of trainees evaluated their level of overall surgical competence at 3/5 compared to an ideal mastery. More than a half (55%) of trainees 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, on which it seems possible to act using learning methods based on the implementation of organized training sessions, associated with different learning tools such as surgical and procedural simulation. Some of these are already available in our country but remain difficult to access or to develop. Conclusion: This study revealed a real demand and motivation from trainees and could serve as a basis to sketch a teaching scheme improving 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 hospitals resources.

Key words: surgical training, clinical competence, ENT trainees, skills improvement

Introduction:

The complementary master's degree in ENT surgery is currently spread over at least 5 years in Belgium after completion of medical school, and varies from 4 to 8 years in other European countries[1-2]. During this period, physician in training must acquire theoretical knowledge on the one hand and technical skills on the other hand. In addition, receiving education is only a small part of the lives of these doctors, who are employed and paid by the hospitals to work and undertake day-to-day clinical responsibility. They staff services round the clock and rotate between hospitals every 6-12 months. Learning and assessment methods are not standardized and remain very heterogeneous across the European Union[1-2]. Since learning is focused on the human patient, it is mainly based on observation and progressive companionship, as for other surgical specialties[2]. However, ideal training conditions based on companionship or apprenticeship seem rarely met for logistical, economical and temporal reasons, and might sometimes leads to frustration and disappointment at some point[2-3-4]. The first challenge is ethical as direct patient contact is needed to train surgeons, but patients have an expectation to have surgery performed only by experienced surgeon. The second challenge is logistical with the development of more and more complex surgical techniques to be taught without lengthening the training's duration. 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] which reveal the generalized nature of these issues. They report varying degrees of dissatisfaction during training period which seems to diminish as years of training grow[2]. In a wide European study published by Oker in 2017, satisfaction with training including support and guidance of seniors was lowest in Italy. In Belgium, there was some gap between the quality of teaching and feedback from seniors as well as apprenticeship. The highest satisfaction with training was in France and Spain followed by Austria. It showed major diversity for all aspects analyzed between the different European countries[2]. Solutions

proposed in the literature are based on various cadaveric dissection or virtual simulation and synthetic laboratories or situations and communication exercises, associated with debriefing sessions with regular feedback[7-8-9]. In this study, we aimed to draw up an inventory of the current practical training from the Belgians trainees' point of view, identifying strengths and gaps of current training and potential tools to be developed.

Material and Method:

We conducted a broad national survey among Belgian trainees' population from all universities of the country. We constructed an online survey (*Google Forms*°) translated into French, English, German and Dutch. We sent it to all listed Belgian trainees available at the official repertoire via official email addresses, i.e. 94 ENT surgeons in training in Belgium. 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 trainees' relationship with their university or hospital. The survey consisted in 25 questions about trainees' perception of their surgery practical teaching, divided into 5 categories: general candidate data, candidate self-assessment, evaluation of training objectives, training quality, and training tools. Each of them will be detailed separately in the results section (https://goo.gl/forms/ij5uil8XBlC8ci1l2). Quantitative and qualitative data were grouped and analyzed using *Google Forms*° software and statistical analysis were carried out using the "*R commander*" software.

Results:

1. General data (Table 1):

The overall participation rate was 59.5%, with a better participation rate in South universities (76% versus 43% response rate in North ones). There was a large female predominance in all universities (73% female). The most represented university networks were the *Catholic University of Louvain* (UCL: 19.64%), followed by *University of Liège* and *University of Brussels* (ULg and ULB : 17,8% and 16% respectively) in the South part and *Catholic University of Leuven* (KUL : 25%), followed by *University of Gent* (UG : 12,5%) in the North part. Main areas of interest reported were rhinology-allergology and sinus surgery (71,4%) followed by laryngology and head and neck surgery (57%), pediatric ENT (37,5%) and pediatric oto-vestibulology (37,5%). The vast majority of trainees did not have any research activity in Belgium (78%). According to Belgian trainees themselves, the 3 qualities most sought after in a clinical trainee were: 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%. Theoretical and scientific knowledge were only cited at 37,5% and 16% respectively. Responses from the North and South part of the country were similar.

2. Self-assessment (Table 2):

Answers of this section were training year dependent with a large varying range: 35.7% of trainees evaluated their level of overall surgical competence at 3/5 (on a 5 steps scale) compared to an ideal mastery according to them, whereas 26% of them evaluated their level at 2/5, 19% at 1/5 and 17% at 4/5. The assessment of the degree of autonomy regarding the surgical management of an urgent case was heterogenous, also depending on the year of

training. Communication skills were favorably rated with 62,5% response to 4/5 regarding patient communication and 46.43% to 4/5 regarding communication with the medical team.

3. Training objectives (Table 3):

More than a half (55%) of trainees did not know the training objectives according to their internship logbook. More than a half (73%) 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 to these training objectives and they did not base their objectives on the items described in the internship logbook neither.

4. Quality of training (Table 4):

We obtained very variable answers in the evaluation of the quality of the global surgical training in ENT from 1/5 to 3/5 mainly (on a 5 steps scale). Practical skills were assessed mainly in a 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, they were assessed informally and relatively randomly. 32% of the feedback could be found in the internship logbook at the end of the year, 59% of the feedback was in informal discussions with the supervisor and there was no feedback in 23% of cases. More than a 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 advice or think that it could be better. The 3 main modes of learning emerging in 73% of cases were the observation of a senior and repetition with supervision on his part (companionship), followed in 69,6% of cases by practical work carried out outside the parent institution, and

various practical work within the institution in 67,8% of cases. Trial and error learning remained a learning mode in 14,3% of cases.

5. Training tools (Table 5):

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 (Fig.1A). The other part had access to it too rarely and expressed its wish to carry out more training of this type. Most of the simulation experience that trainees had tried throughout their medical training were dissections on corpses, followed by exercises on mannequins, followed by exercises on anatomical parts and role plays of cases. We noticed that 10,7% of doctors in training had never had contact with this type of teaching. Majority of them had access to a cadaver dissection laboratory and some of them 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). Majority (91%) of subjects believed that a cadaver dissection laboratory was a 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 everyone's schedules. 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 favored (respectively 21,43%, 12,5% and 19,6%). Some of the resident (26,8%) also thought that a practical examination on anatomical part could be beneficial.

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 the training objectives. Our finding is in line with 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 hypothesis could explain the apparent contradiction between trainees having to fulfill a logbook with stated objectives and then answering a lack of knowledge of their 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 due to 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 the support for practical training within the different hospitals with varying levels of satisfaction depending on the training sites. Differences were not related to the belonging to the North or the South of the country. Our findings showed that the assistants' population had more in common than differences between the two linguistic communities of the country.

Among the Belgian trainees, mostly female, we observed that most of them had a mainly clinical activity, with few respondents devoting themselves to a research activity. From our survey, technical and communicative capacities were valuated compared to scientific or theoretical performances. No communication difficulties were reported within the teams or with the patients, but the vast majority of doctors in training 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 ENT as a career include: the variety of operative procedures, work–life balance, inherent interest in this clinical area and inspirational senior role models, it thus seems important to focus on and improve these aspects during training period[10]. Belgian trainees showed a particular interest in rhinology and cervical and laryngeal surgery followed by otology and pediatric ENT. To the best of our knowledge, this preference was not published before on an European or international scale, so we cannot speculate if it is a general finding or a Belgian particularity. Vocations could be inspired by available information, representation of the sub-discipline 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 interns remains variable depending on the year of training and the center concerned. This observation seems homogeneous from one specialty to another and the remarks made by ENT trainees are generally similar to those found in other specialties[3]. In our study, trainees did not think that surgical activity was distributed in a way adapted to the individual scale on the whole training. Surgical training is based in Belgium as in the rest of the world on the apprenticeship model (observation/repetition), which has shown its limits in terms of performance learning[11-12]. Feedback from our respondents indicated that more access to "simulation-based teaching" would be favorable to improve learning, insisting on access to cadaver, virtual and synthetic models adapted to targeted surgery and better logistics of their time according to a pre-established and tested model. Using simulation make 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[7-8-9-17]. Simulation is not limited to the ENT field but also concern surgical and medical specialties requiring technical skills (abdominal or thoracic puncture, removal of hematopoietic marrow, …)[10-11-18]. The proposed solutions are mainly based on various methods of procedural simulation based on adapted tools[7-8-12-13-19]. This is a growing field in terms of learning but most of the available tools have yet to prove their interest and place in the learning curriculum, as technology rather complement than replace clinical training[8-19].

Conclusion:

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 according to the trainees' point of view may be related to a lack of structured and pre-established training plan in an era of time and money increasing constraints. Additional studies are needed to identify the most effective ways for implementing educational tools such as cadaver's dissection and simulation models within the constraints of the surgical curriculum and teaching hospitals resources.

Conflict of interest:

The authors have no conflict of interest to be declared.

References:

1. http://orluems.com
2. European otorhinolaryngology training programs: results of a European survey about training satisfaction, work environment and conditions in six countries. Oker N, · Naif H, Reichelt AC, Herman P, Bernal-Sprekelsen M, AlbersAE. Eur Arch Otorhinolaryngol 2017; 274:4017–4029
3. Evaluation of training of residents and chief-residents in visceral and digestive surgery in France: results of a national survey Piessen G, Chau A, Mariette C, Bouillot JL, Veyrie N. J Visc Surg. 2013;150(5):297-305.
4. ORL residency in France: Satisfaction and training quality in 2013 Okera N, Escabasse V, Coste A, Albers AE Eur Ann Otorhinolaryngol Head Neck Dis. 2011;132(6):327-32
5. Interest of surgical companionship during the training period of robot-assisted radical prostatectomy du Pouget L, Nouhaud FX, Blah M, Defortescu G, Ndangang M, Grise P, Pfister C Prog Urol. 2017;27(5):297-304
6. Evaluation of a teaching tool for learning the surgical technique of inguinal orchidopexy Haraux E, Ravasse P, Sharma D, Canarelli JP, Gouron R, Tillou X Prog Urol. 2016;26(9):507-16.
7. Assessment of laparoscopic training for gynecological malignancies using Thiel-embalmed human cadavers Usami T, Fujioka T, Yoshida A, Miyaue H, Yasuoka T, Uchikura Y, Takagi K, Matsubara Y, Matsumoto T, Matsubara K, Sugiyama T 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. Virtual reality training for improving the skills needed for performing surgery of the ear, nose or throat Piromchai P, Avery A, Laopaiboon M, Kennedy G, O'Leary S, Cochrane Database Syst Rev. 2015;9(9).
10. A survey of how and why medical students and junior doctors choose a career in ENT surgery. Bhutta M, Mandavia R, Syed I, Qureshi A, Hettige R, Wong BY, Saeed S, Cartledge J. J Laryngol Otol. 2016;130(11):1054-1058

11. Using Medical Simulation to Teach Crisis Resource Management and Decision-Making Skills to Otolaryngology Housestaff Mark S. Volk, Jessica Ward, Noel Irias, Andres Navedo, Jennifer Pollart, and Peter H. Weinstock Otolaryngology–Head and Neck Surgery 2011;145(1): 35–42.

12. Design and evaluation of an interactive training system for scrub Nurses Glaser B, Schellenberg T, Koch L, Hofer M. Int J Cars 2016;11:1527–1536

13. Role of clinical skill centre in undergraduate medical education: Initial experience at Rehman Medical College Peshawar Shafiq Z, Mufti TS, Qayum I. J Pak Med Assoc. 2017 ;67(1):73-76.

14. Applying problem-based learning to otolaryngology teaching Abou-Elhamd KA, Rashad UM, Al-Sultan AI. J Laryngol Otol. 2011;125(2):117-20.

15. Review of temporal bone dissection teaching: how it was, is and will be. George AP, De R. The journal of laryngology & otology 2010;124,119–125.

16. Development of a tool for Global Rating of Endoscopic Surgical Skills (GRESS) for assessment of otolaryngology residents. Marglani O, Alherabi A, Al-Andejani T, Javer A, Al-Zalabani A, Chalmers A. B-ENT. 2012;8(3):191-5.

17. Tool for assessing surgical tracheostomy skills in otolaryngology residents. Al-Qahtani KH, Alkhalidi AM, Islam T. B-ENT. 2015;11(4):275-80.

18. Investigation of training needs for Functional Endoscopic Sinus Surgery. Bakker NH, Fokkens WJ, Grimbergen CA. Rhinology 2005;43:104-108.

19. The ENT boot camp: an effective training method for ENT induction Smith ME, Trinidade A, Tysome JR. Clin Otolaryngol. 2016;41(4):421-4.

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		
ULg	10	17,86
UCL	11	19,64
ULB	10	17,86
KUL	14	25,00
UG	7	12,50
UA	2	3,57
VUB	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
Pediatric ENT	21	37,50
Sleep apneae	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 (research, curiosity, publications, ...)	9	16,07

Table 2 : Self assessment of Belgian trainees

Self assessment	Mean ± SD
Overall skills in relation to the 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

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 of objectives' communication		
Not communicated	31	57,41
Orally	3	5,56
Written (mail,…)	14	25,93
Training plan	4	7,41
Website	2	3,70

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 the patient's bed	4	7,14
	During appointment with patients	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 1 or several supervisors	7	12,50
	Delivery of a written report	3	5,36
	Via my 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

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
A 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

Table 5 : Training tools available in Belgium

Figure 1. Training tools **A**. Do Belgian trainees have regular access to a lab to train ? 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 cadaver laboratory. Alternative simulation-based experiential learning were not regularly available and 16% of respondents had never had contact with this type of teaching.