

Senior vs. junior staff in supervised thyroid surgery: features and pedagogical challenges

Staff senior versus staff junior en cirugía tiroidea. Supervisada: resultados y desafíos pedagógicos

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Abstract

Objective: In the present work we propose to analyze what is the vision of the supervised surgeon who performs thyroid surgery about what and how it is learned in the operating room and what are the characteristics of this learning space. Possible differences regarding the postoperative morbidity of the patient when treated by a supervisor or a supervised person were analyzed. **Method:** Qualitative-quantitative observational study using a questionnaire without predefined options, for both supervisors and supervisees. A retrospective database was also analyzed considering hospital stay, operative times, acute and chronic complications according to operator (supervised or supervisor). **Results:** Professional expertise involves other complex actions that must be made visible to be taught. Both supervisors and supervisees recognized the operating room as a socializing context through supervised learning. There were no statistical differences in complications and/or hospital stay between expert surgeons and supervised surgeons in training. **Conclusions:** This work turns out to be a contribution to those who face the challenge of facilitating learning in the operating room. It is hoped that it will help inspire planned actions that prioritize and add quality to the inescapable educational task.

Keywords: Resident. Supervision. Training. Residency. Learning. Education.

Resumen

Objetivo: En el presente trabajo nos planteamos analizar cuál es la visión del cirujano supervisado que realiza una cirugía tiroidea acerca de qué y cómo se aprende en el ámbito del quirófano y cuáles son las características de este espacio de aprendizaje. Se analizaron las posibles diferencias respecto a la morbilidad posoperatoria del paciente cuando es tratado por un supervisor o un supervisado. **Método:** Estudio observacional cualitativo-cuantitativo mediante un cuestionario sin opciones prefijadas, tanto a los supervisores como a los supervisados. También se analizó una base de datos retrospectiva considerando la estadía, los tiempos operatorios y las complicaciones agudas y crónicas según el operador (supervisado o supervisor). **Resultados:** La experiencia profesional involucra otras acciones complejas que deben visibilizarse para ser enseñadas. Tanto supervisores como supervisados reconocieron al quirófano como un contexto socializador a través de aprendizajes supervisados. No existieron diferencias estadísticas en las complicaciones ni en la estadía hospitalaria entre cirujanos expertos y cirujanos en formación supervisados. **Conclusiones:** Este trabajo resulta ser un aporte a quienes enfrentan el desafío de facilitar el aprendizaje dentro de la sala de operaciones. Se espera que ayude a inspirar acciones planificadas que jerarquicen y aporten calidad a la tarea educativa ineludible.

Palabras clave: Residente. Supervisión. Entrenamiento. Residencia. Enseñanza. Educación.

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Introduction

The operating room is the space in which surgeons develop our professional work. In a university hospital, it is also a place where we carry out educational activity. Looking at it as a teaching space leads us to reflect on the task of supervisors and supervisees, and on how the actions of both influence the learning that is intended to be promoted. This scenario of high potential as a pedagogical-educational space is often invisible to the actors on stage.

Generating learning opportunities in contexts of professional practice confronts us with the problem of the gap that exists between academic training and practice, with a distance that makes it difficult to move from one activity to the other. This problem translates into a crisis of confidence towards professionals^{1,2}. It gets worse if it is made invisible and if the profile of the surgeon we want to train is disconnected from those skills that are demanded of him/her in the field of action³. Consequently, it is necessary to understand which contents are at stake in the operating room, what are the best ways to teach them, what do the different supervisors teach and what do supervisors expect from each one of the supervisees, among other possible focuses.

For all of the above reasons, questions arise about how does teaching take place during and in surgery. That is, how it is favored that those who learn progressively develop activities that, first, are peripheral, although authentic, to gradually become central and with higher levels of responsibility and autonomy⁴.

This research work on education in the field of surgery poses as a problem the challenge presented by surgeons during their training in professional practices. The primary goal of our research is to establish the answer to two questions: 1) what is the supervisee's view about what and how is it learned with surgical supervision of total thyroidectomy by senior staff (SS) surgeons and junior staff (JS) or fellow (F) surgeons? and 2) what are the characteristics of the operating room as a learning context? As a secondary objective, we will answer the following question: are there differences in the results of surgeries performed by SS and trainee surgeons vs. JS/F surgeons under supervision?

Method

Educational context

The study was carried out in a tertiary care university hospital of the Autonomous City of Buenos Aires,

Argentina. The head and neck surgery training that is developed for fellow surgeons' skills refinement takes 3 years. It involves learning both on decisions about patients and difficult surgical procedures and increasing levels of autonomy (privileges). In addition, general surgery residents (4-year program) rotate by the head and neck sector during the first year (1 month), the second year (1 month) and third year (2 months).

Design

To respond to the primary objectives, a qualitative observational design was used, while for the secondary objectives, a retrospective cohort design was used.

Objectives

- Primary objectives: 1) what is the supervisee's view about what and how is it learned with surgical supervision of total thyroidectomy by SS and JS/F surgeons? and 2) what are the characteristics of the operating room as a learning context?
- Secondary objective: are there differences in the results of surgeries performed by SS and trainee surgeons compared to JS/F surgeons under supervision?

Primary objectives methodology

To carry out this study, SS (n = 2), JS (n = 1) and third-year F (F3) surgeons (n = 1) were selected as supervisors. Second-year F (F2) surgeons (n = 1) and third-year residents (R3) who rotated by the sector (n = 4) were evaluated as supervisees, for a total of four supervisors and five supervisees (n = 9).

A Google Drive® questionnaire was developed, with questions without preset options, which inquired about the educational context under supervision of one of the most representative surgeries of the specialty: total thyroidectomy. Limiting the characterization to the supervision of a specific surgical practice allowed to stabilize the possible dispersion in the responses of the different actors (SS, JS, F3, F2 and R3), and to recognize aspects inherent to the technique of those that are characteristic of any supervision at the operating room. The questionnaire was retrospectively implemented in professionals with different levels of training who participate in supervised learning as supervisors or supervisees, and a qualitative analysis

was carried out by similarity relationships of the answers obtained⁵, under an inter-judge modality.

Secondary objectives methodology

A retrospective database comprising the period between January 2013 and December 2016 was used. A total of 823 thyroidectomies were carried out within that period.

Those patients who underwent total thyroidectomy practiced by SS, JS, F3, F2 and R3 surgeons were included. Hemithyroidectomies, thyroid surgeries associated with cervical dissection, those involving resection of other organs (trachea, esophagus, larynx, etc.), primary parathyroid surgery (with thyroidectomy being a consequence of it; e.g., suspected intra-thyroid parathyroid adenoma) and patients with previous neck surgeries were excluded.

Finally, 491 total thyroidectomies were analyzed. Evaluated variables included the percentage of surgeries, prolonged hospital stay (> 24 hours), surgical time, and frequency of acute (hematoma, hypocalcemia, or transient dysphonia) and chronic complications (dysphonia or prolonged hypocalcemia) for the SS or JS/R3, F3/R3, SS or JS/F2 and F3/F2 couples. Hypocalcemia was considered when plasma values were < 8.5 mg%, with transient hypocalcemia being regarded as that which was recorded at immediate postoperative period and reached normal values before 6 weeks, and prolonged hypocalcemia, that which lasted more than 6 weeks since surgery. Dysphonia was defined based on clinical symptoms: transient, that which occurred at immediate postoperative period and was restored before 3 months, and prolonged, that which lasted more 3 months after surgery. The presence of hematoma was established as a complication if it required reoperation.

Statistical analysis

Quantitative variables were presented as medians and ranges, and were analyzed with Mann Whitney's test or Student's t-test according to the observed distribution. Categorical variables were expressed as absolute frequencies and percentages using Fisher's test or the chi-square test, as appropriate, for comparisons. A p-value < 0.05 was established as statistically significant. For statistical analysis, the STATA software, version 3.1, was used.

Results

Primary objectives' results

- What and how is it learned on total thyroidectomy surgical supervision?

One of the phrases expressed by one supervisee (R2) was: "You see one surgeon and another and they are not going to do the same, and they have the same knowledge". This expression led to analyze what is that is taught by these expert surgeons, who have the same knowledge, but do different things, and what is the nature of that which they teach. We then identified two types of contents that come into play in the operating room during thyroid resection supervision: the declarative content and that of professional expertise; i.e., that which can be explained and that which is learned by doing. Both from the perspective of supervised residents and supervisors (SS and JS/F3), SS surgeons give preference to those contents that are most linked to that which can be explained. In contrast, JS/F3 surgeons are perceived as supervisors who focus on that which is learned by doing. Table 1 shows the answers of supervisees about that which is learned and how in the operating room.

On the other hand, supervisees found differences on how supervisors teach depending on their experience; i.e., the teaching forms during supervision were different between SS and JS/F3 surgeons. Table 2 describes in detail the differences observed by supervisees between the groups of SS and JS/F3 teachers.

Situations when SS surgeons should intervene and when to stop helping the supervisee with the procedure (taking control) were identified, which is a point that involves how learning takes place. Furthermore, both SS and JS/F3 agreed on certain characteristics about how they teach: a) "I do not let things drag on when I see that a surgeon in training stops and has doubts; I do not think it is good to learn by mistake, thus, in that case, I intervene"; b) "[I intervene if] the course of surgery gets complicated, if the supervisee is lost, if there is danger of performing an irreversible or dangerous maneuver"; c) "the amount of supervision depends on the complexity of the case or on difficult anatomy", "the teaching act is more effective in case of a not-so-complex surgery where there is not much tension that can lead to momentary interruption of that communication"; and d) "many times the surgeon is supervised during a part of the procedure and not for the entire procedure, because there are some parts that are so complex that are not within reach".

Table 1. Supervisees perception about what and how is it taught in the operating room

That which can be explained (SS)	That which is learned by doing (JS/F3)
"Something that is good for improving is to ask 'what is this', 'why', 'where', 'why did I do this'. It keeps you active, it keeps you awake and in tune with the surgery, so that as a goal, if you don't know something, go to the literature."	"You have to practice and you have to do it because until you do it you will not know, you will not know how much to pull, you will not know how strongly, you will not know, practice. There is no way to put that [content] into words."
"When you are in an operating room and you are there simply to hold and separate, and you do nothing else but that, you fall asleep or get bored or lose concentration, or do not pay much attention, but if they are constantly asking you questions and explaining you, you are more attentive."	"When they guide you, but they let you perform the maneuver by yourself, you feel the mobility of the hand, you find the planes and you feel the force that must be exerted with the tweezers. When I get lost trying to find the nerve it is good to be guided on how and where to go. When the situation overwhelms me because I still can't find the nerve, I prefer to see the supervisor do the search maneuver in order for not to injure any structure and learn, by observing, that difficult part."
"Everything helps, but especially those who explain how to perform a safe, comfortable maneuver with good exposure."	"I prefer to be allowed to perform the maneuver or to be asked what's next and not to be told exactly what to do, in order to put my learning to the test."

F3: third-year fellow surgeon; JS: junior staff surgeon; SS: senior staff surgeon.

Table 2. Characteristics observed by supervisees according to supervising surgeons experience

SS	JS/F3
"The SS usually has less patience [during surgery], but explains more."	"A JS/F3 was recently in the same place as me, he puts himself more in my place and can help me correct certain maneuvers without that much tension."
"SS surgeons explain a lot or ask a lot also about anatomy, about what are the steps to follow, obviously, they have much more standardized tips, right? They explain and give you more comprehensive knowledge during surgery."	"JS/F3 surgeons put themselves in the place of the resident who, obviously, is willing to operate and learn."
"With the SS I felt safer."	"JS/F3 generally has better predisposition to teach and assist the procedure."
"The SS generates more tension, since one tends to make one's greatest effort and with the greatest possible neatness, but the nerves can play against."	"With a JS/F3 you feel you can take part in decision-making."

F3: third-year fellow surgeon; JS: junior staff surgeon; SS: senior staff surgeon.

• What are the characteristics of the operating room as a learning context?

The analysis of the elements that emerged from the questionnaires and the interviews to the supervised teaching participants showed six characteristics that turn the operating room into a learning context, or that threaten this situation when absent: trust, previous preparation, cordiality, patience, relaxed environment, and care in the use of words. Table 3 presents each one of the textual citations that are associated with the above-listed characteristics.

Secondary objectives' result

Of the 491 surgeries that were carried out in the analyzed period, 95 (19.4%) were performed by the R3, among which, in 61 (64.2%), the supervisor was

an SS or JS; the remaining 34 (35.8%) were carried out with an F3 as supervisor.

The F2 performed 68 surgeries, 61 (89.7%) of them with SS or JS, with a median surgical time for the SS or JS/F2 couple of 115 minutes (range: 55-210), and 7 (10.3%) with an F3, with median surgical time for F3/F2 of 107 minutes (range: 50-200) ($p = 0.5$). There were 14 (22.9%) acute complications for SS or JS/F2 and 1 (14.2%) for F3/F2, while chronic complications were 2 (3.2%) and 0 (0%) for SS or JS and F3, respectively.

Table 4 shows the comparisons between established couples for surgical time and complications. The difference in median surgical time between the SS or JS/R3 and F3/R3 couples was statistically significant ($p < 0.0026$). Figure 1 shows a graphical summary of the results of the work.

Table 3. Characteristics of the teaching setting narrated by supervisors and supervisees

Feature	Definition	Excerpt from the interview
Trust	Expectation that supervisors and supervisees will act as expected in terms of knowledge, procedures, attitudes and shared values	"Trust and appreciation towards the supervisee." "Trust of the supervisee." "I value from the resident: responsibility towards other tasks, respect as a person, punctuality, etc."
Previous preparation	Getting ready for action in the surgical scenario, as a characteristic inherent to supervisors and supervisees performance	"Not arriving rushed." "Not being nervous." "[it is necessary to] rest well before surgery." "Emphasis on supervision depends on my mood."
Patience	Ability to tolerate some discomfort in pursuit of the learning needs that emerge in the surgical scenario	"The JS/F3 had more patience than the SS." "The JS/F3 is a somewhat more nervous, stressed."
Cordiality	Friendly treatment in the surgical scenario aimed at residents' learning	"There must be an important degree of cordiality." "Balanced climate, a pleasant climate, where there is respect, but no earnestness"
Relaxed environment	The operating room, as a learning context, is a place where personal interaction develops with no etiquette or protocols	"In the operating room, there is a lot of talk, also when it is a relaxed surgery or when there is no pressure, music is heard, jokes are told, everything. The operating room is far from being what ordinary people think it is: a cathedral of silence."
Taking care with the use of words	Supervisors, when addressing residents in training, prioritize a cordial and respectful mode of communication in the operating room when teaching	"You have a more relaxed atmosphere and talk more about things not related to the operation with a fellow surgeon than with a resident. And in turn, with a resident perhaps one is excessively neater in order for not hurting him with observations. Conversely, the fellow surgeon is already more tempered, he already knows what the subject is like, it is more difficult for him to feel attacked by a comment or by the fact of making him pass to the other side, remaining as an assistant when he was the surgeon."

F3: third-year fellow surgeon; JS: junior staff surgeon; SS: senior staff surgeon.

Table 4. Results of the different surgical couples with regard to surgical time and complications

Variables	SS or JS/F2 n = 68 (13.9%)	SS or JS/R3 n = 61 (12.4%)	F3/F2 n = 7 (1.4%)	F3/R3 n = 34 (6.9)
Surgical time, median, min (range)	115 (55-210)	111 (60-225)	107 (50-200)	133 (65-275)
Acute complications, n (%)	14 (20.6)	19 (31.1)	1 (14.3)	12 (35.3)
Chronic complications, n (%)	2 (2.9)	1 (1.6)	0 (0)	3 (8.8)

F2: second-year fellow surgeon; F3: third-year fellow surgeon; R3: third-year resident JS: junior staff surgeon; SS: senior staff surgeon.

Discussion

Our primary objective was to characterize how teaching is exercised when it is understood as practice supervision in the operating room, and to recognize the criteria that guide its performance.

From the point of view of what and how, supervisees and supervisors established differences between SS and JS/F3. With regard to what they teach, SS are distinguished for giving preference to that which can be explained, where the role of good questions in teaching at the operating room stands out, and JS/F3

are the ones residents resort to for that which is learned by doing, where, for example, the tension to be applied on tissues or finding the recurrent nerve are skills that can only be learned by doing them.

In turn, supervisees found different ways of teaching between SS and JS/F3. The former are characterized for determining greater emotional tension on supervisees, perhaps due to the hierarchical position they hold vis-a-vis minor fellows or residents. On the other hand, the experience they have, and more standardized anatomical or procedural recommendations gave greater security to supervisees. However, they seem

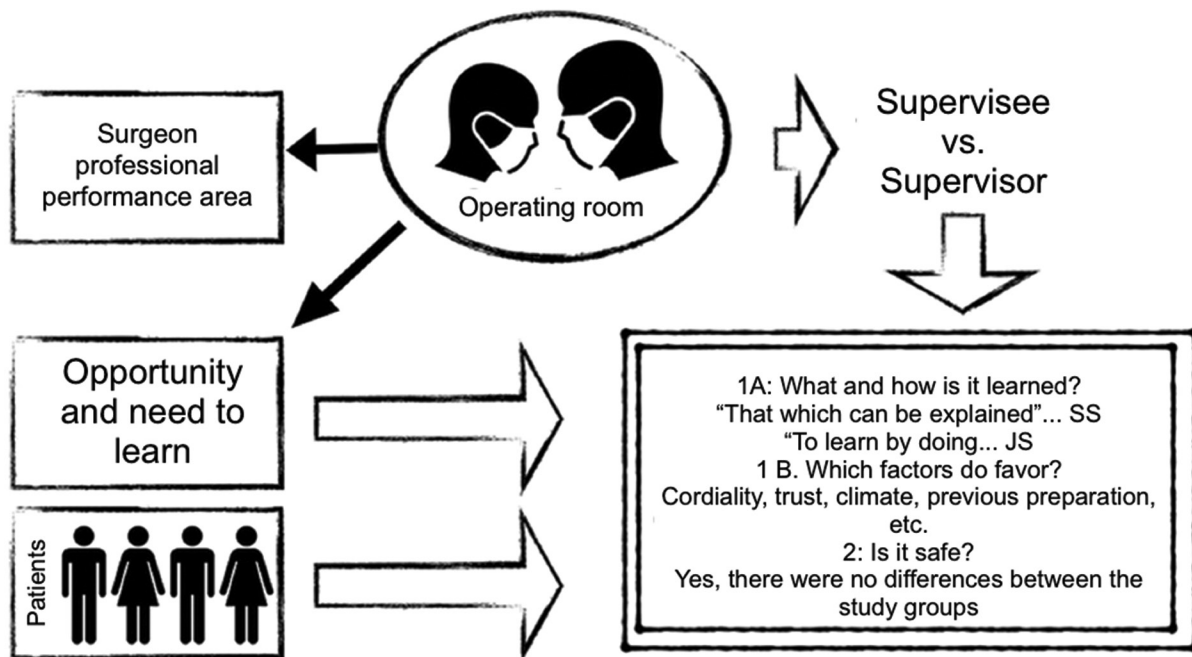


Figure 1. Graphic summary of the results of the work.

to be characterized for having less patience and for earlier discontinuing surgery supervision and help by taking over. One possibility is that, owing to their experience, they know perfectly well when irreversible damage to the patient can be generated, or are convinced that, in the most complex cases, only partial help can be received. On the other hand, JS surgeons are characterized by empathy, greater predisposition to help and supervise surgery, and for considering the opinion of resident or inferior fellow surgeons in intra-operative decisions. Probably, this type of supervisor can be more empathetic because a relatively short time ago he was a fellow surgeon or resident, and considers supervisees' eagerness to operate, as expressed by residents. However, supervisees felt less safe with them, probably due to their lower degree of experience. Some supervisees considered that the higher predisposition of JS surgeons to surgical help may be due to not yet having sufficient exposure to complex cases or complications.

Among the interactions characteristics that are given preference in order for the operating room to become a learning context, generating a beneficial climate for collective work is prioritized, which is based on willingness and trust, among others. Although the relationship between supervisor and supervisee evaluated in our work is only limited to the field of prior and intra-surgical learning, there are

works that describe the importance of mentorship in residency programs. Lin et al.⁶ evaluated how the relationship between mentors and disciples is perceived at otolaryngology residency. Structured mentoring programs that emphasize individual development with continuous guidance, going beyond the mere idea of improving surgical skills, is possibly a necessary development of all residency programs.

We also identified that there are no statistically significant differences in surgical parameters according to the training level of the supervised head and neck surgeon. The only statistically significant variable ($p < 0.0026$) was observed when SS or JS/R3 median surgical time was compared with that of F3/R3. While the SS or JS-R3 couple took 113 minutes, the F3-R3 couple took 133 minutes. This difference may be due to the lower skill of F3 and to that "insecurity, nervousness and stress" supervisees referred, or perhaps to the longer time supervisors' task demands. The tendency to a higher percentage of complications (although not statistically significant) in SS may be due to a bias in the present work, which does not contemplate that SS surgeons may have acted as supervisors in more complex cases than F3 surgeons did. Emre et al.⁷ showed that there was no increase in the incidence of vocal cord paralysis in patients operated on by head and neck surgeons in training (fellow surgeons). Other studies^{8,9} conclude that total thyroidectomy may

be safely performed by duly supervised residents (by senior or junior staff surgeons), with similar results to those in our series. On the other hand, Pollei et al.¹⁰ conclude that residents' participation in the operating room determines an increase in surgery duration, similar to our results, thus increasing the costs for the health system. However, they argue that residency is an essential part of training, and this cost increase is a good investment in the training of new professionals.

Conclusions

The present work showed that residents in the operating room not only learn a particular technique, understood as a series of steps to be followed, but that professional experience involves other knowledge and other complex actions that have to be made visible to be taught. Both supervisors and supervisees recognized the operating room as a socializing context with particular characteristics; a context in which surgeons with short and long professional trajectories do participate and contribute different perspectives, contents and modalities to teaching during supervision.

There were no statistically significant differences in terms of complications or hospital stay between expert and supervised surgeons in training, which reinforces the value of supervised training not only as an educational resource and opportunity, but also for patient safety.

This work aims to be a contribution for those who assume the challenge of training in complex professional practices within the contexts and real work teams. It is expected to help inspire planned actions that prioritize and contribute quality to the inescapable educational task.

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Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this research.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained informed consent from the patients and/or subjects referred to in the article. This document is in the possession of the corresponding author.

Conflicts of interest

The authors have no conflicts of interest to declare.

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