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ORIGINAL RESEARCH

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Patient injuries from tonsil and adenoid surgery in Finland

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Abstract

Objectives: The aims of this national register-based study were to examine patient injury claims related to tonsil and adenoid surgery injuries and to compare the frequency of claims between tonsillectomies and tonsillotomies in Finland.

Methods: We analyzed the complaints related to tonsil and adenoid surgery received by the Finnish Patient Insurance Center (PIC) between the years 2000 and 2019. One hundred seventy-two cases were included in the analysis. The annual surgery rates between the years 2000 and 2018 were acquired from the Finnish Institute for Health and Welfare.

Results: During the years 2000 to 2018, a total of 292,679 patients had tonsil and/or adenoid surgery nationwide. For tonsil or adenoid surgeries, the national average was 5.3 cases and 1.8 cases per 10,000, respectively, resulting in patient injury claims and compensations. A total of 33.1% of the claims regarding tonsil or adenoid surgery processed by the PIC were compensated. Most of the claims were made after a tonsillectomy (87.8%), and few were made after a tonsillotomy (1.7%). Seven deaths were recorded.

Conclusion: Patient injuries from tonsil and adenoid surgeries were mostly related to traditional extracapsular tonsillectomies. Most surgeries, along with most complications, involved specialists, who performed routine operations in high-volume centers. Surgeries for acute or recurrent infections resulted in more claims. Severe complications arising from tonsil and adenoid surgeries were rare.

Level of Evidence: 4.

KEYWORDS
adenoidectomy, patient injuries, tonsillectomy

1 | INTRODUCTION

Most of the errors and adverse events in the field of otorhinolaryngology (ORL) are related to surgical treatment.[1] Retrospective national studies in Finland show that ORL-related patient injuries, in general, are strongly linked to routine operations in high-volume centers.[2–5] In a recent study, 88% of ORL-related patient injuries that affected children were related to operative care in Finland.[3]

All patients treated by public or private health care professionals in Finland are insured by the Finnish Patient Insurance Center (PIC),

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which processes all the claims made due to personal injuries in the health care sector in Finland. Patient injuries are compensated for by the PIC in accordance with the Patient Injuries Act (Potilasvahinkolaki 585/1986). Patients, who have sustained an injury or have experienced an unreasonable delay of treatment that has had an effect on the outcome of the injury, can apply for compensation from the PIC.[6]

Tonsil and adenoid surgeries are among the most frequently performed types of ORL surgeries. During recent decades, partial removal of the tonsils has become a notable alternative to traditional extracapsular tonsillectomy, especially when the indication for surgery is hypertrophy. The efficacy of tonsillotomy and tonsillectomy has been studied in pediatric and adolescent populations.[7] Tonsillotomy is associated with less postoperative pain[8,9] and bleeding.[10] In recent systematic reviews on adult populations, there was no significant difference in the efficacy between the methods, however, there was a significant difference in postoperative pain, use of analgesics, and the amount of secondary postoperative hemorrhages (PTHs) in favor of tonsillotomy.[11,12] However, the risk of reoperation has been reported to be up to seven times higher after tonsillotomy compared to tonsillectomy in the youngest age group.[13] A tonsillectomy and a tonsillotomy have similar postoperative morbidities. The most common are hemorrhage, pain, infections, and dehydration.[14] PTHs can be graded according to the severity as: Grade I being minor hemorrhage that stopped without intervention, Grade II being a required compression or electrocautery with local anesthesia, and Grade III being a required intervention under general anesthesia.[15,16] It is worth noting that PTH grading may also be reflective of institutional practices. For example, a PTH in a child may be more commonly treated under general anesthesia, which consequently increases the grade.

The aim of this study was to examine the Finnish patient injuries related to tonsil and adenoid surgery and to compare the frequency of injuries between tonsillectomies and tonsillotomies. We were also interested in whether the number of compensated cases had decreased from the early 2000s, as the World Health Organization (WHO) surgical checklist was implemented nationally around the year 2010.[2] Our hypothesis was that tonsillotomies result in fewer claims than tonsillectomies.

2 | MATERIALS AND METHODS

In this study, we analyzed all the complaints related to tonsil and adenoid surgery that were received by the PIC between the years 2000–2019. All the claims with the Nordic classification codes for tonsillectomy (EMB10), tonsillotomy (EMB15), adenotonsillectomy (EMB20), and adenoidectomy (EMB30) were collected from the PIC records. All 172 cases were included in the analysis. The STROBE checklist was followed when drafting the manuscript.

The materials from the PIC consisted of medical records, experts' assessments, and indemnity decisions. These materials were reviewed to collect the following information: compensation status, classification code, the year of operation, the operative unit, and primary and secondary injuries. The injuries were distributed into 13 categories (Table 1). PTHs were recorded separately. We graded PTHs according to the severity with the grading criteria described in the Introduction with Grade I being minor hemorrhage that stopped without intervention, Grade II being a required compression or electrocautery with local anesthesia, and Grade III being a required intervention under general anesthesia.

The patient background data are listed in Table 2. From the operative reports, we collected the following data: surgical technique, surgeons' level of training, the duration of the operation, and whether

TABLE 1 Number and proportion (%) of the main compensated patient injury between two different surgical indications.

	Hypertrophy		Infections	
Main compensated patient injury	**All claims**	**Compensated**	**All claims**	**Compensated**
Problems related to altered anatomy of the pharynx	5 (10.6%)	2 (9.1%)	23 (19.5%)	5 (15.2%)
Postsurgery hemorrhage	8 (17.0%)		15 (12.7%)	1 (3.0%)
Nerve injury	1 (2.1%)	1 (4.5%)	21 (17.8%)	7 (21.2%)
Burn injury	8 (17.0%)	7 (31.8%)	10 (8.5%)	7 (21.2%)
Infection	7 (14.9%)	4 (18.2%)	9 (7.6%)	1 (3.0%)
Damage to adjacent anatomical structure	2 (4.3%)		16 (13.6%)	5 (15.2%)
Tonsil remnant (reoperation)	1 (2.1%)		6 (5.1%)	3 (9.1%)
Death	4 (8.5%)	4 (18.1%)	3 (2.5%)	3 (9.1%)
Impaired taste	1 (2.1%)		5 (4.2%)	
Retained surgical bodies	3 (6.4%)	2 (9.1%)	1 (0.8%)	
Complication of anesthesia	1 (2.1%)	1 (4.5%)	3 (2.5%)	1 (3.0%)
Excessive intraoperative bleeding	3 (6.4%)	1 (4.5%)	1 (0.8%)	
Other	3 (6.4%)		5 (4.2%)	
Total	47	22	108	33

Note: The two compensations that were uncategorizable were a burn injury and an infection.

the operation was performed during office hours. We also recorded whether the injury led to any extra visits to an outpatient clinic or the emergency department, an admission to inpatient care, or reoperation.

The annual rates of tonsil and adenoid surgeries in Finland, excluding the year 2019, were acquired from the Finnish Institute for Health and Welfare. Data from the years 2000 to 2018 included the Nordic classification codes, gender, age, and diagnosis code (WHO classification of diseases [ICD-10]) of the patients and annual operation rates of the individual health care institutes in Finland.

For data collection, we used Microsoft Excel (Version 16.40; Microsoft Corporation). For statistical analyses, we used JMP Pro 14 (Version 14.2; SAS Institute Inc.), and descriptive figures and tables were created with Microsoft PowerPoint (Version 16.42; Microsoft Corporation). The data that support the findings of this study are available from the corresponding author upon reasonable request.

Data are described in terms of frequencies and proportions for categorical data and means and standard deviations for continuous data. The counts of events were analyzed using either Poisson or negative binomial (NB) regression using the total amount of procedures as an offset parameter. The model fit between the Poisson and NB models was checked using a Vuong's test.

In Finland, retrospective, register-based studies do not require institutional review boards' approval, and for that reason, an approval from the ethical committee was not applied. The data search and the study protocol were approved by the PIC and the Finnish Institute for Health and Welfare.

TABLE 2 Patient background data: all claimants recorded (all), and those who received compensation (compensated).

	All	Compensated
Number of adults	119	39
Age of adults	Mean = 36.4 (16–73)	Mean = 35.3 (16–73)
Sex of adults	34.5% male	35.9% male
Smoking	17.6%	7.7%
Body mass index	Mean = 25.02	Mean = 24.22
Number of children	53	18
Age of children	Mean = 6.7 (1–15)	Mean = 6.9 (1–15)
Sex of children	54.7% male	66.7% male
Iso-BMI[a]	Mean = 23.52	Mean = 24.48

[a]Age-adjusted body mass index (equivalent to adult values, i.e., >25 is the definition of overweight and >30 obese). Sufficient data to calculate were available for 34 (all) and 14 (compensated) children.

3 | RESULTS

In 2019, the population of Finland was 5.53 million.[17] During the years 2000 to 2018, a total of 292,679 patients had tonsil and/or adenoid surgery nationwide. The overall rate has declined due to the decline in adenoidectomies (Figure 1), but the rate of tonsil surgery has remained steady. Figure 2 shows the volume of operations at different hospital levels.

During the years 2000–2019, a total of 172 claims regarding tonsil or adenoid surgery were processed by the PIC. Fifty-seven of these (33.1%) were compensated. Most of the claims were made after a tonsillectomy ($n = 151$, 87.8%), some after adenoidectomy ($n = 18$, 10.5%), and very few after tonsillotomy ($n = 3$, 1.7%).

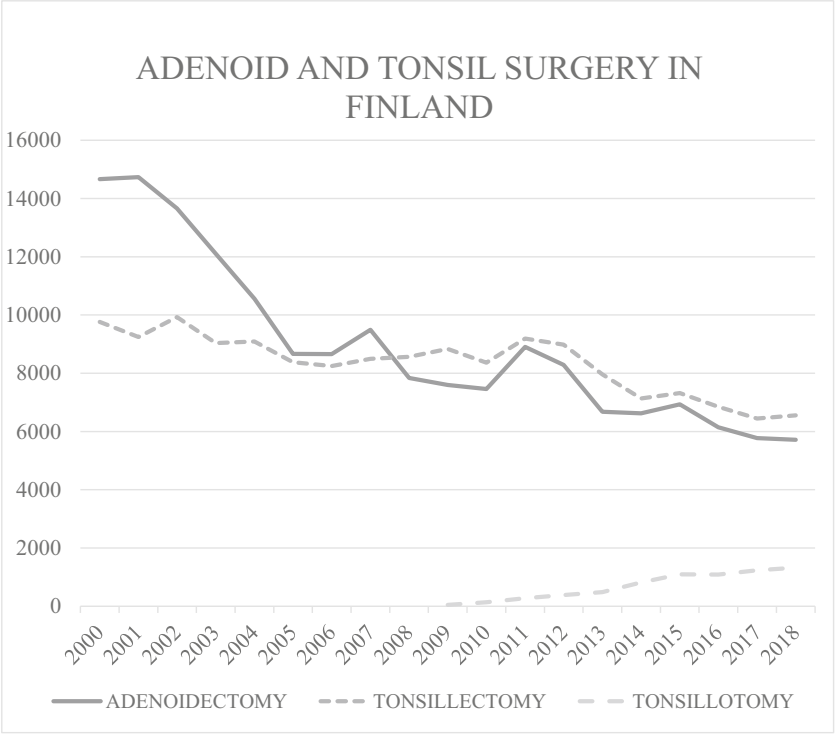

FIGURE 1 Tonsil and/or adenoid surgery rates nationwide during the years 2000–2018.

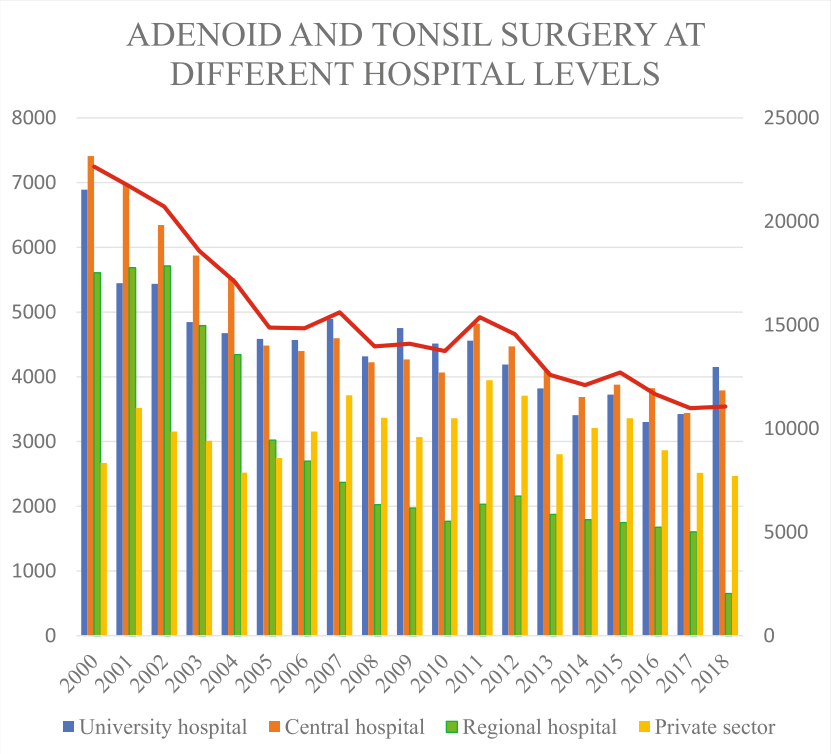

FIGURE 2 Volumes of operations at different hospital levels. Primary care <100 operations per year, and therefore are not visible. Different hospital levels are represented by bars. The total amount operated nationally is represented by a solid line.

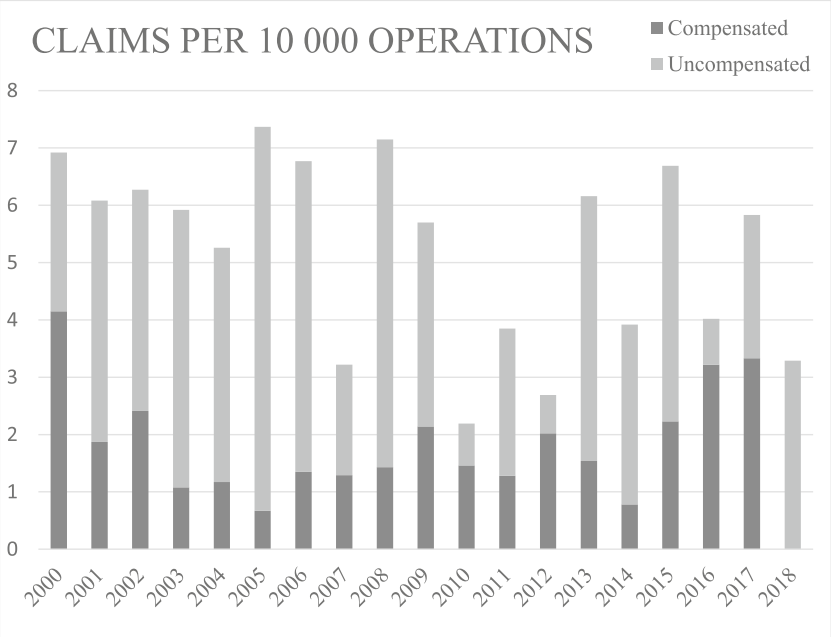

FIGURE 3 The number of claims and compensations nationally per 10,000 operations between the years 2000 and 2018. Compensated cases from 2018 were most likely still being processed at the time of data collection, as their processing time is longer, and we did not receive any.

As the processed claims included operations from years 1996 to 2019, we chose to analyze data from years that we also had national surgery statistic data (2000–2018). Of the total claims in our data, 156 claims were made for patients operated on during the years 2000 to 2018. Fifty-four of these (34.6%) were compensated. This amounts to an average of 5.3 cases per 10,000 tonsil or adenoid surgeries resulting in a claim and 1.8 per 10,000 resulting in compensation. Figure 3 shows the number of claims and compensations per 10,000 operations for the years for which we had national surgery data available. The average was 8.7 claims per 10,000 surgeries for tonsillectomies, 1.3 for adenoidectomies, and 4.4 for tonsillotomies.

Cases are processed and compensated for according to the Finnish Tort Liability Act (Vahingonkorvauslaki 412/1974). A patient injury claim can be accepted as a true injury, but a patient might still not be compensated. The average compensation for accepted claims in our data was EUR 2358.

All the surgeries were performed by either a specialist (72.7%) or a resident in ORL. When analyzing both the total amount of claims

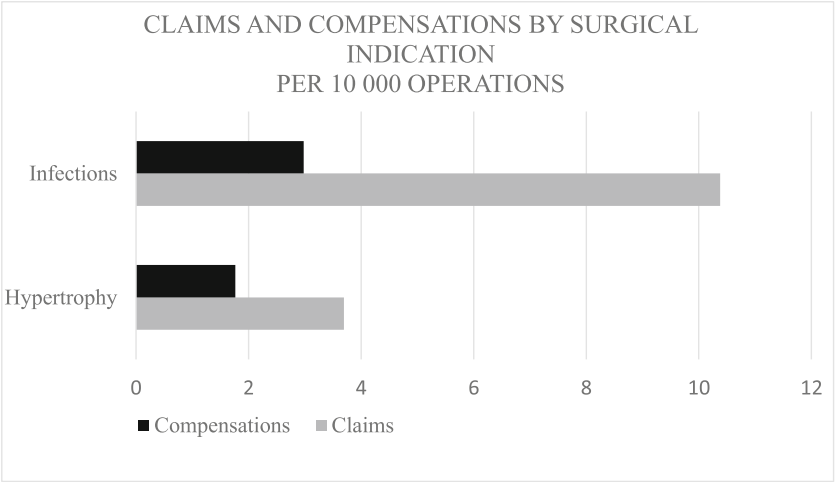

FIGURE 4 The average amount of claims and compensations classified by surgical indication. Nationally, the number of surgeries sorted by diagnosis codes used were received directly from the Finnish Institute for Health and Welfare. Indications for the surgeries resulting in claims were analyzed from patient charts. Seven operations had multiple or no diagnoses available and are not listed here

and only the compensated cases, the professional responsible was most often a specialist (73.7%/75.0%). Nearly all (94.7%) of the surgery was done during office hours. A total of 24.6% of patients who received compensation for injuries were operated on in tertiary (university) hospitals and 38.6% in secondary (central) hospitals. The differences among different hospital districts were not statistically significant.

We divided the indications for surgery into infectious diagnoses, for example, peritonsillar abscess, acute and recurrent tonsillitis, and hypertrophic diagnoses, for example, tonsillar hypertrophy, sleep apnea, and snoring. One hundred sixty-five of the 172 claims could be classified as either. Three times more claims were made after surgery for infectious diagnoses than for hypertrophy (Figure 4) ($p < .0001$), and the number of compensated injuries was nearly double with 2.98 claims for infectious diagnoses and 1.76 claims for hypertrophy per 10,000 operations ($p = .0606$). We also sorted claims by surgical technique. There were five (3.3%) claims where a tonsillectomy was performed by using traditional cold steel dissection. None of these claims resulted in a compensation. In 50 (33.1%) claims, only electrocautery was used. In 87 (57.6%) claims, the dissection was performed using cold instruments, but electrocautery was used for hemostasis. In nine claims, it was not possible to determine which technique was used. National data for surgical methods was not available, and the significance of these differences cannot thus be further analyzed.

During the years 2017–2018, the average tonsillectomy in Finland lasted 28.17 min, which did not include anesthesia. For a compensated tonsillectomy-related injury, the mean operating time was 44.91 min (95% confidence interval = 10–250 min) in our data.

A total of 91.1% of the compensated patient injuries resulted in some additional measures with extra visits to the outpatient clinic in 86.0% of these, visits to the ER in 33.3%, and reoperation in 47.4% of the compensated patient injuries. In 49.1% of compensated injuries, the patient was admitted to the hospital with an average of 5.6 days of inpatient care. Twelve compensated patients (21.1%) spent time in intensive care with an average stay of 5.2 days.

Fifty-five (32.0%) patients, who submitted claims to the PIC, had PTH. Those with PTH were divided into grades as follows: Grade I, $n = 7$; Grade II, $n = 13$; and Grade III, $n = 35$. In 25 patients, PTH was the main complication for which they submitted the patient injury claim. Only one of these was compensated, as PTH is an expected complication.

The WHO Surgical Checklist was implemented in Finland generally around the year 2010. In our data, there were 6.08 claims and 1.85 compensations for every 10,000 operations from 2000 to 2009 and 4.25 claims and 1.75 compensations from 2010 to 2018. The difference in claims was statistically significant ($p = .0331$).

We distributed the different types of patient injuries into 13 categories (Table 1). The most common compensated patient injury was a burn (26.8%) followed by nerve injury. The most common nerve damaged was the glossopharyngeal nerve. Sixty-one patients (35.5%) had two or more separate injuries to claim. Table 1 also shows the different types of compensated injuries divided between two different surgical indications.

The PIC compensates for permanent injury or permanent cosmetic injury based on the Finnish Tort Liability Act (412/1974). Fourteen of the 57 patients compensated (24.6%) were given compensation for permanent injury. In our own analysis of the data, 28 of the 57 compensated had injuries that we ourselves considered permanent (49.1%). Most (76.7% of all claims) of the injuries were detectable immediately on the day of surgery. The PIC requires permanent injuries to reduce the patient's functional capacity permanently that causes a reduction in their quality of life. We classified permanent cosmetic injuries, for example, large burn marks and scars, as permanent also.

All seven deaths were compensated for, as even in cases where the cause was unavoidable, such as PTH, death is an intolerable complication. Five deaths were caused by excessive PTH and the aspiration of blood, and one of these was within 24 h of surgery. One death was unexplainable even after autopsy, and one was due to inadequate monitoring after anesthesia. Two of the deceased were children, who were both under the age of 10. All seven surgeries were routine extracapsular tonsillectomies during office hours, and all surgeons were specialists. According to the Finnish Institute for Health and Welfare, 10 patients died within 21 days of their tonsillectomy during the years

2008–2018, and none of these deaths were due to adenoidectomies or tonsillotomies. Earlier data were not available, but based on this information, it is likely that not all deaths lead to a patient insurance claim.

4 | DISCUSSION

This study supports the hypothesis that most tonsil and adenoid surgery patient injury claims and compensations are related to traditional extracapsular tonsillectomy. Most complications in tonsil or adenoid surgery involved specialists in ORL during office hours, who performed routine operations in high-volume centers. Complications in these routine operations significantly affected patients. Most of the patients who received compensations had extra visits to clinics, and half of those who received compensations required inpatient care. Significantly more claims were made after surgery for a diagnosis for infection. Burn injuries were the most common reason for compensation.

In children, the rate of tonsillectomy-related patient injuries could be reduced by performing more tonsillotomies or intracapsular tonsillectomies in relation to traditional tonsillectomies.[18] Based on recent studies in adults,[12] we hypothesized that their rate of tonsillectomy-related patient injuries could also be reduced by performing an intracapsular tonsillectomy instead, especially when the indication for surgery is hypertrophy or obstruction.

Three patient injuries were related to tonsillotomies, of which one was due to a careless technique causing a burn injury, and two developed osteomyelitis, a rare complication. The first national tonsillotomies in our data were recorded in 2009 (Figure 1). No patient injury claims were made during the analyzed period related to hemorrhage in tonsillotomy procedures.

Five patients died because of PTH. Generally, the PIC does not compensate for PTH, and patients are informed that this is a common complication. Patients can still submit claims to the PIC if they were not satisfied. Grade III PTHs, requiring GA, are overrepresented in our data compared to other reports.[16] This might be because patients think that a PTH that requires general anesthesia to control it is unreasonable, and this may result in more patient injury claims. It may be beneficial to spend additional time on patient counseling in these cases. Based on other studies, performing tonsillectomies with a cold steel dissection technique[19] or performing intracapsular tonsillectomies instead[11] may help reduce PTHs. The incidence of life-threatening PTH is higher in children than in adults.[20] PTH should be treated by an otorhinolaryngologist, but sometimes primary care might be the first to treat these patients in emergencies. In rural areas, treatment should consist of compression, and if compression is unable to stop the bleeding, the patient should be transported to an institution where an otorhinolaryngologist is available.

Burn injury is a known possible complication when using electrocautery.[21] The most common reason for a compensation in a claim was a burn injury, and some form of electrocautery was used in 92.9% of compensated claims. Most of the burns were on the right side of the mouth, presumably because the surgeons were right-handed. A longer operating time was seen in compensated cases in comparison to the national average. This might be because intraoperative complications, which resulted in patient injuries, may lengthen operations, but we cannot conclude causality from our data.

The national rate of adenoidectomies fell rapidly during the early 2000s (Figure 1) after a national recommendation was released that did not support the role of adenoidectomy for a primary indication of recurrent otitis media.

In patients who underwent surgery for acute or chronic infections, they were 79.8% more likely to receive compensation than those operated on for hypertrophy, and the number of claims was threefold. Figure 4 shows the rates per 10,000 operations for the years 2000–2018. We speculate that this difference may be due to the adhesions and scarring after recurrent infections and, in part, due to operating on acutely inflamed tonsils, both of which increase surgical difficulty.

A previous study of Finnish patient injury compensations in otolaryngology supported the role of a checklist intervention in preventing errors.[2] In our data, there were 6.08 claims and 1.85 compensations for every 10,000 operations before the national implementation of the WHO Surgical Checklist and 4.25 claims and 1.75 compensations after. The slight, but statistically significant, reduction in claims may, in part, be due to checklists. Interestingly, a slight increase was noted in the amount of retained surgical packing before and after the implementation of the checklist.

Although every patient treated by an official health care provider in Finland is insured by the PIC, it is likely that not all eligible patients submit claims. The overall incidence of injuries is therefore likely to be greater than reported. The type of insurance policy also affects the type of injuries that are compensated. All the claims are reviewed by medical experts of the PIC, and in most cases, a consultation from a senior otorhinolaryngologist is requested. The opinion of the reviewer or the consultant can, in some borderline cases, affect the result. Nonetheless, we believe our results are generalizable.

As always with retrospectively collected data, we are dependent on chart records. It is possible that not all comorbidities are included in the records. In some cases, data about the duration that the patient had suffered from the complications were not retrievable due to incomplete documents. Some variances in the use of classification codes in Finnish hospitals are possible (i.e., EMB10 used instead of EMB15 for tonsillotomy).

The PIC has a processing time of up to 3 years from the arrival of the application and may have caused incomplete data analysis. As some of the claims processed in the early 2000s were from operations as far back as 1996, it is likely that our data from recent years are missing some cases that are still being processed or patients have not made claims for it yet.

Severe complications are rare in tonsil surgery, and more data are needed to make definite conclusions on factors leading to serious patient injuries.

5 | CONCLUSION

Patient injury insurance claims in tonsil and adenoid surgery were mainly related to the traditional extracapsular tonsillectomy.

Most claims in tonsil or adenoid surgery involved specialists in ORL during office hours, who performed routine operations in high-volume centers. Patient injury claims were more common when operating for infections than adenotonsillar hypertrophy. Severe complications in tonsil and adenoid surgery were rare. Future studies may consider looking at similar statistics in different countries to understand if these trends are consistent globally.

AUTHOR CONTRIBUTIONS

Henrik M. Sjöblom and Jaakko M. Timgren acquired and analyzed the data. Henrik M. Sjöblom and Jaakko M. Timgren drafted the manuscript. Henrik M. Sjöblom, Jaakko M. Timgren, Jaakko M. Piitulainen, and Jussi Jero designed the work, revised and approved the manuscript, and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Shah RK, Kentala E, Healy GB, Roberson DW. Classification and consequences of errors in otolaryngology. *Laryngoscope*. 2004;114(8):1322-1335.
2. Helmiö P, Blomgren K, Lehtivuori T, Palonen R, Aaltonen L-M. Towards better patient safety in otolaryngology: characteristics of patient injuries and their relationship with items on the WHO Surgical Safety Checklist. *Clin Otolaryngol*. 2015;40(5):443-448.
3. Nokso-Koivisto J, Blomgren K, Aaltonen L, Lehtonen L, Helmiö P. Patient injuries in pediatric otorhinolaryngology. *Int J Pediatr Otorhinolaryngol*. 2019;120:36-39.
4. Helmiö P, Saarinen R, Aaltonen L, Lehtonen L, Blomgren K. Iatrogenic patient injuries in otology during a 10-year period: review of national patient insurance charts. *Acta Otolaryngol*. 2018;138(1):16-20.
5. Lehtivuori T, Palonen R, Mussalo-Rauhamaa H, Holi T, Henriksson M, Aaltonen L. Otorhinolaryngological patient injuries in Finland. *Laryngoscope*. 2013;123(10):2397-2400.
6. Finnish patient insurance center [Internet]. 2020. https://www.pvk.fi/en/
7. Ericsson E, Ledin T, Hultcrantz E. Long-term improvement of quality of life as a result of tonsillotomy (with radiofrequency technique) and tonsillectomy in youths. *Laryngoscope*. 2007;117(7):1272-1279.
8. Hultcrantz E, Linder A, Markström A. Tonsillectomy or tonsillotomy?—a randomized study comparing postoperative pain and long-term effects. *Int J Pediatr Otorhinolaryngol*. 1999;51(3):171-176.
9. Ericsson E, Hultcrantz E. Tonsil surgery in youths: good results with a less invasive method. *Laryngoscope*. 2007;117(4):654-661.
10. Hessén Söderman A, Ericsson E, Hemlin C, et al. Reduced risk of primary postoperative hemorrhage after tonsil surgery in Sweden: results from the national tonsil surgery register in Sweden covering more than 10 years and 54,696 operations. *Laryngoscope*. 2011;121(11):2322-2326.
11. Amin N, Lakhani R. Intracapsular versus extracapsular dissection tonsillectomy for adults: a systematic review. *Laryngoscope*. 2020;130(10):2325-2335.
12. Wong Chung JERE, van Benthem PPG, Blom HM. Tonsillotomy versus tonsillectomy in adults suffering from tonsil-related afflictions: a systematic review. *Acta Otolaryngol*. 2018;138(5):492-501.
13. Odhagen E, Sunnergren O, Hemlin C, Soderman A, Ericsson E, Stalfors J. Risk of reoperation after tonsillotomy versus tonsillectomy: a population-based cohort study. *Eur Arch Otorhinolaryngol*. 2016;273(10):3263-3268.
14. Schmidt R, Herzog A, Cook S, O'Reilly R, Deutsch E, Reilly J. Complications of tonsillectomy: a comparison of techniques. *Arch Otolaryngol Head Neck Surg*. 2007;133(9):925-928.
15. Sarny S, Ossimitz G, Habermann W, Stammberger H. Hemorrhage following tonsil surgery: a multicenter prospective study. *Laryngoscope*. 2011;121(12):2553-2560.
16. Tolska HK, Takala A, Pitkäniemi J, Jero J. Post-tonsillectomy haemorrhage more common than previously described - an institutional chart review. *Acta Otolaryngol*. 2013;133(2):181-186.
17. Official Statistics of Finland (OSF). Population Structure [Internet]. Helsinki: Statistics Finland. 2020. http://www.stat.fi/til/vaerak/index_en.html
18. Odhagen E, Stalfors J, Sunnergren O. Morbidity after pediatric tonsillotomy versus tonsillectomy: a population-based cohort study. *Laryngoscope*. 2019;129(11):2619-2626.
19. Söderman A-H, Odhagen E, Ericsson E, et al. Post-tonsillectomy haemorrhage rates are related to technique for dissection and for haemostasis. An analysis of 15734 patients in the National Tonsil Surgery Register in Sweden. *Clin Otolaryngol*. 2015;40(3):248-254.
20. Windfuhr JP, Schloendorff G, Baburi D, Kremer B. Life-threatening post-tonsillectomy hemorrhage. *Laryngoscope*. 2008;118(8):1389-1394.
21. Yamasaki A, Bhattacharyya N. Rare electrosurgical complications in tonsillectomy: analysis of national adverse event reporting. *Laryngoscope*. 2020;130(5):1138-1143.

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