Trends in Public Search Behavior for Otorhinolaryngology: A Two-Decade Analysis

Original Investigation

Seda Sezen Göktaş[1], Levent Ay[2], Furkan Balaban[2], Hande Arslan[1]

[1]University of Health Sciences Türkiye, Samsun Training and Research Hospital, Department of Otorhinolaryngology, Samsun, Türkiye
[2]Samsun University Faculty of Medicine, Department of Otorhinolaryngology, Samsun, Türkiye

Abstract

Objective: Google Trends provides data on searches made on Google from a specific region in a specific period. The aim of this study is to determine the focus of interest in otorhinolaryngology in Türkiye between 2004-2024 using this method.

Methods: Otorhinolaryngology was studied in five subbranches; namely, otology, rhinology, laryngology, head and neck surgery, and facial plastics. The 70 most searched terms in the last 20 years related to these subbranches were determined. The change in the search rates of the terms belonging to each subbranch and the change in the search percentages of the subbranches compared to the total number were determined and evaluated over the years.

Results: In all terms examined, significant increases were observed in general since 2004. However, decrease was observed in all terms, except a few, in 2020-2021, i.e., during the pandemic. In the comparison between subbranches, in the last few years, the lowest search rate was seen in laryngology with 16.86%, and the highest search rate was seen in otology with 24.06%.

Conclusion: Knowing the topics where interest is clustered can be used to guide future medical practices and scientific research.

Keywords: Google Trends, otorhinolaryngology, rhinology, otology, laryngology, head and neck surgery, facial plastic surgery

ORCID IDs of the authors:
S.S.G. 0000-0001-9820-958X
L.A. 0009-0009-1418-8730
F.B. 0000-0002-3645-0092
H.A. 0000-0003-0344-2712

Cite this article as: *Sezen Göktaş S, Ay L, Balaban F, Arslan H. Trends in public search behavior for otorhinolaryngology: a two-decade analysis. Turk Arch Otorhinolaryngol. 2025; 63(3): 133-142*

Corresponding Author:
Seda Sezen Göktaş, MD;
sedasezengoktas@gmail.com

Received Date: 27.02.2025
Accepted Date: 17.09.2025
Epub: 24.09.2025
Publication Date: 26.09.2025

DOI: 10.4274/tao.2025.2024-12-13

Introduction

The rapid expansion of Internet usage coupled with the diversification of information sources has positioned Internet-based data as a primary resource for health-related inquiries within society. Notably, approximately 5% of all Internet searches executed through Google, a leading global search engine, have been identified as pertaining to health-related content (1).

Among these search engines, Google Trends (Google LCC, Alphabet Inc., Mountain View, California, USA), with its open data access, enables the tracking of changes in public interest in various keywords and topics over time.

Infodemiological studies in the literature have examined the tendency of societies to obtain information about various diseases (2-4).

Our study was designed to examine the perception of the otorhinolaryngology field by the society in our country between the years 2004 and 2024. In addition to determining the status of the interest in the subbranches of our field, this study also attempted to understand which topics tended to increase/decrease through the words examined. In light of the data obtained in this study, we otolaryngologists can draw more attention to topics where there is little interest in the society or prevent information pollution by providing correct guidance on topics where interest is concentrated. At the same time, the topics in which interest in the society has increased can be determined and be given more space when planning specialization or in-service training meetings.

Methods

The data obtained through Google Trends (https://trends.google.com/trends/) is proportional, calculated by dividing the number of searches for a given term in a specific region by the total number of searches made in that region in a given month. Since the total search information will reach very high numbers, Google simplifies this data proportionally. With this data, Google Trends creates relative search volume (RSV). RSV is presented on a scale of 0-100 according to the ratio of a term to all other searches.

In our study, the field of otorhinolaryngology was studied in five subbranches; namely, otology, rhinology, laryngology, head and neck surgery, and facial plastic surgery. For each subbranch, at least five terms from the subjects of anatomical structure, symptom, diagnosis, diagnostic examination, and treatment (an attempt was made to include the highest number of terms here without any limitation) were included and a total of 70 terms were used. These terms are shown in Table 1. Changes in the search rates of the terms used over the years and total search rates were recorded. Afterwards, each term, then each subbranch within itself and finally subbranches with each other were compared.

As the data were obtained from the public domain and did not involve human participants, the study did not require local ethics approval or informed consent. The collection and evaluation of the data, followed by re-verification and processing, took approximately 12 days.

Statistical Analysis

In statistical analysis, firstly, Shapiro-Wilk analysis was performed to evaluate the normality of distribution of the search rates. The data was found to be distributed nonparametrically. The Friedman test was applied to study the change within each subbranch ($p<0.05$ was considered significant). Then, total search rates were calculated for each year. The percentage value of each subbranch was calculated from this total. The Wilcoxon signed-rank method was used to evaluate the changes within the subbranches over the years ($p<0.05$ value was considered as statistically significant). Statistical analyses were made using IBM SPSS Statistics version 20.0 (IBM Corp., Armonk, NY, USA).

Results

The search rates of the terms were studied separately for each subbranch and term. The search rates and changes for rhinology terms are shown in Figure 1. The most searched terms in 2024 were "nasal septum," "sleep test" and "allergy

Table 1. Terms with the highest search rates for sub-branches

Rhinology	Otology	Laryngology	Head and neck surgery	Facial plastic surgery
Nose	Ear	Larynx	Neck	Nasal tip
Nasal polyp	Eardrum	Vocal cord	Thyroid	Auricle
Nasal septum	Inner ear	Throat	Tongue	Facial aesthetics
Snoring	Tinnitus	Hoarseness	Neck pain	Big nose
Nosebleed	Cerumen	Speech disorder	Wound of the tongue	Wide nose
Postnasal drip	Ear itching	Throat pain	Mouth ulcers	Bags under the eyes
Nose curvature	Ear infection	Larynx cancer	Thyroid cancer	Protruding ear
Nasal deviation	Vertigo	Laryngomalacia	Thyroid nodule	Retrognathia
Sinusitis	Middle ear infection	Vocal cord paralysis	Throat culture	Droppy nose
Polysomnography	Balance test	Laryngoscopy	Thyoid scintigraphy	Rhinoplasty
Sleep test	Hearing test	Vocal cord surgery	Neck MRI	Nose aesthetics
Allergy test	Hearing screening	Voice thinning	Tonsillectomy	Prominent ear surgery
Septoplasty	Eardrum surgery	Voice theraphy	Adenoidectomy	
Nazal strip	Hearing aid		Thyroidectomy	
Nasal aspirator	Cochlear implant			

MRI: Magnetic resonance imaging

test." Analysis of the change in the average search rates of the terms over the years revealed that the terms "nose," "sinusitis," "nosebleed" and "snoring" were searched since 2004. In general, an increase was observed in the search rates of the terms. However, there was a general decrease in search rates in 2020, when the coronavirus disease 2019 (COVID-19) pandemic emerged. During this period, the terms "nosebleed," "postnasal drip" and "nasal strip" increased. A decrease was observed in other terms. The terms with the most significant decrease during this period were "nasal deviation," "nasal curvature," "septoplasty," and "polysomnography," respectively. The decreased search rates in this period started to increase starting from 2021 and 2022.

Regarding otology, the terms "ear," "ear infection," "middle ear infection," "vertigo," and "hearing aid" were searched since 2004. In 2020, when the COVID-19 pandemic started, the search rates of the terms "ear itch," "cerumen," "balance test," "vertigo" and "tinnitus" increased, while the others decreased. This decrease was most clearly observed in the terms "eardrum" and "eardrum surgery." In 2024, the terms searched for at the highest rate were "cerumen," "tinnitus," and "cochlear implant," respectively. The search rates and change graph of otology terms are given in Figure 2.

Regarding the terms related to laryngology, "larynx" and "larynx cancer," were searched since 2004. Even among the terms that we have identified as being the most searched for this subbranch, we can see that the years in which searches first began are later than in other subbranches and that the curve showing the rate of searches is flatter (Figure 3). In addition, it is seen that the terms that decreased due to the COVID-19 effect in 2020, especially those related to treatment (vocal cord surgery, voice thinning, and voice therapy), still did not reach their pre-COVID rates in 2024. The term "throat pain" showed a significant increase in 2020, however, the search rates of "larynx" and "voice thinning" are terms that increased slightly. The term with the highest rate of decrease during this period was "voice therapy."

In the head and neck area, the most searched term in 2024 was "thyroid." The most significant decrease in search rates in this subbranch in 2020 was observed in the terms "tonsillectomy," "adenoidectomy," and "throat culture." It was also observed that the terms "oral wound," "wound of the

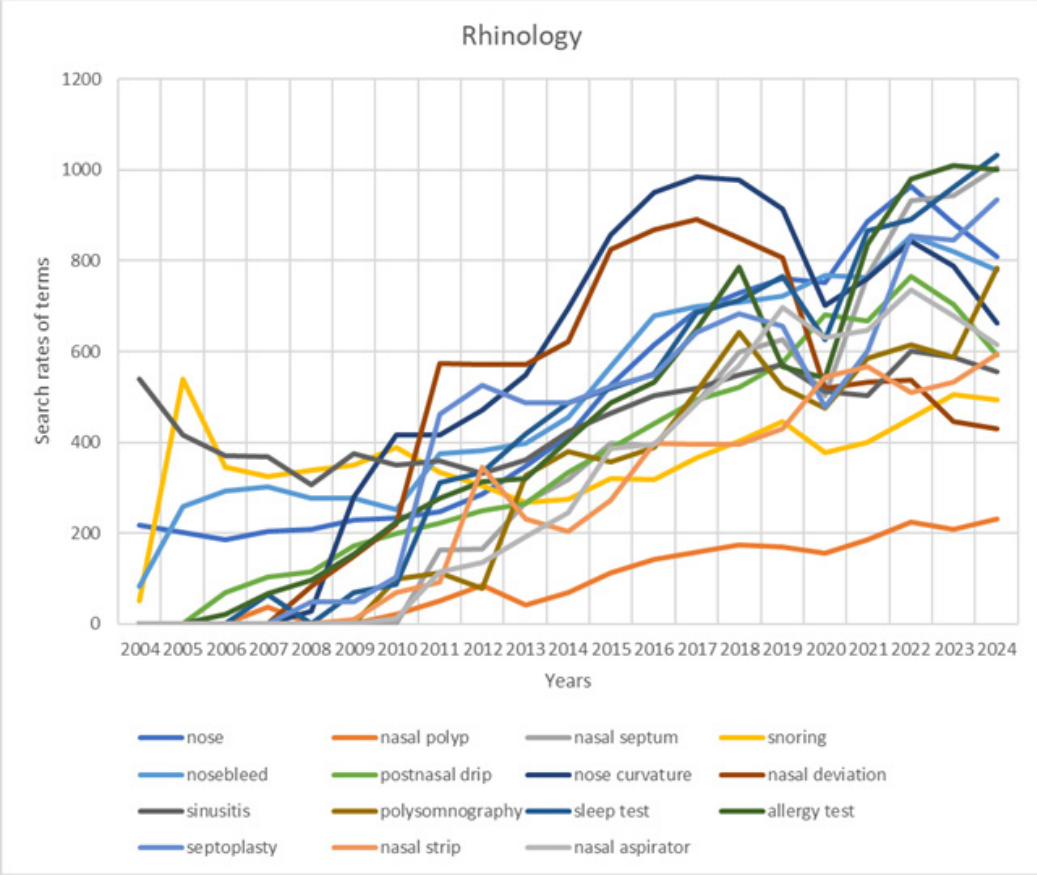

Figure 1. Search rates for the most searched terms related to rhinology by year. As seen, in recent years, the terms "polysomnography," "sleep test," "nasal strip," "nasal septum" and "septoplasty" increased in popularity

tongue," and "neck pain" increased during this period. In this subbranch, the search started in 2010, and its rate increased, then decreased during the pandemic, but continued with a rapid increase in the following years. In 2024, "neck magnetic resonance imaging" comes forth as the second most searched term in this subbranch. The search rates of the terms and their changes over the years are given in Figure 4.

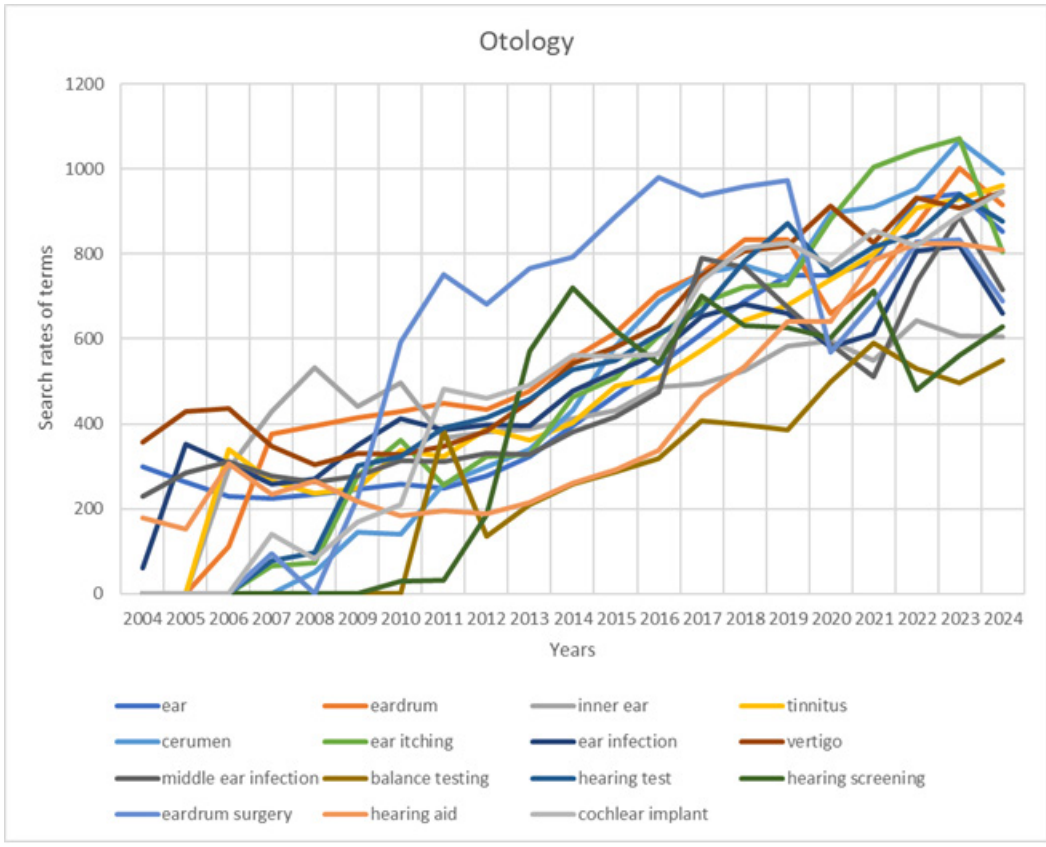

Figure 2. Search rates of otology-related terms and their changes over the years. The graph shows that the terms "cochlear implant," "hearing screening," "balance test" and "middle ear infection" have increased in popularity over the last few years

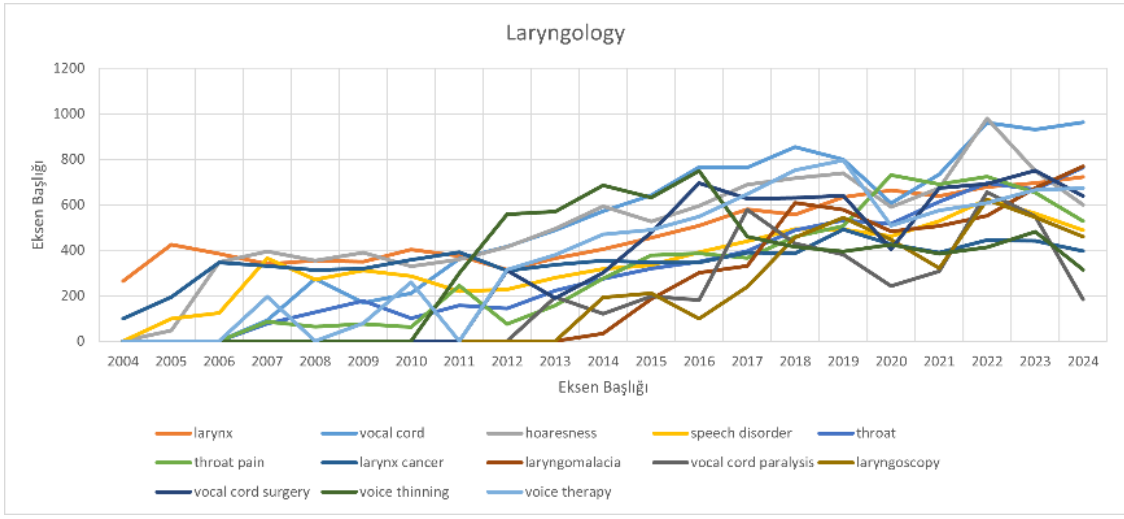

Figure 3. Search rates for the terms related to laryngology. As seen, the terms "vocal cord," "vocal cord surgery," "laryngomalacia," "larynx" have increased in popularity in recent years

While only the terms "nose aesthetics" and "rhinoplasty" were searched for facial plastic surgery in 2004-2005, interest in the terms "protruding ear" and "bags under eyes" increased in the following three years. All terms decreased or slightly increased during the pandemic period. The terms that showed the most significant decrease were "bags under eyes" and "facial aesthetics," respectively. The terms with the highest interest after 2020 were "nasal tip," "nose aesthetic," "protruding ear," and "wide nose." The term "prominent ear surgery," which had the highest search rate between 2011-2015, has decreased in recent years. The search rates of the term "otoplasty," which is synonymous with this term, were low in total and were not included in our study. However, we can see in the search graph that the search rate of this term has increased in recent years (Figure 5). A similar situation was seen in the rise of the term "belpharoplasty" against the term "bags under eyes," which has fallen from interest in recent years (Figure 6). The term "retrognathia" started to gain attention in 2011, but it rose rapidly and became one of the top five most searched terms in 2024. The graph showing the search rates of terms related to facial plastic surgery is shown in Figure 7.

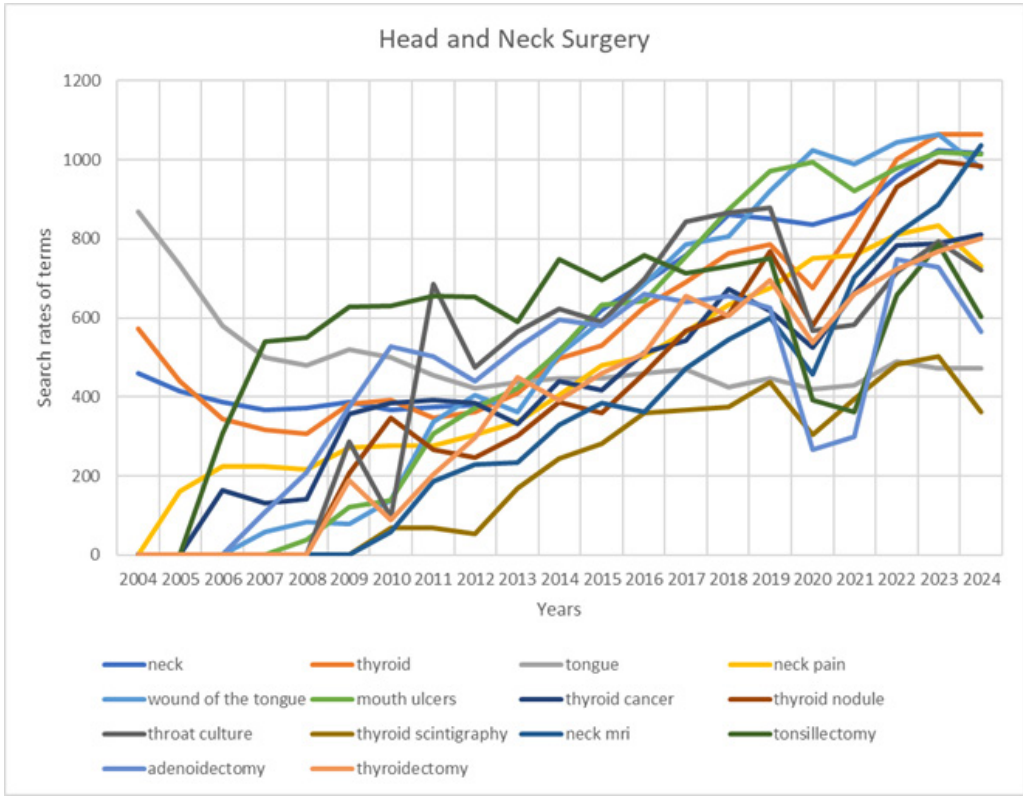

Figure 4. Search rates for terms related to head and neck surgery. As seen, the terms "neck magnetic resonance imaging," "thyroid cancer" and "thyroidectomy" have increased in popularity in recent years

Figure 5. Increase in the rate of search for the term "otoplasty"

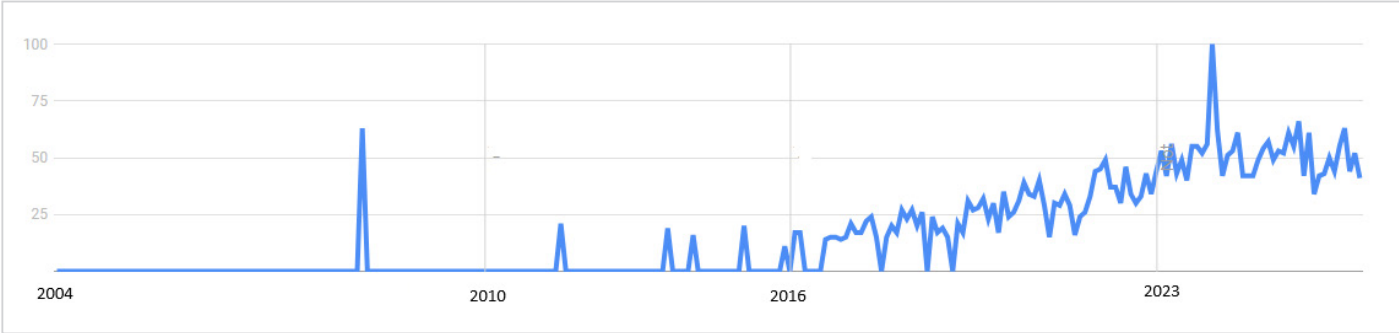

Figure 6. Increase in the rate of search for the term "blepharoplasty"

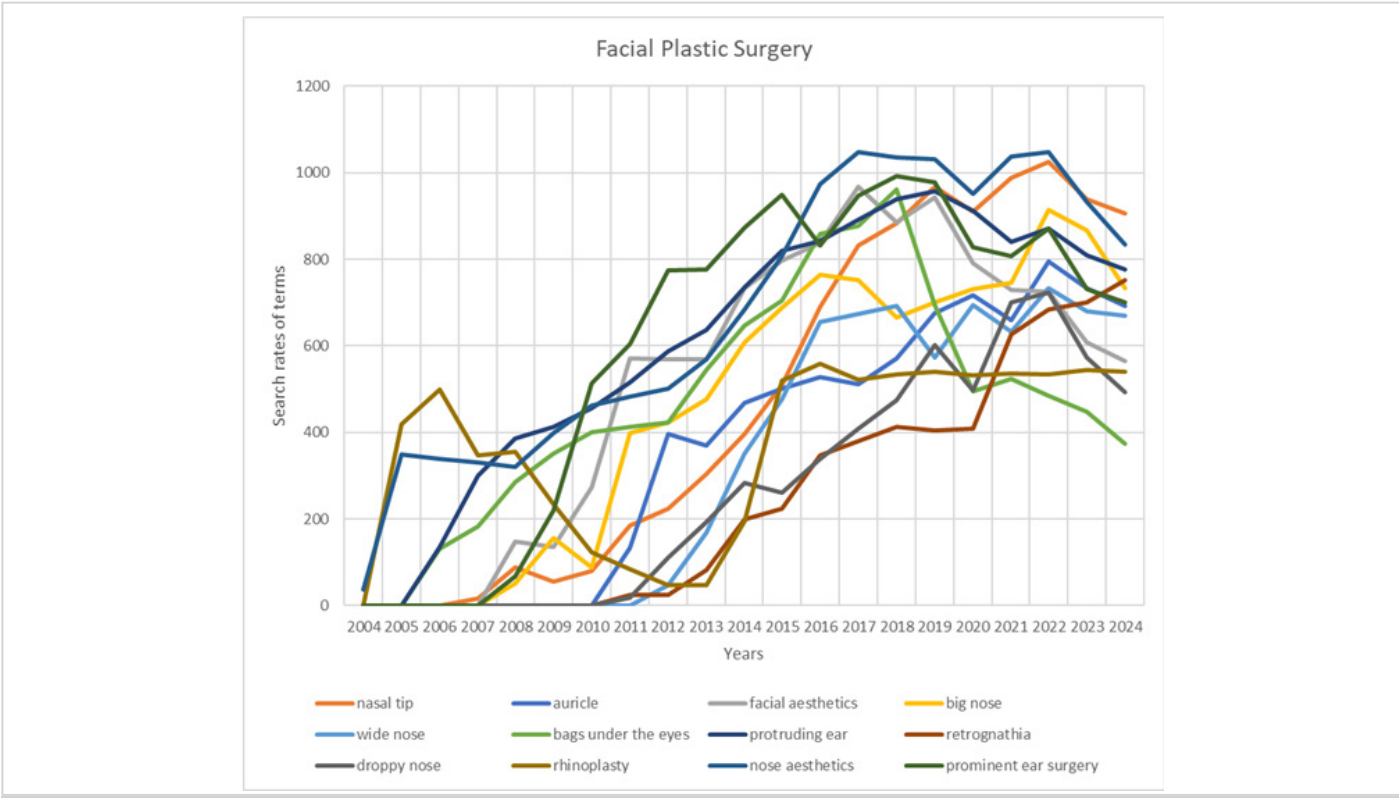

Figure 7. Change in search rates for terms related to facial plastic over the years. Here, while it increased after the beginning of the pandemic, the popularity of all other terms except "retrognathia" decreased as of 2022

Finally, the total search rates of the subbranches were compared. The graph showing the changes in all years is given in Figure 8. To make the comparison more understandable, the years were examined in four periods. The distribution of the percentages in the total search rate according to these periods and the changes over the years are shown in Table 2. According to the table, a significant increase was observed in rhinology in the 3rd and 4th periods compared to the 2nd period. In otology, a significant decrease was observed in the 2nd and 3rd periods after the 1st period, and an increase occurred again in the 4th period, but this was not significant. A significant decrease was observed in laryngology in the 2nd, 3rd, and 4th periods compared to the 1st period. In head and neck surgery, an increase was observed in the 2nd period compared to the 1st period, but this was not significant. A significant decrease was observed in the 3rd period compared to the 2nd period. Although there was an increase in the 4th period, it was not significant. The last period was found to be significantly lower compared to the 1st period. In facial plastic surgery, although the 3rd period showed a significant increase compared to the 2nd period, a significant decrease was observed in the last period.

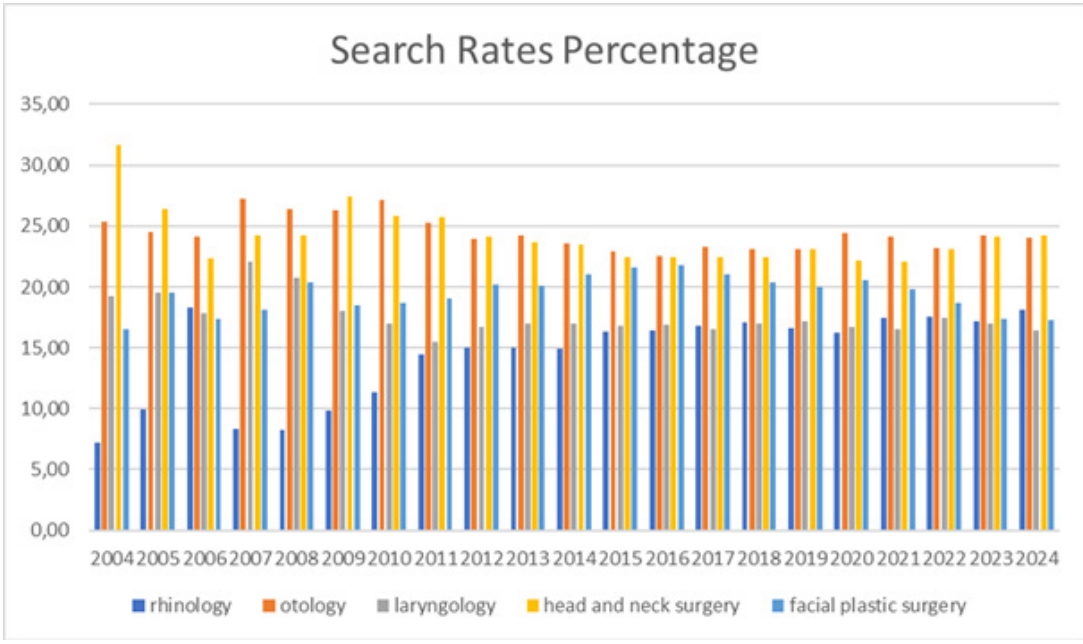

Figure 8. Graph created by calculating the percentage values of the total search rate of each subbranch compared to the total of all otorhinolaryngology

Table 2. Search rates (as percentages) of terms by sub-branch and year

	2004-2008 (1st period)	2009-2013 (2nd period)	2014-2018 (3th period)	2019-2024 (4th period)	p value*
Rhinology	8.37	14.43	16.41	17.35	0.043 (2nd-3rd periods) 0.043 (2nd-4th periods)
Otology	25.37	25.23	23.13	24.06	0.042 (1st-2nd periods) 0.043 (1st-3rd periods) 0.043 (2nd-3rd periods)
Laryngology	19.51	16.97	16.86	16.86	0.043 (1st-2nd periods) 0.043 (1st-3rd periods) 0.043 (1st-4th periods)
Head and neck surgery	24.21	25.74	22.47	23.12	0.043 (1st-4th periods) 0.043 (2nd-3rd periods)
Facial plastic surgery	18.08	19.09	21.03	19.24	0.043 (2nd-3rd periods) 0.043 (3rd-4th periods)

The table presents the percentage search rate values for each subbranch relative to the total search rate, categorized by year. Statistically significant differences across these periods are also indicated in the table (the Wilcoxon signed-rank method was used for statistical evaluation). *: $p<0.05$ value was considered as statistically significant

Discussion

The Internet is increasingly being used in the society to obtain information about health-related issues. A 2010 study conducted in the United States of America, involving interviews with 3,001 adults, demonstrated that individuals perceived the Internet as a very valuable source of information for reasons such as obtaining quick information about health, evaluating other treatment options, or learning more about prescriptions (2).

Health information seeking behavior can be useful in tracking people's trends, disease epidemiology, etiology, and management of certain health conditions (3). Google Trends data has previously been used to track infectious diseases and epidemics and is also known to provide useful information about consumer behavior. Using Google Trends to analyze health-related topics can provide big data, but it is still not widespread (4). By analyzing recorded search terms, public interests can be effectively determined, thereby enabling healthcare providers to leverage this data for

both disseminating accurate information and enhancing healthcare policies.

However, after many problems were experienced because of information pollution, especially during the pandemic, the science of infodemiology, which examines the ways of obtaining information over the Internet and aims to provide accurate information presentation, emerged. Searches made on Internet search engines and social media are recorded in real time, enabling infodemiological research (5). This big data analysis derived from Internet searches holds significant promise for utilization in health research.

Google Trends, which extracts data from a portion of approximately three billion daily searches, is an important data source for assessing public behavioral trends. In addition, Google Trends has been proven to be effective in many studies in the literature (6). It has been suggested that Google can be used to predict disease occurrence and epidemics by examining this search traffic (7). On the other hand, the reliability of Google Trends data has also been evaluated in the literature. In the methodology of our study, the results of a reliability study on Google Trends, which was previously included in the literature, were taken into account. Accordingly, the method we used to evaluate the change in interest in a term over time, social trends and correlations was found to be reliable (8).

Determining public interest using Internet search engines can be leveraged to shape preventive medicine activities by revealing the need for information on topics such as head and neck malignancies. For example, the search rate for the term "nasopharynx cancer" has been 221 in total since 2004. This rate is below the annual search rate for many other terms, as seen in the figures in our study. In addition, the increase in public interest in some scientifically unproven treatments can also be determined through Google Trends data. In this context, an orthopedic study reviewed the search rates for platelet-rich plasma (PRP) treatment for hip and knee osteoarthritis. The authors suggested that, in instances where public interest increases for treatments like PRP—whose efficacy remains unproven—academic governing bodies ought to initiate informational campaigns targeting both surgeons and the general public (9). Similar studies can be conducted in otorhinolaryngology.

Some studies using Google Trends to obtain information about otorhinolaryngology have been published in the literature in recent years. One study concluded that throat cancer screening rates could vary across the years and communities (3). In another similar study, research conducted in Spain to obtain information about oropharyngeal cancer was examined (10). A study aimed at measuring public awareness of nasal polyposis reported an increase in related searches (4). A study on sinusitis reported a positive correlation between the search rates for sinusitis symptoms and the search rate for the term "sinusitis." The same study reported that the seasonal variation in the search terms was consistent with real life (11). Another study found that Google Trends searches related to bruxism increased during the winter months (12). A study examining searches on the term "laryngectomy" on Google reported that search rates remained stable between 2017 and 2022, and the most searches were on the topics of post-laryngectomy speech, laryngectomy comparison to tracheostomy, stoma and stoma care, survival/recurrence, and post-laryngectomy eating (13).

In a publication similar to ours, the change in awareness and interest in chronic liver diseases between 2004-2017 years was examined. This publication reported that people avoided complex medical terms in their searches. It was also reported that current scientific data did not rapidly affect the searches (14). We, too, did not identify such rapid changes in our study. There were seasonal changes in the terms we examined regarding symptoms, diseases, and surgical interventions (for example, an increase in terms related to allergic rhinitis in the spring months), but there were no rapid increases in interest in new medical methods.

In our study, we found changes in the search rates of Google Trends search terms during the COVID-19 pandemic. A comparable situation was observed for the terms related to other branches. For example, one study reported that the diagnosis of acute coronary syndrome decreased in the field of emergency, but the search rate for the term chest pain, which is known to be highly searched for with this diagnosis, increased. This was associated with patients' search for information on the Internet because of their tendency to avoid emergency room visits (15).

A study in literature has shown that although the search rate for terms related to aesthetics and cosmetic procedures decreased in the months when the COVID-19 pandemic began, it increased significantly in the following months (16). Consistent with this, our study found that the field of facial plastic surgery continued to increase during the pandemic.

Another recently published study found that all surgical procedures examined (including non-aesthetic procedures such as cataract surgery) decreased at the beginning of the pandemic. However, a statistically significant increase was observed later in the terms blepharoplasty, facelift, neck lift, and Botox compared to the pre-pandemic period. This study reported that interest in the term "rhinoplasty" initially increased and then returned to pre-pandemic levels by the end of 2022 (17). In our study, we found that search rates for the terms "blepharoplasty" and "otoplasty," which were not among the most searched terms overall, remained stable during the pandemic and then increased compared to the pre-pandemic period (Figures 5 and 6). Similarly, the terms "nose aesthetics," "facial aesthetics," and "protruding ear surgery" decreased during the pandemic, increased again

the following year, and decreased after 2023, showing lower search rates compared to the pre-pandemic period.

Since no similar studies were found in the literature, we have no way of comparing the search rates of otorhinolaryngology-related terms from Türkiye with searches from other countries. However, our study provides important information about the perception of otorhinolaryngology by the public in Türkiye.

The limitations of our study are that data was obtained from a single search engine, and there is no data that could allow for analyzing detailed search behavior (such as demographic data, search location, and possible interactions with media or social media that were not scanned back), and terms may have meanings other than their medical meanings. The reason why Google was chosen as the search engine in our study is that Google offers the most preferred search engine in the world, with more than 89% of the market share (18). Data collection from Google Trends required twelve days. Although Google Trends generally provides stable normalized values, minor variations may occur due to the platform's sampling and updating algorithms. This time span is therefore acknowledged as a potential limitation. To enhance the contribution of our study to the literature, the number of terms searched should be increased and the locations searched should be examined in more detail.

Conclusion

The change in the terms searched for regarding subbranches of otorhinolaryngology on Internet search engines is important in terms of reflecting the interests of society today. Keeping this data up to date will make it possible to shape preventive medicine practices, identify disease clusters and apply them to future clinical research.

Ethics

Ethics Approval: The study did not require local ethics approval.

Informed Consent: Patient consent were not required.

Footnotes

Authorship Contributions

Concept: S.S.G., H.A., Design: S.S.G., Data Collection and/or Processing: L.A., F.B., Literature Search: L.A., F.B., Writing: S.S.G., F.B.

Conflict of Interest: The authors declare that they have no conflict of interest.

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

Main Points

- In our country, Internet searches for terms related to all topics of ear, nose and throat have increased significantly between 2004 and 2023 compared to the previous year.
- The sub-branch with the highest interest was head and neck surgery.
- The sub-branch with the lowest interest was laryngology.
- In our country, during the coronavirus disease pandemic in 2020-2021, it was determined that interest in rhinology and facial plastics continued to increase, but interest in other topics decreased.

References

1. Google. Google Flu Trends estimates – Google Public Data Explorer [Internet]. 2024 Sep 15 [cited 2024 Sep 15]. Available from: https://www.google.com/publicdata/explore?ds=z3bsqef7ki44ac [Crossref]
2. Pew Research Center. The social life of health information, 2011 [Internet]. 2011 May 12 [cited 2024 Sep 15]. Available from: https://www.pewresearch.org/2011/05/12/the-social-life-of-health-information-2011/ [Crossref]
3. Faoury M, Upile T, Patel N. Using Google Trends to understand information-seeking behaviour about throat cancer. J Laryngol Otol. 2019; 133: 610-4. [Crossref]
4. Jin P, Zhao Q, Zang Y, Zhang Q, Shen C, Zhang H, et al. A Google Trends analysis revealed global public interest and awareness of nasal polyps. Eur Arch Otorhinolaryngol. 2023; 280: 2831-9. [Crossref]
5. Eysenbach G. Infodemiology and infoveillance: framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the Internet. J Med Internet Res. 2009; 11: e11. [Crossref]
6. Nuti SV, Wayda B, Ranasinghe I, Wang S, Dreyer RP, Chen SI, et al. The use of Google Trends in health care research: a systematic review. PLoS One. 2014; 9: e109583. [Crossref]
7. Carneiro HA, Mylonakis E. Google Trends: a web-based tool for real-time surveillance of disease outbreaks. Clin Infect Dis. 2009; 49: 1557-64. [Crossref]
8. Rovetta A. Google Trends in infodemiology: methodological steps to avoid irreproducible results and invalid conclusions. Int J Med Inform. 2024; 190: 105563. [Crossref]
9. Cohen SA, Zhuang T, Xiao M, Michaud JB, Amanatullah DF, Kamal RN. Google Trends analysis shows increasing public interest in platelet-rich plasma injections for hip and knee osteoarthritis. J Arthroplasty. 2021; 36: 3616-22. [Crossref]
10. Mayo-Yáñez M, CalvoHenríquez C, Chiesa-Estomba C, Lechien JR, González-Torres L. Google Trends application for the study of information search behaviour on oropharyngeal cancer in Spain. Eur Arch Otorhinolaryngol. 2021; 278: 2569-75. [Crossref]

11. Sharma D, Sandelski MM, Ting J, Higgins TS. Correlations in trends of sinusitis-related online Google Search Queries in the United States. Am J Rhinol Allergy. 2020; 34: 482-6. [Crossref]
12. Kardeş S, Kardeş E. Seasonality of bruxism: evidence from Google Trends. Sleep Breath. 2019; 23: 695-701. [Crossref]
13. Wu MP, Miller LE, Meyer CD, Feng AL, Richmon JD. Online searches related to total laryngectomy. Laryngoscope. 2023; 133: 2971-6. [Crossref]
14. Teufel A, Itzel T, Zimmermann A, Dumitrascu D, Bugianesi E, Valenti L, et al. Evaluation of Google Search Trends for liver diseases in Europe. J Gastrointestin Liver Dis. 2024; 33: 234-44. [Crossref]
15. Senecal C, Gulati R, Lerman A. Google Trends insights into reduced acute coronary syndrome admissions during the COVID-19 pandemic: infodemiology study. JMIR Cardio. 2020; 4: e20426. [Crossref]
16. Dhanda AK, Leverant E, Leshchuk K, Paskhover B. A Google Trends analysis of facial plastic surgery interest during the COVID-19 pandemic. Aesthetic Plast Surg. 2020; 44: 1378-80. [Crossref]
17. Liao D, Lee M, Shomorony A, Weitzman R, Sclafani AP. Zoom boom or bust? Understanding post-pandemic interest in facial plastic surgery via Google Trends. Laryngoscope. 2024; 135: 657-64. [Crossref]
18. Reliablesoft. Top 10 search engines in the world (2025 Update) [Internet]. 2025 [cited 2025 May 26]. Available from: https://www.reliablesoft.net/top-10-search-engines-in-the-world/ [Crossref]