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Trending Tubes: A Social Media Analysis of Tympanostomy Tubes in Children

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Abstract

Objective. To investigate the popular social media platforms Instagram and Facebook for public posts related to tympanostomy tubes in children, to discern attitudes and perceptions surrounding tympanostomy tubes, and to evaluate the content of social media posts related to tympanostomy tubes.

Study Design. Qualitative study.

Setting. Instagram and Facebook social media platforms.

Methods. Instagram and Facebook were searched for public posts from 2018 and 2019 including the search terms "ear tubes," "ear tube surgery," "tympanostomy," and "myringotomy." Posts were excluded if they were unrelated to pediatric tympanostomy tubes or written in a non-English language. Relevant posts underwent subgroup analysis based on 6 domains: media type, perspective, topic, timeframe, popularity, and overall tone.

Results. Of 1862 public social media posts, the majority (78.2%) were made by the patient's parents/caregivers and the rest by physicians (6.0%), hospitals (8.2%), and chiropractors (6.1%), with a few posts by the patients themselves (0.4%). The majority (79.3%) of posts portrayed tympanostomy tubes positively. Most negative posts were made by chiropractors (50.8%) and the patient's parents/caregivers (42.9%). The most common themes of posts were reassurance regarding surgery (74.9%), advertisements (12.5%), apprehension (12.4%), and education (10.3%).

Conclusion. Most social media posts were made by parents/caregivers in the perioperative period, and there was a low percentage of educational posts. This information could be used by otolaryngologists to optimize their interactions with patients and parents and to potentially increase physician involvement and educational material related to tympanostomy tubes on social media.

Keywords

social media, middle ear ventilation, communications media, perception, otitis media, child

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Continued ease of access to social media and mobile phones allows our patients and their caregivers to publicly express their views and experiences with all facets of their lives, including health care. Educational, factually accurate content on social media is certainly not a guarantee.[1] Previous authors have noted that as common social media services such as Facebook and Instagram continue to grow in popularity to near ubiquity, these platforms can serve as windows to the lived experiences of patients.[2-4] Several studies in the orthopedic surgery and otolaryngology literature have utilized social media as a tool to examine patient perspectives and experiences surrounding various surgical procedures.[5-10] In addition, some studies have evaluated the industry presence in social media pertaining to procedures such as cochlear implantation,[11] and others have examined the involvement of otolaryngology residency programs in social media.[12] However, no studies to date have examined the presence of tympanostomy tubes in social media.

By identifying the type of content available on social media, otolaryngologists and other health care professionals can be better equipped to respond to common concerns and misunderstandings regarding tympanostomy tube placement.[12] Facebook and Instagram are widely known as 2 of the

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most popular social media platforms, with Instagram continuing to become more widely used among younger populations, while Facebook remains the most popular social platform in the world.[13,14] Therefore, closely examining these websites for the presence of posts related to tympanostomy tubes can provide crucial information for otolaryngologists about the availability of information that patients and parents/caregivers may be seeing. The purpose of this study is to investigate the popular social media platforms Instagram and Facebook for public posts related to tympanostomy tubes and surgery for tympanostomy tube insertion in children, to discern public attitudes and perceptions surrounding pediatric tympanostomy tube insertion, and to evaluate the content of social media posts related to tympanostomy tubes in children.

Materials and Methods

This qualitative study was performed by searching Instagram and Facebook for public posts including the search terms ''ear tubes,'' ''ear tube surgery,'' ''tympanostomy,'' and ''myringotomy.'' Posts were excluded if they were unrelated to tympanostomy tubes, written in a non-English language, or not clearly related to pediatric patients. All posts from the years 2018 and 2019 underwent classification and subgroup analysis. Since this study utilized publicly obtained social media posts, it was exempt from review per the standing policy of the University of Texas Medical Branch Institutional Review Board. Study authors gathered all data using Microsoft Excel 2016, which was also used for basic percentiles and statistical analysis. A written data collection guideline was formulated before the study to standardize the process.

Data extracted for subgroup analysis from each social media post fell into 1 of 6 domains: media type, perspective, topic, time frame, tone, and popularity. The media type of the post was considered picture, video, or text. No Instagram posts were classified as text only, since Instagram requires either an image or video to be posted, whereas Facebook allows text-only posts.

The perspective of the social media post could otherwise be stated as the author of the post. Social media posts identified in this study included patients, parents/caregivers of patients, physicians, hospitals, professional organizations, media, and chiropractors.

Topics were not considered mutually exclusive, so each post could include elements of multiple topics. For example, a single post could contain an advertisement for a hospital with information regarding otitis media and tympanostomy tubes. Advertisements consisted of promotion of any organization, product, physician, chiropractor, or other marketable resource. Apprehension was defined as posts exhibiting concern or worry about surgery (eg, ''We are a nervous household this morning . . . ear tube surgery is today''). Complication posts centered on a complication of tympanostomy tube insertion, such as post–tympanostomy tube otorrhea or postoperative pain/fussiness. Educational or informational posts offered information about pediatric tympanostomy tube placement, indications for surgery, or a pediatric otolaryngology practice performing tympanostomy tube insertion. Reassurance as a category was largely encompassed by posts offering words of encouragement regarding surgery—for example, ''We are ready for surgery today!'' or ''IV is in and [he] took it like a champ!''

Questions were defined as posts aimed at asking something to the social media community (eg, ''Our doctor is recommending tubes. Should we go for it?''). Examples of posts in each topic can be seen in **Table 1**.

The time frames of posts were considered pre-, peri-, post-, and nonoperative. Posts were classified as perioperative if they occurred within 1 week before or after surgery (including intraoperative posts). Nonoperative posts were advertisements, informational posts, and general questions regarding tympanostomy tubes.

The tone of each post was considered positive, negative, or neutral. This was determined according to the judgment of each study author based on elements of the post, such as media and accompanying text. According to the written protocol, if there was a question whether a post was truly positive or negative, preference would be given to classify such posts as neutral. Posts made on the day of surgery would be classified as negative, for example, if parents depicted their child with a caption such as ''Surgery hit this boy like a freight train. I've never seen him in such rough shape.'' Most advertisements and educational posts were classified as neutral unless they specifically advised against or promoted tympanostomy tubes. For instance, posts advertising chiropractic services as a treatment for otologic pathology were classified as neutral unless there was a specific statement advising against tympanostomy tube insertion. **Table 1** provides examples of various posts with positive, negative, and neutral tones.

Instagram and Facebook utilize the ''like'' system, in which users of the social media platforms can like another user's post, increasing the visibility of that post via the social media algorithms and allowing it to reach a greater number of users. The number of likes for each post were used as a marker of popularity in this study. Data then underwent subgrouping and analysis.

Results

An overall 1862 public social media posts were analyzed (**Table 2**). In total, 227 posts were excluded due to being unrelated to tympanostomy, written in a foreign language, or not clearly related to pediatric tympanostomy tubes.

Perspective

The majority (78.2%) of posts were made by the patient's parents/caregivers, with the rest made by physicians (6.0%), hospitals (8.2%), chiropractors (6.1%), professional organizations (0.4%), and traditional media outlets (0.7%), with a few posts made by patients themselves (0.4%). Despite making up just 1.2% of Instagram posts, chiropractors and chiropractic groups authored 51.9% of Facebook posts related to tympanostomy tubes (**Figure 1**). Most Instagram posts were made by parents/caregivers (84.5%), who had a smaller presence on Facebook (19.0%).

Table 1. Examples of Social Media Posts by Topic and Tone.

Topic	Example
Advertisement	What's your Superpower?
	Solo+ TTD #eartubes #topicalanesthesia #orl #ent #otitismedia
	For most families, summer means splashing around in the pool, ocean, or lakes at some point. For kids with certain ear problems, this can be problematic, but no worries, we have a suggestion. Swim plugs! Swim plugs are a great way to keep the fun going all summer long while also staying safe.
Apprehension	Maddy's preop appointment on Friday. So we are going back to get a second set of ear tubes placed. The first ones fell out! Geesh!
	My little guy is having surgery today, and I'm not sure who is the more nervous wreck. Him or me??
Complication	Can't believe she's in so much pain!! I thought they said this surgery was painless?!
	OMG, there is BLOOD coming out of his ear now :(
Educational	Whether your child has ear tubes or swimmer's ear, you may need to protect their ears and prevent water from entering the ear canal. First and foremost, please follow your physician's directions.
	Children who experience transient conductive hearing loss are at risk for having difficulty with speech, phonological awareness and even attention skills so it is beneficial to treat ear infection without delay. Tympanostomy tube insertion may be a treatment option for recurrent ear infections.
Reassurance	She keeps getting ear infections . . . so tubes it is! But she hasn't let it slow her down
	Show them you're a tiger-grrrrrr!!! Love our girls strength, bravery and sass, she's rad!!!
	Henry did so well yesterday, he barely cried. Still had a lot of fluid drained & adenoids were very large.
	Hopefully this gives him relief. Grateful for the Nurses
Question	Her doctor thinks ear tubes would help. Have any of your kids had this procedure?
	I know ear infections, and tubes, are super common but still kills me to think about this guy being in so much pain all the time! Anyone else struggle with this for their kiddos?
Tone	
Positive	Ear tube surgery this morning but I'm still repping the best!!
	You'd never know it from these pics, but this morning the girls had surgery to get ear tubes. They did great!
	Killian had a procedure done today and he did so good! We are so proud of him! He was happy almost the whole time even when he was all doped up!
Negative	Tubes? Not all that great.
	#eartubes #yuccavelley #chiropractor
	Tubes are not a fix. It just creates a hole for fluid to drain and prevent pain and speech complications from any hearing loss. It does not stop infections.
Neutral	This is a common procedure performed under general (children) or local anesthesia (adults) for recurrent or refractory middle ear infections with effusions (fluid behind the ear drum).
	Your ears usually do a good job cleaning themselves and don't need any extra care or procedures like ear tubes. The only reason you should clean them is to soften or remove earwax from the outside of your ear canals.

Topic

The most common themes of posts were reassurance regarding surgery (74.9%), advertisements (12.5%), apprehension (12.4%), and education (10.3%), with some posts having multiple themes (**Figure 2**). Facebook had a larger percentage of educational/informational posts (46.4%) and advertisements (34.1%) vs Instagram (6.4% and 10.2%, respectively). Overall, 86.7% of Facebook advertisements were posts made by chiropractic groups, which generally depicted tympanostomy tubes neutrally or negatively.

Time Frame

About two-thirds of posts (69.6%) were made in the perioperative period. However, this trend differed between Instagram and Facebook, with 75.8% of Instagram posts occurring in the perioperative period vs only 11.7% of Facebook posts. Facebook posts, however, were primarily made in the nonoperative setting (79.9%). This closely corroborates with the topics of Facebook posts, since 80.5% of posts were either advertisements or informational.

Tone

The majority of posts (79.3%) portrayed tympanostomy tubes positively. Neutral posts made up 14.0% of the total, and negative portrayals were the least common (6.8%). Most negative posts were found on Facebook and were more likely to be made by the patient's parents/caregivers (42.9%) and chiropractors (50.8%; **Figure 3**). However, when weighted according to total number, 62.1% of posts made by chiropractors had

Table 2. Social Media Data: Ear Tubes.

Posts	Source, No. (%)		
	Total	Instagram	Facebook
Overall	1862	1683 (90.4)	179 (9.6)
Media type			
Picture	1733 (93.1)	1628 (96.7)	105 (58.7)
Video	69 (3.7)	55 (3.3)	14 (7.8)
Text only	60 (3.2)	0	60 (33.5)
Time frame			
Preoperative	60 (3.2)	56 (3.3)	4 (2.2)
Postoperative	177 (9.5)	166 (9.9)	11 (6.1)
Perioperative	1296 (69.6)	1275 (75.8)	21 (11.7)
Nonoperative	329 (17.7)	186 (11.1)	143 (79.9)
Popularity: likes per post	114.2	113.8	16.8

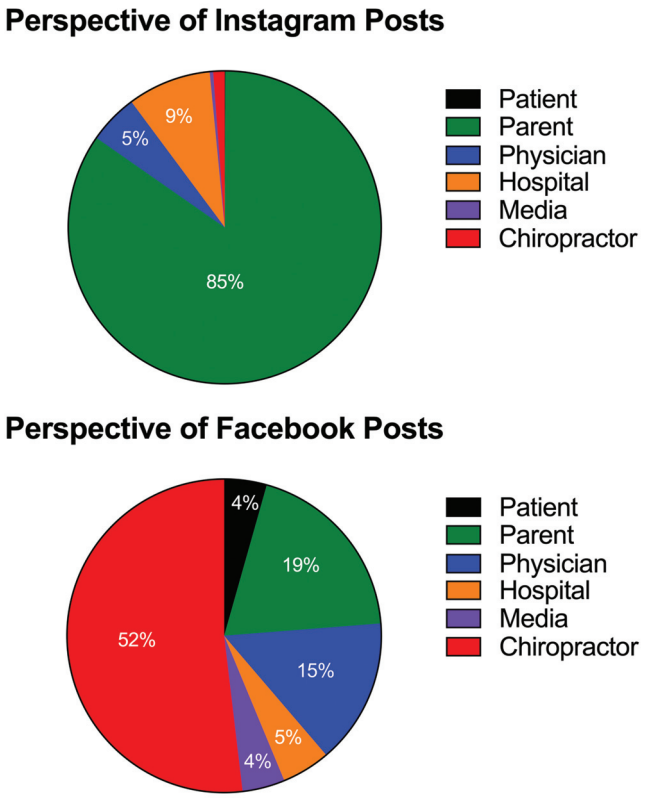


Figure 1. Social media posts regarding pediatric tympanostomy tubes: contrasting perspectives/authors between the platforms.

a negative tone regarding tympanostomy tubes, with the rest being neutral (ie, no posts depicted tubes positively). Yet, only 3.7% of posts made by parents/caregivers were classified as negative. Of the 96.3% of positive posts by parents/caregivers, 81.8% were made in the perioperative period.

Popularity

Notably, the average popularity for Instagram posts was higher, with a mean 113.8 likes per post vs 16.8 for Facebook.

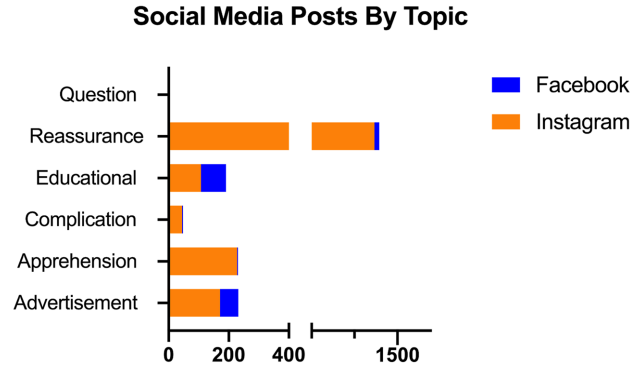


Figure 2. Social media posts regarding pediatric tympanostomy tubes: distribution by topic with subdivision according to platform.

However, the Instagram data were subject to a significant positive skew, with a standard deviation of 688.5 due to a few extreme outliers with >10,000 likes.

Discussion

This is not the first study in the otolaryngology literature utilizing social media to analyze patient perspectives surrounding a common surgical procedure. Hairston et al used Twitter to examine pediatric tonsillectomy and subclassify posts, which generally fell into 2 domains: procedural concerns and attitudes or experiences.[8] In another study, Uyesugi et al examined and subcategorized YouTube videos about sinus surgery based on various attributes.[15] To our knowledge, just 1 study thus far has examined a common otolaryngologic procedure across multiple social media platforms: Saxena et al analyzed posts about cochlear implants across various websites, including Facebook, Twitter, YouTube, and public blogs.[11] Yet, these studies focused on the content of the social media posts rather than the depiction of surgery or the patient's perception, as done in this study. One study did examine patient satisfaction after primary rhinoplasty; however, these authors utilized RealSelf, a less popular social

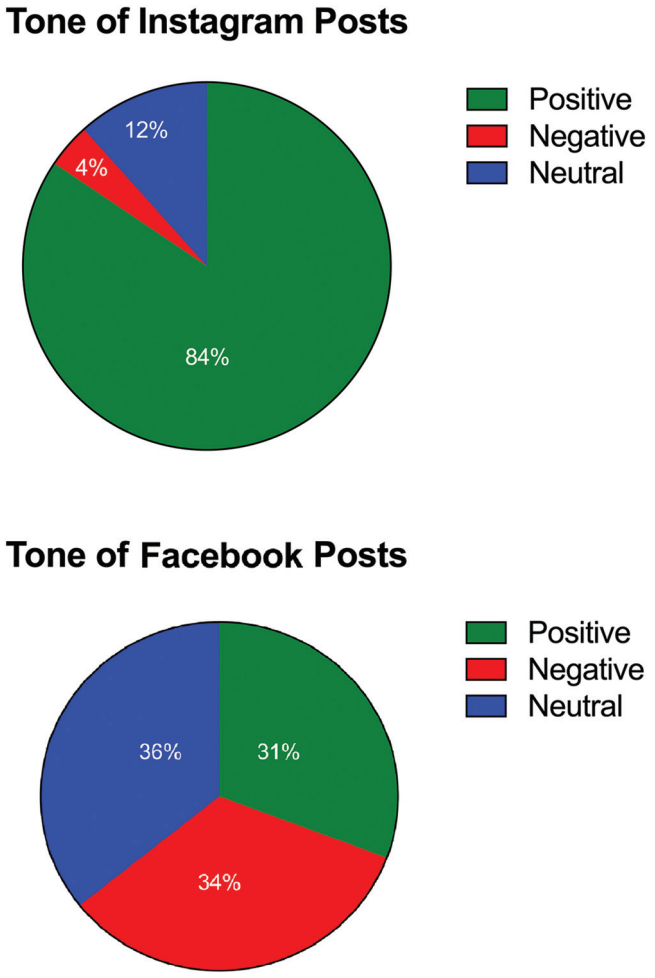


Figure 3. Social media posts regarding pediatric tympanostomy tubes: contrasting the tone between the platforms.

media website designed for cosmetic surgery reviews.[9] In a 2014 study, Sorensen et al explored the content of YouTube videos related to pediatric adenotonsillectomy and tympanostomy tube placement,[10] although other social media platforms were not examined. This is the first study investigating the presence and depiction of tympanostomy tubes in popular social media platforms.

In this study, we chose Instagram and Facebook as the primary social media platforms of interest due to their universality and continually growing popularity among patients and physicians. Although platforms such as Twitter were considered, a 2019 *Forbes* study found that Twitter has continued to decline in popularity, while Instagram enjoys a booming increase in users and Facebook remains the most popular social media platform in the world.[13,14] Therefore, we chose to focus on these 2 platforms, though a prior study examining the presence of tonsillectomy posts on Twitter was reviewed.[8] Hairston et al noted that posts by parents were commonly made in the postoperative period with the primary concern for nutrition during the recovery process. Similarly, most posts in the present study were made in the perioperative period by parents/caregivers, but these posts were rarely related to nutrition and more likely to report postoperative pain or fussiness, concerns about anesthesia, or post–tympanostomy tube otorrhea. A simple Instagram search revealed >55,000 posts for #tonsillectomy vs 8000 total posts for #eartubes, indicating an even higher presence of social media perceptions currently available for this procedure and an apparent popularity as a topic. Notably, the demographics of Instagram users indicate younger users than Facebook.[14] Although this study did not account for the ages of post authors, physicians can use this information to target their social media posts for a desired audience. For example, parents of toddlers are typically in their 20s or 30s and would presumably be more likely to use Instagram, whereas Facebook users tend to be older.

One notable finding of this study was the difference in perspectives or authors between platforms. Instagram had a much larger percentage of posts by parents/caregivers than Facebook, with a small percentage of Instagram posts being made by physicians, hospitals, or chiropractors. Facebook, though, had fewer posts by parents/caregivers and more by organizations, physicians, hospitals, media groups, and chiropractors. Of the 113 posts made by chiropractors, 93 (82.3%) were on Facebook and only 20 (17.7%) on Instagram. In contrast, 97.9% of parental posts occurred on Instagram. Most physician posts were on Instagram (78.2%) as well as posts by hospitals (94.8%). These results might signify that physicians should focus their efforts on Instagram rather than Facebook when seeking information from or targeting the experience of patients and parents/caregivers undergoing tympanostomy tube insertion.

Another significant finding was the substantial presence of chiropractors in the Facebook community, with over half of Facebook posts made by chiropractors and chiropractic groups, as opposed to just 1.2% of Instagram posts in this cohort. More than half of posts made by chiropractors were classified as negative, with the rest classified as neutral and none portraying tympanostomy tubes positively. For clarification in the context of this study, a negative post does not imply a maligned, ill-willed, or unprofessional post; rather, a post was recorded as negative if the data collector felt that it depicted or implied a negative connotation to tympanostomy tubes. In the context of chiropractic posts made on Facebook, most were made by chiropractors or chiropractic groups, with the rest being made by alternative medicine and wellness organizations. These posts most commonly promote chiropractic manipulation as an alternative method of treatment of recurrent acute otitis media or chronic otitis media with effusion in children. For example, chiropractic manipulation of the cervical spine, or spinal manipulation therapy (SMT), and adjacent cervical muscles is postulated to improve function of the tensor veli palatini muscle, thereby allowing proper dilation of the eustachian tube and subsequent aeration of the middle ear.[16] The literature support for SMT primarily consists of case reports and retrospective reviews.[17-20] In 2012, Pohlman and Holton-Brown reviewed the literature and found 4 clinical trials describing chiropractic or osteopathic manipulation as a treatment for acute otitis media, recurrent otitis media, or chronic otitis media with effusion.[17,21-24] These

trials reported some potential for chiropractic therapy, with improvement in many patients and few adverse events, but they also showed limited effects. As such, more evidence is needed before spinal manipulation can be recommended as a definitive treatment option.[17,20]

Facebook posts made by chiropractors or chiropractic groups most frequently cited case reports describing osteopathic manipulation as a means of improving middle ear function, thus avoiding tympanostomy tube placement.[16,25] Generally, these posts served as advertisements for chiropractic services. We feel that it is crucial for otolaryngologists to understand alternative medicine options that their patients might be seeking online. Additionally, an essential aspect of caring for children with tympanostomy tubes is multispecialty collaboration and excellent communication among all health care providers. This must include professional relationships and communication with our chiropractic colleagues, since a thorough understanding of the indications for tube placement or a referral to an otolaryngologist for evaluation of otologic pathology is crucial for all pediatric health care providers. The role of the pediatrician throughout this process cannot be understated, and the American Academy of Otolaryngology–Head and Neck Surgery and the American Academy of Pediatrics have acknowledged as such throughout the otolaryngologic and pediatric literature.[26]

Only 10.3% of social media posts investigated in this study were classified as educational. This disparity represents an opportunity for physicians to use social media to educate the public on tympanostomy tubes. This educational content cannot replace an individualized preoperative counseling session, but it may provide the narrative perspective that makes social media engaging for users. Educational content could be created to show the patient and caregiver what the experience of tympanostomy tube insertion is like, which may be lacking in standard preoperative counseling. Physicians could provide more factual content related to the benefits of tympanostomy tube placement, which is currently a small proportion of all social media posts. Additionally, surgeons might consider posts that depict the perioperative setting, such as preoperative areas and postanesthesia care units, as these images could demystify the experience of surgery for young patients and caregivers alike. When used with caution, social media can be an important adjunctive tool for physicians of all specialties to understand public perspective and educate patients and parents/caregivers regarding tympanostomy tube insertion.

This study is not without its weaknesses. Primarily, this study utilized a nonrandomized or convenience sample, which limits the interpretation of the findings to the public social media posts within the domains of Facebook and Instagram. Since not all parents/caregivers use social media and since many of those who do choose to remain private with their posts, the study population might not accurately reflect the population at large undergoing tympanostomy tube insertion. In addition, data collection was subject to the individual biases of the study authors when determining the elements of each post, such as tone and topic. To minimize this risk, a written data collection guideline was prepared for this project and used by all authors. Nonetheless, it is possible that this study could be repeated by another group with different interpretations of positive vs negative tones, for example. Additionally, this study did not examine other popular social media platforms, such as Twitter, Snapchat, and TikTok. Finally, it is difficult to interpret clinical significance from evaluation of social media posts. Otolaryngologists and other physicians involved in the care of children with tympanostomy tubes who wish to become more involved with social media could consider starting with an Instagram or Facebook page depicting information about tympanostomy tubes, including patient testimonials, intraoperative photos and videos, and postoperative care. However, caution should always be used on social media given the potential for misuse and abuse of information in the public sphere. Finally, avenues for future studies can include using a similar methodology to examine the social media perspectives of other common pediatric otolaryngologic procedures, such as tonsillectomy or frenotomies, on various social media platforms. Given the abundance of posts regarding tonsillectomy on Instagram alone, utilizing multiple social media platforms, including Instagram, will be necessary to accurately gauge the current social media perceptions on this or any other otolaryngology procedures.

Conclusion

This study represents the first social media analysis of tympanostomy tubes. In general, tympanostomy tubes were portrayed positively. Facebook posts were more likely to depict tubes negatively. In addition, a higher percentage of posts were made by chiropractors, physicians, hospitals, and professional organizations on Facebook than Instagram. A low percentage of educational posts was seen, with a scarcity of physician involvement. Careful and cautious interpretation of these data gives physicians a glimpse into the lives of pediatric patients and their families throughout the holistic experience of undergoing tympanostomy tube insertion, illustrates the content and quality of information available on popular social media platforms, and highlights deficiencies in educational and physician involvement on content relating to tympanostomy tubes.

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Author Contributions

Nicholas A. Rossi, drafting and editing of the manuscript; **Katherine R. French**, drafting and editing of the manuscript; **Chad L. Evans**, drafting and editing of the manuscript; **Jason F. Ohlstein**, drafting and editing of the manuscript; **Luis D. Neve**, drafting and editing of the manuscript; **Shiva Daram**, concept, guidance, and review of manuscript; **Dayton L. Young**, concept,

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