

Artificial Intelligence and ChatGPT: An Otolaryngology Patient's Ally or Foe?

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Introduction

In November 2022, OpenAI released to the public ChatGPT,¹ a chatbot with the ability to communicate in plain English and called by some as a “tipping point for AI.”² Far from being a comprehensive review, the intention of this study is a cursory review of ChatGPT’s diagnostic capability, ability to convey pathophysiology in simple terms, accuracy in management recommendations, and appropriateness in follow up and post operative recommendations in common otolaryngologic conditions.

Methods and Materials

Assessment of ChatGPT’s current diagnostic capability, ability to convey pathophysiology in simple terms, accuracy in management recommendations, and appropriateness in follow-up and postoperative recommendations in common otolaryngologic conditions was explored in December 2022. A qualitative analysis of adenotonsillectomy (T&A), tympanoplasty (TP), endoscopic sinus surgery (ESS), parotidectomy (PT), and total laryngectomy (TL) was performed.

We asked ChatGPT:

- “How do I know if I need *(procedure)?*”
- “What are treatment alternatives to *(procedure)?*”
- “What are the risks of *(procedure)?*”
- “How is a *(procedure)* performed?”
- “What is the recovery process for *(procedure)?*”

Results

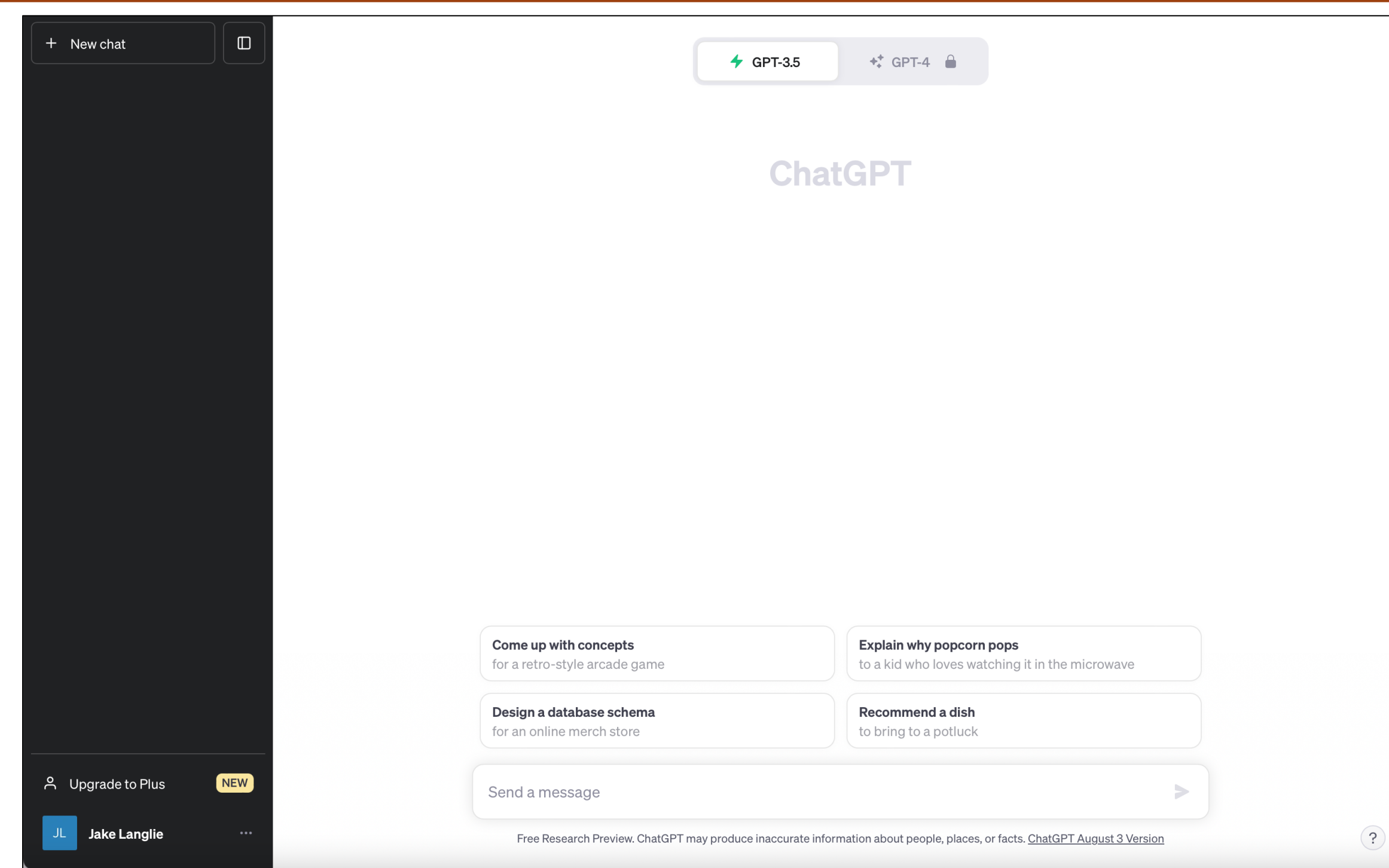


Figure 1. Interface of the ChatGPT 3.5 Version utilized in December 2022

What is the recovery process for total laryngectomy?

A total laryngectomy is a surgical procedure in which the entire larynx (voice box) is removed due to medical reasons such as laryngeal cancer. The recovery process following a total laryngectomy can be challenging and requires adjustment to a new way of speaking and breathing. Here's a general overview of the recovery process:

- 1. Immediate Postoperative Care:**
 - After the surgery, you will spend time in the recovery room before being transferred to a hospital room.
 - The medical team will monitor your vital signs and ensure that you're comfortable.
 - You might have a temporary tracheostomy tube placed in your neck to help with breathing while the surgical site heals.
- 2. Healing and Recovery:**
 - The surgical wound in your neck will take time to heal. Stitches or staples will need to be removed at a later date.
 - During this time, it's important to keep the wound clean and dry to prevent infection.
 - Pain management will be a priority, and your medical team will provide appropriate pain medications.
- 3. Learning to Breathe and Communicate:**
 - With the larynx removed, you will no longer be able to breathe, speak, or swallow in the same way.
 - You will learn a new way of breathing through the tracheostomy tube if it's still in place.
 - Speech therapy will be an integral part of your recovery. You will learn alternative methods of communication, such as esophageal speech, electronic speech devices, or surgical voice restoration (if possible).
- 4. Swallowing and Nutrition:**
 - Initially, you might receive nutrition through a feeding tube to allow your surgical site to heal.
 - Over time, you will work with a speech therapist and a dietitian to relearn how to swallow safely and consume a balanced diet.
- 5. Tracheostomy Tube Removal (if applicable):**
 - Once you've sufficiently recovered, the tracheostomy tube might be removed. This will depend on your individual healing progress.
 - Breathing and speaking without the tracheostomy tube will require further adjustment and therapy.

Figure 2. Example of ChatGPT response when queried: “What is the recovery process for total laryngectomy?”

Results

	How do I know if I need....?	What are the treatment alternatives to....?	What are the risks of....?	How is a....performed?	What is the recovery process for....?
Tonsillectomy	Positive: accurate generalized procedure description; safely recommends need for physician evaluation Negative: suggested unnecessary imaging and cultures	Positive: suggested watching and waiting and antibiotics; mentioned alternative treatments alleviate symptoms but do not treat the underlying problem Negative: no aberrant suggestions	Positive: covered appropriate risks; discussed issues of swallowing and dehydration Negative: no aberrant risks mentioned	Positive: mentions techniques including cold knife, electrocautery, and ablation Negative: does not cover surgical steps or patient positioning	Positive: describes accurate post-op course, pain, recovery, discomfort, rest, and saltwater rinses Negative: no aberrant suggestions
Tympanoplasty	Positive: accurate procedure description; discussed details of possible causes of cholesteatoma Negative: no aberrant suggestions	Positive: recommends antibiotics and hearing aids; mentions specific indication will guide treatment Negative: inaccurately describes myringotomy and PE tube as equal alternatives	Positive: highlights major risks including graft failure and hearing loss Negative: does not mention facial nerve or risks of dysgeusia	Positive: describes both postauricular and transcanal approaches; covers accurate steps Negative: not very detailed surgical sequence or techniques	Positive: mentions keeping ear dry; describes accurate postoperative course Negative: no mention of avoiding insufflation or Valsalva
Endoscopic Sinus Surgery	Positive: highlights need to fail medical therapy then proceed with surgical workup Negative: isolates indications to chronic sinusitis	Positive: mentions alternatives including nasal sprays, saline rinses, allergy treatment, and humidification Negative: no aberrant suggestions	Positive: mentions bleeding, infection, damage to eyes, and persistence of symptoms Negative: no aberrant risks mentioned	Positive: accurate procedure basics with widening of sinus apertures and removal of polyps Negative: falsely states periorbital bruising can occur; describes endoscope as flexible not rigid	Positive: mentions need for postoperative nasal sprays and avoiding strenuous activity; describes as outpatient Negative: no aberrant description of recovery period
Parotidectomy	Positive: provides basic anatomy and function of parotid; mentions surgical evaluation by ENT Negative: focuses on masses; does not mention chronic parotid diseases as an indication	Positive: states options based on specific pathology; mentions radiation and chemotherapy alternative; emphasizes surgery as best option for cancer Negative: no aberrant suggestions	Positive: focuses on facial nerve injury and results of surgery Negative: fails to mention sialocele, Frey’s, First Bite, or cosmetic defect	Positive: states need for general anesthesia, neck incision, and dissection of the facial nerve Negative: does not mention facial incision or placement of a drain	Positive: accurately describes incision care and pain management Negative: states that most patients go home the same day
Total Laryngectomy	Positive: Mentions only for cancer of larynx; resection size depending on tumor size and characteristics Negative: no aberrant surgical indications	Positive: mentions radiation, chemotherapy, photodynamic therapy, and laser; states total laryngectomy is best for aggressive pathology Negative: no aberrant suggestions	Positive: highlights bleeding, infection, and damage to surrounding structures Negative: lacks major risks including chyle leak, dysphagia, tongue weakness, and stoma creation	Positive: highlights basic steps of procedure including incisions and dissection Negative: no mention of anatomical boundaries, reconstruction, or need for free flap	Positive: highlights recovery basics and rehabilitation of speech and swallowing Negative: states patient can go home same or next day, states no way to speak after surgery, and does not describe stoma management

Discussion

- In terms of management recommendations, ChatGPT was able to give generalized statements of evaluation, need for intervention, and the basics of the procedure without major aberrant errors or risks of safety.
- ChatGPT was successful in providing appropriate treatment alternatives in all procedures tested.
- When queried for methodology, risks, and procedural steps, ChatGPT lacked precision in the order of procedural steps, missed key surgical details, and did not accurately provide all major risks of each procedure.
- In terms of the recovery process, ChatGPT showed promise in T&A, TP, ESS, and PT but struggled in the complexity of TL, stating the patient could speak immediately after surgery without speech therapy.

Conclusions

- ChatGPT accurately demonstrated the need for intervention, management recommendations, and treatment alternatives in common ENT procedures.
- However, ChatGPT was not able to replace an otolaryngologist’s clinical reasoning necessary to discuss procedural methodology, risks, and the recovery process in complex procedures.
- As AI becomes further integrated into healthcare, we should continue to explore its indications, evaluate its limits, and refine its use to the otolaryngologist’s advantage.

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2. Mollick, Ethan. “ChatGPT Is a Tipping Point for AI.” Harvard Business Review. <https://hbr.org/2022/12/chatgpt-is-a-tipping-point-for-ai>

Disclosures

The authors nor the University of Miami Health System are affiliated with OpenAI or the ChatGPT software utilized in this study. The queries and answers provided by OpenAI’s ChatGPT Version 3.5 are not representative of the views of the University of Miami Health System, the Department of Otolaryngology at the University of Miami Health System, or the authors of the study.