

# Cryoextraction: A novel approach to remove aspirated chewing gum

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**Abstract:**

The extraction of aspirated foreign bodies can prove challenging at times, requiring even rigid bronchoscopy. Cryotherapy probes have been reported to help with extraction of foreign bodies. We present a case where successful “cryoextraction” was performed on an aspirated chewing gum. The case highlights the fact that this technique is useful to extract all materials that have water content. This technique can be performed through flexible bronchoscopy and can save patients from more aggressive approaches.

**Key words:**

Bronchoscopy, cryotherapy, cryoextraction, foreign body, gum

Foreign body aspiration (FBA) is not uncommon and is likely increasing as our population life expectancy rises. Many potential sequelae to FBA have been described. Acute complications include asphyxiation, obstructive emphysema, atelectasis, pneumothorax, and pneumomediastinum. Late complications usually arise from the development of an obstructive infectious process that presents as a recurrent pneumonia, and can lead even to the development of bronchopleural fistulas and a secondary empyema. Patients may develop bronchiectasis and even irreversible damage to the obstructed segment, with the development of airway stenosis. The complication rate is significantly higher when the diagnosis is delayed beyond 24 hours.<sup>[1]</sup> Therefore, prompt recognition and removal is essential. Dating back to the times of Chevalier Jackson, the extraction of these bodies could only be accomplished through rigid bronchoscopy. Currently, new flexible techniques have allowed extraction of many aspirated objects through flexible bronchoscopy. Nevertheless, many objects are still not easily retracted with these flexible techniques, and hence require rigid bronchoscopy, a skill not widely available.<sup>[2]</sup> The use of cryotherapy probes has proved to be an alternative approach to remove foreign bodies through simple flexible bronchoscopy, but only a few cases have been reported, with the most recent describing the removal of a water-moistened gold tooth implant.<sup>[3,4]</sup> We wish to add to this body of literature by reporting on the utility of this technique to extract a chewing gum from the airway.

**Case Report**

A 58-year-old woman presented to the emergency department after she awoke in the morning with cough. She went to sleep with a chewing gum in

her mouth and when she awoke, the gum was no longer present. She reported sleeping many times with chewing gum in her mouth without any problems. She denied any other significant medical history and was a lifelong non-smoker. She denied dyspnea or fever, but reported some substernal chest discomfort and minimal blood tinged phlegm. Her presentation prompted the performance of a chest roentgenogram [Figure 1] and computed axial chest tomogram [Figure 2]. The prior was unremarkable, but the latter confirmed the presence of a foreign body in the left proximal mainstem bronchus. The patient then underwent a flexible bronchoscopy through an endotracheal tube, with the use of a 5.2-mm Olympus Flexible Video Bronchoscope (Olympus America, Center Valley, PA, USA). A foreign body, identified as chewed gum, was noted in the proximal left mainstem bronchus. Repeated attempts to remove the gum with forceps and a basket were unsuccessful, with only small pieces being removed. We then decided to try to remove the gum with the use of the cryotherapy probe. The ERBE cryotherapy system (Erbokryo, ERBE Cryosurgery, Tübingen, Germany) was utilized, with a 1.9-mm cryotherapy probe. This allowed us to successfully remove en-bloc the entire chewing gum. The patient tolerated the procedure well and was discharged the next day with no complications, and with resolution of symptoms. Four weeks later during a routine follow-up, she reported no further problems.

**Discussion**

Flexible catheters currently allow the use of cryotherapy through flexible bronchoscopes. The utility for cryotherapy is being more widely disseminated. The cryotherapy probe is utilized to not only treat endobronchial lesions and

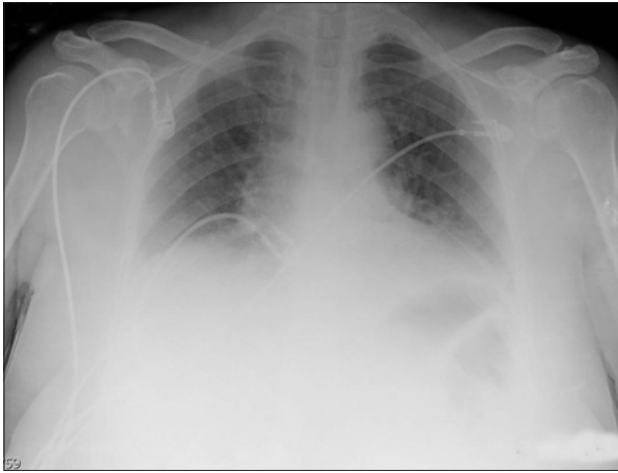


Figure 1: Chest roentgenogram showing no evidence of a foreign body

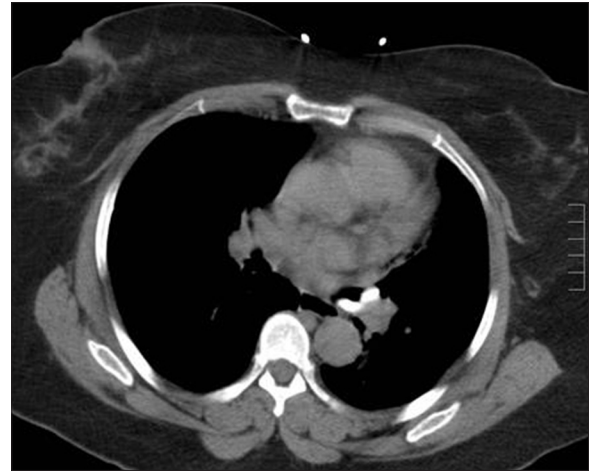


Figure 2: Computed axial tomogram demonstrates a radiopaque object in the left main stem

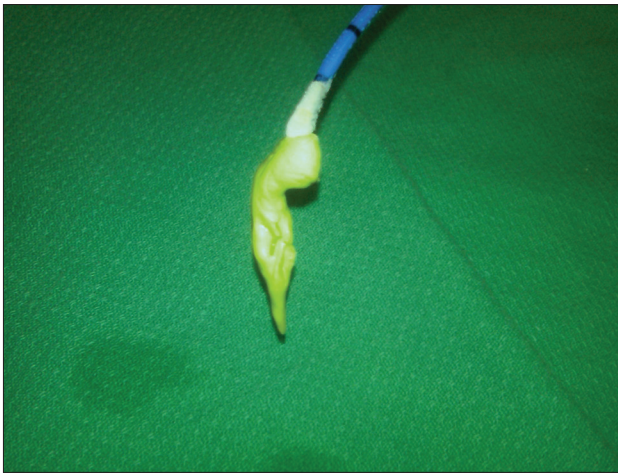


Figure 3: Chewing gum being held in the air from the tip of a cryotherapy probe

biopsy airway pathology, but also is an excellent instrument that can be used to remove foreign airway bodies.<sup>[5]</sup> Due to the mechanism facilitating the use of cryotherapy probes to remove foreign bodies, water content is required in the foreign object, suggesting that mostly organic material is appropriate for this approach.<sup>[6]</sup> In the case of our patient, we felt that chewed gum, despite being an insoluble substance and commonly inorganic, should still have enough water content to allow its removal with the cryotherapy probe. The principle of freezing gum to facilitate removal is a well-known household anecdote and has been marketed commercially (gum removal products). Under circumstances in which a foreign body does not have any or enough water content, one may consider spraying saline over the object and immediately freezing the foreign body which now contains water to allow for successful cryoextraction.

An additional advantage of this technique is that the learning curve to utilize the cryotherapy probe is quite short and does not require the more prolonged training needed to master rigid

bronchoscopy, something not available in many institutions. Given the nature of chewed gum, it is also foreseeable that even with rigid bronchoscopy and larger forceps, removal of such material may be complex and lead to a more prolonged procedure where only small pieces are obtained with each forceps bite. The cryoextraction technique allows en-bloc removal of the entire object at once [Figure 3].

Our approach proved correct and we were able to successfully remove the chewing gum. To our knowledge, this is the first case reported on the utilization of cryoextraction to extract chewing gum. It highlights the utility of cryotherapy probes to remove any object that has water content, even if inorganic. It is a safe and easy approach to foreign body removal, which helps patients avoid more invasive approaches such as rigid bronchoscopy.

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