Chewing Gum Bezoars of the Gastrointestinal Tract

ABSTRACT. Children have chewed gum since the Stone Age. Black lumps of prehistoric tar with human tooth im-
pressions have been found in Northern Europe dating from 
~7000 BC (Middle Stone Age) to 2000 BC (Bronze Age).1 The bite impressions suggest that most chewers were be-
tween 6 and 15 years of age. The Greeks chewed resin from the 
mastic tree (mastic gum). North American Indians 
chewed spruce gum. The first manufacturing patent for 
chewing gum was issued in 1869 for a natural gum, chicle, 
derived from the Sopadilla tree, indigenous to Central 
America. Chewing gum sold today is a mixture of natural 
and synthetic gums and resins, with added color and flavor 
sweetened with corn syrup and sugar. Chewing gum is big 
business. A significant amount of the $21 billion US candy 
industry sales is from chewing gums, many of which appeal 
almost exclusively to children. Despite the history and 
prevalence of gum chewing, the medical literature contains 
very little information about the adverse effects of chewing 
gum. In the present report, we briefly review gum-chewing 
complications and describe three children who developed 
intestinal tract and esophageal obstruction as a conse-
quence of swallowing gum. Pediatrics 1998;102(2). URL: 
http://www.pediatrics.org/cgi/content/full/102/2/e22; gum, 
chewing gum, constipation; fecal mass.

CASE REPORTS

Case 1

A boy, 4½ years of age, was referred with a 2-year history of 
constipation. His constipation was associated with encopresis and 
constipation was reported well before any candy or gum reward. 
Candy, especially chewing gum, was given as a reward for successful toileting. Constipation was reported well before any candy or gum reward. The parent described the child’s stools as dry and “like glue.” The physical examination was normal except for soiled underwear and a palpable firm mass in the left lower quadrant. The cremen-
teric and anal wink reflexes were present. Anorectal examination demonstrated normal sphincter tone without expulsion of gas or feeces. A firm fecal mass was palpated at <3 cm from the anal 
verge. An unprepared barium enema study revealed a large amount of stool confined mostly to the rectum without a transition 
zone. The initial treatment plan was behavior modification with 
regular, daily intervals on the commode; mineral oil (30 mL bid); 
fiber supplements; and saline enemas (5 oz each night for 4 
weeks). This clean-out regimen produced no results after 4 days. On the 5th day, the child was brought in for manual disimpaction 
with conscious sedation. On this occasion, the fecal mass was unmistakably chewing gum, because it contained 
multiple spheres of chewed gum congealed into a multicolored rectal mass. Dislodging the mass revealed the taffy-pull sign. Ganglion cells were evident on rectal suction biopsy. After the disimpaction, the family reported that chewing gum was part of a positive reinforcement system used on many occasions each day. The child had the habit of swallowing gum, often just to get another piece.

Case 2

A 4½-year-old girl was referred because of encopresis, consti-
pation, and barium enema findings that showed megarectum. The 
early life, medical, and family histories were noncontributory. The physical examination revealed a palpable firm mass in the left lower quadrant, soiled underwear, and firm stool in the rectal 
rectum. Phosphosoda enema, fiber supplements, mineral oil, and 
behavior modification were ineffective. Manual disimpaction oc-
curred 7 days later with conscious sedation. On this occasion, the 
fecal mass was unmistakably chewing gum, because it contained 
multiple spheres of chewed gum congealed into a multicolored rectal mass. Dislodging the mass revealed the taffy-pull sign. Ganglion cells were evident on rectal suction biopsy. After the disimpaction, the family reported that chewing gum was part of a positive reinforcement system used on many occasions each day. The child had the habit of swallowing gum, often just to get another piece.

DISCUSSION

Chewing gum has been associated with many adverse health effects. In most cases, additives (sweet-
eners, flavorings, preservatives) and not gum induce pathology (Table 1). For example, sorbitol (in “sug-
areless” gum and candy) nonabsorption may cause diarrhea, abdominal pain, and flatulence.2 Cinnamon 
flavoring has been linked to mouth ulcers.3 Bubble 
gum may induce a perioral dermatitis with granulo-
matus histology; the postulated mechanism of this 
perifollicular lesion is selective absorption of certain 
gum oils by the follicle.4 Chlorophylla, menthol, and 
butyln hydroxytoluene additives can induce a dissem-
nated cutaneous urticaria.5 Licorice flavoring in 
chewing gum (glycyrrhiza) can induce hypokalemia and hypertension.6,7 Frequent oral cavity exposure to 
concentrated sugars facilitates dental caries.

Gum chewing also may induce mechanical injury to teeth (Table 2), extrusion of dental repairs (fillings, 
crowns, bridges, orthodontics), and overuse injury 
including temporomandibular joint syndrome. A syndrome of temporalis and other masticatory muscle 
hypertrophy has been reported with so-called “chewing gum abuse.”8 Mercury levels are higher in
excessive gum chewers because of the release of mercury from dental amalgam.9

In addition, the cost to maintain public and private facilities free of discarded chewing gum is enormous. Gum pollution (“gumfitti”) has created an entire industry of solvents and gum-removal devices. The environmental effects of using solvents to remove accidental or purposeful gum pollution has not been studied.

Our report of two children with protracted constipation and chewing gum rectal bezoar is another example of gum pollution requiring expensive clean up. Other authors have previously reported gum removal to relieve symptoms. A patient was found to have a chewing gum obstruction of her endotracheal tube while undergoing elective surgery; she admitted her noncompliance to the NPO preoperative orders.10 Three separate case reports of bubble gum intestinal bezoar in children have been noted elsewhere.11–13 Swallowed bubble gum in the gastrointestinal tract simulated calcification on plain abdominal x-ray examination.14

Our report adds to an already long list of adverse health effects from chewing gum. Two patients, each toddlers, received gum on a daily basis and their means of discarding the gum (swallowing) was well known to the families and was a source of levity. Each child presented with intratable, medically refractory constipation that required manual stool removal. Interestingly, the disimpaction procedure is characteristically a “taffy-pull.” The rainbow of fused, multicolored gum fragments in the removed fecoma is easily recognized by physician and family as old gum. It is assumed that the third patient, an infant, put multiple coins in her mouth at a time when she was chewing gum. The coin–gum mass produced esophageal obstruction when swallowed (Figure). The “taffy-pull” sign again was evident, and it was difficult to strip the gum away from the coins. The finding of an imperfectly round coin on x-ray examination has been reported to indicate the presence of multiple adhered coins.

In summary, chewing gum should not be swallowed and not given to children who cannot understand this point. Chewing gum does have occasional beneficial use as a delivery system for drugs (nicotine, aspirin, bismuth). However, chewing gum has documented deleterious effects in the oral cavity and may obstruct the esophagus and colon. With regard to the older infant and toddler, anticipatory guidance about gum should be outlined for the parent. For example, the toddler with constipation should also have practice of gum-chewing noted in the medical history. Gum-swallowing in a child with chronic constipation or acute coughing and drooling should raise suspicion about chewing gum intestinal or esophageal bezoar. This is especially important when the taffy-pull sign accompanies the manual disimpaction or even is noted on routine rectal examination.

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REFERENCES

TABLE 1. Complications From Additives to Chewing Gum

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Cause</th>
</tr>
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<tbody>
<tr>
<td>Diarrhea, flatulence, borborygmi</td>
<td>Sorbitol</td>
</tr>
<tr>
<td>Mouth ulcers</td>
<td>Cinnamon flavoring</td>
</tr>
<tr>
<td>Perioral dermatitis</td>
<td>Gum oils</td>
</tr>
<tr>
<td>Diffuse cutaneous urticaria</td>
<td>Chlorophyll, menthol, butylhydroxytoluene</td>
</tr>
<tr>
<td>Dental caries</td>
<td>Concentrated sweetener, corn syrup</td>
</tr>
<tr>
<td>Hypertension, hypokalemia</td>
<td>Licorice (glycyrrhetic acid)</td>
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</tbody>
</table>

TABLE 2. Adverse Mechanical Effects of Chewing Gum

<table>
<thead>
<tr>
<th>Effect</th>
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<tbody>
<tr>
<td>Extrusion of dental work</td>
</tr>
<tr>
<td>Temporomandibular joint syndrome</td>
</tr>
<tr>
<td>Hypertrophy of masticatory muscle</td>
</tr>
<tr>
<td>Increased serum mercury level</td>
</tr>
<tr>
<td>Increased air swallowing</td>
</tr>
<tr>
<td>Occlusion of endotracheal tube</td>
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<tr>
<td>Esophageal or colonic bezoar</td>
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Fig 1. Four coins stuck in gum lodged in esophagus.


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