

# Endoscopic fundoplication: patient selection and technique

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**Abstract:** Gastroesophageal reflux disease (GERD) is a common condition that places a significant burden on the healthcare system. Additionally, there have been concerns raised about potential risks of long-term proton pump inhibitors. Laparoscopic anti-reflux surgery is currently the gold standard option for patients when surgery is planned. However, there continues to be interest in an endoscopic, alternative to laparoscopic surgery. Transoral incisionless fundoplication (TIF) is being increasingly utilized for such patients. We review the indications, patient selection and technique for this procedure. A video of the procedure, which we previously published on CTSNet is also attached.

**Keywords:** Reflux; transoral; endoscopic repair

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## Introduction

The current standard approach for treating gastroesophageal reflux disease (GERD) is laparoscopic Nissen fundoplication. Although effective, surgery may lead to unwanted consequences of bloating and difficulty with belching (1,2). These adverse effects make the laparoscopic option unappealing to some patients. So, there has been continued interest in an endoscopic alternative such as transoral incisionless fundoplication (TIF). This is an endoscopic partial fundoplication, which is associated with a lower incidence post-operative gas bloat and dysphagia compared to the more standard Nissen operation (3). We have recently published results with TIF procedures performed on 80 patients (4). Grade 2 complications occurred in 7 (8.75%) and only 1 (1.25%) grade 3 complication occurred, which was an aspiration pneumonia. The median length of stay was 1 day, intermediate follow-up (mean 24 months) was available in 41 patients. Mean satisfaction scores improved significantly and 63% of patients completely stopped or reduced their proton pump inhibitors, demonstrating safety and efficacy (but not as profound as would be expected with a laparoscopic procedure). Patient selection and technique of this procedure are described below.

## Patient selection

The ideal patient should have no hiatal hernia or a hiatal hernia that is less than 3 cm in size. Previous anti-reflux surgery is a contraindication. However, a previous endoscopic approach, such as another TIF, or Stretta procedure would not preclude TIF. In the original feasibility studies patients with Barrett's esophagus were excluded. Although it would be technically possible to perform a TIF procedure in such patients, control of reflux is probably less effective with a TIF rather than a laparoscopic approach. In patients with Barrett's, particularly dysplasia superior reflux control is desirable to minimize progression of Barrett's. We routinely obtain manometry when planning an anti-reflux procedure. However, an advantage with the TIF procedure, compared to 360 degree fundoplication or LINX procedure the TIF can be performed in patients with impaired motility. In fact, this may be a good compromise for such patients, as reflux is decreased and there will be minimal dysphagia created.

## General considerations

Procedures are performed under general anesthesia with full muscle relaxation. Patients are positioned in the left

lateral decubitus position. There are usually two operators, one will work the EsophyX device (Endogastric Solutions, Redmond, WA, USA) and the other will work the gastroscope. The reason for full muscle relaxation is that carbon dioxide will be insufflated through the irrigation port of the gastroscope. This is important to help with visualization, particularly for the initial suture placement.

### Procedure

- (I) An initial endoscopy was performed to rule out any unexpected anatomic or mucosal abnormalities. After confirming satisfactory findings, the device was prepared and then coupled with the endoscope;
- (II) It is important to lubricate both the gastroscope and the outside of the EsophyX device as well as the working channel of the device;
- (III) The device and gastroscope passed through the oropharynx into the esophagus and down into the stomach. This can be tricky and so jaw thrust is helpful to allow the device and gastroscope to pass into the esophagus from the oropharynx;
- (IV) Once in the stomach, the gastroscope was retroflexed independently of the device and then the device was similarly retroflexed under direct vision;
- (V) The device was then rotated to the 11 o'clock position. The device was then slightly opened and the helical retractor of the device advanced into the gastroesophageal (GE) junction on the esophageal side;
- (VI) Then with traction on the helical retractor, the device was closed and  $\times 2$  sutures ("H-fasteners") were placed to hold the fundus to the esophagus;
- (VII) At least 2–4 more sutures were placed in this location;
- (VIII) The helical retractor was detached, and the device rotated back to the 1 o'clock position. An additional 4–6 sutures were placed;
- (IX) The device was then repositioned and sutures were placed in the 5 and 7 o'clock positions. The sutures were placed in a slightly deeper length and in this way, an approximately 2-cm partial fundoplication was created;
- (X) Following this, the device was straightened, and then under direct vision with the gastroscope, the device and gastroscope were removed. We usually perform one more endoscopy to confirm the findings are satisfactory. The stomach was then suctioned out

and the endoscope was removed;

- (XI) It is our routine to get a barium esophagogram the next morning and then start the patient on clear liquids. If the findings are satisfactory, the patient is usually discharged the morning after the procedure.

Please review the video for procedural steps: <https://youtu.be/4Z9Noa5ciz0>.

### Conclusions

The TIF procedure is a good alternative to medical therapy. It is safe and effective but not as profound as with a laparoscopic approach. On the other hand, patients may experience less bloating and dysphagia compared to a Nissen fundoplication and this may be preferable to many patients. Additionally, this is a good option for patients with impaired esophageal motility, who do not have a large hiatal hernia.

### Acknowledgements

None.

### Footnote

*Conflicts of Interest:* The author has no conflicts of interest to declare.

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