



Dr. Philip L. Leggett is a Minimally Invasive Surgeon Specialist in Houston, TX. He trained as a General Surgeon at The Alton Ochsner Medical Foundation in New Orleans, LA. He is a Clinical Assistant Professor in Surgery at The University of Texas Medical School at Houston and a Clinical Associate Professor in Surgery at The University of Texas Medical Branch at Galveston. He is a Staff Surgeon at Houston Northwest Medical Center. He has been the Director of The Fellowship in Laparoscopic and Endoscopic Surgery at The University of Texas-Houston Medical School, Department of Surgery- Houston Northwest Medical Center since 1999. He is one of the national leaders in Minimally Invasive and Bariatric Surgery with over 30 years of experience in the field. He has directly trained 29 Fellows many of whom have also become leaders in the field.

Laparoscopic Fundoplication with the FreeHold Trio[™] Retractor

Introduction

Gastroesophageal reflux disease (GERD) is a highly prevalent disease. It affects about two thirds of adults in the U.S. at some point in their lives and accounts for greater than 4 million physician visits every year^{1,2}. The so-called typical symptoms of GERD consist of heartburn, regurgitation and dysphagia. Cough, wheezing, hoarseness or chest pain may be present and are termed atypical symptoms.

Management of GERD can be divided into life-style modifications, and medical and surgical treatments³. The surgical approaches for GERD include open surgery, laparoscopic surgery and endoscopic interventions. Dr. Rudolf Nissen (1896-1981) was the first one to describe the first fundoplication in the 1950s for the treatment of severe reflux esophagitis. The original procedure has been modified on multiple occasions, but the basic principles have remained the same. Laparoscopic Nissen fundoplication has been shown to have advantages over the open approach, including improved cosmesis, reduced morbidity, shorter hospital stay, decreased respiratory complications, and faster recovery⁴. In addition, long-term outcomes after laparoscopic Nissen fundoplication are comparable to those after open surgery^{4, 5}. Laparoscopic Nissen fundoplication is now considered the standard surgical approach for the treatment of severe GERD^{4, 5}.

Over the last 15 years, there has been an impetus to develop even smaller and less invasive techniques compared to traditional laparoscopic surgery. I have dedicated my professional life to the advancement of minimally invasive surgical approaches. We have been one of the early adopters of mini-laparoscopy surgery, also known as micro-laparoscopy or needlescopic surgery, which uses 3mm or smaller ports and instruments instead of the traditional 5- and 10-12mm ones.

Here we describe the use of a hands-free intracorporeal organ retractor system (FreeHold Trio[™]) for liver retraction during Minilaparoscopic Nissen Fundoplication obviating the need for a mechanical retractor and of an additional incision.

Pathophysiology of GERD

Gastroesophageal reflux disease is not the result of acid overproduction. It is due to mechanical dysfunction in the region around the lower esophageal sphincter (LES) leading to failure of the antireflux barrier, allowing abnormal reflux of gastric contents into the esophagus⁴. Other factors leading or contributing to GERD are a gastric emptying disorder or failed esophageal peristalsis⁴. Long standing reflux may ultimately lead to esophageal tissue damage with or without further complications including malignancy or airway disease⁴. The exact composition of the antireflux barrier has not been completely elucidated, it is clear the LES, phrenoesophageal ligament and diaphragmatic crura are essential components⁷.

FreeHold Trio: A Hands-free Intracorporeal Retractor and its Use During Minilaparoscopic Nissen Fundoplication

The technology of minimally invasive surgery continues to evolve at a rapid pace. It is well established that less and smaller laparoscopic incisions lead to decreased post-operative pain, rate of ileus, wound infections, ventral herniation, adhesive bowel obstruction, and shorter hospital stays⁸⁻¹⁰. These benefits have continued to drive the miniaturization of new approaches and instrumentation. In fact, multiple studies and small prospective randomized trials have shown that when compared to conventional laparoscopic surgery, mini-laparoscopic surgery further reduces postoperative pain, improve cosmesis, and allow patients return to normal activities sooner¹¹.

We have added the use of a hands-free intracorporeal retractor (FreeHold Trio™, FreeHold Surgical, New Hope, PA) to a variety of surgical procedures including Minilaparoscopic Nissen Fundoplication. The FreeHold Trio is a fully and continuously adjustable intracorporeal retractor that allows us liver retraction during MNF obviating the need of an additional incision for a Nathanson liver retractor.

Case Report

A 42 year-old man with history of chronic acid reflux with decreased response to proton pump inhibitor therapy over the last year presented for surgical evaluation. Reflux work up demonstrated a 2-cm hiatal hernia and chronic esophagitis, but no intestinal metaplasia or dysplasia. Manometry studies demonstrated a normal gastro-esophageal junction relaxation and post-swallow regurgitation. He was scheduled for a minilaparoscopic Nissen Fundoplication.

After entering the abdomen via an umbilical approach using the Optiview technique, insufflation was applied. Percutaneous and conventional laparoscopic instruments were inserted at the left lateral quadrant, left mid-clavicular and right mid-clavicular lines.

A FreeHold Trio retractor was delivered via one of the 5mm ports into the abdominal cavity (Fig 1, panel A) and used to retract the liver anteriorly as follows: Using a laparoscopic grasper with the left hand and another by the assistant, the liver is lifted to expose the diaphragmatic crura. Then, a fixed hook of the FreeHold Trio Retractor (Fig 1, Panel B) is grasped with a needle driver and is inserted in the right crura. Afterwards, the needle driver is used to grasp and insert the adjustable hooks in the anterior abdominal wall at the appropriate positions to achieve retraction of both the right and left liver lobes (Fig 1, panels C through F). Placement is customized to the anatomy of the patient. For example, sometimes a small window is made in the falciform ligament to achieve adequate retraction of the right lobe. At this point, the free end of the sutures from each adjustable hook is pulled to achieve the desired degree of retraction. Once liver retraction is accomplished the Nissen fundoplication is completed in the standard laparoscopic fashion. The patient recovered well from surgery, was discharged on POD#1 and continued to do well at 1-week, 1-month and 3-month follow up visits.

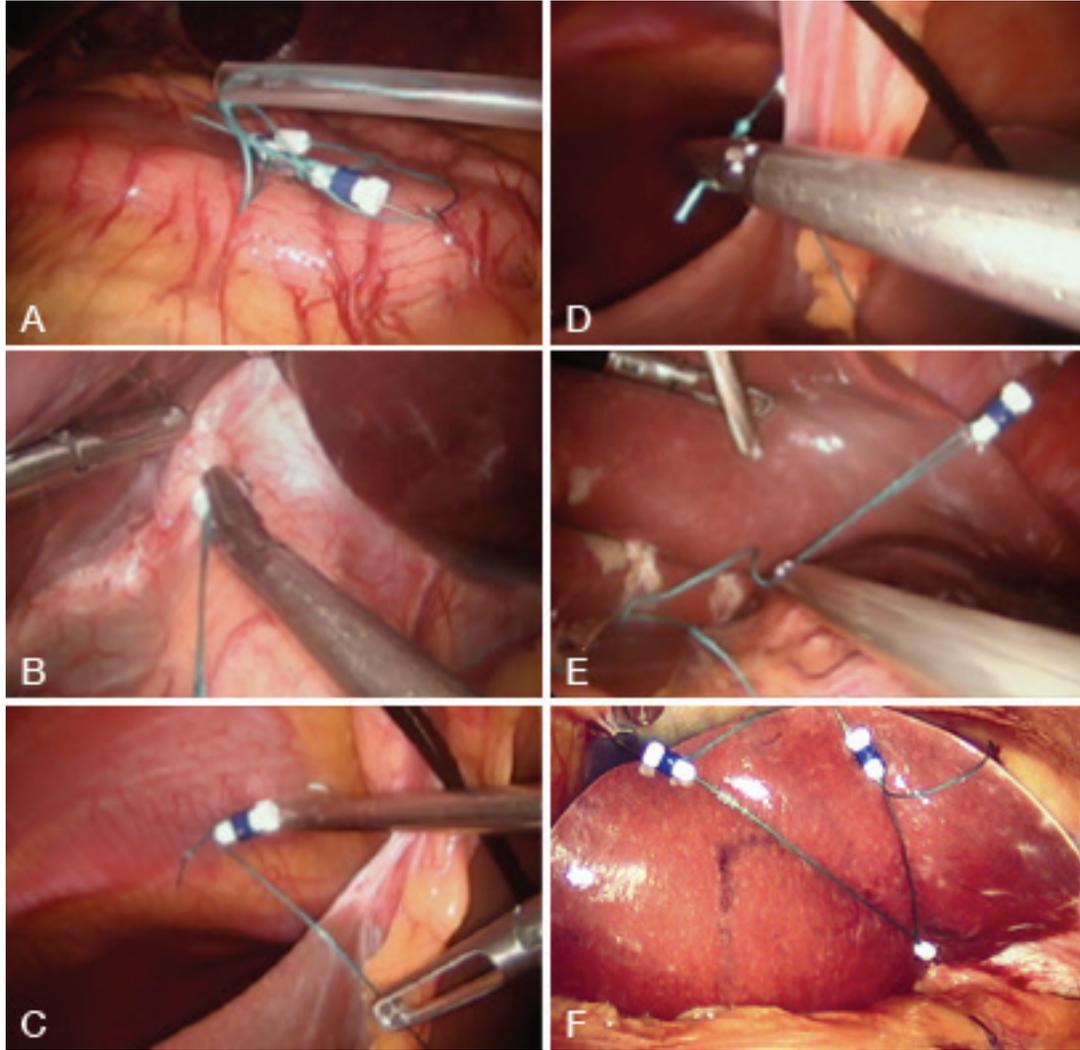


Figure 1. Use of FreeHold Trio Retractor during a Minilaparoscopic Nissen Fundoplication.

Important Points

FreeHold Trio is a hands-free, easily adjustable intracorporeal retractor that is ideal for liver retraction during a Nissen Fundoplication. It allows us to use one trocar less leading to decreased pain and improved cosmetic outcomes. The learning curve is short. In fact, in our experience, a surgeon with adequate laparoscopic skills is able to successfully and efficiently deploy the FreeHold Trio retractor after 3 or 4 procedures.

Bibliography

1. Granderath F A, Kamolz T, Schweiger U M, Pointner R (2003) Laparoscopic refundoplication with prosthetic hiatal closure for recurrent hiatal hernia after primary failed antireflux surgery. *Arch Surg* 138:902-907
2. Digestive diseases in the United States: Epidemiology and Impact (1994), vol. NIH Publication No. 94-1447, NIDDK.
3. Kahrilas P J, Shaheen N J, Vaezi M F, Hiltz S W, Black E, Modlin I M, Johnson S P, Allen J, Brill J V (2008) American Gastroenterological Association Medical Position Statement on the management of gastroesophageal reflux disease. *Gastroenterology* 135:1383-1391, 1391 e1381-1385
4. Draaisma WA1, Rijnhart-de Jong HG, Broeders IA, Smout AJ, Furnee EJ, Gooszen HG. Five-year subjective and objective results of laparoscopic and conventional Nissen fundoplication: a randomized trial. *Ann Surg.* 2006 Jul;244(1):34-41.
5. Lafullarde T1, Watson DI, Jamieson GG, Myers JC, Game PA, Devitt PG. Laparoscopic Nissen fundoplication: five-year results and beyond. *Arch Surg.* 2001 Feb;136(2):180-4.
6. DeVault, TD, Castell, BT. Guidelines for the diagnosis and treatment of gastroesophageal reflux disease. Updated guidelines for the diagnosis and treatment of gastroesophageal reflux disease. 2008.
7. Wetscher G J, Redmont, E.J., Vititi, L.M.H. (1993). Pathophysiology of gastroesophageal reflux disease. In *Gastroesophageal Reflux Disease*, R.A. Hinder, ed. (Austin, TX: R. G. Landes Company), pp. 7-29.
8. Leggett PL, Churchman-Winn R, Miller G. Minimizing ports to improve laparoscopic cholecystectomy. *Surg Endosc.* 2000 Jan;14(1):32-6.
9. Leggett, PL, Bissell, CD, Churchman, RN, R, Ahn, C: Three-port microlaparoscopic cholecystectomy in 159 patients. *Surgical Endoscopy*, Vol. 15, No. 3, pg. 293-296, March 2001.
10. Leggett, PL, Bissell, CD, Churchman, RN, R: Cosmetic minilaparoscopic cholecystectomy. *Surgical Endoscopy*, Vol. 15, No. 10, page 1229-1231, October 2001.
11. Novitsky YW, Kercher KW, Czerniach DR, et al. Advantages of Mini-laparoscopic vs Conventional Laparoscopic Cholecystectomy: Results of a Prospective Randomized Trial. *Arch Surg.* 2005;140(12):1178-1183.

www.freeholdsurgical.com | info@freeholdsurgical.com
Customer Service: 646.200.7005

© 2016 FreeHold Surgical, Inc. All Rights Reserved.
FreeHold, FreeHold Duo™ and FreeHold Trio™ are trademarks of FreeHold Surgical, Inc.

SM-FRE-056 Rev. A