



## Focus on Laparoscopic Feeding Jejunostomy Operative Technique

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### Abstract

The feeding jejunostomy placement is a surgical operation in which the patient is nourished through a feeding tube placed in the jejunum. Laparoscopic jejunostomy feeding tube placement can be standardized due to the regular anatomy. We developed a technique by laparoscopic approach a serosal tunnel (according to Witzel open technique) of the feeding tube using accessible materials.

### Introduction

The feeding jejunostomy placement is a surgical operation in which the patient is nourished through a feeding tube placed in the jejunum, the first part of the small bowel. The first to accomplish a jejunostomy for nutritional purposes was Bush in 1858 in a patient with non-operable gastric cancer [1]. In 1891 Witzel described the most well-known technique for jejunostomy, and it has undergone diverse modification, such as those adopted by Coffey and Albert. A definitive jejunostomy is that done by the Roux-en-Y technique [2]. By 1990 minimal invasive surgery had appeared, and diverse options for jejunostomy by laparoscopy were described [3-8]. The feeding tube is a tube that requires an opening to be created between the skin of the abdomen and the wall of the jejunum. Connected directly to the patient's digestive tract, the feeding tube provides water, nutrients, and medication if needed. Feeding jejunostomy is essential when a patient is unable to have an oral alimentation. It is also performed when there is a deficiency of nutrient intake or excessive nutrient loss. These situations can occur in particular in the context of ENT and oeso-gastric cancers; during anorexia, which corresponds to an eating disorder, characterized in particular by a loss of appetite; also in senility or pathological ageing, which refers to a deterioration of physical and mental capacities in the elderly; in cases of lesions in the upper digestive tract; in the context of intensive diarrhea and in extra-digestive loss, which is manifested by a loss of water and nutrients not coming from the digestive system [2,5-7].

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We developed a technique by laparoscopic approach with witzelisation of the feeding tube using accessible materials that we describe in this publication.

### Operative Technique

#### General principles

The patient is placed in supine position on the operating table under general anesthesia and oro-tracheal intubation. The surgical team is placed on the right side of the patient and the operative screen and the laparoscopy tower on the left side.

The port placement it's on the left flank: two 5 mm trocars for the instruments and one of 10 mm for the optical system.

#### Instruments

- Kit of laparoscopy surgery
- 1 mm × 10 mm trocar
- 2 mm × 5 mm trocars
- Kit of jejunostomy
- Suture threads

### Trocar Placement

The first trocar of 10 mm is placed at the same level as the umbilic at 8 cm on the right flank.

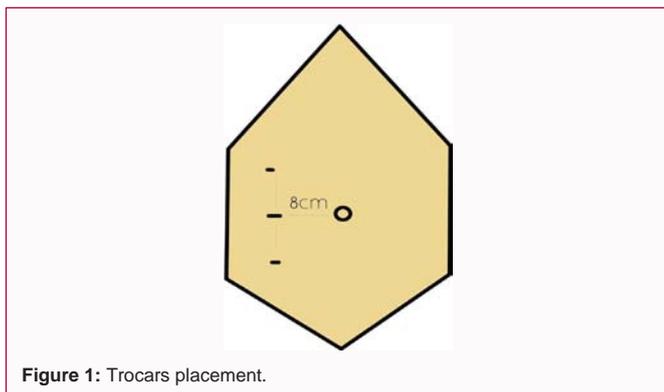


Figure 1: Trocars placement.

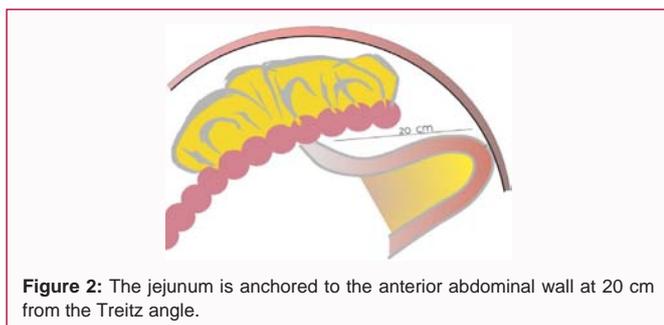


Figure 2: The jejunum is anchored to the anterior abdominal wall at 20 cm from the Treitz angle.

This placement is easy to evaluate also by the placement of 4 fingers. We mark the placement of the jejunostomy tube at the middle line between the left flank and epigastric area. Two trocars of 5 mm placed cranially and caudally on the same line, at 8 cm each. This disposition allows a correct triangulation of the instruments and facilitates mostly the realization of the sutures. Care must be taken to avoid the Inferior Epigastric Vessels (IEV) and the risk of damage and consequently hemorrhage. In case of active hemorrhage of the IEV, there is the possibility of control with percutaneous suture or transverse mini-laparotomy on the bleeding site which allows the identification and vessels ligation. These measures of 8 cm, or 4 fingers, are considered in order to have a standardization of the procedure that can increase the reproducibility and the safety of the intervention but also to reduce the risk of having a bad placed trocar that can increase the operative difficulty for the surgeon (Figure 1).

### Jejunal landmarks and parietal fixation

The proximal jejunal loop identified. The Treitz angle is identified and 20 cm of proximal jejunum starting from the angle of Treitz are measured. Is important to have a jejunostomy placed proximally in order to have the maximum length of small bowel and to allow a complete and correct nutriments absorption. The jejunostomy should not be placed too proximally because in this case there it can be too much tension between the Treitz angle and the abdominal wall that can predispose to complication like for example avulsion of the parietal fixation suture. Is important to identify correctly the afferent and efferent loop for a correct placement of the tube in the distal loop, in the direction of the intestinal transit. Once the jejunum is measured and the place of fixation is defined a stitch is placed between the antimesenteric side of the bowel and the abdominal wall. The fixation site is choose on the left flank in a position where the bowel is not put under tension. For these steps use a resorbable wire (Vicryl 2-0). For the children we can use small wire like Vicryl 3-0 or Vicryl 4-0 because of the small thickness of the bowel. To facilitate the fixation we can lower the intra-abdominal pressure or

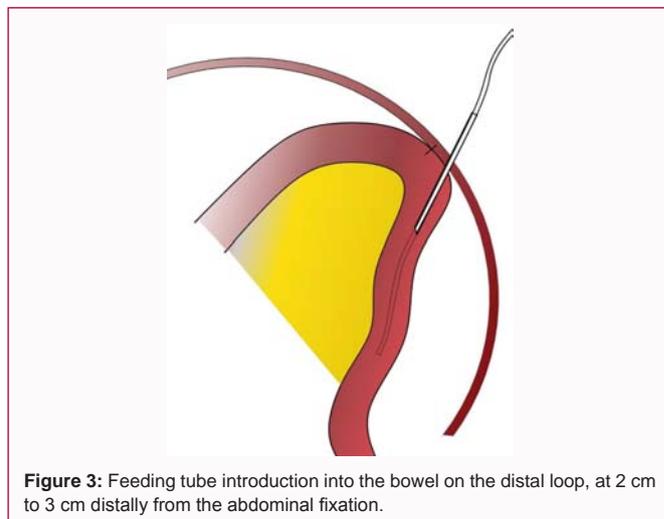


Figure 3: Feeding tube introduction into the bowel on the distal loop, at 2 cm to 3 cm distally from the abdominal fixation.

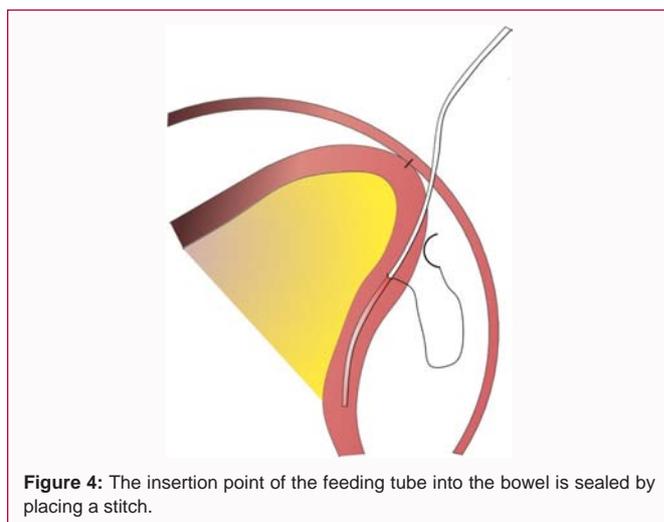


Figure 4: The insertion point of the feeding tube into the bowel is sealed by placing a stitch.

we can ask to the assistant to press on the abdominal wall. The needle should not be placed too profoundly on the abdominal wall. It should be avoided the muscle in order to avoid any hemorrhage from the perforant vessels of residual postoperative pain. The stitch should not be too large; 3 mm to 4 mm should be enough on the sides, bowel and abdominal wall.

### Feeding tube introduction

Once the jejunum is fixated to the abdominal wall, the feeding tube can be inserted into the bowel lumen. The parietal insertion place is choosing close to the fixation site, not much than 1 cm. In function of the surgeon preferences of available materials is possible to use a trocar of insertion or the feeding tube alone. On the bowel an incision is performed at 2 cm to 3 cm distally from the parietal fixation site on the antimesenteric side. The incision can be performed using the electric hook. The feeding tube is slides into the lumen for 20 cm. The tube progression can also be performed by the assistant while the surgeon can manipulate the bowel the help the tube progression. A guidewire can be placed inside the tube can facilitate the introduction. If the tube get stuck into mucosa is very important to stop and to find another solution, due to the perforation risk. For example, the guidewire can be removed and is possible the instillation of 50 ml of physiological solution into the lumen via the feeding tube to facilitate the progression of the tube.

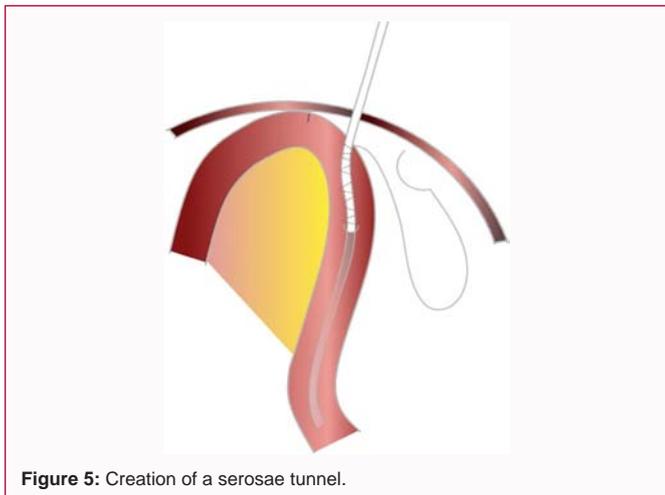


Figure 5: Creation of a serosae tunnel.

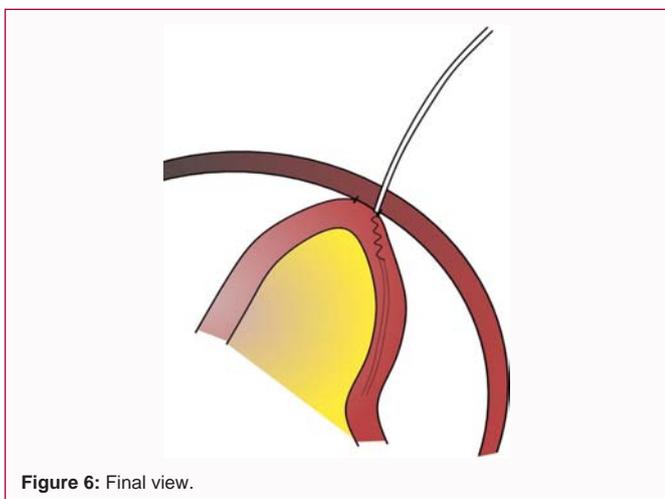


Figure 6: Final view.

### Creation of a serosae tunnel- feeding tube witzelisation

The insertion site of the tube into the bowel is secured with a “U” stitch of absorbable suture and the knot is performed. It is important that the knot is performed on the antimesenteric side. The same stitch is used to perform the witzelisation of the feeding tube and the size of the stitch is advised to be at least 15 cm (Vicryl 2-0). Using the same stitch, a serosae tunnel is performed around the feeding tube to ensure a correct sealing of the tube and to avoid a peritoneal contamination with intestinal content or with nutrition fluid. A running suture is performed until the parietal insertion site of the tube. The wire is fixed to the abdominal wall and the knot is performed. This wire serves also as a suspension stitch of the bowel to the abdominal wall. Two stitches are considered sufficient for the fixation due to the witzelisation of the tube. Once the feeding tube is placed, using physiological solution to test the sealing of the fixation and the good permeability of the tube. The tube is fixed on the skin like an abdominal drain or in a silicon support if a jejunostomy kit is used.

### Justification of the technique

Laparoscopic feeding tube jejunostomy can be a challenging technique, for a young surgeon and if it is not done correctly can be a source of morbidity for the patient. Laparoscopic jejunostomy feeding tube placement can be standardized due to the regular anatomy. We propose this placement of the trocars that we consider that are adapted to increase the ergonomics of the surgical gesture mostly during the suture. The landmark of the trocars placement is important especially for young or inexperienced surgeons but are for orientation and the placement is flexible and it can be adapted to the patient. If the patient presents intra-abdominal adhesences, of multiples scars then the trocars disposition should be modified. Concerning the sutures, we use only 2 resorbable sutures, not for economic reasons but to maximize the efficiency of the surgical gesture. The correct anchorage of the bowel to the abdominal wall and the witzelisation of the feeding tube and is obtained with less but efficient surgical gestures. A study is actually ongoing in our institution on this technique.

### Conclusion

Feeding jejunostomy is essential when a patient is unable to have an oral alimentation due to a neoplastic disease, a deficiency of nutrient intake or excessive nutrient loss. Laparoscopic feeding tube jejunostomy can be a challenging for an inexperienced surgeon and can be a source of morbidity for the patient. We propose a laparoscopic technique of feeding jejunostomy with a creation of a serosae tunnel (according to Witzel technique) of the feeding tube.

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