

Abdominal Wall Stability: A Comparison of the Optical Trocar with a Reusable Laparoscopic Trocar

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The principal reason for employing an optical trocar has been described by Kaali.¹ The potential clinical benefits of a visually directed trocar entry system have been identified in a follow-up clinical series.² Current experience with the commercially developed Endopath Optiview™ trocar has suggested an additional surgical advantage through an enhanced abdominal wall stability of the trocar sheath. The purpose of the current investigation was to determine whether or not this clinical observation could be mechanically quantified.

MATERIALS AND METHODS

Between July 6 and September 25, 1995, informed consent was obtained from 100 consecutive women presenting for elective laparoscopic sterilization at our ambulatory surgical unit. The women were alternately assigned to one of the two study groups. Fifty subjects comprising group A had their intra-abdominal surgical ports established with a conventional 10-mm reusable trocar (R. Wolfe, Rosemont, Ill.). While for the 50 women

in group B an Endopath Optiview 10/12-mm trocar (Ethicon Endo-Surgery, Cincinnati, Ohio) was employed. Demographic comparisons between the two groups are provided in Table 1. No significant differences existed.

In all cases sterilization was performed under balanced general anesthesia through a semilunar incision made at the lower rim of the umbilicus. Trocar insertion was performed in an identical fashion for both groups. A bipolar tubal coagulation was accomplished success-

fully for all subjects.

At the completion of the surgical procedure, the distending CO₂ was released and a spring loaded mechanical force gauge (Chatillon, N.Y., USA) was attached by its hook to the stopcock of the trocar sheath. Manual tension was applied to extract the sheath from the abdominal wall and the required force (lbs) was documented and recorded.

The mean peak forces required for groups A and B were compared using a single tailed Student's T Test.

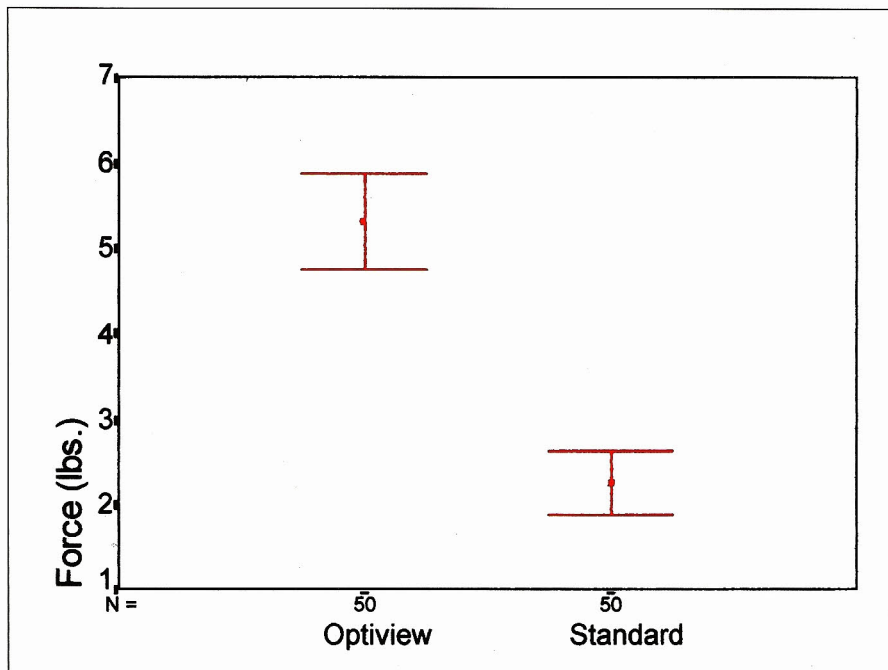


Figure 1.

	Group A (Standard) n=50	Group B (Optiview) n=50
Height (inches)	64.1 +/- 2.54	63.9 +/- 3.1
Weight (lbs)	148.8 +/- 26.5	147.5 +/- 39.2
Age	34.4 +/- 4.5	33.6 +/- 5.2
Previous Laparotomies	16	14

RESULTS

The mean peak force required for removal of the trocar sheath in group A was 2.25 ± 0.19 lbs. (mean-SEM). The comparative value for group B was 5.32 ± 0.28 lbs. $p < 0.005$.

DISCUSSION

Traditionally, the laparoscopic trocar is inserted through an initial skin incision and then advanced through the layers of the abdominal wall with substantial force.³ The mechanism of advancement requires sharp cutting of the tissues by the pyramidal edges of the instrument. Clinical experience indicates that the reusable trocar sheaths are often loose and unstable within the abdominal wall. Accidental displacements and removals are not uncommon and often cumber-

some to correct. A rational explanation for this observation is that the transversed damaged layers of the abdominal wall cannot hug the shaft tightly enough to hold the sheath in place. Various attempts to correct this problem through unique design modifications of the trocar shaft have been suggested. These have included stability threads, inflatable intra-abdominal balloons and specially coarsened shaft surfaces to enhance adherence to the tissues. All of these innovations make the trocar more complicated and in some instances more traumatic.

Semm described the use of a pointed conical trocar with which abdominal entry is accomplished by puncturing and separating tissues instead of cutting.⁴ Using Semm's insertion technique placement of the sharp trocar tip is still a blind procedure. The rationale for the Endopath Optiview system was to potentially re-

duce traumatic complications known to be associated with such blind trocar entries. Visual advancement was made feasible by the translucent conical blunt tip of the instrument. To aid the progression of the tip through the layers of the abdominal wall, recessed tissue separators were included in the commercial design. These features permit a totally blunt tissue dissection.

Our surgical experience was that trocar placements appeared much tighter and that there was an advantageously greater stability without intraoperative displacements. The current investigation was initiated to validate this phenomenon. The data confirm our observation and point to the likelihood that an atraumatic separation of the tissues encountered during the insertion process results in a tighter placement of the trocar in the abdominal wall.

Incisional hernias have been reported to occur at a rate of 0.23% and 0.31% following operative laparoscopies with 10- and 12-mm cannulas respectively.⁵ In order to prevent the development of incisional hernias, recent reports have recommended suturing of fascial defects left by the insertion of laparoscopic trocars, especially if the diameter is greater than 10-mm.⁶ Dissecting trocars leave a tighter fascial defect which may be smaller than the incision left by cutting trocars. It may be that these undamaged tissues will approximate better and form a tighter, more physiological seal. It remains to be demonstrated whether or not this benefit will eliminate the need for suturing the fascial defect left by trocar insertion. **STI**

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