Laparoscopic Surgery with the Greenberg System
The goal of the Greenberg Integrated Surgical Support System is to dynamically stabilize and restabilize instrumentation and tissue. This new System was developed using ergonomic logic.

The Greenberg System will be used in the following three surgical situations:

- Laparoscope
- Uterus
- Instrumentation and tissue in the surgical field

The goal will be for the surgeon to use both hands for actual surgery and be able to operate alone and still be in total control. The surgeon will:

- Be able to leave instruments in the surgical field.
- Have fewer needs for instrument exchanges.
- Have shorter hand travel distance.
- Be able to operate faster.
- Have less frustration and fatigue.
- Need less assistance from others in the operating theater.

In short, there will no longer be a need for human retractors and the surgeon will be ergonomically efficient.

The Greenberg System was demonstrated at the Polyclinique in Clermont-Ferrand, France, during the week of February 12-18, 1989. The surgeons involved were Roger Duvivier, M.D., I.M. Greenberg, M.D., M.A. Bruhat, M.D., J.L. Pouly, M.D., A. Wattiez, M.D., and M. Canis, M.D.
Mobilization and Stabilization - View from under the operating table

Adjusting tension-setting knob

Two tissue-holding forceps are anchored in the System

Mounting the System in the operating room
The laparoscope support system and some additional instruments required during laparoscopic surgery should be mounted on the “elevated railing” on the side opposite to where the surgeon will be standing.

The “elevated railing” should align with the top of the patient’s abdomen.

The horizontal (platform) is angulated toward the patient’s abdomen (see top right picture).

The laparoscope is attached to this horizontal platform at two points (see lower right picture):

• Near the light source (top of the laparoscope)
• About the abdominal trocar.
Anchoring the top of the laparoscope to the System at the abdominal trocar level creates a stability and relatively fixed fulcrum for laparoscopic movement.

The problem of the softness of the abdominal wall is thus eliminated. The result is a marked increased exactness of laparoscopic placement.

The video screen image can now be accurately held without drifting.

The picture at the lower left shows both support systems for the laparoscope. This is stabilized by the System and can be restabilized (small adjustments) at will.
Adjustments are simple, fast, and can be extremely delicate.

In order to mobilize and stabilize the uterus we anchor it to the System. Thus, it is possible to acutely flex the uterus in position or rotate from side to side as needed (see top right picture).

During surgery the surgeon simply reaches down and makes the adjustments as necessary (see lower left picture).
The next step is to stabilize the surgical target. By using two grasper attached to the System and in turn holding the tissue that is to be operated on, we can accomplish our goal.

In the past these instruments were handheld and would thus drift.

Also, in the past there might be only one hand available, resulting in the target “flapping from side to side.”

Using the System, however, the target is stabilized with subtle adjustments.
Two graspers are supported by the System. The handheld one is being subtly adjusted.

The surgical target supported by the System is stabilized and the surgeon has both hands free for surgery.

In the laparosurgical field we see the two graspers stabilizing the surgical target (i.e., ectopic pregnancy).
Surgeon can stop at any time for break or breather.

Leaving the operative field, yet everything remains in place.

Surgeon can watch video monitor at all times.

Surgery resumes with total reliance on the video monitor and the Integrated Surgical Support System.
Subtle adjustments to the laparoscope and suction irrigator

Suction irrigator is firmly supported by the System

By having two tissue holders supported by the System and two handheld instruments for the surgery, we have four active instruments in the laparoscopic field (see lower right picture).
By using this System there can be six instruments/structures in the laparoscopic field controlled by the surgeon:

1. Laparoscope
2. Uterus
3. Grasper (supported)
4. Grasper (supported)
5. Grasper (handheld)
6. Grasper (handheld)

The operator is able to maintain the surgical field with just the right degree of magnification in the center of the screen.

Everyone else is watching. The surgeon is totally independent.
Instruments are stored in the laparosurgical field by attaching them to holders anchored to the elevated railing (see picture at upper right).

This permits complete instrument exchanges, such as bipolar to scissor and back to bipolar within the laparosurgical field.

A surgeon can execute these steps rapidly and without the help of any other members of the surgical team, resulting in total ergonomic efficiency on the part of the operating surgeon.

The dynamics of constant repositioning of all the surgeon’s instruments in the laparosurgical field is the key for surgery to progress smoothly and rapidly.

Interruptions to clean or exchange instruments are ergonomically efficient because everything is supported by the System (see picture at lower right).

Progressive and more sophisticated laparoscopic surgery is now possible.

(First published by I.M. Greenberg, in *Neurosurgery*, "Proximity Storage of Surgical Instruments in the Operative Field," Vol. 20, No. 6, 1987.)
Without the System, a surgeon has limitation of movement because he must hold the laparoscope. The assistant has to be a human retractor. Using the System, both hands are free and there is stability to the entire surgical field. The surgery progressed in a relaxed fashion with everyone watching.