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PHOTOGRAPHY IN OBSTETRICAL AND
GYNECOLOGICAL EDUCATION

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Visual aids are being used to great advantage in all fields of education, but in no other field have they proven more valuable than in medical education. The newest and perhaps most valuable of these visual aids is photography. Miniature color transparencies are the most widely used because: (1) they have excellent color reproduction and a third dimensional effect, (2) they are most readily integrated with a lecture, (3) they require a minimal expense in photographic equipment, and (4) they can be taken by the average physician without special photographic training. The value of photography in medical education has been pointed out by numerous authors. Sutton(1) says, "The value of visual aids in education is now well established. The application of medical photography in the teaching of the medical staff, interns, nurses, and technicians in the hospital is one of its most important uses. The introduction of color photography in medical staff conferences provides a striking example of its advantages. Formerly, discolored and foul-smelling pathological specimens were passed around the conference room for individual inspection. Since the speaker was usually discussing another subject before the specimen

had reached many hands, little benefit was gained from the demonstration. Today, photography provides lantern slides in color transparencies which can be viewed simultaneously by the entire audience while the speaker points out special features of each slide. Pertinent information, such as x-rays, electrocardiograms, charts, tables, drawings, and gross and microscopic pathology, may be shown by lantern slide. In addition photographs of the patient may be included thus eliminating the problems and objections of bringing the patient to the conference room. Conferences are speeded up and more variety is introduced. With the aid of photography as described, medical staff conferences which were otherwise dull and poorly attended have been transformed into interesting, well-attended conferences of high educational value. The same advantages apply to the clinical-pathological conferences, journal club meetings and seminars for interns and residents. Other time-saving uses of photography include lantern slide demonstrations of typical nursing procedures, preparation of operating room and delivery room, surgical instrument setup, emergency room techniques, blood transfusions, and many other similar examples."

The value of photography is further shown by Gibson (2) who says, "In the academic field, illustrations are universally recognized as necessities. This is true whether the 'teaching' takes the form of classroom instruction, professional lecturing, exhibiting, or publishing. Photography is indispensable for many classroom sessions or professional clinics, because it is obviously impracticable to rely on the availability of actual patients as 'visual aids'. Furthermore, photographs are valuable even in those fortuitous cases where patients are available because the brief examination permitted the student will accomplish more if he has previously been familiarized with the disease through photographs."

Aird (3) writes, "The 'still' lantern slide is the most popular and probably the most valuable of the visual aids which are available to the medical teacher." "The 2 by 2 inch lantern slide has more advantages and fewer disadvantages than the others...it is inexpensive to prepare, economical to store, easy to carry, and in use in at least some departments of every medical school in the world."

In the April 1953 Lancet (4) is written "Photography has been used in medicine for more than a century; but only in recent years have we begun to appreciate how much the camera can help us." "For instance, close-up pictures of the eye and color photography of the living retina with snapshot exposures, have only been satisfactorily achieved since 1939. Techniques for endovesical and intraperitoneal photography are post-war developments..." "The main function of photography is simply to record--for example, the changing pattern of skin lesions, the repair of defects by plastic surgery, and the follow up of a case...but photography is also an important research technique."

"As the techniques have grown so have the numbers of specialists (medical photographers). There are however many hospitals and many doctors, even in research departments, who have no inkling of what the medical photographer can do to help them... Photography is a part of the science of Light, and should not be hidden under a bushel."

Lattimer (5) writes, "The most valuable tool in the hands of the medical educator is the visual teaching aid. This is perfectly obvious to you as medical illustrators,

but it is not fully understood by the majority of physicians. These same physicians form a large proportion of the instructors in our medical schools. Even the large medical schools do nothing to educate their instructors in teaching methods or in the use of teaching aids. A few doctors had their eyes opened by the excellent visual teaching methods to which they were exposed at the Carlyle and other Medical Field Service Schools during the war."

The importance of photography is referred to by Kline and Stevenson (6). "In clinical medicine alone, the photography of external lesions and of those within the eye, oral cavity, larynx, bronchus, stomach, intestines, bladder, vagina, etc., is of the utmost importance for diagnosis, treatment, and teaching."

The value of photography in dermatology is pointed out by Gross (7); in obstetrics and gynecology by Goldstein (8), Bruner, Rosebrook, and Cushman (9), Galloway (10), Crier and Kimble (11), and Footer (12); in ophthalmology by Wagman and Naidoff (13), Nisbet (14), and Lopes-Enriquez (15); in otorhinolaryngology by Payne (16), Holinger and Brubaker (17), and Jennes (18); in orthopedics by Kilshaw and Ollerenshaw (19); and in

plastic surgery by Tuerk, Trevaskis, and Marcks (20), and Detro and Beiter (21).

This thesis is limited to the considerations necessary and the problems encountered in collection of color transparencies for obstetrical and gynecological teaching.

In building up a teaching slide file, one should choose a camera with which he can be fairly certain of obtaining good transparencies. McComb (22) discussed a number of cameras in the January 1953 General Practitioner, but since there are many others available at this time and more being introduced as time goes on, one should discuss this with a medical photographer or photographic equipment salesman before investing in a camera.

The 35 millimeter cameras available vary greatly in price from the Kodak Technical Close-up Outfit (23) which sells for \$62.75, up to the Alpa, Contax, Exakta, Leica, Nikon, and Rectaflex which have prices between \$300 and \$600 (24). Any of the more expensive cameras can be readily converted to take close-up pictures, macrophotographs or microphotographs. Of the cameras mentioned above, the Contax, Leica (9) (10), and Nikon

are not single lens reflex cameras and therefore require some sort of framing device for accurate focus of close-up work and a separate viewing lens system for microphotographic work. The Alpa, Exakta (12) (20), and Rectaflex are single lens reflex cameras. This means that the viewing and focusing is done through a lens-mirror system in the camera itself which utilizes the same lens system used in the taking of the picture. This enables one to get accurate focusing and framing without special adapters or framing devices, and makes these cameras more adaptable to the field of medical photography. Other single lens reflex cameras are available in the \$60-\$250 range. The Astra, Consol, Contaflex, Exa, Pentacon, Practina, Practiflex, and Tower are single lens reflex cameras available in this price range (\$24). Each of these cameras has advantages and disadvantages, by comparison with the others in the group, which should be considered in buying a camera. This theses does not intend to include all these points of comparison, however, but only to give the reader an idea of the cameras available.

For photography of the uterine cervix, one must either have a camera which in some way attaches to a

special vaginal speculum or a camera arrangement which will take the picture through the ordinary bivalve type vaginal speculum. Either of these arrangements introduces a lighting problem which must be overcome to obtain good pictures. Galloway (10) used a bivalve speculum which had the inner surfaces painted black and small lights in the tips of the speculum valves. He then used a section of large Penrose drain to hold the lateral vaginal walls back so they would not obstruct the view. Bruner, Rosebrook, and Cushman (9) and Footer (12) used a tubular speculum attached directly to the camera with the light being introduced through the side of the speculum and reflected onto the cervix by a mirror arrangement within the speculum. According to Footer, who tried both arrangements, this is better.

In addition to these more simple cameras, there are cameras available in combination with a colposcope. This combination may include a camera such as a Leica (25) (26) or a stereoscopic camera (27). Stereoscopic pictures produce a third dimension in viewing which is valuable, but they also introduce many problems in projection and viewing equipment (28).

For our use we chose a Coreco (29) which is

very easy to use and has an electronic flash unit attached. It also has a 4 x 6 inch framer, a 9 x 13 inch framer, and a cervical attachment, each of which has the diaphragm opening marked on it and each of which automatically adjusts the lens focus. This unit is light weight and completely portable as the flash unit uses a dry cell battery as a power source. This camera uses 828 film which gives transparencies 28 x 40 millimeters as compared with the 24 x 36 millimeter size of the standard double frame "35" millimeter camera. This presents no problem in the use of a standard 35 millimeter projector however, since both the 828 and the 35 millimeter transparencies are mounted in 2 x 2 inch frames. The 828 film is available in 8 exposure Kodachrome rolls, and since we were using the electronic flash unit a daylight type film was necessary for accurate color reproduction.

The pictures most useful in teaching are those of patients, surgical specimens, and instruments. Since pictures are taken of patients, one must consider the legal aspects involved. Holman (30) states that patient photography violates the patients right of privacy, and, if pictures are to be taken, written consent

should be obtained from the patient, definitely stating what the photographs are to be used for. This not only provides legality, but, if it is properly stated, also lessens the reluctancy of the patient to have such pictures taken. The following is a sample consent form taken from Holman's article.

CONSENT

In connection with the medical services which I am receiving from Dr. _____, I consent that photographs may be taken of me under the following conditions: (1) The photographs may be taken only with the consent of my physician or surgeon and under such conditions and at such times as may be approved by him. (2) The photographs shall be taken by a competent photographer, approved by my physician. (3) These photographs shall be used for medical records only, unless, in the judgement of my physician, medical research, education, or science will be benefited by their use. In that event I agree that they may be used for such purposes

provided that my identity is not revealed by the photographs or by descriptive texts accompanying them.

ok. _____ M.D.

Patient

Parent or legal
guardian

In addition to the legal aspects involved one must consider the factors of safety as well as factors to increase the quality of the pictures. The safety factors involved in taking pictures in the operating room or delivery room are the same ones which generally come into consideration. Maintenance of a sterile field requires that any portion of the photographic apparatus which comes into contact with the operative field be sterilized. For this reason if a framer is used to get accurate focus and to determine the area to be included in the picture, that framer should be autoclaved and care taken to keep it sterile throughout the procedure which is to be photographed. One easy way to keep the framer sterile is to place the camera, when not in use, on a small table with the

Framer supported on an adjacent table of the same height which has been draped with a sterile towel.

Explosive factors must also be considered, especially when, by bringing photographic equipment into the operating or delivery room, one is introducing known or at least potential spark sources. Greppin (31) discusses this aspect of photography and recommends use of equipment with an Underwriter's classification of Class I Group C if possible. To assure safety the anesthetist should be consulted so that a nonexplosive anesthetic will be used. A conduction block type anesthetic or nonexplosive general anesthetic such as a thiopental-nitrous oxide-oxygen combination may be used in most cases if the anesthetist knows that pictures are to be taken. Planning of the anesthetic can be left to the anesthetist as long as he is aware ahead of time of your desire to photograph the procedure.

The quality of the pictures (32) taken can be improved by such things as arranging in as orderly a manner as possible the instruments which will be in the picture and using green or blue drapes. The use of the green or blue background also improves the pictures of surgical specimens. Something should also be included in the picture so that its size can readily be seen.

A centimeter rule will usually do this adequately without distracting from the specimen.

Pictures taken of vulvar pathology are useful not only in the teaching of diagnosis by showing the appearance of such lesions, but also in demonstrating the comparative appearance of the area before and following therapy. The pictures of this area are quite easy to take so this poses little difficulty. Their value as teaching photographs, however, can be increased by standardizing your photographic technique. One should try to keep the camera angle, lighting, picture area, and drapes as nearly the same from picture to picture as possible, especially in the before and after series. In this way the student can more easily see what has changed from picture to picture. Keeping these things constant also adds greatly to the instructive usefulness of pictures of surgical specimens before and after sectioning. Many times students lose the orientation when close-ups of the sectioned specimens directly follow gross pictures of the unsectioned specimens. By showing first the gross unsectioned specimen, and

then the gross sectioned specimen, followed by the the close-up of the sectioned specimen, the student can easily retain his orientation.

Serial pictures taken during surgical procedures can be used to demonstrate the major steps of that procedure. Use of these pictures cannot replace the instruction given in the operating room but it can add to it. By using such pictures to demonstrate lectures the student can learn these major points and retain this knowledge much more readily than by just hearing the lecture and trying to mentally visualize the anatomical relationships. An example of such a series of pictures is shown in figures 1-8 taken during an abdominal hysterectomy.

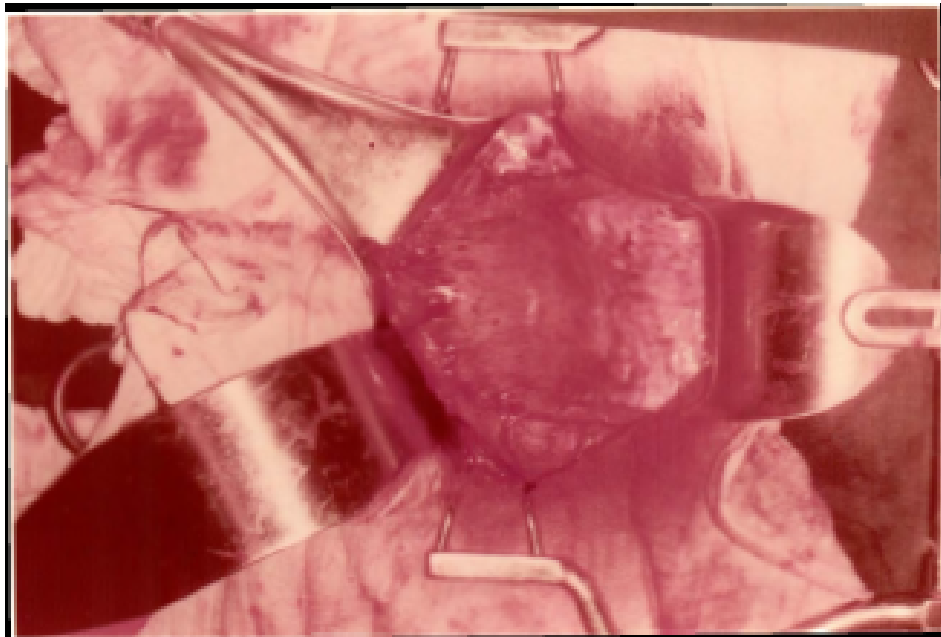


Fig. 1. - Uterus exposed

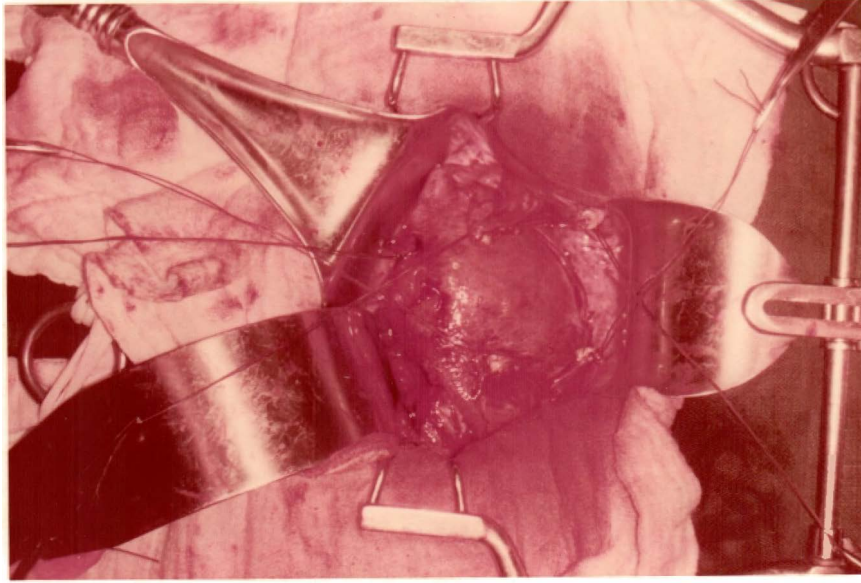


Fig. 2. - Round ligaments cut

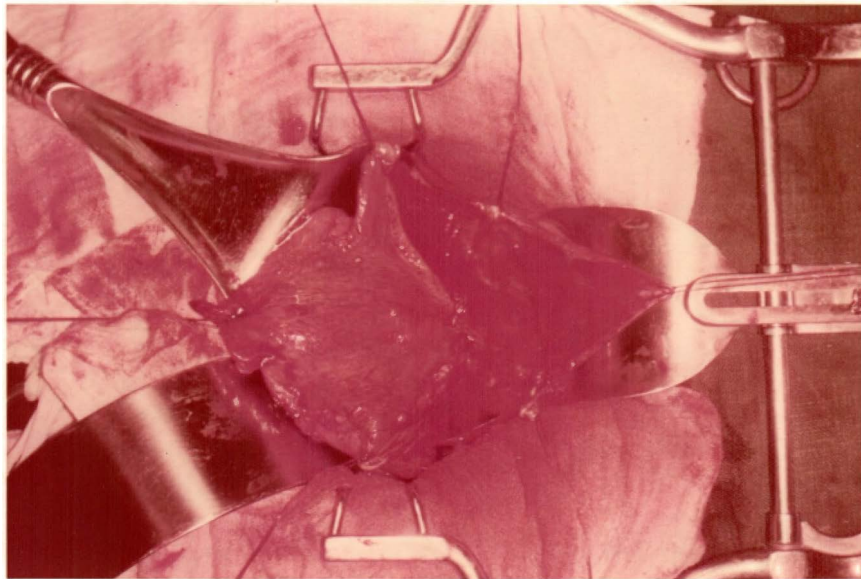


Fig. 3. - Peritoneum reflected inferiorly from uterus

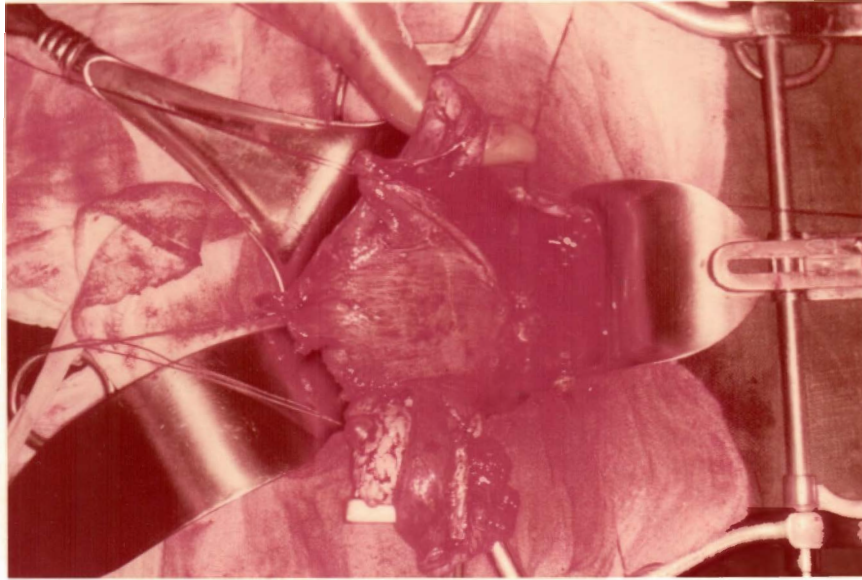


Fig. 4. - Broad ligaments being cut

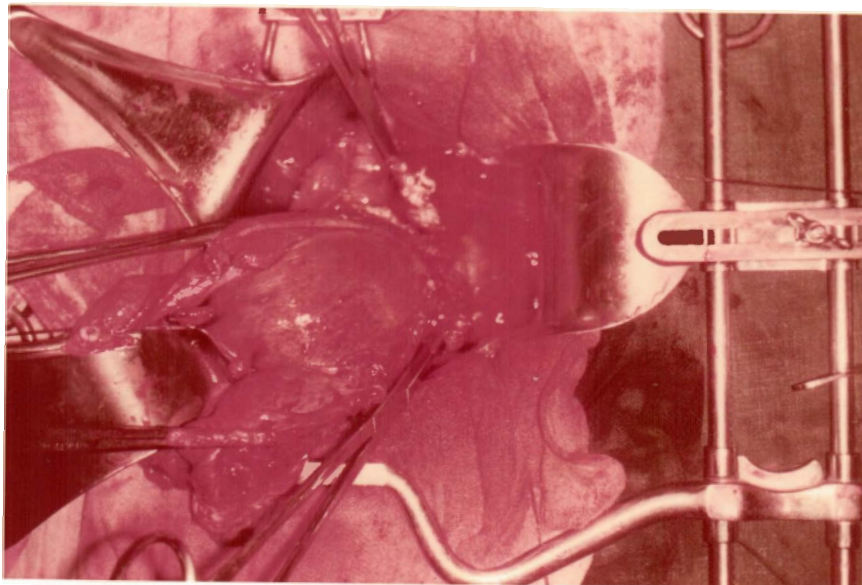


Fig. 5. - Beginning of opening of vagina

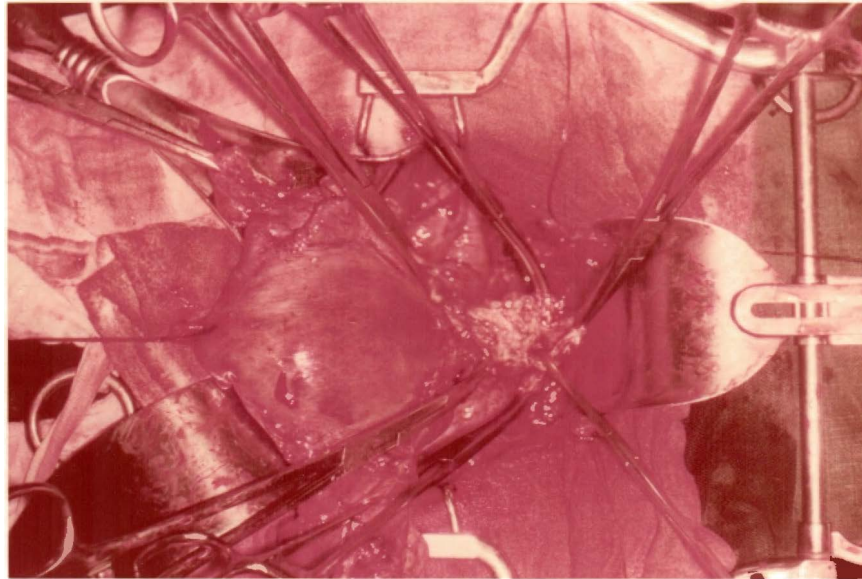


Fig. 6. - Completion of opening of vagina

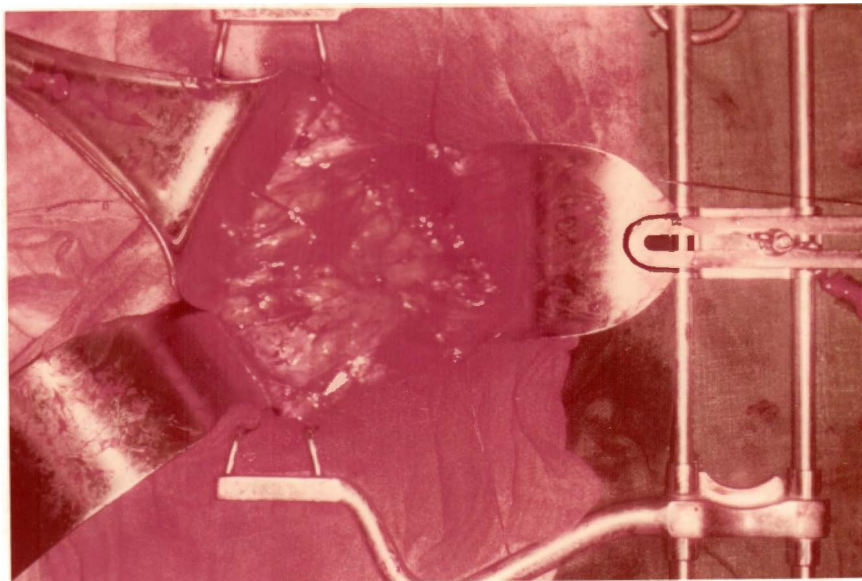


Fig. 7. - Vagina closed

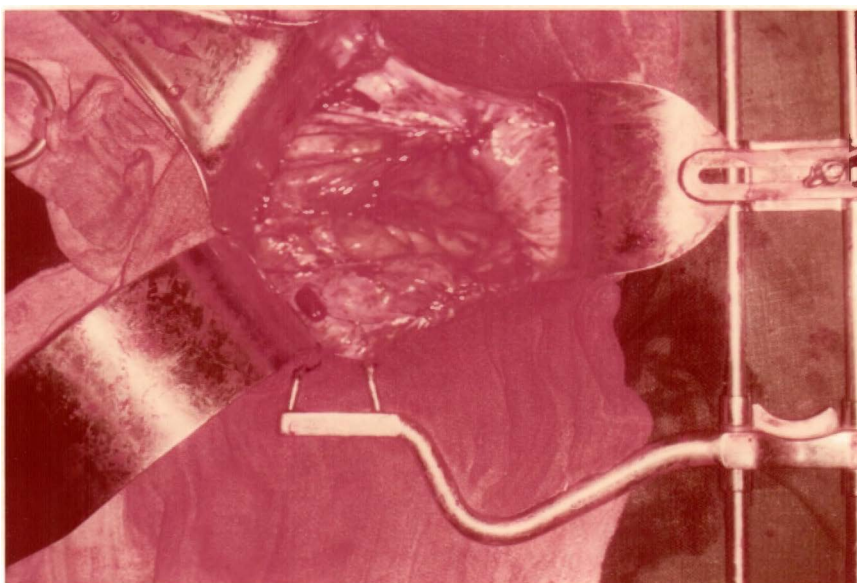


Fig. 8. - Defect in pelvis reperitonealized

Series pictures of draping procedures can be used to teach both medical and nursing students. Here again the pictures are most useful in giving the student a basic knowledge before being introduced to the actual situation in the operating or delivery room. Draping procedures for the delivery room are often not even demonstrated to medical students: It is true that most times the medical student will learn this in the first few deliveries he observes, but often one of these students is faced with helping to drape a patient only

to find he doesn't even know some of the fundamentals involved in a sterile delivery.

Pictures can be easily taken of any pathology which can be seen with the eye, and any of these are of value in teaching since the appearance of any abnormality is of utmost importance in the diagnosis of that lesion. A variety of abnormalities is shown in figures 9-16 to show the type pictures useful in teaching.

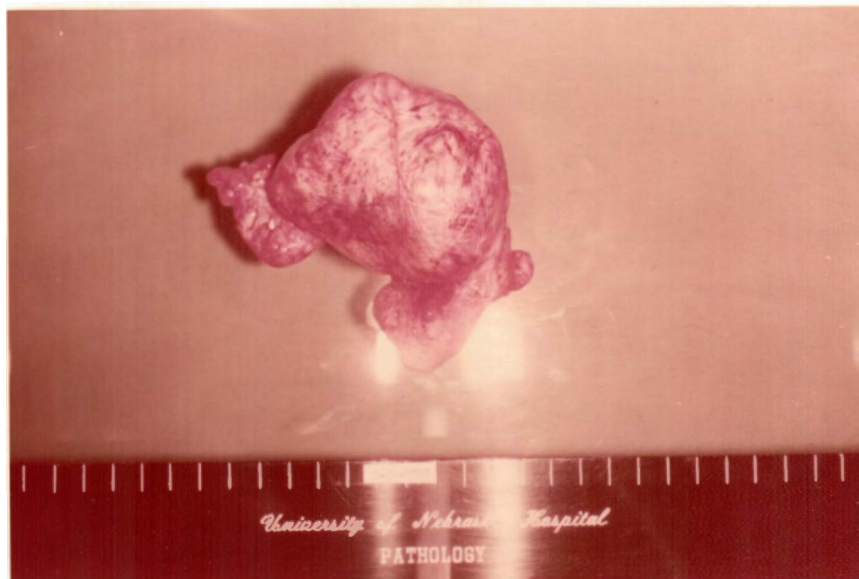


Fig. 9. - Uterus with leiomyoma intact

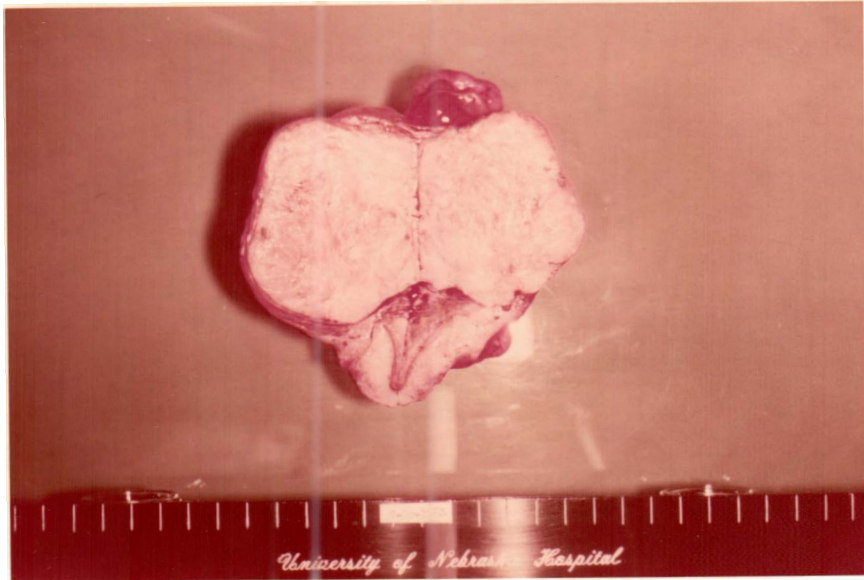


Fig. 10. - Uterus with leiomyoma transected

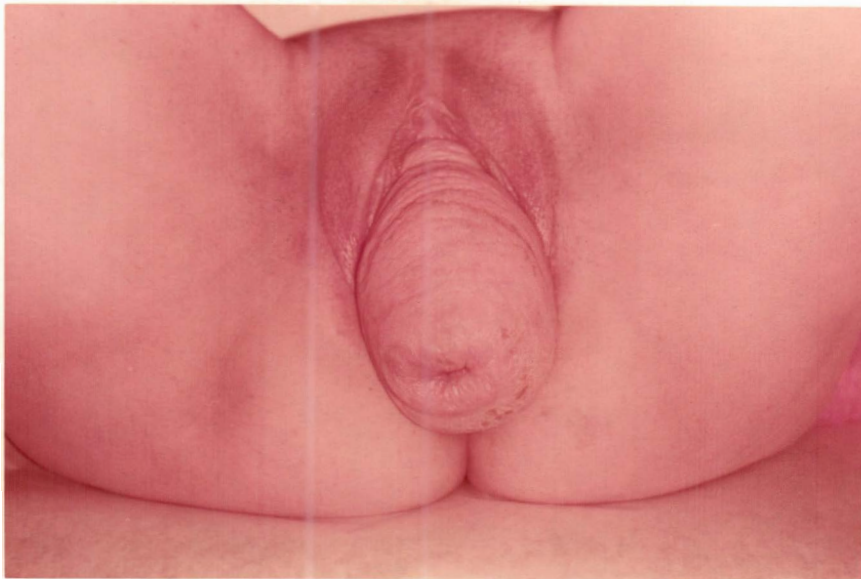


Fig. 11. - Uterine procidentia



Fig. 12. - Bilateral cystadenocarcinoma of ovary

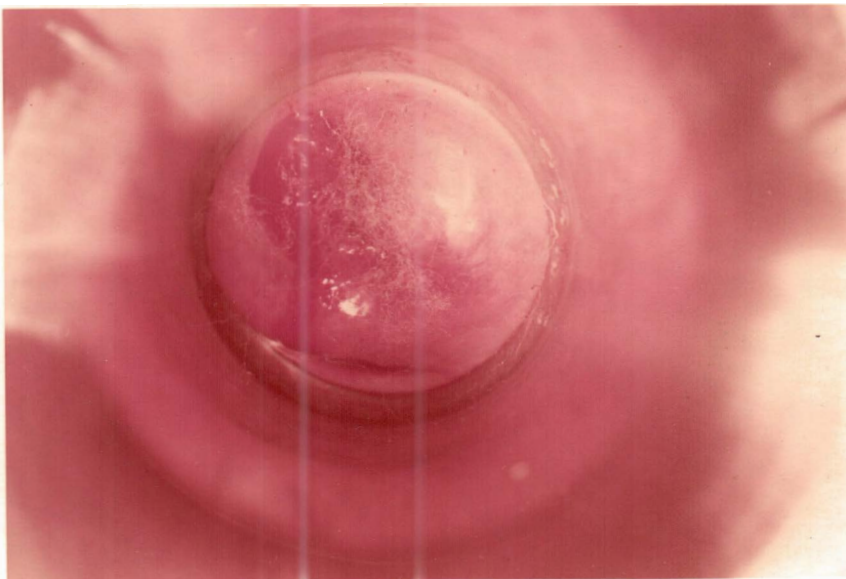


Fig. 13. - Squamous cell carcinoma of cervix



Fig. 16. - Anencephalic monster (color)

<u>Uterus</u>	
Procidencia	4
Myofibroma	8
Adenocarcinoma	3
Pessary imbedded in uterus	1
Endometrial polyps	1
<u>Cervix</u>	
Squamous cell carcinoma	3
Adenocarcinoma	1
Endocervical polyp	1
<u>Fallopian Tube</u>	
Carcinoma	1
<u>Ovary</u>	
Cystadenoma	6
Fibroma	1
Adenocarcinoma	1
Dermoid cyst	1
<u>Fetal or Congenital Abnormalities</u>	
Encephalocele	1
Anencephaly	2
Fetal hydrops	1
(Placental hydrops)	1
Ovarian agenesis	1
Adrenogenital syndrome	2
<u>Breast</u>	
Abscess	1

Also taken was a series during an abdominal Hysterectomy and a series of 20 pictures of the delivery room and labor room including:

1. Delivery room equipment and instruments.
2. Positioning of patient.
3. Draping procedures and the prep. tray.
4. Anesthetic equipment.
5. Umbilical cord treatment tray.

6. Eye treatment tray.
7. Air lock for newborns.
8. Labor room equipment.
9. Sitz bath.
10. Delivery room data board.

Pictures of operative room and delivery room procedures can be used for teaching nurses as well as medical students. Therefore we took these pictures in cooperation with the nursing school, and a few of these pictures are designed specifically for nursing instruction but are also useful in the education of medical students.

For ease of use all pictures should be filed and an adequate index of this file should be maintained. Where a single set of pictures is used for a variety of lectures, a cross index is best (33) (34). In this system each picture number is listed under the appropriate topic in each file. The gynecology pictures can thus be cross indexed by organs and by conditions as follows:

ORGANS	CONDITIONS
I. Vulva	I. Normal
II. Vagina	II. Congenital Abnormalities
III. Cervix	III. Infection
IV. Uterus	IV. Neoplasm
V. Fallopian Tubes	V. Trauma
VI. Ovaries	VI. Relaxations

As pictures are taken these topics can be divided into subtopics and in this way adapted to any individual needs. All transparencies should be numbered consecutively and also have such information as organ, condition, patient's name, and case number so that they may be used in giving case reviews as in clinical-pathological correlations. Much time will also be saved if as pictures are taken, note is made in the chart of the picture file number assigned to the pictures.

SUMMARY

This thesis considers the equipment necessary in taking transparencies, the legal aspects and safety factors involved, aids to increase picture quality and value, the types of pictures useful in teaching, and the filing and indexing of these transparencies for easy future reference.

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