

## HOW TO SELECT A COLPOSCOPE

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### SUMMARY

**Colposcopy is gaining popularity in our country. Best results from colposcope can be obtained only if proper selection of the equipment is made initially. The points which should be considered during purchase of the equipment have been highlighted.**

Colposcopy has gained popularity in last few decades after its discovery in 1925 by Hinselman. It is widely used in most of the countries for early detection of cancer. Colposcopy is being carried out in many hospitals in India. (Lulla and Saraiya, 1983). New units will be purchased by the hospitals which are engaged in early detection of cancer and do not yet possess this essential equipment.

It is very essential to have the knowledge of the equipment one is going to use as life long companion. Needless to say that it is a must to choose the right equipment in the beginning only rather than to repent later. The purpose of the present communication is to deal with some points which should be kept in mind while buying a colposcope. Instruments of various makes are available in the market but the important aspects to be looked into while buying an equip-

ment are (i) cost, (ii) requirement, (iii) quality.

#### *Cost*

Cost is the most important factor which matters in the purchase of any instrument. Colposcopes are available in various price ranges. The cost depends on quality of the instrument and also changes with the additional accessories like photographic attachment, co-observation tube, etc. Though one has to depend on the funds available, one should not compromise with the quality of the instrument as far as possible for good results. Low cost equipment may sometimes prove to be pain in the neck. Good service of the equipment by competent engineers is another important aspect which should not be ignored.

#### *Requirement*

It is important to consider the use to which the equipment is going to be put. If the colposcope is being used in gynaecological clinic which is based in a dis-

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trict hospital and where teaching is not the part of the activities of the staff, a simple basic equipment is sufficient. But in a teaching hospital it may be necessary to have an equipment with co-observation tube. Colpophotographs are ideal for follow up, for comparing the results and for scientific communication. If colpodocumentation of results especially for copist desires these activities, it is essential to purchase the photographic attachment also.

#### *Components of a Colposcope*

The important parts of a colposcope are: (1) Optical System, (2) Illumination, (3) Stand, (4) Accessories.

#### *Optical System*

Optics is the heart of any microscopic instrument. Best efforts should be made not to compromise on the optics. It is necessary to have quality lenses for eye strain free viewing and good photography. The lenses should be free of lateral chromatic and spherical aberrations. The optical system consists of (a) Eyepieces, (b) Objectives.

#### *Eyepieces*

Since the cervix has definite structure and depth, it is necessary to get stereoscopic view for its examination. This can only be achieved by binocular eyepieces. The eyepieces are available in various magnifications ranging from 10X, 12.5X, 16X and 20X. The high powered eyepieces though give higher magnification but can cause severe eye strain. Therefore, one has to choose between magnification and comfortable viewing. In practice 12.5X and 16X eyepieces are satisfactory and provide optimum magnification without eye strain. If photographic attachment is ordered, one eye-

piece should have photo reticle which is used for sharp focusing of the object on the camera plane. Eyepieces should preferably be focussable so that difference in the dioptré of two eyes of the observer can be corrected by the eyepieces only. The wide field and high point eyepieces have advantages of viewing of a larger area with spectacles in position and should be preferred.

#### *Objective*

Objectives should be of such a focal lengths that manipulation by the instruments like speculum, forceps etc. is possible. Objectives of varying focal lengths are available but those with focal lengths of 200-225 mm. are suitable. If simple microscopy is desired, fixed magnification of the objective is sufficient. However, objectives with facility of variable magnification are preferred by most of the colposcopists as these provide opportunity for examination of certain changes in detail. The commonly used final magnification during examination varies from 5X to 10X. It must be kept in mind that magnification of the object depends on the focal length and magnification of the components as given in the formula.

$$M = \frac{F_t}{F_o} \times M_e \times M_o$$

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$$F_o$$

Where M = Total Magnification

F<sub>t</sub> = Focal length of tube

F<sub>o</sub> = Focal length of objective

M<sub>e</sub> = Magnification of eyepiece

M<sub>o</sub> = Magnification of objective

Though zoom objectives are also available, they are not yet very popular.

#### *Illumination*

The illumination should be bright for proper observation. For ordinary exami-

nation, filament lamp of 30 watt 6V is sufficient. However, for photography stronger light source is required. This can be obtained by electronic flash attachment on the camera or by using 12 Volt 100 Watt halogen lamp. The halogen lamp produces lot of heat which may be uncomfortable for the observer during prolonged examination. This can be avoided by the use of fibre optic light system as the lamp can be placed on the stand away from the observer with minimum loss of intensity of light.

#### *Stand*

Stand of the microscope has important role in manipulation of the microscope during examination. Three basic types of stands are available (a) Floor stand, (b) Stand attached to examination table, (c) Ceiling attachment. The choice between the stands depends on the design of the examination room, availability of floor space and the personal choice.

#### *Accessories*

##### *(a) Co-observer Tube*

For teaching purposes it is essential to have co-observer tube. If it is desired that co-observer helps in manipulation then the tube should be short in length. For teaching the students the co-observer tube should be long so that the student is out of the observer's working area.

##### *(b) Photographic Attachment*

If the colposcopist is interested in colpophotographs for research publications or for keeping the records of patients, for follow up of the patients, it is essential to have photographic attachment to the instrument. Colpophotographs are also the

best way of teaching the students. The camera can have an electronic flash attached to it. The path of the light is same as the light path of observation. Alternatively the light source used for examination can be used for photography also. Photography can be done in colour or black and white. For the latter, it is necessary to insert a green filter in the light path anywhere between the camera and the object.

It is hoped that the points mentioned in the above discussion will help a gynaecologist to choose a right kind of instrument for future use.

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#### *References*

1. Hinselman, H.: Verbesserung der Inspektionsmöglichkeiten von Vulva, Vagina and Portio. *Munch Med. Wochenschr.* 72: 1733, 1925.
2. Lulla, M. and Saraiya, U. B.: *Ind. J. Cancer.* 10: 156, 1963.
3. Lang, W. H.: Handbook of Zeiss microscope for microsurgery, their technical principle and operation. Carl Zeiss, D-7082 Oberkochen, West Germany.