APPLICATORS USED FOR LOW-DOSE-RATE INTRACAVITY TREATMENT OF GYNECOLOGICAL CANCERS AT MDACC

APPLICATORS USED FOR INTRACAVITY TREATMENT AT MDACC

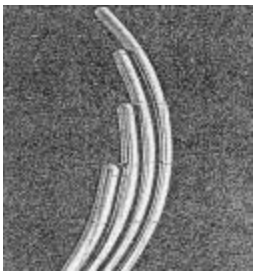
MANUAL AFTERLOADING APPLICATORS

- Tandem
- Ovoids
- Vaginal Cylinders
- Dome Cylinders

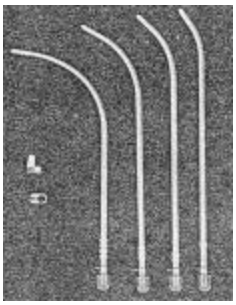
MANUAL AFTERLOADING APPLICATORS

TANDEM

- Separate from the ovoids.
- Made of stainless steel.
- Hollow inside.

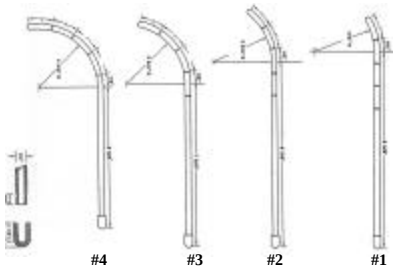


TANDEM



- Inserted into the uterus through the cervix.
- Available in 4 different curvatures.
- Sources are loaded from the inferior end.

MANUAL TANDEM



FLANGE AND FLANGE WITH KEEL

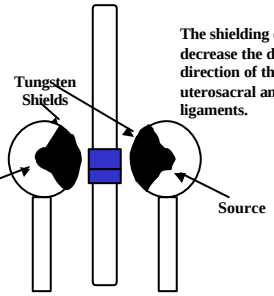
- Made of stainless steel.
- Placed on the tandem to stop the forward advancement of the tandem.
- Is used to keep the tandem in a selected position.

FLETCHER-SUIT-DELCLOS OVOIDS

- The ovoid designed by Dr. Fletcher is cylindrical in shape.
- The ovoid has been modified by Dr. Suit and Dr. Delclos.
- These modifications have resulted in ovoids that are afterloading and less bulky on the handles.

FLETCHER-SUIT-DELCLOS OVOID

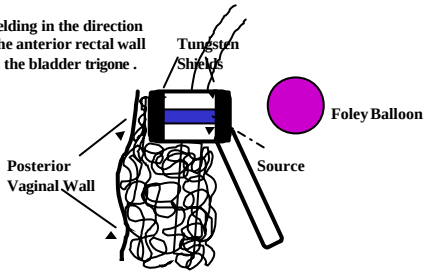
The ovoid was designed to increase the depth dose to the paracervical and parametrial areas while reducing the dose to the bladder and rectum



The shielding does not decrease the dose in the direction of the uterosacral and broad ligaments.

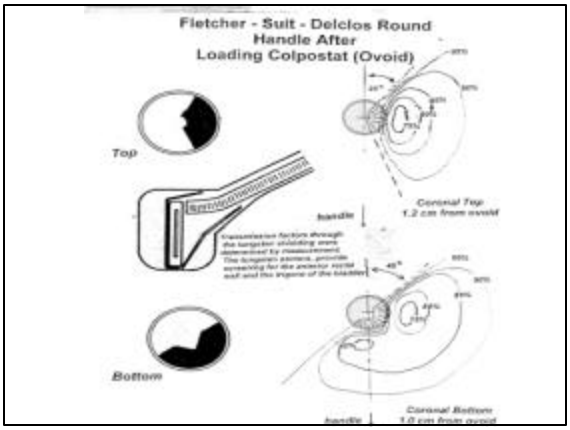
FLETCHER-SUIT-DELCLOS OVOID

Shielding in the direction of the anterior rectal wall and the bladder trigone .

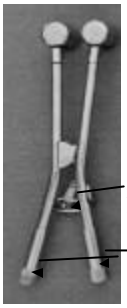


OVOID SHIELDING

- The reduction in the bladder and rectal dose is enhanced by the addition of tungsten shields at both poles of the applicator.
- The rectal shield is half a disc.
- The bladder shield is a 150 degree sector.



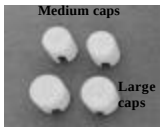
MANUAL SMALL OVOID



The manual small ovoid is made of stainless steel.

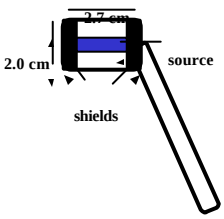
Hinge for fastening ovoids together.

Screw caps



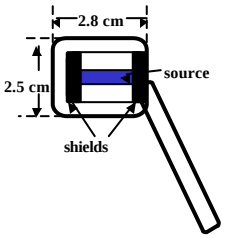
Caps can be added to the small ovoid to increase the size of the ovoid.

MANUAL SMALL OVOID



Tungsten shielding is placed in the direction of the anterior rectal wall and the bladder trigone.

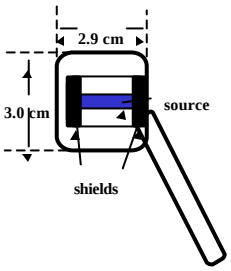
MANUAL MEDIUM OVOID



The medium ovoid is a small ovoid with a teflon cap placed on the ovoid.

The medium cap increases the width of the ovoid 0.25 cm superiorly and inferiorly, and increases the length by 0.1 cm in the posterior (non handle) direction.

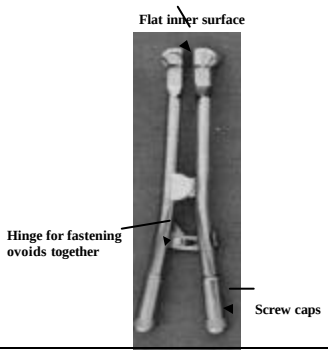
MANUAL LARGE OVOID



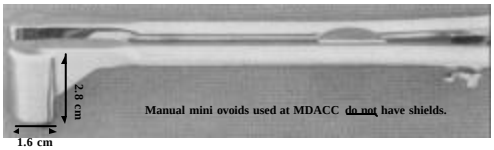
The large ovoid is a small ovoid with a teflon cap placed on the ovoid.

The large cap increases the width of the ovoid 0.50 cm superiorly and inferiorly, and increases the length by 0.2 cm in the posterior (non handle) direction.

MANUAL MINI OVOIDS



MANUAL MINI OVOIDS

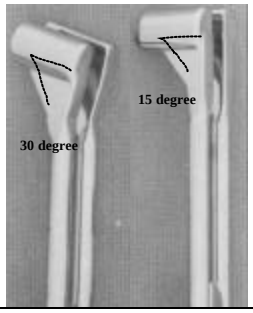


The mini ovoid is used when the vagina is to narrow to accommodate small ovoids.

OVOID ANGULATION

This is the angle between the body of the ovoid and the ovoid handle.

Sometimes a greater angulation is necessary to place the ovoids flush against the posterior lip of the cervix.



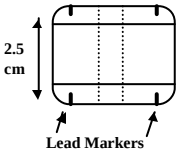
Manual ovoids are available in 15 and 30 degree angulation, and manual mini ovoids are available in 0, 15, and 30 degree angulation.

VAGINAL CYLINDERS

- Vaginal cylinders are used to treat the vagina when the tumor extends from the cervix down along the vaginal wall.
- Vaginal cylinders are used to hold a vaginal source when the vagina is to narrow to accommodate ovoids.

VAGINAL CYLINDERS

Diameters of 2.0 cm to 5.0 cm in 0.5 cm increments.



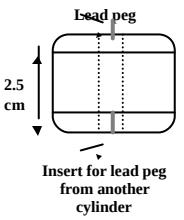
Vaginal cylinders are made of lucite.

These cylinders have no shielding.

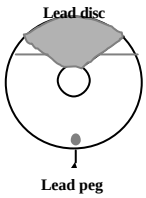
Vaginal cylinders are radiopaque and have lead markers in the top and bottom to aid in identification on film.

These cylinders can be placed on the tandem, inferior to the flange, or on the stem of a dome cylinder.

VAGINAL CYLINDERS WITH LEAD



Leaded cylinders have same range of diameters as unleaded cylinders



VAGINAL CYLINDERS WITH LEAD

- Vaginal cylinders with segments of incorporated lead are used to partially shield vagina, rectum, or urinary bladder and urethra.
- Doses calculated to points that are shield by the lead disc need to be reduced.
- Using the following equations , and measuring the thickness of the lead disc, you can determine the % reduction in dose.
- HVL = 0.693/u
- $I_x = I_o e^{-ux}$ (thickness of lead in mm)

DOME CYLINDERS

- Designed to deliver a homogenous dose to the vaginal cuff alone or to areas of the vagina in patients who have had a hysterectomy (there is no uterus to insert a tandem into).

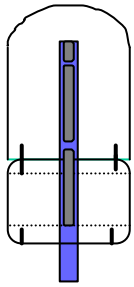
MANUAL DOME CYLINDERS

Manual dome cylinders are made of lucite.

Available in diameters of 2.0 cm to 5.0 cm in 0.5 cm increments.

The 2.0 cm and 2.5 cm domes have a length of 3.5 cm.

The remaining diameters have a length of 4.0 cm.



The stem of the dome is stainless steel and hollow.

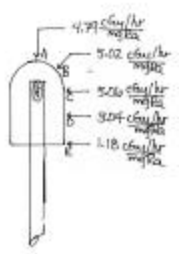
Cs-137 sources are inserted into the inferior end of the stem.

Vaginal cylinders can be placed on the dome stem when needed.

MANUAL DOME CYLINDERS

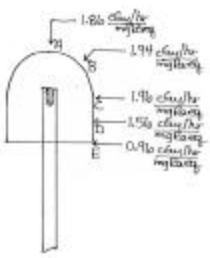
- The source that is used in the manual dome cylinder is a Cs -137 source that is 8mm in size, and is refered to as a “point” source. (Walstam capsules)

VARIATION IN SURFACE DOSE RATE MANUAL DOME CYLINDERS



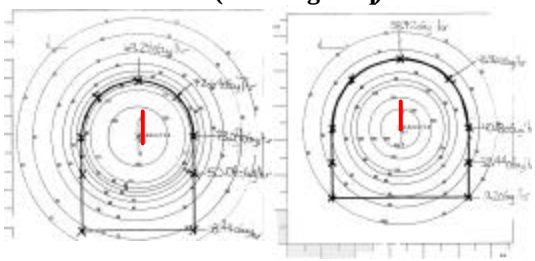
The surface dose around the dome varies as the curvature and thickness of lucite between the source and the dome surface change, inverse square law.

The surface dose is also affected by the encapsulation around the source.



2.5 cm Dome Cylinder **4.0 cm Dome Cylinder**

VARIATION IN DOME SURFACE DOSE RATES WITH Cs-137 POINT SOURCE W784 (20.85 mgRaeq)



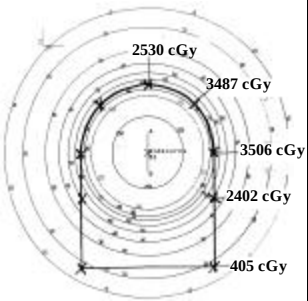
3.0 cm Dome Cylinder **4.0 cm Dome Cylinder**

MANUAL DOME CYLINDERS PRESCRIBING

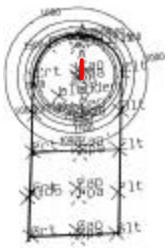
- Dose is prescribed to the surface of the dome.
- Treatment with the manual dome cylinder is usually prescribed for:

  30 Gy in 48 hrs

  50-60 Gy in 72 hrs

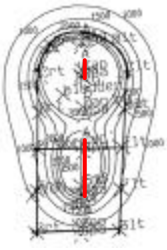


MANUAL DOME CYLINDERS



Cs-137 Point Source

A Cs-137 tube source can be added when it is necessary to treat the vaginal surface below the apex of the vagina.

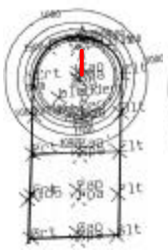


Cs-137 Point Source + Cs-137 Tube Source

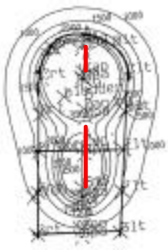
MANUAL DOME CYLINDERS

- The dose falls off very fast beyond the surface of the dome.
- If 30 Gy is prescribed to the dome surface, then 5mm beyond the dome surface the dose is approximately one half of the surface dose (inverse square law).
- If the area of interest is deeper than the vaginal surface, that area will need to be boosted at the time of the dome cylinder insertion.
- This is accomplished with needles, that will be loaded with Ir-192 wire, placed directly into the area of interest.

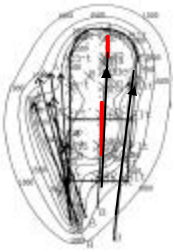
MANUAL DOME CYLINDERS



Cs-137 Point Source



Cs-137 Point Source + Cs-137 Tube Source



Cs-137 Point Source + Cs-137 Tube Source + Ir-192 in Needles