

INSTRUCTIONS

INTERNAL ROTATION RIDGES

These are superb compensating filters, specially designed for digital arteriography of the lower extremities in internal rotation, **including the feet**. They make for much more homogeneous density up to a width of 35 cm, thereby avoiding saturated signals that cause halation. Moreover, during bilateral examinations, the central sensors of a large fluoroscope are able to select technical factors that are reliably applicable to the periphery. Finally, these ridges contribute greatly to immobilization. Here are a number of helpful suggestions.

PRECAUTIONS

To become acquainted with these filters, we suggest you fluoroscope them before use. First, check that they are homogeneous. Then their image will give you an indication of the effect they will produce over the anatomy. You will also see an opaque ruler in the main midline filters: rotation will show the depth of the rulers, lying pretty close to the level of adjacent main arteries.

Protect the thin edges of the filters from trauma and tears; folding it over itself and superimposing it on its neighbor may cause artifacts.

DESCRIPTION

The INTERNAL ROTATION RIDGES are made of white waterproof silicone rubber, absorbing twice as much as water or muscle. They are **thinner distally**, to match the gradually decreasing size of the legs; they are wedged nearly 45° all around, except at the knees where wedges are more shallow. **The arrows must point toward the direction of the arterial blood flow.**

The set consists of **five elements (figure 1)**: **A)** an *inter-thighs* pyramidal filter, lies on the surface with its apex downward and its wide base near the knees; it contains an opaque ruler to help localize lesions and estimate their length and diameter; **B)** two *inter-legs* filters that are

adapted to the typical medial curved contour of the legs in internal rotation: the *main* one is thick and also contains a ruler; its tapering upper end merges with that of the inter-thighs filter to help adapt to variations in length of the lower extremities; the *accessory* one is thinner; together they provide appropriate compensation for the density of the tibia, over which important arteries are superimposed; **C)** two *lateral* triangular filters projecting along the lateral border of the feet.

Disinfection is done with alcohol or Zephiran®. Thin transparent food wrapping is a practical, inexpensive and disposable protection; it may wrap completely the inter-thighs filter, which is exposed to Providine® and blood. However, the other filters should only be covered on the surface in contact with the patient, as the opposite surface must remain bare to adhere to the table or to the sheets for immobilization. Such wrapping can also protect the skin (and cushions) from adhesive tapes.

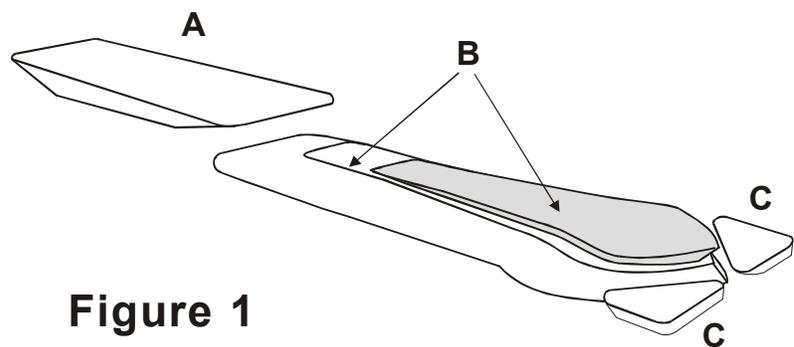


Figure 1

POSITIONING

Practicing beforehand on a staff member reduces preparation time, and even improves future examinations.

We suggest you start by placing the Velcro® bands under the main inter-legs filter (**figure 2**); the felt faces upward and the hooks are away on the other side of the patient.

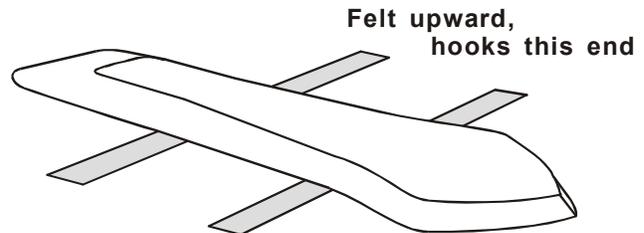


Figure 2

Then the accessory inter-legs filter is placed over the main one (**figure 3**). Its role is to increase the density of the image during automatic adjustment by the x-ray machine, so that opacified arteries are well visualized over the tibia. Some small legs may not require the accessory filter. A test image may be necessary in doubtful situation.

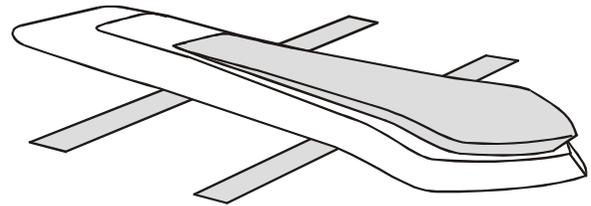


Figure 3

Next, place the patient with his legs on both sides, the heels just beyond the belly of the filters (**figure 4**).

In cases of angular deformities, if the knees are difficult to bring close to the filter, flex them slightly with a foam cushion underneath, or try full extension by raising the heels.

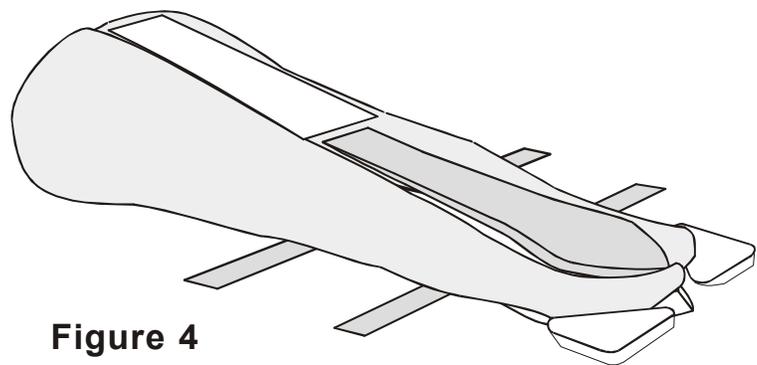


Figure 4

Finally, place the *triangular filters*, along the lateral border of the feet.

The *inter-thighs* filter may be positioned now, or only after insertion of the catheter, by sliding it under the sterile drapes.

IMMOBILIZATION

Silicone rubber sticks naturally to the skin, to the table and to a cotton sheet. It slips when dusty (or with an interposed tissue paper), but adhesiveness is restored by washing with water.

Immobilization is usually advisable. Firm downward compression of the legs together and against the filters ensures vertical and horizontal immobilization (**figure 5**).

Tighten together both inter-thighs filters and both legs with the straps; also use additional Velcro® bands or adhesive tape anchored from each side of the table.

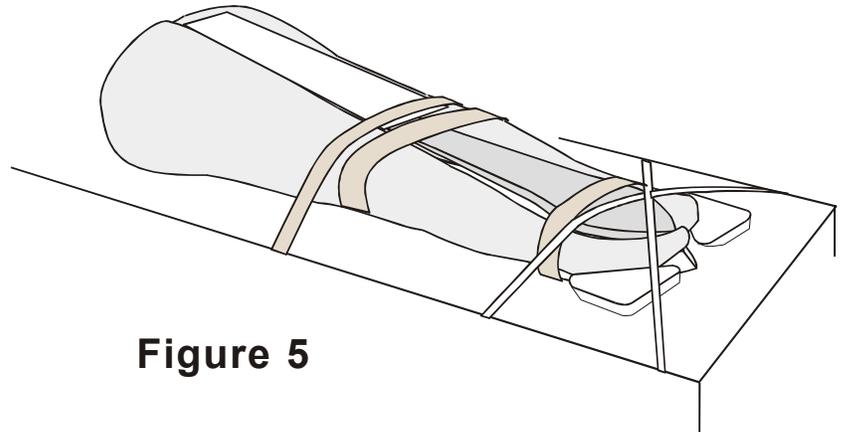


Figure 5

Finally, rotation is prevented by **immobilizing the feet** in internal rotation, always **exactly above the space provided for them by the filters**. There are many ways of proceeding, with or without cushions (see examples **figures 6 and 7**). The toes remain free of pressure. Keep the great toes together.

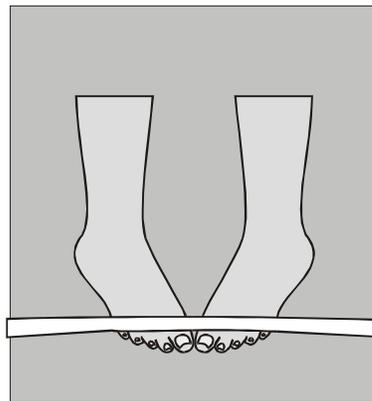


Figure 6

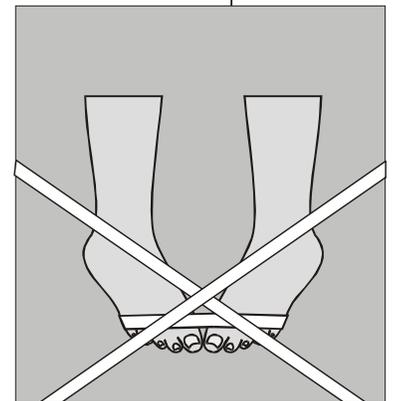


Figure 7

VERIFICATION

Fluoroscopy and/or films before the injection are very important to insure high quality imaging. Immediate correction at this time will produce better results later.

The width of the diaphragms is adjusted inside the legs and remains the same from the hips down to the heels. Verify satisfactory positioning of patient and filters: mainly great toes close together on the midline. No unfiltered radiation should pass around the surface of the legs. If automatic density control is used, check that the tibia is sufficiently penetrated for proper visualization of the superimposed arteries.

MISCELLANEOUS

Slight oblique views are feasible, but at some point, the shadow of a ruler may overlap an artery and the wedges will not function properly. Full oblique and lateral views can only be made one side at a time, by rotating the patient and the leg. If AP views of the feet and ankles alone are necessary, "GENTLE SLOPE" filters are a useful option available that can compensate for the reduced thickness of the forefoot.

The set up also suits phlebography. The lateral filters may also be used for angiography of the upper extremity.

It would be worth consulting the supplied educational brochure and video "THE OCTOSTOP® FILTERS" by Dr Jean A. Vézina M.D., president and medical advisor of OCTOSTOP® Inc.

MEASUREMENTS

The opaque rulers allow an estimation of the length of lesions and diameter of arteries, by using a correction factor **F**:

$$\text{Where } \mathbf{F} = \frac{\text{Number of cm available on the ruler near the lesion on one film}}{\text{Length on the film of these cm (in cm)}}$$

NOTES:

1. The higher the number of cm selected, the more accurate factor **F** will be.
2. The level of measurements must be near that of the ruler, otherwise a correction should be estimated.
3. ***Any correcting factor is applicable only to a lesion located on the film from which it originates. A CORRECTION FACTOR REMAINS SPECIFIC TO THE RULER, THE LESIONS AND THE FILM FROM WHICH IT ORIGINATES. IT IS NOT APPLICABLE TO ANOTHER FILM.***
4. Marked catheters are very useful for measurements.

The suggested formula is:

$$\text{ESTIMATED SIZE of a LESION} = \mathbf{F} \times \text{Measure of lesion on film}$$

Examples:

A. The length of a lesion measures 7 cm on a film. When measuring the adjacent ruler on the *same* film, if nine (9) cm actually measure 6.4 cm on the film, $\mathbf{F} = 9/6.4 = 1.4$. The lesion is thus estimated at: $1.4 \times 7 \text{ cm} = 9.8 \text{ cm}$ (approximately).

B. The diameter of a narrowing measures 2.5 mm on an enlarged film. When measuring the adjacent ruler on the *same* film, if three (3) cm actually measure 4.6 cm on the film, $\mathbf{F} = 3/4.6 = 0.652$. The diameter is estimated at: $0.652 \times 2.5 \text{ mm} = 1.6 \text{ mm}$ (approximately).

WARNING

Must be used only by qualified personnel, according to appropriate procedures, and under the responsibility of a physician. OCTOSTOP[®] Inc. and its personnel do not assume any liability regarding the use, indications, consequences, or any situation directly or indirectly related to its products.

ACCESSORY INTER-THIGHS FILTER (For Dr Plant's experimentation)

Good subtraction depends on proper film density. When performing bolus chasing or stepped imaging of both lower legs, the anatomy diminishes in thickness from the pubis to the ankles, so the radiation must decrease accordingly. This is controlled automatically by central sensors. Two factors intervene in this control of density:

A. The level of density selected (or adjusted) on the machine. This is a constant factor influencing all the exposures.

B. The thickness of the material the sensors "see" between the lower extremities.

The midline filters fulfill this role. Their thickness has been chosen to reflect average leg thickness. In order to afford more flexibility, we offer *main* and *accessory* filters.

When a main filter is used alone, the density of the arteries may be too "faint", especially over the tibiae and with big legs. By adding the accessory filter, the density will increase locally.