

Tips and Tricks Provided by Cortex Technologies

MECHANISM OF CELL INJURY

The mechanism of cell injury from freezing is both chemical and mechanical, and a main effect is directly related to the formation of ice crystals within the cells. Rapid freezing does not allow sufficient time for intracellular water to leave the cell and, consequently, it leads to intracellular ice crystallization and mechanical rupture of the cell membrane. During slow thawing, recrystallization takes place – i.e. small ice crystals aggregate to form larger crystals – leading to further mechanical damage of the cell membranes. Therefore:

- Apply a quick freeze/slow thaw technique.
- Repeated freeze/thaw cycles may improve efficacy.
- Extend the ice ball beyond the target margins to ensure freezing of the entire target.

USING OPEN SPRAY TIP TECHNIQUE

Select a spray aperture appropriate for the lesion to be treated. In-depth freezing is best obtained when the spray aperture is close to the lesion (5 - 10 mm distance) as the liquid content of the spray is higher close to the aperture. When possible, raised warts should be approached tangentially from at least two sides. This allows the ice ball to move down through the wart while sparing the surrounding tissue. Spraying directly at the lesion (perpendicular to the surface) will cause more lateral spread with less penetration. To avoid this, apply the spray intermittently or use a smaller spray aperture. Superficial desquamation is obtained using the larger apertures ("A" or "B") at approx. 5 cm distance (higher vapor content) and slowly "painting" the surface with vaporized nitrogen.

USING SPRAY CONE TECHNIQUE

Spray cones in combination with an open spray aperture may be used to confine the lateral spread of the freeze. Select a cone size, which will fully cover the target area and spray directly into the cone at close distance. Small diameter hard, clear cones are available for small to medium size lesions. For larger lesions rubber cones are available, which may be shaped to follow the margins of the lesion more accurately.

USING CLOSED CONTACT PROBE TECHNIQUE

Closed contact probes provide in-depth freezing with minimal lateral spread. Select a probe size fitting the size of the lesion. Make the lesion wet with a drop of water or contact gel prior to freezing to facilitate the thermal transfer between skin and probe tip. Apply the contact probe when still warm applying light pressure and pull the trigger handle. Allow approx. 5 sec. extra freezing time to cool down the contact probe and keep freezing until a 1 mm halo is seen around the probe tip. Then stop the freezing and allow a few seconds for the probe tip to come loose. This "quick freeze slow thaw" procedure using the contact probe technique ensures a very effective treatment with high penetration and accuracy.

CLEANING A CLOGGED SPRAY TIP

Small diameter spray apertures (C & D sizes) are more sensitive to impurities in the liquid nitrogen supply than large diameters (A & B sizes). In the event of a very uneven spray (spitting) or no spray at all, this might be an indication of partial or complete clogging of the aperture.

Do never attempt to clean the aperture with a hard and sharp pointed object (e.g. a needle), as this may cause irreversible damage to the aperture. Instead, detach the aperture and blow it clean with pressurized air in the reverse direction of the normal nitrogen flow. Alternatively, blow it clean with liquid nitrogen in the reverse direction, by detaching the tip, turn it around 180 degrees, press it firmly against the knurled knob and activate the trigger. Be careful not to get hit by escaping liquid nitrogen.

STORING LIQUID NITROGEN

A clean supply of liquid nitrogen is essential to trouble free operation of liquid nitrogen cryosurgical treatment units. To ensure a clean nitrogen supply, we advise to completely empty the storage tank (dewar) 3 - 4 times per year prior to refilling. If necessary, water from ice crystals remaining inside the tank can be dried out by creating air circulation (e.g. using a vacuum cleaner for approx. 15 min.).