

CryoPen

A very practical solution for Cryosurgery

Do you treat wart, adenoma and papilloma.....
Easily, effectively and at a reasonable cost?

The CryoPen destroys tissues by rapid freezing without need of anaesthesia. Since its freezing power is consistent, the learning curve is short.



The cartridge delivers a steady flow of pressurised liquid N₂O. Since each cartridge can treat 2 to 3 lesions, the cost of treatment is much lower than expected.



What is the different between Cryosurgery and Cryo**Pen**?

The CryoPen is a new generation of cryosurgical tool. Though it employs the same principle, it has technical breakthrough in bringing accuracy down to millimeter and utilising biofeedback to gauge adequacy of penetration.

Some Examples of applications:

- Warts
- Papilloma
- Fibroma
- Adenoma
- Seborrhoeic keratosis
- Acrochordon (skin tag)
- Treatment of tumour margins
- Angioma
- Granuloma...and many more



Why investing in a CryoPen?

It creates a win-win situation.



As a patient, you will be more pleased to know the procedure is practically pain-free. Complication is unlikely and minor. Aftercare is simple (if any). And most importantly, the result is good.

As a doctor, you can now treat these cutaneous lesions confidently with persistently good result. Treatment can be done right on spot during the consultation (default rate is thus zero). The set-up cost is very affordable and so as the running cost. CryoPen will pay for itself in a year. It appears to be a lost if you are not equipped with it.



Call Now!

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Technical Tips that might interest you!

Why use cryotherapy?

Cryotherapy is a well established method of destroying tissue while **keeping the fibrous structure intact**. It has in many ways surpassed the efficacy of alternative treatment modalities. For example, the procedure is short (15-30 seconds) and creates minimal discomfort (applicable without anaesthesia). Intra and post-operative problems such as haemorrhage, infection risk, suture removals or follow-up care, are minimal to nonexistent. And unlike other treatment options, it leaves little to no scar formation. It is particularly preferred by the dermatologist. Classic example is the use of liquid nitrogen.

Under what temperature will thermal damage be effective?

Cryotherapy destroyed unwanted tissue by applying extreme cold. From literature, we know that cryo-necrosis occurs in all human tissues if it is **rapidly** frozen to minus **(-)27°C** or lower.

What cryogenes are used in cryotherapy?

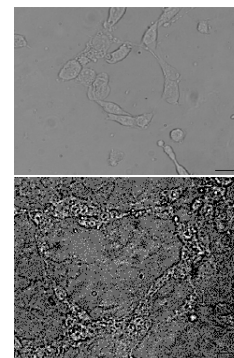
Liquid nitrogen is the traditional potent cryogen at minus (-)196°C. It is used primarily for larger and deeper lesions in major centers. This cryogen must be stored in a bulky thermo-isolated vessel. For safety reasons, liquid nitrogen cannot be capped and sealed. Constant leakage thus requires regular refills, even when not been used. Furthermore, direct spray of liquid nitrogen does not afford treatment accuracy. A variety of can-type alternatives are offered in market. They applied cryogen indirect to skin lesion via cotton swabs or sponge. Though being more practical, they have compromised freezing power.

How can freezing energy be applied more effectively?

Cryosurgery can be classified into **direct** and **indirect** methods. Spraying liquid nitrogen is considered as a direct method. While immersing a cotton swabs into liquid nitrogen then applying to a skin lesion is an indirect method. The energy delivered by indirect method generally is not sufficient to push the ice-ball to the deeper extent of the lesion and results in recurrence. Direct spraying of cryogen on the skin can create a more **rapid freezing** down to a **lower absolute temperature**. For liquid nitrogen, indirect application can only lower the temperature to minus (-)20°C, in contrast to (-)196°C by direct spraying. It is a huge difference!

More factors influencing successful cryotherapy applications

Effective treatment for tissue destruction requires rapid freezing. Intracellular fluids will freeze and form spiked shards of ice which will rupture the cell membrane and destroy the cell. However, cells might survive in slow freezing because intracellular fluid can flow out of the cell by osmosis. Furthermore, since frozen tissue and ice are poor thermal conductors (Remember Eskimos lives in Igloo?), indirect cryotherapy cannot push the icing front deeper due to insufficient freezing power. In contrast, direct application draw heat from deeper tissue even the superficial tissue has not yet been frozen. That creates an additional margin on top of a much lower absolute temperature.



If each episode of freezing causes 90% of cells to undergo cryonecrosis, an additional freezing will bring the chance of survival down to 1%! Therefore a **freeze-thaw-freeze** cycle is always preferable as it will improve the result dramatically.

CryoPen was designed for optimising these factors.

What cryogen is used with the CryoPen?

CryoPen|c instruments utilise disposable cartridges filled with Nitrous Oxide (N₂O) which have been approved to comply with the strictest safety criteria.

Direct inhalation of the contents of the N₂O cartridges though not hazardous, should be avoided.

Using unauthorised cartridges can damage the instrument and void the warranty. Bringing the cartridge from overseas to Hong Kong requires Customs clearance otherwise is liable to prosecution under the law, Cap 60 ordinance.

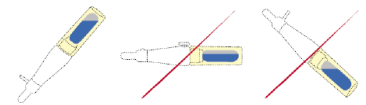
How to store gas cartridges?

The use of disposable cartridges greatly simplifies the operation. Since cartridges are under high pressure, they should be stored in a cool dry place and kept out of direct sunlight and the reach of children. Standard shelf life is 5 years.

How must CryoPen be positioned?

The content of the cartridge is liquid N₂O (87%). The rest is N₂O gas. The liquid is the refrigerant, the gas only act as the propellant. By holding the CryoPen vertically with the micro-applicator directed downward, the liquid will be in the lower chamber because of gravity and the gas will fill the upper aspect of the cartridge. The pressure of the gas will eject the liquid cryogen on to the lesion via the micro-applicator (30micron, i.e. 0.03mm!) in form of direct cryotherapy.

If the CryoPen is held with the tip directed upward or in a horizontal position, the gas will be expelled rather than the liquid. Because there is little to no freezing power to the gas alone, it will not work. An angle of less than 45° must be avoided.



How to control emitted energy?

When the cartridges are punctured, the pressure inside the CryoPen|c will be maintained until all the liquid N₂O leaves the micro-applicator. At its tip, the jet of liquid N₂O will immediately expand and absorb the surrounding heat, thus freeze and destroy the tissues.

The jet of liquid N₂O is focused, alike your gas stove. At the **Cryo-point**, all liquid form N₂O will be transformed into gas. This Cryo-point is in equilibrium and the freezing power is most focused. Bringing this Cryo-point to the skin lesion will create an ice-ball gaining 1mm every 5sec to a maximum size of 5mm.



Moving from the Cryo-point to the micro-applicator tip, the freezing power becoming stronger but less focused. Further from the Cryo-point, there will be no freezing power.

Adjusting the distance between the skin lesion and the CryoPen can fine tune the size of the intended tissue destruction. Since CryoPen|c was designed to have its accuracy in mm, collateral damage is minimal. You can judge the depth by **biofeedback**.

What is biofeedback?

Skin lesion lacks free nerve ending and is pain-free even when ablated. However, its surrounding normal tissue is full of pain fibers. If you limited the ice-ball inside the skin lesion, your client will only feel cold without discomfort. Once pain rather than "coldness" is felt, it implies the ice-ball has extended beyond the skin lesion. Now, you can be sure the whole lesion has been covered without guessing. The technique is referred as biofeedback. CryoPen|c is the only cryosurgical equipment that you can use biofeedback. Even laser tissue ablation cannot afford the surgeon a peace of mind like CryoPen can.

Adding an addition 5 to 10sec will create a 1 to 2mm margin. Recurrence is therefore even less likely.

How to use the CryoPen in my practice?

The most important issue is case selection, which is the core competence of every doctor.

Your client should be positioned as comfortable as possible while exposing the lesion, which is horizontal to the floor. The hand holding the instrument should be supported by towel. Instruct your clients about what to expect. They will feel the coldness, but not with discomfort at first. Then they will start to feel some pain, a nature being completely different and by all means distinguishable. At that time, they need to voice out and need to bear with it for few seconds. Afterward, let thawing take place. A minute later, another freezing is needed to be done, which is usually faster than the first freeze.

During the procedure, it is important to keep the CryoPen vertical at all times with the micro-applicator directed downward. The larger the area to be treated, the closer the micro-applicator should be held to the skin surface. If rapid, deep penetration is desired the micro-applicator tip can touch the surface of the lesion directly. The highly pressurised jet of cryogen can freeze deeper tissue by Penetrating Jet Freezing (PJF) phenomenon, which is also unique in CryoPen. The tip is made of medical grade polyetheretherketone (PEEK). It will not stick like other cryoprobes.

The micro-applicator can be cleaned with alcohol prep. It is also autoclavable if its O-ring has been removed.

Post-operative care is minimal as there is no wound or raw area. However, wheal is common in the first 24 hours. Itchiness might invite scratching, which might need to scar formation. The lesion will dry up, assume a darker colour and slough off in 1 to 2 weeks. Hair loss is unlikely. However, depigmentation sometime does occur. Dark complexity client is liable to such "complication".

You can arrange a follow-up appointment in 2 to 3 weeks time. In unlikely event of persistence or recurrence, another treatment will settle the problem.

With experience, you will soon realise that you can accurately pin point the area to be treated by selecting the proper working distance.

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