

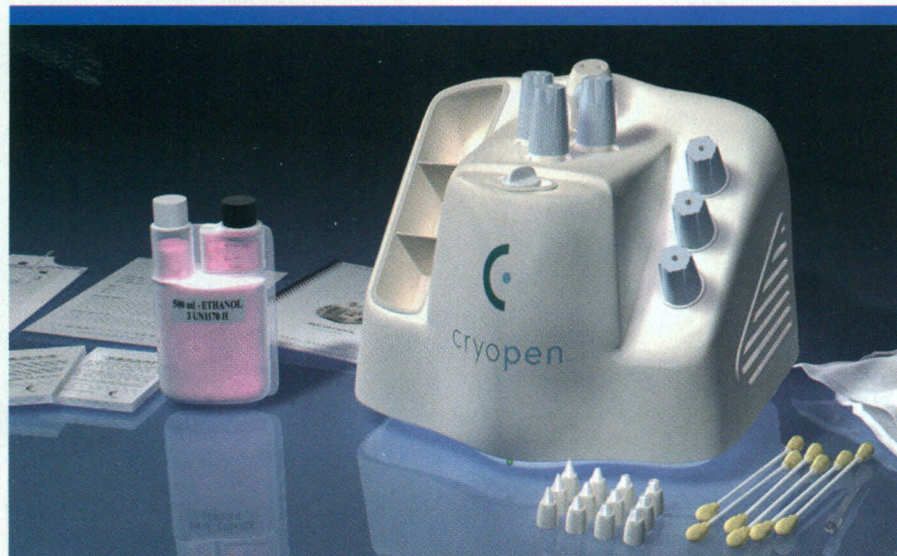


## Surgical Pearls

Clinical Editor: Jesse Burks, DPM

# Emerging Concepts In Cryosurgery For Wart Treatment

By Jerome Slavitt, DPM



The author says the CryoPen enables him to provide a treatment plan to patients without the need for injections or postoperative wound care.

**W**hile warts are among the most common pathological problems that podiatrists treat, they are also among the most frustrating conditions. While there are multiple forms of therapy available, the success rate is not what we would like to see. In my clinical experience, I have found that these modalities only have an average cure rate of 75 percent.

There is no individual approach that can be construed as the single most effective form of wart therapy. It is also a good idea to inform the patient about the possibility of recurrence both during and after the treatment procedures. Additionally, new lesions may develop during the treatment process.

One can tailor the treatment plan to the needs of the specific patient. Warts can occur in children, young adults and adults, all of whom have specific needs. We should consider how a specific treatment

may affect daily activities. The physician must know the answer to the question, "Will the patient follow instructions as they apply to the chosen treatment plan and comply with my directives?"

### Assessing The Viability Of Treatment Options And Patient Adherence

Current treatment modalities include topical acids, surgical procedures (blunt curettage), various laser therapies, multiple forms of cryosurgery, oral medications, injection therapy, immunotherapy and electrocautery.

Additional considerations are based on the number of warts and locations. A single wart has the highest cure rate while the mosaic variety has a high rate of recurrence. The patient's age also dictates treatment parameters. It is difficult to approach the younger child with the idea of surgical removal with the under-

standing that a local injection for anesthesia will be required.

Also bear in mind that athletes may find it difficult to keep the involved areas clean and dry for several days following acid therapies. With the reduction in insurance reimbursement and specific size criteria, outpatient hospital or surgery center laser therapy may not be a treatment option.

I generally present my patients with three options for treating warts. The patient with a more involved condition may require more sophisticated treatment plans. Topical acid therapy after surgical debridement will require the patient to keep the involved area clean and dry for two days and return every two weeks for treatment until the condition resolves. Surgical blunt curettage is a second option but one must be selective in utilizing this approach with regard to the patient's age, mental condition and the size of the lesions. The third option for many years was laser surgery.

However, cryosurgery, which is more of an office-based procedure, has now become my primary treatment of choice.

### A Closer Look At How Cryosurgery Works

Physicians have employed cryosurgery for many years for the treatment of warts. Cryosurgery methods range from a large "Q-Tip" type applicator dipped in liquid nitrogen to the more sophisticated cryosurgery units now available.

There are key precautions to keep in mind when considering the use of cryosurgery for suspected warts. Physicians must rule out the possibility of melanomas, recurrent basal cell carcinomas and pigmented cells in their differential diagnosis. Other conditions one should consider are chronic inflammato-





Photo courtesy of Harvey Lemont, DPM

The author notes that mosaic warts, as shown above, have a high rate of recurrence.

## A Quick Guide To Temperatures Of Cryosurgery Modalities

Liquid nitrogen	-196°C
Nitrogen gas N <sub>2</sub> O	-88°C
Carbon dioxide gas CO <sub>2</sub>	-78°C
Organic compressed gases	-55°C to -75°C
CryoPen	-95°C

ry disease, chronic infections, neoplasms, diabetes and peripheral vascular disease.

Cryosurgery has a specific mode of action with the selective destruction of identifiable lesions. It causes cryogenic cell death by extreme cold temperatures. A major benefit of cryosurgery is the preservation of the tissue matrix, which is relatively cold resistance and therefore allows for proper cosmetic healing with minimal scarring. The destroyed tissue sloughs off and reepithelialization occurs.

In order for cryosurgery to be effective, tissue temperatures must change rapidly (by 50 to 100°C per minute) with a baseline tissue cell temperature of -20°C or lower. Cell death occurs below -20°C. One must hold the temperature at these levels for a specified period of time depending on the type of lesion and its anatomical location. This extreme temperature allows intracellular changes to occur

and adequate cell destruction to take place.

During the state of freeze, ice crystals form within the cells and cause a transient membrane osmotic gradient. This alteration causes rupture of the membranes and associated organelles. Initially, there is a decrease in vascular flow followed by a rapid vascular flow after thawing. After the initial freeze, the treated area takes on a white, even snow-like appearance due to the ice in the tissue.

This so-called ice ball then thaws and an inflow of blood presents as an area of erythema. Blister formation occurs and this is followed by drainage. A crust usually forms after blister destruction and, depending on the size, location and depth of the freeze, healing may take one to six weeks. Be advised that certain areas may become hypopigmented.

Based on the location of the warts, application times for cryosurgery will

vary. For example, the plantar surface of the foot has a much thicker epidermal layer than the dorsal or digital areas. Consequently, in my experience, I found that a 90-second application is required on the plantar surface and 45- to 60-second applications are required for thinner skinned areas.

The various cryosurgery modalities have different temperature ranges (see "A Quick Guide To Temperatures Of Cryosurgery Modalities" at left). One must select the correct modality and temperature to provide a safe and successful treatment. Modalities with more extreme temperature ranges may cause damage to tissue structures, potentially causing nerve and connective tissue pathology. The cold temperatures are produced by the specific modality and are not the actual temperatures on the surface of the skin.

## Can A New Cryosurgery Pen Facilitate Successful Wart Treatment?

The CryoPen System (CryoPen) is an all-in-one unit consisting of the cooling chamber, six probes with varying application diameters, a probe thermometer and reusable tips. One can remove a probe from the cooling chamber and immediately replace it with another probe of the same type so the next application will always be ready.

Over the past two years, physicians in our office have used the CryoPen System to treat hundreds of patients with verruca. These patient presentations ranged from a singular lesion to mosaic warts, both unilateral and bilateral. The patient population included children, teenagers and adults. The general reception has been more than satisfactory. However, certain patients experienced uncomfortable responses to the cold. No matter what form of modality one uses, certain patients will react less than satisfactorily.

There are certain advantages with the CryoPen System. It enables me to provide a treatment plan to patients without the need for injections or postoperative wound care. In addition, patients can get the treated areas wet.





## A Guide To Using The CryoPen

First, evaluate the patient's verruca. Surgical debridement of all hyperkeratotic tissue is essential to try to visualize capillary endings without causing capillary bleeding. If bleeding occurs, apply a hemostatic agent first.

Select the appropriate size CryoPen probe and verify the temperature. Apply a sterile tip to the probe and insert the probe, selecting the appropriate contact time. With the help of an assistant, one can treat a variety of lesions in different areas using multiple probes at the same time.

After the application, the area has a snow-like appearance, which is followed by an area of hyperemia. Blister formation follows with subsequent darkening of the skin. Apply a Band-Aid type dressing and send the patient home with written instructions explaining the procedure.

One would see the patient again in two weeks. Perform surgical debridement to remove the blister and subsequent hyperkeratosis. This should reveal

the absence of the wart. In certain cases, one or two more applications may be required to facilitate complete healing.

## In Summary

In my practice, I have found cryosurgery using the CryoPen System to be an effective modality for the treatment of pedal verruca in the majority of cases. The treatment is simple, quick and effective. The majority of patients receive the treatment well.

With all forms of therapy, one must strive for strong patient communication as this plays a key role in managing patient expectations and achieving optimal outcomes. ■

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*For related articles, see "Exploring Current Approaches To Plantar Warts" in the December 2006 issue or "Exploring Alternative Treatments For Resistant Warts" in the May 2004 issue.*

*Also be sure to visit the archives and get reprint information at [www.podiatrytoday.com](http://www.podiatrytoday.com).*

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