

## **“Liquid Freezing” in Aesthetic Dermatology**

M. Hundeiker

Hornheide Hospital, Münster, Germany

The principles of cryotherapy of the skin are presented in the corresponding recommendations for quality assurance (1). None of this needs to be repeated here. At this point I would simply like to point out the current state of technology that has advantages in certain indications as a result of simple handling and low costs (2).

Dinitrogen monoxide (N<sub>2</sub>O) is commercially available as highly compressed gas. When pressure is released (Joule-Thompson effect) a temperature of –184.4°K or –88.8°C can be reached. N<sub>2</sub>O has long been used for cooling closed probes for treating lips and the transitional skin in the mouth and genitals. Using this cooling medium openly and in handy devices seemed obvious, as it is available almost everywhere in small cartridges for whipped cream appliances. Very satisfying results with the first manually produced devices and enthusiasm for the principle were the reason for a first publication (2). However, insufficient precision of the gas cartridge manufacturers resulted in unexpected problems with nozzles and seals. However, now that special gas cartridges are being produced for liquid freezing these nuisances have definitely been mastered. They contain N<sub>2</sub>O gas of medicinal quality, are free of detritus, have a built-in filter and a screw-on connection for the valve part, upon which in turn the corresponding probe is mounted. There is no longer any need for a housing to hold the cartridge (Fig. 1).

Glass ceramic probes are available with various capillary widths (40-80µ) for the flow-through and different contact surfaces up to 4.5mm. This enables pressure to be applied to the treated surface (e.g. with small angiomas or venous lakes) as well as the coolant to be precisely applied (e.g. with very

small papillomas) with minimal interference of the surrounding skin. Depending on the chosen capillary width the therapist can control – directly after his/her visual impression - the actual mass flow of the coolant and the cooling capacity by applying contact pressure; this contact pressure simultaneously limits the rebounding which reduces the cooling capacity at the outflow velocity of  $> 40\text{m/s}$  (whether with spraying technique or free application).

This is important in that skilled cryotherapy often has excitingly scar-free, inconspicuous results as it does not interfere with the non-cellular tissue components, this however does not apply to crude schematic freezing: for example as a result of the particular sensitivity of pigment cells to low temperatures, the method is particularly suitable in the hands of the dermatologist and after careful diagnosis for removing still small naevus cell naevi and freckles leaving hardly any, or no traces at all. However too little or irregular treatment leads to recurrences and too intensive treatment leads to lastingly visible depigmented areas. Therefore cryogenic methods cannot be simply prescribed like any other operation method. And especially  $\text{N}_2\text{O}$  must not be underestimated simply because it does not reach temperatures as low as those reached by  $\text{N}_2$ . The range, not the effect within the effective range, is smaller. This method is not really less painful either and cannot be influenced any more satisfactorily than with  $\text{N}_2$ . This must be kept in mind when dealing with patients. In individual cases, such as with the combination naevus dysplasia syndrome and keloid tendency, we have repeatedly treated countless lesions in one session – however, supported by the anaesthetists. Pleasant long-term results are worth every effort in such cases. Naturally all standard cautionary measures that apply to other cryogenic treatment methods also apply to liquid freezing.

**Indications:** According to the above-mentioned expositions, indications for  $\text{N}_2\text{O}$  treatment with open probes are above all any small, flat and multiple changes: basal-cell papillomas (seborrhoeic keratoses, Fig 2-6), exophytic virus papillomas such as verucae vulgares, small and flat naevus cell naevi,

freckles but also solar keratoses or (with pressure) small angiomas, venous lakes, Pasini ectasias.

To date the procedure has less indications in the therapy of skin tumours where greater depths must be reached (1). Probes are being tested for interstitial treatment. The procedure is hardly worth it in large dermatological treatment centres that have a constant supply of N<sub>2</sub> and a large N<sub>2</sub> consumption. However, great advantages are found wherever cryogenic methods are not being used daily, but where these methods must always be available in case of corresponding diagnoses. This is especially relevant for aesthetic dermatology.

**Advantages** of liquid freezing compared with other cryogenic treatment methods with the corresponding indications are: not much space is required, problem-free unlimited storage of coolant cartridges, no more transport problems with consultant treatments of outpatients, relatively low costs as several lesions or patients can be treated with one cartridge.

#### **Literature:**

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**Address:** Prof.Dr.M.Hundeiker, Fachklinik Hornheide, Dorbaumstr. 300,  
D-48157 Münster; max@hundeiker.de