



# VERRUCA PLANTARIS

Treatment guide

## Verruca plantaris

Verrucas are superficial viral infections of the skin caused by human papilloma virus (HPV).

Verrucas are common, but benign and often self-limiting.<sup>1</sup> They occur in places where the skin has been exposed to trauma, as the virus is inoculated into the skin through minimal lesions.<sup>1</sup>

Verrucas may vary in appearance, but frequently occur as hyperkeratotic skin-coloured papules.

Verrucas on the sole of the foot are pressed flat during daily mobilisation and grow inwards. As the verruca pushes into the sole of the foot, its hyperkeratotic surface may be a source of pain that restricts mobilisation.

HPV is resistant and spreads through both direct and indirect contact, leaving a large proportion of everyday objects as reservoirs of infection. As the incubation period is 1-6 months, verrucas should therefore be treated soon as possible to break the infection chain and reduce infection of others.

HPV persists in the skin after completed treatment of the actual verruca, but can prevent the spread of the infection to other parts of the body.<sup>1,2</sup>

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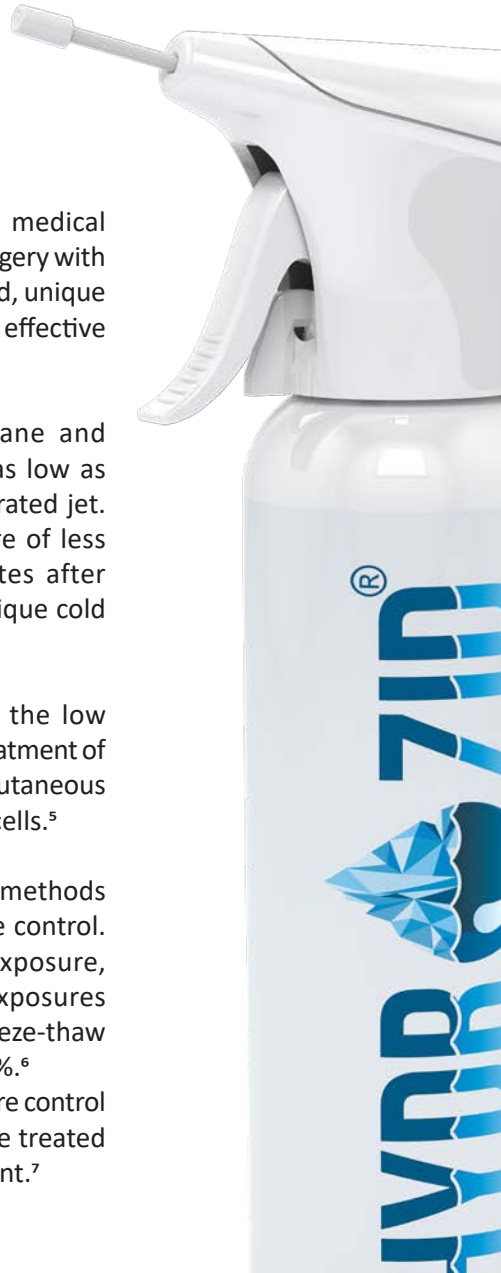
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## What is Hydrozid®

- Hydrozid® is an innovative CE-marked medical device that combines traditional cryosurgery with modern aerosol technology. Its patented, unique application system provides a safe and effective method for treatment of verrucas.
- Hydrozid® contains the gas norflurane and exposes the lesion to temperatures as low as -54°C to -58°C by means of a concentrated jet. The consistent treatment temperature of less than -50°C lasts for up to 4.5 minutes after treatment start and thus ensures a unique cold potential within cryosurgery.<sup>3,4</sup>
- The varying reaction of skin cells to the low temperatures of cryosurgery enables treatment of epidermal cells without damaging subcutaneous connective tissue, fibres and immune cells.<sup>5</sup>
- Hydrozid® treatment is based on the methods of freeze-thaw cycles and temperature control. Rather than continuous treatment exposure, studies have shown that repeated exposures to freezing followed by thawing (a freeze-thaw cycle) enhance the effect by up to 100%.<sup>6</sup> These cycles also afford the therapist more control of the temperature and its effect on the treated area, which helps prevent overtreatment.<sup>7</sup>



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- Cryosurgery also has a unique immune-stimulating effect, meaning that the treatment of verrucas may contribute to the formation of antigens in the immune system,<sup>2</sup> thus causing non-treated verrucas to be rejected and disappear.<sup>1,2</sup> Immunocompromised patients are less susceptible to obtaining this immune-stimulating effect.<sup>2</sup>
- It is not necessary to anaesthetise the treated area prior to treatment. The cryosurgery functions as a local anaesthetic in itself.<sup>8</sup>
- Hydrozid® treatment is approved for patients from 5 years and up.

All treatment with Hydrozid® should be adapted to the individual patient.

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## Inform the patient before treatment

Provide the patient with the Hydrozid® patient instructions.

The patient instructions give relevant advice and information in brief about the treatment process.

The patient instructions are available free of charge at <https://shop.hydrozid.eu> or by email: [info@hydrozid.com](mailto:info@hydrozid.com).

### Application template

When treating verrucas, use one of the accompanying application templates to protect the surrounding healthy tissue during treatment.

The application templates have holes in 6 different sizes (3-10 mm in diameter). If the verruca is larger than 10 mm in diameter, treat the verruca as described in the treatment section *Treatment of verrucas larger than 10 mm in diameter, mosaic warts*.

The treatment margins may become blurred during treatment as the formation of ice crystals covers the actual delimitation between the verruca and the surrounding healthy tissue. The application template can thus help focus on the limits of the verruca during treatment.

You can also use the application templates' size indications to compare the size of the verruca after each procedure to assess the effect of treatment.

The application templates can be used to treat more verrucas on the same patient, after which they must be discarded to avoid cross-infection.<sup>9</sup>



Application template

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## Treatment of one wart

### Treatment steps using Hydrozid®.

After unpacking – do not remove the tip of the application tube. It must remain in place during treatment.

**1.** Release the locking mechanism under the activation arm, from left to right. The canister is now ready to use.



**2.** Hold the application template in place above the verruca with your non-dominant hand. Hold the Hydrozid® canister in your dominant hand as vertically as possible. Push lightly on the canister until you hear a hissing noise and the gas is released. If you push the canister too hard, the sound will be more like when dispensing a deodorant spray, which releases unnecessary amounts of gas with a risk of damaging surrounding healthy tissue. Also, this is not an economical use of the gas.



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**3.** Spray at a distance of 2-3 centimetres from the verruca, for 6 seconds. A film of white ice crystals will now form in the treated area. Start counting when ice crystals start forming on the verruca. After (up to) 30 seconds, the ice crystals are no longer white, indicating that the thawing period has ended. The first freeze-thaw cycle is now completed.



A distance of 2-3 centimetres corresponds to about 2 finger widths.

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**4.** Then repeat another freeze-thaw cycle. The recommended number of freeze-thaw cycles is up to 4-6 cycles. The total treatment time is between 24-36 seconds.

The therapist assesses the patient and the treated area between each freeze-thaw cycle and must regard the treatment times as recommendations. Treatment for a longer period than recommended is associated with more frequent and more intense side effects.<sup>9</sup>



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## Treatment of 2-4 verrucas

If the patient has 2-4 verrucas, the treatment can be streamlined, as it is possible to treat 2-4 verrucas within the same period of time as it takes to treat one (4 x 6 seconds - 6 x 6 seconds). The therapist assesses the patient and the treated area between each freeze-thaw cycle.

As a natural consequence of the low gas temperature, the tip of the canister will crystallise during prolonged treatment like this and impede the free flow of gas.

When treating multiple verrucas, it is therefore advisable to have an additional canister close to hand to replace the canister first used, until its tip has returned to room temperature and is ready to be used for treatment.

### Treatment steps using Hydrozid®

Prepare the canister and place the application template as described in treatment steps 1 and 2 in the above-mentioned section.

#### Next treatment steps:

1. Spray at a distance of 2-3 centimetres from the first verruca, for up to 6 seconds. Start counting when ice crystals start forming on the verruca.
2. While the ice crystals thaw and the thawing period passes, continue treating the second verruca.
3. Treat the second verruca using the same procedure. While the ice crystals thaw and the thawing period passes for verrucas 1 and 2, continue treating the third verruca.
4. Treat the third verruca using the same procedure. While the ice crystals thaw and the thawing period passes for verrucas 1, 2 and 3, continue treating the fourth verruca.
5. Finish by treating the fourth verruca for 6 seconds using the same procedure.

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When the thawing period for the fourth verruca has passed, the first freeze-thaw cycle is complete. Now you can start a new freeze-thaw cycle on the first verruca, followed by the three others.

The recommended treatment time is 4-6 freeze-thaw cycles for verrucas, corresponding to 24-36 seconds of treatment for each verruca. The therapist assesses the patient and the treated area between each freeze-thaw cycle.

## Treatment of verrucas larger than 10 mm, mosaic warts.

The adjacent growth of several verrucas, separated by small connective tissue septa, is referred to as *mosaic warts*.<sup>9</sup>

For *mosaic warts* or verrucas with a diameter larger than 10 mm, follow the treatment steps:

### Treatment steps using Hydrozid®

After unpacking – do not remove the tip of the application tube. It must remain in place during treatment.

1. Release the locking mechanism under the activation arm, from left to right. The canister is now ready to use.
2. Hold the canister in your dominant hand as vertically as possible. Push lightly on the canister until you hear a hissing noise and the gas is released. If you push the canister too hard, the sound will be more like when dispensing a deodorant spray, which releases unnecessary amounts of gas with a risk of damaging surrounding healthy tissue.
3. Spray at a distance of 2-3 centimetres from the centre of the verruca/mosaic wart

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and continue by constant spraying in circular motions to the edge of the delimitation of the common wart/mosaic wart. A film of white ice crystals will now form in the treated area. The six-second treatment time starts when ice crystals start forming on the verruca/mosaic wart. The entire verruca/mosaic wart must be covered by the ice crystals.

4. After (up to) 30 seconds, the ice crystals are no longer white, indicating that the thawing period has ended. The first freeze-thaw cycle is now completed.
5. Then repeat another freeze-thaw cycle. The recommended number of freeze-thaw cycles is 4-6 cycles. The total treatment time is between 24-36 seconds.

The therapist assesses the patient and the treated area between each freeze-thaw cycle and must regard the treatment times as recommendations. Treatment for a longer period than recommended is associated with more frequent and more intense side effects.<sup>9</sup>



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## Treatment of stubborn/treatment-resistant verrucas

Some types of verruca do not respond to treatment. In particular, verrucas that have been present for several years can become resistant to certain treatments.

The literature does not clearly define stubborn/treatment-resistant verrucas, but they can be defined as verrucas that do not respond after their fifth treatment or if the treatment process is longer than 6 months.<sup>10</sup>

In such cases, cryosurgery is recommended in combination treatment with curettage.<sup>2,10</sup>

### Curettage prior to treatment with Hydrozid®

To support treatment with Hydrozid® and minimise the risk of recurrence, pare down the verruca before the first treatment with Hydrozid®.

The paring aims to counter hyperkeratinisation where an accumulation of keratinocytes results in thickening of the skin. The hyperkeratotic surface of the verruca may insulate body heat around the verruca in certain instances, preventing the efficacy of cryosurgery in the epidermis.<sup>9,11</sup>

Scrape off the thickened skin over the verruca with a curette or scalpel. Scrape off the verruca parallel to the skin surface until the verruca is level with the healthy skin. The verruca is now ready for treatment with Hydrozid®.



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## Side effects, healing process and treatment outcome

Cryosurgery may cause a stinging or burning sensation during treatment.

The treated area may appear red, tender and swollen immediately after treatment.

Within 24 hours after the completion of treatment, inflammation develops in response to cell death.<sup>2</sup> This process contributes further to destroying the polyp and is a natural reaction in the inflammatory phase of the wound healing process.

Wounds and possibly blisters may subsequently occur in the treated area.<sup>4</sup> In such cases, the treated area must be protected with a plaster.

After treatment, the patient must keep the treated area clean by washing it daily with water and non-perfumed soap.

To avoid scarring and pigment changes, the patient should avoid exposing the treated area to sunlight for 10-14 days until the treated area is fully healed.

If repeated treatment is deemed necessary, a treatment interval of 1-2 weeks is advisable. The intensity and number of treatments depend on the patient's individual clinical response and is assessed by the therapist.

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## Precautions and contraindications

**Hydrozid® must only be used by trained healthcare professionals.**

Even though the effect of short freezing times as recommended in this material does not result in scarring,<sup>4</sup> Hydrozid® must be used with care to avoid damaging the dermis.

### **Exercise special caution when applying Hydrozid®:**

- near cutaneous nerves, tendons and nail beds.<sup>12</sup>
- in children.<sup>2</sup>
- in persons with impaired arterial or venous circulation<sup>12</sup> (e.g. diabetes patients).
- in persons with thin and/or sensitive skin (e.g. elderly with ageing skin, systemic scleroderma, persons treated with inhaled steroids for a prolonged period of time, etc.).<sup>12</sup>
- in persons with dark skin types. Even though the effect of short freezing times as recommended in this material rarely results in pigmentation changes in the treated area, hypopigmentation/hyperpigmentation may occur. This change is seen in persons with dark skin types in particular.<sup>12</sup>

### **Do not use Hydrozid®:**

- On open skin lesions or eczematous skin to avoid subcutaneous emphysema<sup>11</sup>.
- In patients with cryoglobulinemia, Raynaud's disease, cold urticaria, blood dyscrasias and Pyoderma gangrenosum.<sup>5</sup>
- In case of uncertain diagnosis of the type of lesion (biopsy for skin carcinoma).<sup>5</sup>
- On healthy skin.

**IF YOU HAVE ANY QUESTIONS OR, CONTRARY TO EXPECTATIONS, EXPERIENCE CHALLENGES WHEN USING HYDROZID®**

Please contact Hydrozid® by email: [info@hydrozid.eu](mailto:info@hydrozid.eu)

Hydrozid® was developed by the Danish-owned family enterprise BIBAWO Medical A/S, Denmark, and is currently used in more than 20 countries around the world.

In Denmark, Hydrozid® is approved for the following therapeutic indications: acrochordon, actinic keratosis, cervical contact bleeding, condyloma acuminatum, gingival melanin hyperpigmentation, seborrheic keratosis, lentigo, molluscum contagiosum, verruca plana (flat warts), verruca plantaris (plantar warts), and verruca vulgaris (common warts).

Learn more about Hydrozid® on [www.hydrozid.eu](http://www.hydrozid.eu)

## References

1. Morgensen, M & Jensen, A. N. (2022): Fodvorter. Tilgængelig d. 01.02.2023 på: <https://www.sundhed.dk/sundhedsfaglig/laegehaandbogen/hud/tilstande-og-sygdomme/papuloese-tilstande/vorter-paa-haender-og-foeder/>.
2. Buckley, D. (2021). Cryosurgery for Warts in General Practice. Textbook of Primary Care Dermatology, pp 541- 552.
3. Sørensen, D. D. (2018): Hydrozid Evaporation Temperature Measurements when Applied to a Surface. Danish Technology Institute (DTI).
4. Ollerenshaw, J. D. (2022): Bench-Top Study of Thermal Profiles During Use of Hydrozid [Force]® and Hydrozid®. (Anthem Biotechnologies). Data on file.
5. Andrews, M. D. (2004): Cryosurgery for Common Skin Conditions. AMERICAN FAMILY PHYSICIAN. Volume 69, number 10 / May 15, 2004, pp. 2365-2372.
6. Zouboulis, C. C. (2015): Kryochirurgie in der Dermatologie. Hautarzt 2015, 66. pp. 834–848.
7. Sharma VK, & Khandpur, S. (2008): Guidelines for cryotherapy. Indian J Dermatol Venereol Leprol 2009;75(Suppl 2):90-100. Received: August, 2008. Accepted: October, 2008.
8. Saleh, K. (2021): Distant Resolution of Actinic Keratosis following Cryosurgery: An Unusual Phenomenon. Case Reports in Dermatology. 13(2):289-292. Karger, 2021.
9. Lipke, M. (2006): An Armamentarium of Warts Treatments. Clinical Medicine & Research. Volume 4, number 4: 273-293.
10. Kazeminejad, A., Ghahari, M. J. & Hajheydari, Z. (2020): Treatment of Warts in Children With Focus on Recalcitrant Warts: A Narrative Review. Journal of Pediatrics Review. 2020; 8(4):237-246.
11. Thai, K. E., & Sinclair, R. D., (1999): Cryosurgery of benign skin lesions. Australasian Journal of Dermatology, 1999, 40, pp: 175-186.
12. Sterling, J. C., et. al (2014): British Association of Dermatologists' guidelines for the management of cutaneous warts 2014. British Journal of Dermatology. 2014, pp. 696–712.