

VERRUCA TECHNIQUES

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INTRODUCTION

Verruca are common soft tissue lesion involving the foot and are caused by approximately two dozen different serotypes of the human DNA-containing papilloma virus. They invade epithelial cells affecting the skin and mucous membranes. The dermis is relatively uninvolved, and the basement membrane is left intact. Pathologic characteristics of biopsied specimens include hyperkeratosis, parakeratosis, papillary acanthosis, and elongation of the rete ridges. Upon debridement of the hyperkeratosis, characteristic pinpoint capillary bleeding is noted, as blood vessels appear to loop up into the verruca proper. Weight-bearing lesions are typically characterized by pain upon lateral compression. A differential diagnosis should include pigmented nevi, fibroma, epidermoid cyst, intractable plantar keratosis, porokeratosis, eccrine poroma and epidermal malignancies such as basal cell carcinoma, squamous cell carcinoma and melanomas.

The etiology of verruca relates to trauma to the foot such as stone bruises, shell cuts, improper weight distribution, ill-fitting shoes, and psychosomatic factors. Verruca may spontaneously involute, whereby multiple lesions persist longer than individual lesions. Endocrine and metabolic factors may play a role as well. There may also be an inherited tendency toward verruca, as fair-skinned whites are more prone to develop verruca than blacks.

The fact that there are many treatment plans for verruca suggests that no single modality provides a complete cure. The therapeutic approach should be based upon the number, size and location of the lesions, as well as to what previous modalities have been attempted. The patient's general health and age should also be taken into consideration.

ALTERNATIVE TREATMENT MODALITIES

Topical Preparations

One of the earliest known modalities in the treatment of verruca is the topical use of a mild to moderate strength salicylic acid preparation. This may be combined with lactic acid or a collodion vehicle. As of August 14, 1992, manufacturers cannot sell high concentrations of salicylic acid or a combination of salicylic acid/lactic acid in concentrations greater than 17%. Those products within the acceptable concentration range are now dispensed as over-the-counter preparations, suggesting that medically-untrained patients are capable of the diagnosis and chemical treatment of their own warts. Physicians can prescribe custom-made pharmaceutical products for individual patients in a quantity sufficient to treat only that patient.

Other available topical chemotherapeutic agents include monochloroacetic acid, bichloroacetic acid, fuming nitric acid, phenol, cantharidin, podophyllin, corticosteroids, vitamin A, and enzymes. The topical application of 5-fluorouracil (5-FU) has failed to demonstrate a clinically high success rate, and thus is not FDA approved.¹

Injections

Intralesional injection of 5-FU has produced favorable results. McCarthy reports a cure rate of 92% following intradermal injection of 0.1 to 0.4 ml, depending on the size of the lesion.² Appropriate anaesthesia is recommended. One week following injection, the lesions appear dark brown, scabbed, or blistered and may require debridement or curettage.

Intralesional injection of bleomycin, an anti-neoplastic cytotoxic antibiotic, has also proven to be successful. Koenig reported a 95% cure rate with this technique.³ Approximately .25 cc of a 0.1% solution (15 mg bleomycin in 15 ml of sterile water = 1 unit of bleomycin/ml) is infiltrated into the lesion, following the delivery of a local anesthetic. The verrucous tissue undergoes desiccation, thrombosis, and necrosis, and begins to slough within several weeks. Occasionally, debridement may be necessary. This treatment is most efficacious in treating multiple or resistant warts, especially the mosaic variety. The disadvantage of this treatment is the cost, approximately \$225.00 per 15 unit vial. Once reconstituted, bleomycin is unstable after 12 hours, thereby eliminating multi-dosing.

Cryotherapy

Cryotherapy involves the use of carbon dioxide snow, dry ice, liquid oxygen or liquid nitrogen. Limmer reported a 90% cure rate with cryotherapy.⁴ Following application, the wart appears white and hard, and subsequent erythema and a bullae form over the next several days. Debridement and drainage is performed in 7-10 days, allowing epithelialization to occur. Cryotherapy should be reserved for soft, non-weight bearing areas of the foot.

Other treatment modalities reported with varying success include needling, vaccinations, oral vitamin A, ultrasound, radio waves, radiation, high speed drilling, and psychotherapy. Electro-surgical techniques include fulguration, desiccation, hyperfercation, coagulation, and negative galvanism.

Carbon Dioxide Laser

The use of the Carbon Dioxide Laser in conjunction with surgical excision, has shown to be very effective in the treatment of verruca. It provides intraoperative hemostasis, minimizing postoperative edema, pain and scarring. A study by Mancuso reported an overall success rate of 75%, with a higher rate for solitary and new lesions, and a lower rate for recurrent or multiple lesions.⁵ Disadvantages of laser therapy use include the high cost of the instrumentation, diminished function in the face of a wet field, and the possibility of an inadvertent laser burn.

RECOMMENDED TREATMENT MODALITIES

Blunt Dissection

The author believes that surgical excochleation or blunt dissection is the present-day treatment of choice. This technique is ideally suited for isolated or multiple deep lesions. The procedure is performed under local anesthesia in an office surgical setting, using aseptic techniques.

Local anesthesia is typically obtained by infiltrating near, but not directly into, the verruca to prevent inoculation of surrounding tissue. A local anesthetic combined with epinephrine is recommended to help control intraoperative bleeding. The superficial hyperkeratosis is debrided to demonstrate a clear demarcation between normal and verrucous tissue. Using a #15 blade, the lesion is circumscribed approximately 2 mm beyond the edge of the wart tissue. The knife is intended to penetrate through the epidermis only. Using a No. 3 dermal curette or a freer elevator, the verrucous mass is bluntly separated from the underlying dermis. Care should be taken to work evenly around the circumference of the lesion in an attempt to excise the lesion in one piece. The blunt outer margin of normal skin is saucerized with a tissue forceps or knife. The base of the lesion is then thoroughly curetted to remove any remaining warty tissue. Phenol cauterization may be used to control postoperative bleeding. The wound is dressed with a non-adhesive dressing such as Adaptic or Owens silk, a topical antibiotic such as betadine, neosporin or sulfadiazine, and a dry sterile dressing. The specimen is transported to the laboratory in formalin solution, for microscopic evaluation.

The patient is instructed to keep the wound dry for 24 hours, after which the dressing is removed, and epsom salt soaks are initiated. The wound is further cleansed with hydrogen peroxide, and dressed with a topical antibiotic. Re-epithelialization is usually complete within one month, and scarring is minimal if the basement membrane is not violated. Recurrent and satellite lesions can occur.

Topical Verrusol

The author also recommends the topical use of Verrusol (R-Palisades Pharmaceutical). This is a very potent agent composed of Salicylic acid 30.0% (keratolytic), podophyllin 5.0% (roentgenomimetic and anti-metastasizing effects), cantharidin 1.0% (vesicating agent), penederm 0.5% (surfactant which facilitates release from the film and penetration) in an adherent film-forming vehicle of ethylcellulose, cellosolve, collodion, castor oil and acetone. Patient selection is important, as this therapy is typically painful. Verrusol should not be used on pregnant women, diabetics, or patients with poor circulation. Verrusol is very flammable and should be kept away from flames or fire. The 7.5 cc bottle should be capped tightly following use and stored at room temperature. If the solution thickens, it can be diluted with a small amount of acetone.

Following the debridement of verrucous tissue, a drop of verrusol is applied, using a thin-tipped applicator. The wooden stick end of a cotton-tipped applicator works well. The solution is allowed to dry, forming a white, chalky appearance, before further medication is applied. The number of drops used is dependent on the thick-

ness and size of the lesion. The lesion is then covered with clear plastic tape after it has completely dried.

Pain is usually present within several hours after application. An inflamed blister forms within 24 hours and the patient should be instructed to leave the tape on for up to 24 hours, or until the pain is no longer tolerated. The tape is then removed and the skin cleansed with a mild antibacterial soap and water. A mild to moderate analgesic is typically needed.

Aftercare is dependent on the pain tolerance of the patient and the number and size of the lesions. With small lesions, when the pain is tolerable, the lesions are left untouched for seven days at which time debridement of the lesions and de-roofing of the blister is performed. With large painful lesions, debridement is performed within 24 hours, with the use of a local anesthetic. The blister is punctured with a sharp blade and the lesion circumscribed and removed with the use of a tissue forceps. The base is curetted and the margins debrided. The patient is then instructed to soak the foot in an epsom salt bath, apply hydrogen peroxide, a topical antibiotic and a dry sterile dressing. The wound will epithelialize within one month.

CLINICALLY ILLUSTRATED SURGICAL TECHNIQUE

Excochleation of Verruca



Figure 1. Preoperative lesion, left third toe.

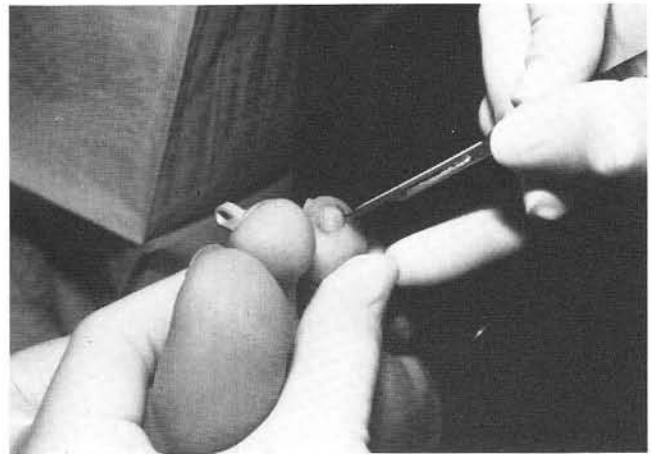


Figure 2. The lesion is circumscribed with a #15 blade.

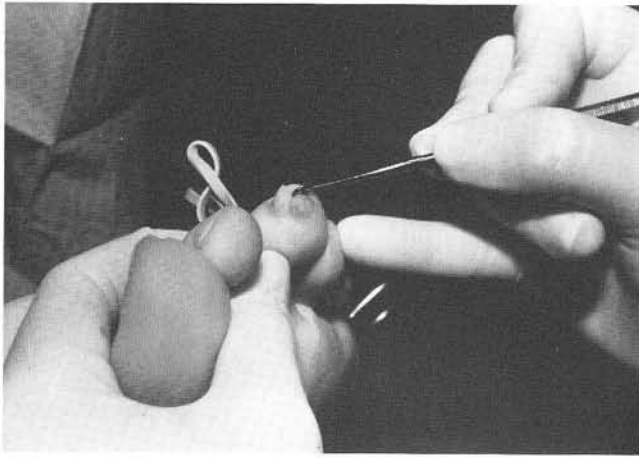


Figure 3A, 3B. Blunt dissection of the lesion is performed using a #3 dermal curette and freer elevator. The lesion is excised completely.

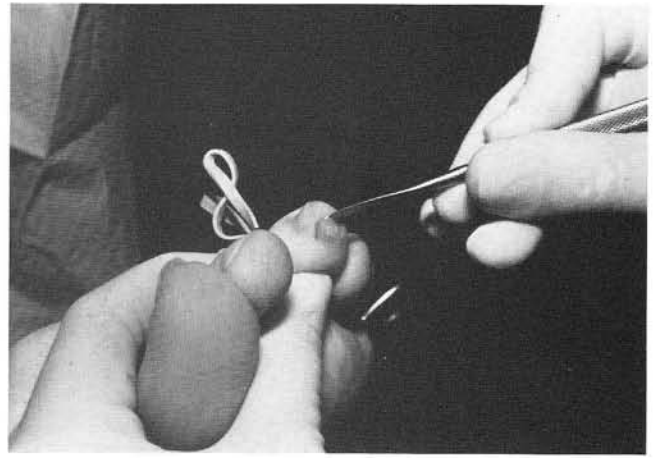


Figure 3B.

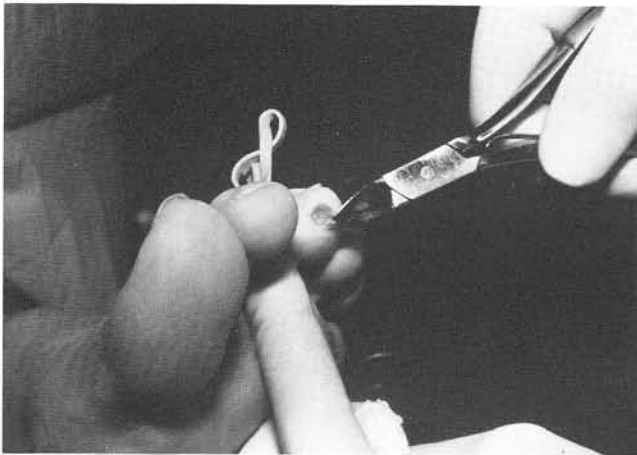


Figure 4A, 4B. Saucerization of the blunt outer margin using a tissue forceps and surgical blade.

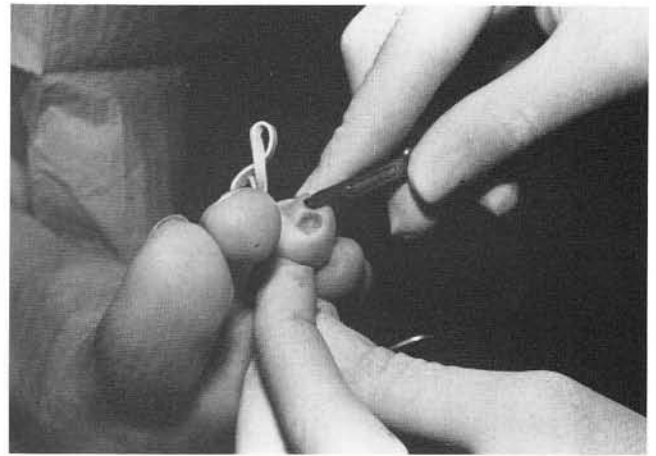


Figure 4B.

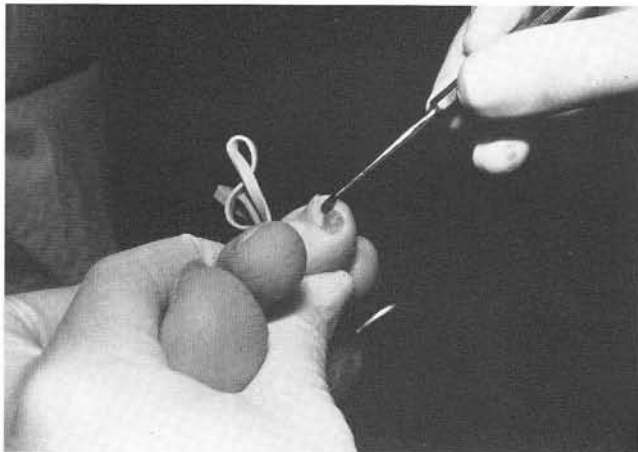


Figure 5. Curettage of the base of the lesion to remove any remaining verrucous tissue.

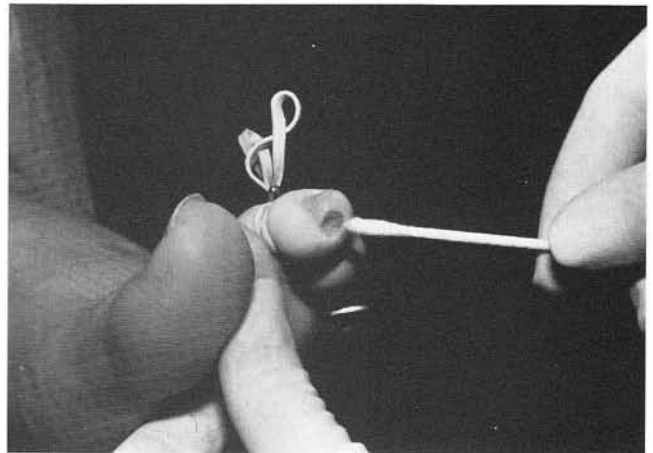


Figure 6. Phenol cauterization of the base of the lesion to diminish postoperative bleeding.

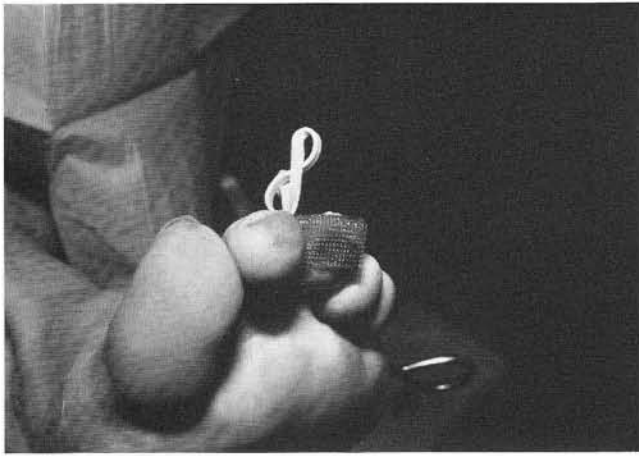


Figure 7. A betadine soaked adaptic dressing is applied.

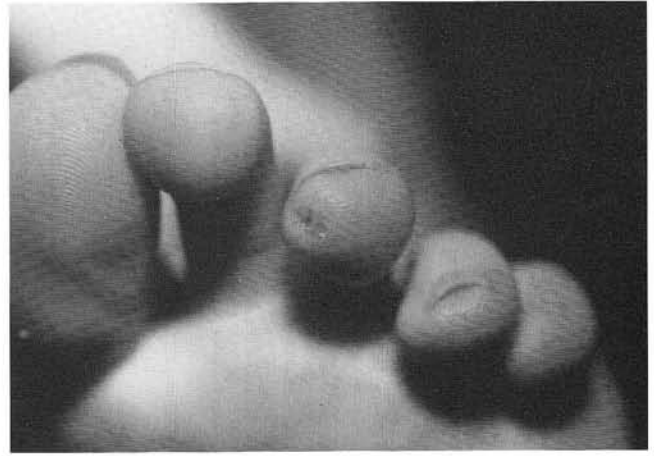


Figure 8. Appearance of the wound three weeks at postoperative.

Application of Topical Verrusol



Figure 9. Preoperative lesion on the plantar aspect of the foot

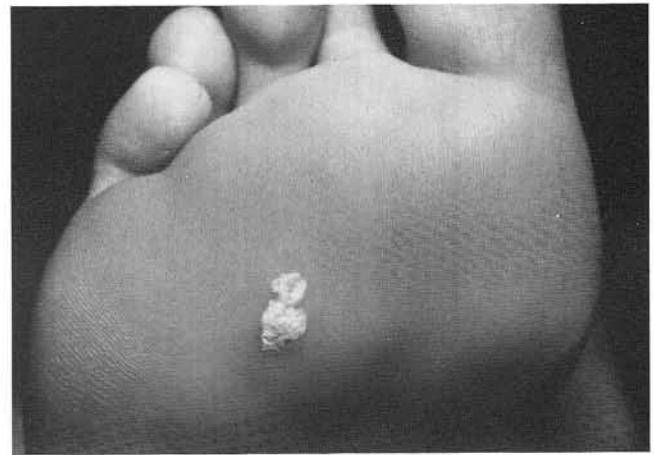


Figure 10. Application of verrusol. Note the white appearance after it has dried.



Figure 11. The wound is covered with clear plastic tape.

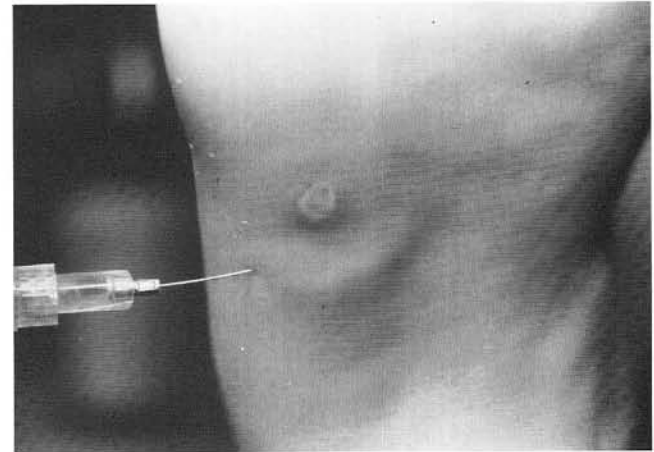


Figure 12. A local anesthetic is infiltrated proximal to the lesion 24 hours after verrusol application.

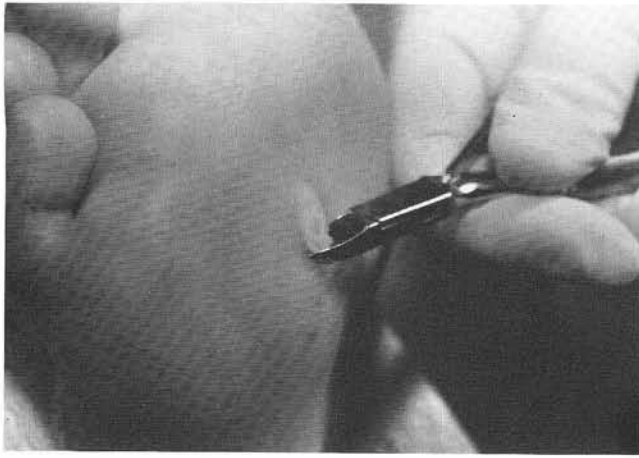


Figure 13A, 13B. Sharp excision of the blister and verrucous tissue with a tissue forceps.

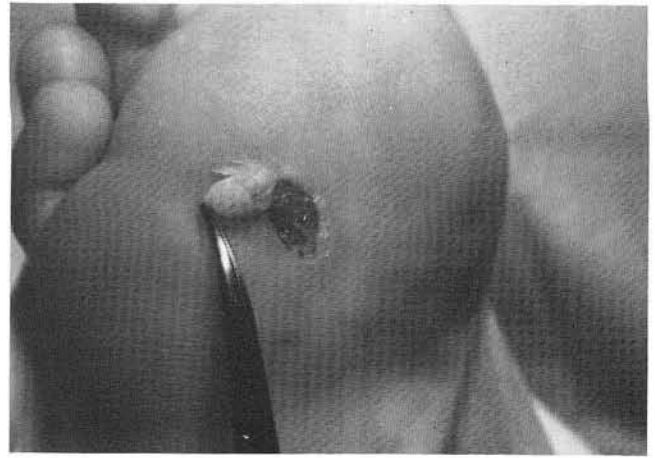


Figure 13B.

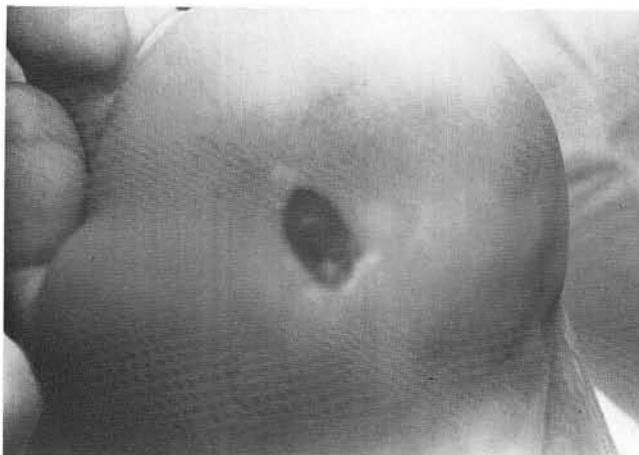


Figure 14. The wound appears clean following trimming of the margins.

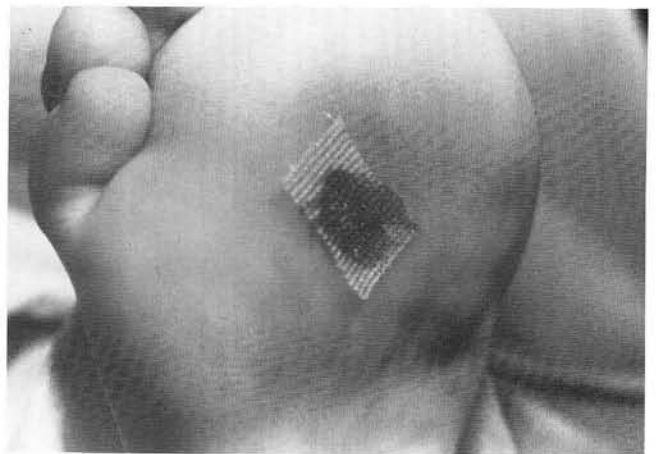


Figure 15. Adaptic gauze impregnated with betadine ointment is applied.



Figure 16. Appearance of the wound one week postoperatively.

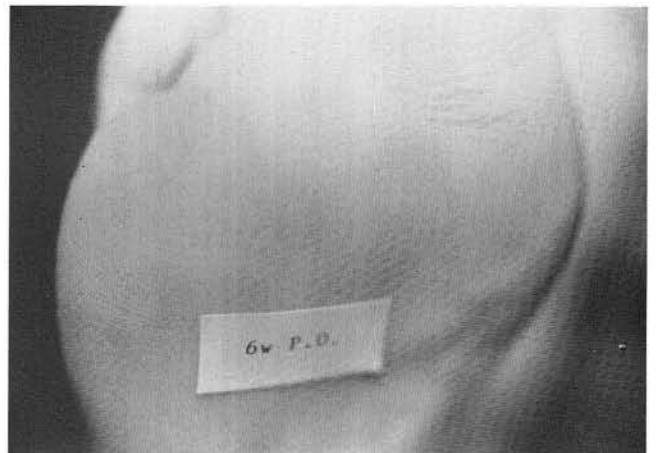


Figure 17. Appearance of the wound six weeks postoperatively showing complete resolution of the lesion.

CONCLUSION

Surgical excision is recommended for single lesions or multiple deep lesions that are grouped together. The author recommends the use of verrusol for multiple lesions of intermediate depth, where patients have a high pain tolerance. If surgical excision fails, the author recommends a follow-up with the use of verrusol. Although no prospective or retrospective studies have been performed, it is the author's opinion that better results occur, with fewer recurrent or satellite lesions, with the use of verrusol. For those patients where surgery or verrusol is not applicable, such as the pediatric patient, the daily use of a low potency salicylic acid preparation, applied before bedtime is recommended. The patient is followed in the office every three weeks.

RISK MANAGEMENT CONCERNS

Prior to any office surgical procedure, consent must be obtained. The patient must be informed that there is the risk of recurrence, or the appearance of new satellite lesions. The patient should also be informed of the possibility of the use of multiple treatment modalities.

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1. McCarthy DJ, Berlin SJ: The Ultrastructural Effects of 5-Fluorouracil in the Management of Pedal Verrucae. *J Am Podiatry Assoc* 72:403-411, 1982.
2. McCarthy DJ, Tate R, Rusin J: Intradermal Use of 5-Fluorouracil in Human Pedal Verrucae. *J Am Podiatry Assoc* 69:587-597, 1979.
3. Koenig RD, Horwitz LR: Verrucae Plantaris-Effective Treatment with Bleomycin: Review of the Literature and Case Presentations. *J Foot Surg* 21:108-110, 1982.
4. Limmer BL, Bogy LT: Cryosurgery of Plantar Warts. *J Am Podiatry Assoc* 69:713-716, 1979.
5. Mancuso JE, Abramow SP, Dimichino BR, Landsman MJ: Carbon Dioxide Laser Management of Plantar Verruca: A 6 Year Follow-Up Survey. *J Foot Surg* 30:238-243, 1991.

ADDITIONAL REFERENCES

- McCarthy DJ: Therapeutic Considerations in the Treatment of Pedal Verrucae, *Clin Podiatr Med Surg* 3:433-448, 1980.
- Rubenstein JA, Black E: Wart Treatment-A Great Stumble Backward, *Podiatry Today* 5:26, 1992.