Blast Off: Treatment of Seborrheic Keratoses with an Alexandrite 755-nm Laser After Color Enhancement

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Abstract
Seborrheic keratoses are common skin lesions affecting a majority of the population over 50 years old. Patients often present for removal of these lesions for cosmetic reasons. Many treatment modalities have been used in the past, including lasers, which have had only moderate success in removing SKs efficiently. In this case, we colored on several SKs with a black marker and then treated them with a 755-nm, long-pulsed alexandrite laser to remove them from the skin surface in a single session.

Introduction
Seborrheic keratoses (SKs) are epidermal tumors derived from keratinocytes and consisting of multiple histological subtypes. These benign lesions are typically 0.5 cm to 1 cm in diameter, round or oval and slightly elevated, with a “stuck on” appearance. They often range in color from yellow-tan to brown-black. Current literature suggests these growths are more prevalent in the Caucasian population and that men and women are equally affected. Elderly people are most frequently affected by these lesions. Risk factors apart from old age may include UV-light exposure and genetic predisposition, though the influence of these factors has yet to be determined.

Patients often seek removal of these lesions for cosmetic reasons. Several treatments have been used to remove SKs, including liquid nitrogen, electrocautery, erbium:YAG laser, CO2 laser, diclofenac gel, retinoic-acid microneedles, and electroporation. Most modalities require many treatments, often with unsatisfactory results. Our case shows that laser treatment preceded by application of black marker to the lesion can be an efficient means of SK removal.

Case Report
A 64-year-old white female presented to our office with many brown, verrucous, “stuck on”-appearing lesions located on the chest, back (Figure 1), abdomen, arms and legs, consistent with SKs. The lesions had been present for more than 10 years but had recently become irritated and pruritic after catching on her clothing. The lesions had been treated in the past with liquid nitrogen, but the patient had developed areas of hyperpigmentation from the treatment and was interested in other options. She had heard about lasers for the treatment of other skin conditions and wanted to know if a laser would be helpful in the treatment of SKs. Knowing that lasers target a specific chromophore to heat and destroy conditions of the skin, we postulated that if we colored the surface of SKs with a dark-colored marker, the laser would target that pigment and destroy the tissue.

We chose to treat the patient with a 755-nm alexandrite laser (Candela GentleLASE). Her SKs were colored in using a black permanent marker (Figure 2) before undergoing one round of treatment with the laser (Figure 3). Laser settings included a spot size of 18 mm, fluence of 20 J/cm², and pulse duration of 3 ms. In all, 523 pulses were used.

After the treatment, the SKs formed superficial blisters and fell off within 10 days (Figure 4). The patient experienced minimal pain during the treatment and stated that it was tolerable. She applied double antibiotic ointment (polymyxin B/ bacitracin topical) to the treated areas, and within two weeks she noticed a dramatic improvement in the appearance of the SKs. Several months later, she was still thrilled with the improvement but started to see recurrence in some areas where the previous SKs had been. We believe this is most likely because she underwent only one treatment.

Discussion
Although SKs do not spontaneously regress, they can be removed. Patients with large numbers of SKs will require many treatments, so it is important to choose a treatment that can be well-tolerated when used repeatedly. Lasers have been successful in the removal of SKs, particularly non-selective, ablative lasers such as the erbium:YAG and CO2; however, adverse effects such as pain and hyper/hypopigmentation may occur, especially in patients with darker skin.

Lasers work by targeting specific chromophores in the skin that absorb the energy and convert it to heat, thereby destroying the lesion. This process is called selective photothermolysis. The major chromophores of the skin include melanin, hemoglobin, and water. Melanin, located in the epidermis, is the target chromophore in seborrheic keratoses. It has an absorption spectrum of 600 nm to 1100 nm.

The alexandrite laser has a wavelength of 755 nm and therefore targets the melanin in SKs. Kim and colleagues treated 216 SKs with an alexandrite laser and observed marked improvement in most lesions. We found that treating the lesions with an alexandrite laser alone yielded unsatisfactory results, most likely due to insufficient pigment in
the SKs. Coloring the lesions with a black marker before treatment imparted more pigment, so the lesions absorbed more energy, and the SKs were heated and destroyed more effectively. Side effects of treatment include crusting or hyperpigmentation at the treatment site (our patient exhibited mild erythema), but these side-effects typically resolve within one to two days (as was the case with our patient). Alexandrite lasers also typically cause less scarring and hypopigmentation than cryosurgery or ablative lasers. For our patient, treatment with the laser was more tolerable than cryosurgery. We have treated dozens of patients with this augmented technique in the past, with consistently satisfactory results. The recurrence of some of the SKs in this case could have indicated that multiple treatments were needed in order to target the base of the lesion for complete clearance. We have also had success using this method to treat warts that do not have dark areas in them.

Culbertson performed diode-laser ablation with red-marker color enhancement on 326 patients and 1,567 SKs and achieved complete resolution of 93% of the lesions. This is the only other documented report of using color enhancement with a laser to treat SKs. To date, there are no reports of using color enhancement with an alexandrite laser or with the application of black pigment to aid in energy absorption.

**Conclusion**

There are many ways to treat seborrheic keratoses. The 755-nm alexandrite laser is a valid method of removal, especially on non-pigmented lesions color-enhanced with black permanent marker. This technique is a novel approach to treating large numbers of typically difficult-to-eradicate seborrheic keratoses.

**References**


