#### THE MEDICAL POST

**DERMATOLOGY** • Clinical Practice Guide

## Your guide to When patients want to be rid of their age spots and wrinkles, here's what to recommend—and what to avoid cosmetic dermatology

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n Canada, the top reasons for dermatological cosmetic consultations include rhytides (wrinkles), volume loss, discolouration or lentigines, and vascular changes such as telangiectasia. These are all part of the natural aging process, and are worsened by sun exposure, smoking, illness and an overall unhealthy diet and lifestyle. The field of cosmetic dermatology is evolving at a rapid pace to address these concerns—and that poses a challenge to physicians confronted for advice by patients. By reviewing the current treatments available, we aim to improve physician confidence and patient care.

#### **Neurotoxins**

Botulinum toxin is a neurotoxin produced by the bacterium Clostridium botulinum that blocks acetylcholine release in muscles, resulting in paralysis. Cosmetic indications include facial dynamic rhytides, platysmal bands, facial asymmetry (e.g., Bell's palsy) and focal forms of hyperhidrosis. Classical use is for dynamic rhytides of the upper face such as crow's feet (periorbital rhytides), horizontal forehead lines and glabellar or frown lines. Dynamic rhytides of the lower face may also be treated, including bunny lines on the nose, perioral "smokers lines," marionette lines and dimpled chin. Muscular contractions are both a causative and aggravating factor for this type of wrinkle, therefore botulinum toxin both treats and prevents future pathology. It has also proven efficacious for treating more static rhytides and folds in the lower face, neck, and chest; sculpting or shaping the face to correct for asymmetry or paralysis; prolonging and enhancing the effects of other cosmetic modalities; and aiding postoperative wound healing, which minimizes scarring.

The efficacy and safety of botulinum toxin is well established in the literature, as well as the safety of repeat treatments and combination therapy with fillers, laser and chemical peeling. Botox has been around for over 20 years, and its cosmetic usage originally was developed, researched and refined by the Vancouver husband-and-wife physician team of Dr. Alastair and Dr. Jean Carruthers. Treatment effects typically appear 48 to 72 hours after injection and last approximately three to six months. Contraindications include a known hypersensitivity to any component of the product, neuromuscular disease, pregnancy, breast feeding, and concomitant use of aminoglycosides, calcium channel blockers, penicillamine and guinine. Relative contraindications include medications that alter blood coagulation, coagulopathies and/or infection at the proposed injection site(s). Trade names of botulinum toxin serotype A include Botox, Dysport and Xeomin, which are all available in Canada. Complications are rare and usually technique dependant, therefore care should be placed in choosing a well-trained and knowledgeable physician to



Fractionated laser therapy (above) is a popular skin resurfacing option among both physicians and patients for treating wrinkles and lentigines, and improving skin tone.

administer treatment. In the event of complications and/or undesirable cosmetic results, there are compensatory techniques, but once botulinum toxin is injected, its effects on the muscle are irreversible. The U.S. Food and Drug Administration states the most frequently reported side-effects are absence of effect (63%), reaction at the injection site (19%) and ptosis (11%). Reactions to the injection site include pain, erythema, edema, bleeding, hematoma/ecchymosis, headache and short-term hyperesthesia. Skin irritation at the injection site may also induce flares of herpes labialis, therefore patients with a history of infection should receive prophylactic antivirals. Ptosis of the upper eyelid, brow, lip and cheek may be the result of product diffusion from the original site of injection or failing to respect predetermined safe injection distances from a given site. Practically speaking, cosmetic Botox is by far the most popular cosmetic procedure in the world with a very high satisfaction rate when performed properly. There is effectively no down time, the treatment takes minutes to perform and there is almost no discomfort.

#### Soft tissue augmentation

Soft tissue augmentation or "fillers" are substances injected into the dermis and/or subcutaneous tissue to treat volume loss, contour changes and rhytides secondary to soft tissue atrophy. Three categories of fillers exist: biologic, synthetic and autologous. Biologic fillers are derived from organic sources (humans, animals or bacteria) and come in three sub-classes: hyaluronic acid, acellular soft-tissue matrix and collagen. Hyaluronic acid (HA) is the most widely used soft-tissue augmentation material in Canada, largely due to its efficacy, safety and reversibility. Once injected, it binds water and provides a bulking effect that lasts four to 18 months (depending in part on the location treated). The effect may be extended with adjunctive botulin toxin use, particularly in glabellar and forehead lines. Indications for treatment include: glabellar, forehead, periocular, marionette and vertical lip rhytides; nasolabial folds; lip, cheek and temporal atrophy; jawline augmentation; panfacial volume augmentation; and atrophic scarring. Low, medium and high-viscosity preparations exist, which correct progressively deeper folds and volume loss. Depending on the patient's needs, different viscosities may be layered to address both deep folds and superficial lines. In the event of

complications or unsatisfactory results, HA fillers are reversible with hyaluronidase, an enzyme that degrades the HA within the tissue. The impermanence and reversibility of HA fillers are appealing to many patients, especially those new to cosmetic procedures or who are more risk adverse. The relative ease of use and "off-the-shelf" availability makes HA a convenient product for physicians as well. Also, most HA fillers now come with an anesthetic inside them, which has dramatically reduced discomfort from the procedure.

The most common complications for all fillers, including HA, are lumps, bumps and irregularities, pain, ecchymoses and overcorrection. Since HA is derived from organic sources, sensitization, disease transmission and immunogenicity are potential risks of the product. Allergic reactions occur in approximately one in 3,000 patients. Rare but serious complications include nodules, soft-tissue necrosis and embolic phenomena. If addressed in a timely manner, these complications may be reversed or minimized with hyaluronidase, warm compresses, nitroglycerine paste and ASA. Any physician administering treatment should have these tools immediately accessible. A high degree of knowledge of which "danger zones" to avoid, and developing a fine-tuned skill of proper injection techniques, is invaluable.

Synthetic fillers are the second category of softtissue augmentation and are made from manufactured materials like calcium hydroxyapatite (CaHA), poly-L-lactic acid, polymethylmethacrylate and silicone. They are absorbed more slowly by the body and provide a semi-permanent cosmetic result lasting one to three years. These fillers are not only long-lasting but irreversible, and have been criticized for higher rates of complications including granulomas, acute or delayed infections, migration and displacement of the material, and inflammatory nodules or papules. Removal of the material when these complications arise can lead to scarring and deformity. The longevity, irreversibility and  $\geq$ potential complications of these products make them more appropriate for patients with prior experience and/or more extensive soft-tissue atrophy. Lastly, autologous fillers are derived from the patient's own tissues such as platelet-rich fibrin matrix, dermis, fascia, cartilage, fat and cultured fibroblasts. These procedures are more involved for both the patient and physician and are not offered in most clinic settings. As such, they are beyond the scope of this review.

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is solar lentigines, which arise

peels are most appropriate for

this indication given their depth

of penetration and risk profiles,

therefore these will be the focus

or all of the epidermis, which

may stimulate collagen forma-

tion in the papillary dermis.

They are attractive to a wide

patient base as they may be

hyperpigmentation and are

used on any skin pigment with

minimal risk of postprocedure

proven to improve skin texture.

They lighten solar lentigines,

however they may not resolve

them completely, therefore this

depth of peel is most appropri-

Other pathology improved with

ate for individuals with only

minor pigmentary changes.

Superficial peels remove part

of our discussion.

secondary to sun exposure. Superficial and medium-depth MAY 26, 2015 **17** 



Before and two weeks after botulinum toxin injection.







#### **Chemical peels**

Chemical peels are a form of controlled wound induced by one or more exfoliating agents. Epidermal regeneration is achieved during the healing process by migration from adnexal structures or the adjacent epithelium, which may improve skin colour and texture, reduce pore size, reduce fine lines and remove actinic damage. Among other methods of skin resurfacing, chemical peels are most affordable for the patient. Three categories of chemical peels exist: superficial, medium-depth and deep. The names reflect the depth of penetration and degree of desquamation, with superficial peels penetrating to the papillary dermis, medium-depth peels to the upper reticular dermis and deep phenol peels to the mid-reticular dermis. The disorders (melasma, post-inflammatory hyperpigmentation, freckles, lentigines); acne (superficial acne scars, post-acne dyspigmentation, comedonal acne); aesthetics (photoaging, fine superficial wrinkling, <sup>5</sup> dilated pores, superficial scars); and epidermal growths 🖞 (seborrheic keratoses, actinic keratoses, sebaceous <sup>5</sup> hyperplasia). The most common indication, however,

this depth of peel are ephelides (freckles), actinic keratosis, thin seborrheic keratosis, acne vulgaris, post-inflammatory hyperpigmentation and melasma. Peeling agents include: low concentrations of glycolic acid; trichloroacetic acid 10% to 25%; Jessner's solution (resorcinol/salicylic acid/lactic acid); tretinoin; 5-fluorouracil; salicylic acid, a beta-hydroxy acid; solid  $CO_2$  slush; and alpha hydroxy acids (AHAs). Multiple peels, ranging from four to eight, every one to four weeks, are usually required to achieve maximal results. With every peel, desquamation and re-epithelialization generally takes one to four days.

Medium-depth peels exfoliate beyond the basal layer of epidermis where melanocytes responsible for pigmentary changes reside and therefore more effectively treat dyspigmentation and provide a greater improvement in skin texture. They are appropriate for patients with more extensive photodamage and lighter skin tones, ideally Fitzpatrick I to III. Although this depth of peel may still be used on Fitzpatrick skin types IV to VI, the risk of post-inflammatory hyperpigmentation is greatly increased. Peeling agents include: trichloroacetic acid 35% to 50%; solid CO<sub>2</sub> + 35% trichloroacetic acid; Jessner's solution + 35% trichloroacetic acid; 70% glycolic acid + 35% trichloroacetic acid; 88% phenol; and pyruvic acid. Medium-depth peels are also performed in a series of treatments, typically once permonth or so. Desquamation and re-epithelialization typically take five to seven days and 10 days, respectively, with postprocedure erythema lasting sometimes a few weeks. It is important to note that the results achieved with multiple superficial peels are not equivalent to those achieved with one medium-depth peel, which is a common misconception among patients and doctors.

Potential complications of chemical peels include: pigmentary changes (most common in darker skin tones); infections; milia in up to 20% of patients; acneiform eruptions in almost all acne-prone patients receiving medium-depth peels; and scarring, especially in the lower part of the face. Additional minor sequelae that may occur with any depth of peel include pain, erythema (temporary or persistent), pruritus and swelling/edema. To prevent complications, it is essential that patients have a healthy foundation for wound healing, such as adequate blood flow to the treated area, capacity for re-epithelialization and immune competency. For this reason, relative and absolute contraindications to treatment include patients with a history of poor wound healing, HIV infection, hypertrophic or keloid scar formation, excessive actinic damage and recent oral or topical retinoid usage. With chemical peels, the majority of complications may be predictable and preventable.

#### Lasers

Lasers are another method of skin resurfacing used to treat photoaging, which is characterized by roughened skin texture and variable degrees of dyspigmentation, telangiectasias, wrinkling and skin laxity. Lasers are a complex topic, therefore our aim is to simplify it by dividing lasers into two broad categories: ablative and non-ablative. The most common indications for laser therapy in cosmetic dermatology are lentigines and telangiectasias, therefore these will be the focus of our discussion.

Ablative laser energy is selectively absorbed by water, resulting in ablation of the epidermis and upper part of the dermis via vaporization. This type of injury stimulates de novo collagen and elastin formation and collagen contraction, which provides excellent and predictable textural **continued on • page 18** 



## **Continuing Medical Education Program**

### **Changing the Face of Rosacea: An Update on Managing Common Manifestations of the Condition**

This online program has been accredited by the College of Family Physicians of Canada for up to 1.0 Mainpro-M1 credit(s).

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#### **LEARNING OBJECTIVES**

Upon successful completion of this continuing education program, you will be better able to:

- 1. Review the most common clinical presentation of rosacea
- 2. Discuss the different subtypes of rosacea
- **3.** Counsel a patient on the different treatment options for rosacea
- **4.** Discuss the different treatment options to help with the redness associated with rosacea

#### **PROGRAM DETAILS:**

Rosacea is a highly prevalent dermatological condition seen in primary care. It is believed to affect up to 10% of the general population. With it predominantly affecting facial skin, it has been shown to have a negative impact on the patient socially, emotionally and deteriorate their overall quality of life. This program will help you to identify the common clinical presentation and counsel the patient on treatment options.

This program was supported in part by an educational grant from Galderma

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and pigmentary results. These types of lasers include  $CO_2$  pulsed, erbium:YAG pulsed, and fractionated lasers. Pulsed  $CO_2$  laser is considered by many to be the gold standard for resurfacing and is particularly effective at treating lentigines and other dyschromias, mild to moderate perioral, periocular and glabellar rhytides, and diffuse actinic damage.

With ablative lasers, the entire epidermis is destroyed, therefore, the postoperative period of re-epithelialization and associated risks are similar to medium-depth peels previously discussed. Expected side-effects from ablative laser include erythema, edema and pruritus. Complications include prolonged erythema, milia, acne, contact dermatitis, infection, herpes exacerbation, hyperpigmentation, hypopigmentation, hypertrophic scarring and ectropion. Again, like chemical peels, a healthy foundation for wound healing and meticulous postoperative wound care are paramount to optimizing results and preventing adverse effects. Fractionated lasers are not as aggressive and require more treatments, but they have less down time and are much safer and thus have become far more popular among physicians and patients.

Non-ablative lasers, on the other hand, use a technique called selective photothermolysis, which combines the appropriate wavelength of light, fluence (dose), pulse duration and protective skin cooling to induce a selective thermal injury in targeted structures without damaging the surrounding tissue. Pigments in the skin, such as melanin found in lentigines, terminal hairs (for laser hair removal treatments) and oxyhemoglobin found in telangiectasias can therefore be specifically destroyed. Telangiectasias associated with rosacea and actinic damage have particularly excellent clearance with an incidence of scarring less than 1%, even after multiple treatments. Other indications for this technique include rhytides and roughened skin texture. The advantages of non-ablative lasers are less down time and a lower risk of infection and scarring, but clinical outcomes are more modest than ablative procedures and multiple sessions (for example, three to six) are often required. Patients with mild to moderate photodamage or rosacea are good candidates for this technique. Types of non-ablative lasers include pulsed-dye, Nd:YAG, diode, erbium glass and intense pulsed light or broad-band light (the latter not being a "true" laser source).

Relative contraindications to laser resurfacing include: active dermatitis or infection, history of hypertrophic or keloid scarring, history of koebnerizing dermatitis (psoriasis, vitiligo, etc.), history of photo-induced dermatitis, recent topical or oral retinoid usage, recent ablative resurfacing, medium or deep chemical peel, or surgery to the proposed area. Fitzpatrick skin types IV to VI are at increased risk of postoperative hyperpigmentation and thermal damage. Likewise, individuals with suntans are also at greater

risk for spotty hypopigmentation, therefore preoperative sun avoidance and/or sunscreen is essential for success. Postoperatively, lentigines rarely recur after complete clearance when future sun exposure is minimized. Special consideration must be given to suspicious pigmented or telangiectatic lesions, which should be biopsied if there is any concern for malignancy.

#### Conclusion

Primary prevention remains the best approach to healthy youth-

ful skin. Sun safety, tanning bed avoidance, smoking cessation and an overall healthy diet and lifestyle should be advocated at every office visit. Highlighting the cosmetic consequences of unhealthy habits may further motivate patients to make positive changes that also benefit their overall health. If cosmetic treatments are pursued, great care should be placed in selecting the appropriate procedure as well as a knowledgeable, well-trained physician to administer it to ensure therapeutic success. MP

#### For further reading

· Carruthers A, Carruthers J. Botulinum Toxin: Procedures in Cosmetic Dermatology, 3rd Ed., 2013. • Flint PW, et al. Cummings Otolaryngology - Head and Neck Surgery, 6th Ed., 2015, p. 391-408. • Hruza GJ, Avram MM. Lasers and Lights: Procedures in Cosmetic Dermatology, 3rd Ed., 2013. • Neligan PC. Plastic Surgery, 3rd Ed., 2013, p. 1-77. • Robinson JK, et al. Surgery of the Skin, 3rd Ed., 2015, p. 357-580. • Tung RC, Rubin MG. Procedures in Cosmetic Dermatology Series: Chemical Peels, 2nd Ed., 2011.



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