

# Cosmetic Dermatology: or an aestheti

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*Throughout the ages, the human race has been preoccupied with the quest for preserving and enhancing the aesthetic appearance of the human form*

Disfigurement of face and body through disease or trauma has inspired the development of various ingenious surgical and non-invasive techniques which, aided by advances in research and technology, have evolved into the speciality of plastic and reconstructive surgery. In tandem with these developments, society has imposed an increasing desire to retain and enhance aesthetic features, so it is not surprising that the application of these techniques would eventually evolve into the fascinating art and science of aesthetic dermatology. The boundary between correcting and enhancing desirable features or changing unflattering ones has thus been blurred, and in the following article, we shall be reviewing some examples of these applications.

## Botulinum toxin (BTX)

Botulinum toxin is the exotoxin of the spore-forming anaerobe *Clostridium botulinum*. BTX works on the neuromuscular endplate and other cholinergic synapses, causing irreversible synaptic blockade. BTX has been used since the 1980s in suitably modified form to treat dystonias such as blepharospasm, spasmodic torticollis, limb dystonias and dysphonias.<sup>1-3</sup> The cosmetic properties of BTX were discovered quite by chance when a patient being treated for blepharospasm by a pioneering ophthalmologist commented that her periorbital wrinkles had greatly improved over the course of therapy. Subsequent trials on facial wrinkles led to widespread acceptance of this technique as a very effective treatment for hyperfunctional facial expression lines such as frown lines or those around the eyes<sup>4</sup> (Figure 1). BTX is even used to effectively treat axillary and palmar hyperhidrosis.<sup>5</sup> Since the body breaks down this substance, the effects described above are not permanent and top-up treatment is needed for continued efficacy.

## Dermal fillers

Tissue augmentation, the filling-in of dermal or subdermal defects, is a technique which has found clinical applications in reconstructive surgery, ophthalmic and ENT fields and orthopaedics. In cosmetic dermatology worldwide, dermal fillers occupy fourth place in the list of most performed procedures. The earliest tissue expander was autologous fat which today is undergoing

a revival with improved extraction and injection methods. Intensive research and innovative pharmacology have provided a variety of natural or synthetic fillers.

Hyaluronic acid is an avian-derivative of the connective tissue matrix of the skin, and is used to fill in wrinkles, enhance lips and contour chin and cheeks<sup>6</sup> (Figure 2).



**Figure 1:** Before and after BTX treatment of crow's feet around eyes.



**Figure 2:** Lip augmentation with Hyaluronic acid.



**Figure 3:** Thread vein removal with sclerotherapy.



**Figure 4:** Laser hair removal of facial hair - before and after.

Unlike many other fillers, it is immunologically inert and does not need test-patching on the patient, but, being organic, it is broken down eventually and requires a top-up after about 6 months for continued effect. Collagen is one of the longest established fillers and can be either naturally extracted from bovine tissue,<sup>7</sup> again requiring top-ups after a few months; or a semi-synthetic development with a longer life span of 3 to 5 years.<sup>8</sup> These products are used to correct acne and other scars, frown lines, deep wrinkles and nasolabial folds. They do require a test-patch since some people are immunologically sensitive; the most recent development in this field has been human collagen (cadaveric or bioengineered) which has entered clinical use this year after FDA approval.

There are also synthetic fillers such as Gore-Tex and silicone which have much longer persistence but carry attendant risks of complications notably rejection, granuloma formation and scarring.

## Non-surgical facelifts

Toning up the facial and neck muscles by using micro-current stimulation has become an established and effective alternative to the scalpel. The technique is the legacy of technology developed to treat patients suffering from facial paralysis as a result of stroke or Bell's palsy by delivering electric pulses to stimulate muscles. In aesthetic dermatology, the technique is suitable for the whole face including lips and eyes as well as neck and throat.

## Microexfoliation

Microexfoliation is a highly effective form of treatment for several types of skin conditions such as acne, facial scarring and post-surgical scars, but cosmetically has been applied to improve pigmentation, stretch marks and the effects of skin aging. The principle of the technique is that by removing the most superficial skin layers, skin turnover is encouraged with production of a healthier skin and subdermal matrix. Traditionally, exfoliation has been carried out by controlled application of  $\alpha$ -hydroxyacids (eg. glycolic and lactic acid) but a more recent development is microdermabrasion which is a mechanical exfoliation where tiny granules of sterile aluminium oxide are directed at high speed onto the skin surface to produce a 'sandblasting' effect. In both these techniques, the depth of the exfoliation can be precisely controlled for the respective outcome, and the procedures are carried out without need for anaesthesia.

## Sclerotherapy

The selective destruction of unwanted veins by injecting chemicals into them is a procedure that has been applied to a



# A medical intervention or a cosmetic procedure?



**Figure 5:** Intense pulsed light treatment of facial veins – before and after.

variety of vascular conditions ranging from non-surgical removal of varicose veins, down to ablation of the minute spider or thread veins mostly on the lower limbs which may be the cause of symptoms such as cramps, leg pain or heaviness. Many patients however seek this treatment for cosmetic removal of unsightly thread veins (Figure 3). Various chemicals have been used,<sup>9</sup> including hypertonic saline, mannitol, polydocanol and tetradecylsulfate. The procedure involves multiple injections of the chemical into the length of the vessels using a very fine needle, following which the veins close up and is absorbed by the body over a period of a few weeks. There is usually no need for anaesthesia and the patient is ambulant and can remain active immediately after the procedure.

## Laser treatments and intense pulsed light

Light-based therapy has been one of the greatest technological success stories of recent times and its rapid evolution continues to push this modality to the forefront of therapeutic and cosmetic applications. Laser uses a focused beam of light of one specific wavelength, whereas intense pulsed light sources give out a broad wavelength spectrum but uses a selection of filters to cut off successive wavelengths depending on the indication of the treatment. Both systems operate on the principle of *selective photothermolysis* which means that individual wavelengths can selectively target and destroy specific structures in the skin by thermal energy, with minimal effect on surrounding less sensitive tissue. Light-based therapy has thus been used to selectively destroy pigmented lesions, thread veins and unwanted vessels, birth marks as well as excess facial and body hair<sup>10,11</sup> (Figures 4, 5).

The latest cosmetic application which has gained worldwide popularity is photorejuvenation<sup>12</sup> whereby intense pulsed light is used to reverse the harmful effects of sun exposure and stimulate the natural production of collagen by the skin, with improvement of texture and elimination of blemishes such as age spots, thread veins, open pores and facial wrinkles.

## Mesotherapy

Developed in 1952 by a French doctor, mesotherapy is a fascinating technique



**Figure 6:** Mesotherapy of bra strap folds – patient before and after a series of treatments.



**Figure 7:** Mesotherapy of abdominal fat and cellulite – before and after.

whereby medication is injected into the mesoderm, which is the layer of fat and connective tissue between the dermis and subcutaneous tissue. Clearance of any injected substance from this area is slow, leading to a controlled release and persistence of the substance into the vicinity of the application thus enabling a localised desired effect. The principle has been a development of prolotherapy where various medications are infiltrated in the vicinity of joints, tendons and soft tissues to treat a variety of orthopaedic and sport-related conditions.<sup>13</sup> Although mesotherapy has not yet been universally endorsed on account of approval of the concoction of substances used, its undeniably successful results have made it popular worldwide in treating a myriad of cosmetic conditions including overall weight loss, spot weight reduction (non-surgical liposculpture) and cellulite reduction, as well as for hair loss, scar revision and wrinkle elimination<sup>14,15</sup> (Figures 6, 7).<sup>16</sup>

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