Restoration of orofacial aesthetics: A new multidisciplinary concept

Authors: Drs Hermes Pretel, Jackson Lins & Ismael Drigo Caçao, Brazil

Introduction

Since ancient times, humanity seems to focus on the characterization of aesthetics standards which modulate the individuals and make them being noted and appreciated by the society in which they live. For this reason, trends in aesthetics are always established by standards determined by society as a whole. In dentistry, this applies too, hence the pursuit of oral aesthetics using the best technological and human resources in the various specialties. Nowadays, any oral restoration procedure is initiated from a detailed plan, which aims to satisfy the patient’s wishes. In general, the intended result of treatment is healthy, well-aligned, whitened teeth with an ideal occlusion and with a harmonious integration of orofacial aesthetics.

The time when the work of a dental surgeon entailed only exodontia, aggravated by the fear caused by the noise coming from the high-rotation system, belongs to past. Fortunately, whether owing to the evolution of the materials we use or formation improvement, today we are recognized for the excellence of our work, which unites science and art to provide safe and comfortable treatments, combining function and aesthetics in one of the regions of the body that most requires care, the face.

In the new area of orofacial aesthetics, as with other areas of dentistry, diagnosis and planning are indispensable for excellent dentofacial aesthetics. For the feasibility of these treatments, a multidisciplinary approach, employing new techniques such as botulinum toxin, filling materials and phototherapy, is an essential therapeutic approach for treating many dysfunctions. Therefore, in addition to dental procedures, new and efficient procedures, which are aimed at not only oral restoration but also orofacial restoration, are used for treating a gummy smile, dystonia, mandibular spasms, temporomandibular joint dysfunction syndrome, hypertrophy of the masseter, orofacial pain, loss of support of the lips, short interdental papillae or black space between the teeth, and other epidermal dysfunctions.

The aim of this article is to present new concepts in orofacial dentistry in order to promote new supporting therapies in the pursuit of multidisciplinary treatment. Using botulinum toxin for therapeutic purposes, filling dynamic wrinkles resulting from facial expressions with filling materials, and the application of phototherapy to orofacial aesthetics will be considered.

Discussion

The botulinum toxin commercialized in Brazil by different pharmaceutical companies originates from a Gram-positive bacterium called Clostridium botulinum. There have been many reports on the action of
Botulinum toxin since the middle of 18th century, when Justin Kerner described it as “sausage poison” because of the effects in patients after eating contaminated sausage. Only in 1949, did Arnold Burgen report the discovery of the blocking action of botulinum toxin on neuromuscular transmission. Since then, many studies have been conducted on the therapeutic and cosmetic uses of botulinum toxin. It was first used for therapeutic purposes with the approval of health regulatory agencies in 1989 in ophthalmology to treat strabismus, blepharospasm and hemifacial spasms.

From 2000, botulinum toxin Type A began to be widely used in muscular and cosmetic therapies but without indication of use, that is off label.1

When it is injected into muscle, botulinum toxin Type A paralyses muscular movement. The mechanism of action of botulinum is the inhibition of acetylcholine, the neurotransmitter released by the action of nerve impulses at neuromuscular junctions, thus preventing muscular contraction. Consequently, temporomandibular joint dysfunction syndrome, muscular hypertonia (trismus), migraines and gummy smiles, among others, are dysfunctions that may benefit from the use of the toxin (Figs. 1a–3b).2

Botulinum toxin is contra-indicated in lactating and pregnant women, people with autoimmune diseases, neurological diseases and diseases that affect the muscles, people allergic to egg protein and people using medicines derived from aminoglycosides.

Among the major risks of botulinum toxin is overdosing and application to incorrect regions, which may result in asymmetry. In terms of health, it could affect the movements necessary for good function such as blinking, chewing and swallowing.3

Botulinum toxin has a temporary effect, thus its treatments must be seen as palliative and not definitive. For this reason, if treatment is satisfactory, it will have to be repeated to maintain the results. There is not a rule, each person has a singular reaction, but the applications are generally done every six to eight months, always by a skilled professional. The possibility of developing resistance and thus requiring increasingly higher dosages and shorter intervals between treatments is a matter of debate. Some studies show that over time the patient may develop resistance to the toxin, indeed requiring higher dosages in future applications. This dosage excess may cause an insensitivity of the patient to the effects. Other studies however show that over time the need for the toxin is reduced, which implies that lower dosages are required. After some time the relaxed muscle shows a decrease of conditioning spontaneous of activity, as an atrophy, thus explaining the decrease in need of toxin.4, 5

Filling materials are widely used in medicine. In orofacial dentistry, filling materials such as polymide, hyaluronic acid and hydroxyapatite are employed to fill nasolabial folds, the lips, the barcode lines of the upper lip and short interdental papillae, also known as black triangles or black spaces, and to sculpt the Cupid’s bow and model the philtrum, the vertical groove in the center of the upper lip. (Figs. 4a–5c).6, 7

Therapeutic procedures to restore function are combined with procedures to restore aesthetics in
industry report - new concept of aesthetic restoration

Phototherapy combines function and aesthetics. Therapeutic lasers have been used for over 50 years in diverse medical specialties. The effects of phototherapy are based on the absorption of the electromagnetic energy and its conversion into chemical energy in the cell. This photo-biostimulation promotes the acceleration of scarring processes, as well as bio-modulation of pain and tissue remodelling.

Associated with dental treatment, orofacial aesthetics provides the link between the mouth and face. Phototherapy for aesthetic purposes thus assumes an important role in multidisciplinary treatment. Different wavelengths are used to treat facial dysfunctions that affect aesthetics. The most studied wavelengths are red, infra-red, amber and blue. The red wavelength acts directly on the mitochondria, increasing cell metabolism and, consequently, tissue repair. The infra-red wavelength acts on the cell membrane, modifying its permeability, controlling the input and output of ions, and modulating the propagation of nerve impulses in controlling pain. The amber wavelength interacts with the ribosomes responsible for amino acid synthesis. Finally, the blue wavelength increases the quantity of intra-cellular fluid, promoting hydration and cell swelling.

In orofacial aesthetics, phototherapy, among other therapies, is used to effect an increase in collagen, tissue swelling and whitening, cell biostimulation and lymphatic drainage.

Conclusion

Therefore, orofacial dentistry offers dental surgeons a multidisciplinary approach, combining oral and facial treatment, providing minimally invasive, integrated treatment with effective results in the dental practice. New treatments and therapies are constantly being integrated into modern dentistry. For this reason, continuing education is essential for the development of orofacial aesthetics.

Editorial note: A complete list of references is available from the publisher.

about the authors

Dr Hermes Pretel, DDS., MSc., PhD, is a dental surgeon, a master and doctoral degree in Dentistry Sciences by Faculdade de Odontologia de Araraquara – FOAr – UNESP; Researcher of Grupo Bimateriais, Laser and Led in bone and dental repair of FOAr – UNESP, Scientific Director of Núcleo de Pesquisa e Ensino de Fototerapia nas Ciências da Saúde – Nupen (Research and Teaching Center of Phototherapy in Health Sciences) – Brazil. He can be contacted at hpretel@hotmail.com.

Dr Jackson Lins is a dental surgeon and a lawyer. He works at a private dental practice in Iguaba Grande, Brazil.

Dr Ismael Drigo Cação is a dental surgeon, a master and an expert in facial phototherapy. Habilitation in laser by Conselho Federal de Odontologia (Dentistry Federal Council) – CFO – Brazil.

Figs. 5a–c. Immediate post-op photograph of Case 5 (a), filling of nasolabial folds, upper lip, Cupid’s bow and philtrum using Aqualift (c). During the procedure, the points requiring filling were marked (b).

Figs. 6a–c. Case 6 treated to effect facial hydration and lighting using facial phototherapy biophotonics, showing photoactivation of collagen mask with blue LED (Elite, DMC) during the procedure (b).