

# ESSENTIALS OF DERMAL FILLERS TREATMENT

CBAM Aesthetic Mastery Series



## PRINCIPAL AUTHORS:

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Dr. Mohsen Talani



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# ABOUT AUTHORS



Dr. Reza Akef is a highly experienced and respected cosmetic physician, with over 15 years of experience in teaching and practicing cosmetic medicine. He is currently the Assistant Professor at McMaster University and the Chairman of the Canadian Board of Aesthetic Medicine (CBAM), where he shares his knowledge and expertise with other healthcare professionals to provide the best care for their patients.

Dr. Akef is board certified by the College of Family Physicians of Canada in both Family and Emergency Medicine. Additionally, he is deeply involved in interventional pain practice cooperation for the treatment of Migraines, chronic pain, TMJ, Myofascial pain, and Fibromyalgia. He is a leading cosmetic physician and an internationally recognized specialist in non-surgical cosmetic procedures.

Dr. Akef is dedicated to understanding his clients' concerns and creating personalized treatment plans that meet their needs and goals. He is committed to thoughtfully and strategically creating individualized combinations of leading, safe treatments that exceed client expectations. He is also the founder of Angel Gloss spa in Toronto, an established, leading destination for non-surgical cosmetic procedures for individuals seeking leading physicians with proven experience, the latest technology, and cutting-edge techniques.

Dr. Akef is actively involved in multiple training courses, webinars, and conferences all around the world, including prestigious international conferences such as IMCAS, AMWC, and Dubai Derma. He participates as a speaker at these events and is always looking to stay up to date with the latest developments in the field of cosmetic medicine.

**Mohsen Talani** is the Director of CBAM. He has over 18 years of experience teaching anatomy in Canada and internationally to students and healthcare practitioners in different fields of medicine such as physicians, dentists, nurses, chiropractors, and physiotherapists.

After graduating from medical school at a young age, he became a medical doctor in his home country, Iran, and practiced in the field of emergency medicine. While pursuing his Master's thesis in neuroscience at McGill University, he discovered his passion for teaching. Since then, he has been working in the field of medical science education, with a focus on anatomy.

He strongly believes that with the rapidly growing aesthetic industry, all practitioners should have a profound knowledge of skin basics, fat compartments, muscles, blood vessels, and nerves, in order to provide safe and effective care to clients and prevent or minimize post-treatment complications linked to lack of anatomy knowledge.

He is currently training healthcare practitioners who seek to have a deep knowledge of anatomy. He incorporates fun, innovative, and easy-to-understand methods of teaching in all of his classes, guest lectures, and presentations. Additionally, he supervises the cadaver lab dissections and hands-on practicals.

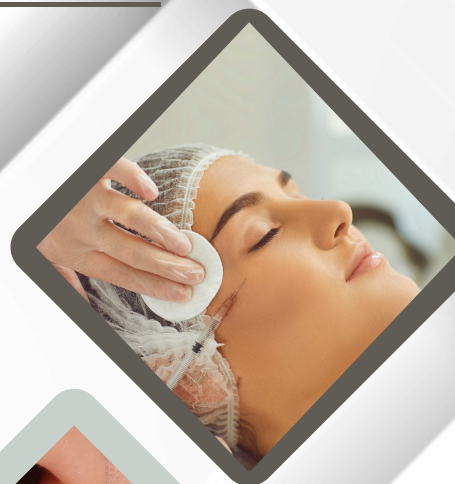


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# INTRODUCTION

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# Introduction

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Dermal fillers have reshaped the landscape of aesthetic medicine, enabling practitioners to perform subtle yet transformative enhancements with minimal downtime. As a versatile non-surgical approach, fillers address various aspects of facial aging, such as volume loss, skin laxity, and wrinkle formation. These treatments cater to a growing demand for minimally invasive options that achieve natural-looking results, allowing patients to enhance their appearance without the need for surgery.

The global surge in demand for dermal fillers reflects a shift in patient preferences toward subtle enhancements and gradual improvements. As a result, dermal fillers are now used not only for rejuvenating mature skin but also for preventive treatments in younger patients, aiming to maintain youthfulness and delay the visible effects of aging.

## **Historical Background and Development of Dermal Fillers**

The concept of augmenting facial volume and structure can be traced back to early plastic surgery. Initial attempts,

using substances like paraffin, were largely unsuccessful due to complications. In the late 20th century, bovine collagen injections became the first widely recognized filler, offering temporary results. However, issues such as allergic reactions limited their use, necessitating a breakthrough in safer, biocompatible materials.

The introduction of hyaluronic acid (HA) fillers in the 1990s marked a significant milestone in dermal fillers. HA is a naturally occurring polysaccharide in the body that attracts and retains water, providing hydration and elasticity to the skin. This biocompatibility, combined with the reversible nature of HA fillers, set a new standard for safety and efficacy in aesthetic treatments. Subsequent developments in filler materials, such as calcium hydroxylapatite and poly-L-lactic acid, have further broadened the options available to practitioners.

## **Mechanisms of Action: How Fillers Work**

Each type of filler provides unique benefits depending on its composition and mechanism of action:

- **Hyaluronic Acid (HA) Fillers:**

Hyaluronic acid (HA) is a naturally occurring polysaccharide polymer composed of repeating disaccharide units of d-glucuronic acid and N-acetyl-d-glucosamine. First isolated in 1934 by Karl Meyer and John Palmer from the vitreous humor of bovine eyes, HA is abundant in the human body—approximately 15 grams in a 70 kg individual—and is found in the umbilical cord, joints, vitreous humor, skin, and connective tissues.

HA can be sourced from animals like rooster combs, bovine vitreous humor, shark skin, and human umbilical cords, as well as from non-animal origins such as bacteria, fungi, and plants. Notably, HA derived from animal sources tends to have higher levels of endotoxins and protein residues compared to that obtained from non-animal sources. Conversely, HA isolated from bacteria exhibits higher purity and greater immunogenicity.

The molecular weight (MW) of HA varies depending on its source, leading to different biological effects. The classifications include oligosaccharide HA (o-HA, less than 10kDa), low molecular weight HA (LMW-HA, 10–250kDa), medium molecular weight HA (MMW-HA, 250–1000kDa), high molecular weight HA (HMW-HA, over 1000kDa), and very high molecular weight HA (vHMW-HA, exceeding 6000kDa). LMW-HA has potent pro-

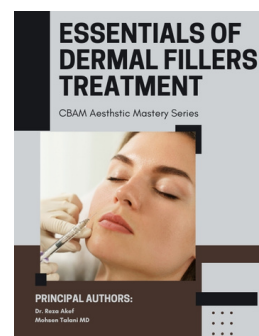
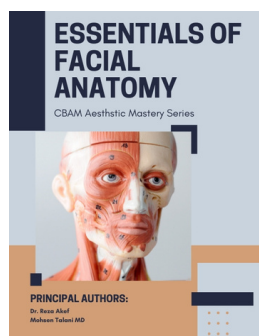
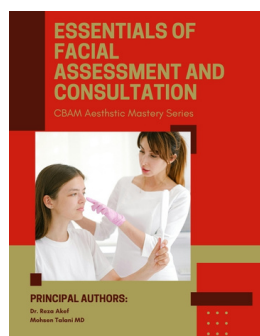
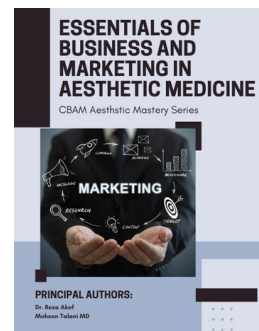
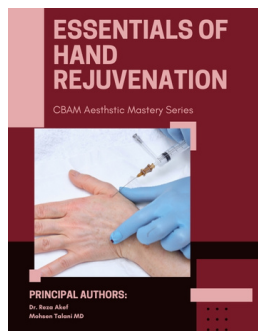
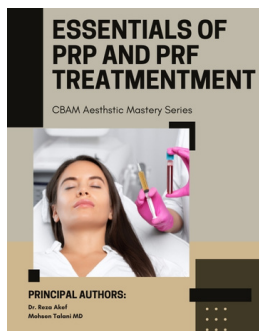
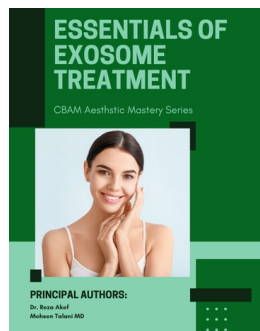


**Fig 1. Hyaluronic acid (HA) is a naturally occurring polysaccharide polymer composed of repeating disaccharide units of d-glucuronic acid and N-acetyl-d-glucosamine.**

inflammatory actions and can promote angiogenesis and wound healing, whereas HMW-HA exhibits anti-inflammatory effects and anti-angiogenic activity, acting as a natural immunosuppressant.

Located in both the extracellular matrix (ECM) and pericellular matrix, HA contains numerous carboxyl and hydroxyl groups, enabling it to retain up to 1,000 times its weight in water. This high level of hydrophilicity allows HA to hydrate the ECM, thereby modulating tissue homeostasis. Additionally, HA forms a protective coat around cells and serves as an intercellular signaling molecule that regulates cell proliferation and migration. Within cells, it participates in controlling inflammatory processes.

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## Principal Authors:



**Dr. Reza Akef**

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Dr. Reza Akef is a highly experienced and respected cosmetic physician, with over 15 years of experience in teaching and practicing cosmetic medicine. He is currently the Assistant Professor at McMaster University and the Chairman of the Canadian Board of Aesthetic Medicine (CBAM), where he shares his knowledge and expertise with other healthcare professionals to provide the best care for their patients. Dr. Akef is board certified by the College of Family Physicians of Canada in both Family and Emergency Medicine. Additionally, he is deeply involved in interventional pain practice cooperation for the treatment of Migraines, chronic pain, TMJ, Myofascial pain, and Fibromyalgia.



**Dr. Mohsen Talani**

MD, Anatomist

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