



Dr. Lee uses both the Thermage radiofrequency procedure and vitamin C iontophoresis for skin tightening and facial contouring.

# Exploring The Science of Collagen

**Malaysian consultant plastic surgeon Dr. Charles Lee talks about how combination treatment with radiofrequency and iontophoresis holds promise in rebuilding the facial support system.**

Photos courtesy of Dr. Charles Lee

When it comes to creating a younger, firmer appearance in the face, many surgeons look for ways in which to bolster the support network of the facial tissues – namely, the matrix of collagen that keeps our faces taut and supple.

Dr. Charles Lee, a Malaysian consultant plastic surgeon practicing in Kota Kinabalu, uses a novel approach to accomplish just this. By combining the tightening effects of radiofrequency treatment with a non-invasive means of delivering vitamin C to the lower levels of the skin, he believes that doctors can effect a host of beneficial changes in the collagen of the face – particularly when it comes to skin tightening and facial contouring.

“This combination of treatment, involving both creative science and art, will shape the future of non-invasive aesthetic treatments for facial rejuvenation,” he says.

## THE ART AND SCIENCE OF WORKING WITH COLLAGEN

There was a time when the only way to

reposition the skin and other tissues of the face was through surgery. And though surgery still rules the roost when it comes to dramatic redraping of facial tissues, the art of achieving rejuvenative results without surgery has become an art in the science of aesthetic medicine.

“What is the science behind the remodeling and repositioning of tissues in the face without invasive surgery?” Dr. Lee asks. “The answer: ‘the science of collagen.’”

Collagen, a naturally occurring fibrous protein, provides the structural support for skin, ligaments, tendons, bones and blood vessels and is the target of any treatment in facial rejuvenation that uses radiofrequency modalities. In short, collagen is the ‘glue’ that holds the newly contoured and tightened facial skin envelope together in its newly remodeled position.

Clinically proven radiofrequency treatments, such as the Thermage ThermaCool System, allow for the superficial layers of the skin to be left intact, while at the same

time tightening the deeper dermal collagen and soft tissue layers through denaturing of the collagen fibrils. This occurs as a result of the deep heat created by the focused energy from the radiofrequency device. Immediate contraction of the existing collagen fibrils and long term collagen remodeling through new growth takes place in three dimensions, and this natural, biological process produces a subtle, younger looking face, contoured to last for a few years. Clinical reports show improvement in the wrinkles around the eye area, eyebrow height and cheek and neck sagging.

Increasing patient demand for aesthetic rejuvenation procedures along with the strong desire for minimal downtime and very low risk has enabled Thermage to carve a niche in the aesthetic marketplace of cosmetic surgeons as a one-time non-invasive procedure for skin tightening and facial contouring. But how long do the results last?

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– Dr. Charles Lee, Malaysian consultant plastic surgeon

“The answer to this,” explains Dr. Lee, “lies in the degree of response of the denatured collagen to tissue repositioning and the amount of new growth of collagen that forms the new bulk of the fibrous protein ‘glue’ that will keep the re-contoured skin envelope tightened and lifted. The clue to this response lies in the supply of vitamin C.

“When skin ages, it gets thinner and loses its volume of collagen content and gives the ‘sagging look’ that we do not want to see,” Dr. Lee continues. “Vitamin C, or ascorbic acid, is essential in the synthesis of collagen in the body. Vitamin C is also a strong antioxidant. In the course of being irradiated by the sun daily, we generate something called reactive oxygen species, or free radicals. I call these free radicals ‘biological terrorists,’ as they can be quite destructive to tissues, and we have to protect against this. And it turns out that vitamin C (ascorbic acid) gets rid of these free radicals resulting in a much healthier, supple, younger-looking skin.”

The problem, he says, is this: the amount of vitamin C that you can get into the skin by eating fruits or vegetables rich in vitamin C is very tightly controlled. The body has mechanisms that limit the amount that can be absorbed and the amount that actually can be delivered to

the skin.

“Thus, the most effective way to deliver this essential vitamin to the skin directly and provide the catalyst for new collagen growth as well as photoprotection is using iontophoresis technology,” Dr. Lee says.

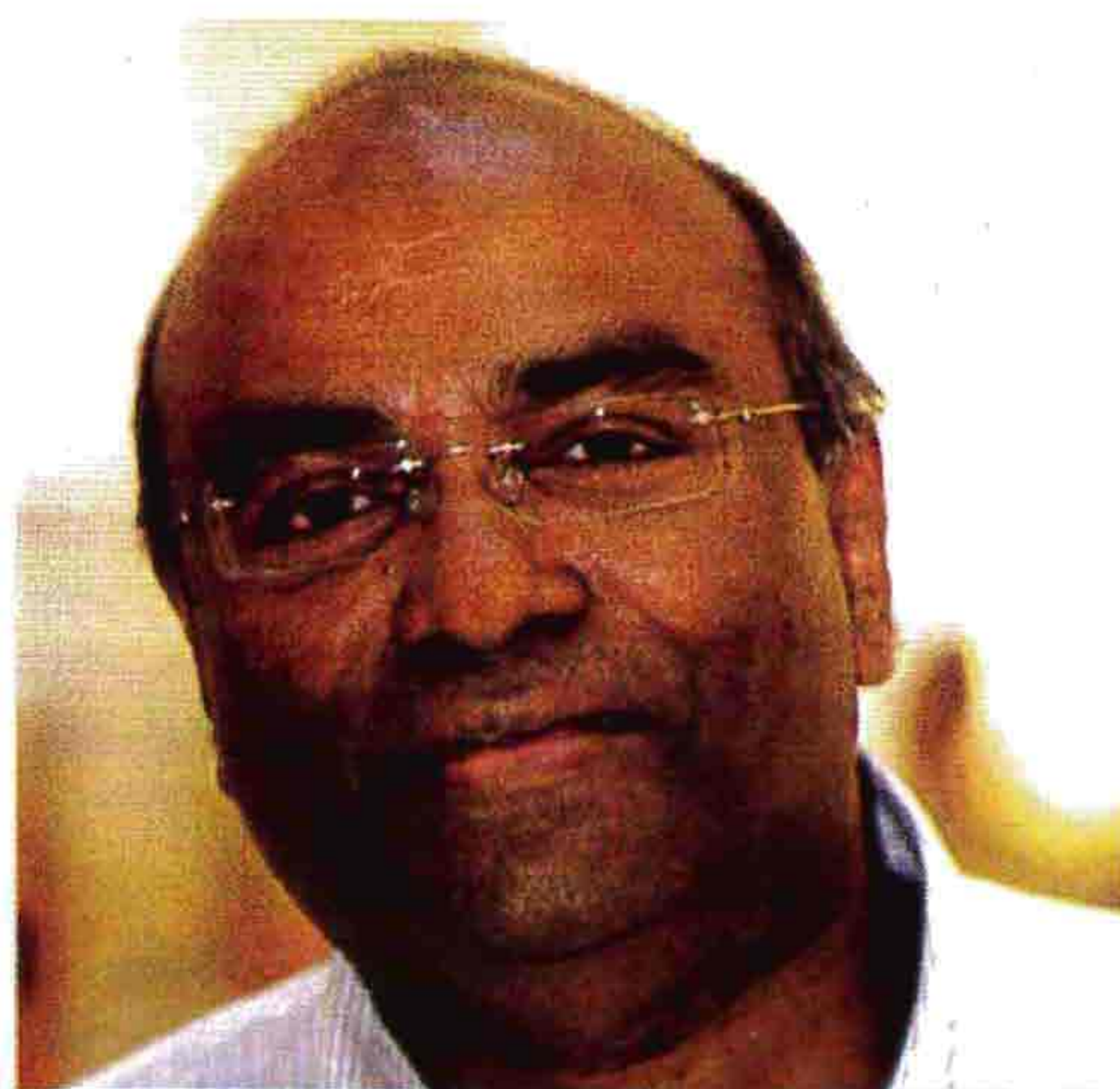
#### VITAMIN C AND IONTOPHORESIS

Iontophoresis technology is based on the principle that an electric potential will cause ions in solution to migrate according to their electrical charges – that is, the treatment can actually cause charged particles like those in vitamin C to be pulled through the skin into the deeper dermis and underlying tissues. It is in these tissues that the new collagen is being produced and the process of remodeling and tissue repositioning takes place over several months. Thus, this method provides a non-invasive means that employs a direct electrical current to induce ions to be transferred transdermally into and across the

skin. Encouraging results from clinical trials and reports have shown this method of delivery of vitamin C for the treatment of skin pigmentation in conditions such as melasma to be effective.

#### RADIOFREQUENCY AND IONTOPHORESIS

By combining both technologies in facial rejuvenation, the denatured collagen fibrils,



Malaysian consultant plastic surgeon Dr. Charles Lee says combining radiofrequency treatment with iontophoresis can have significant benefits in terms of collagen restructuring.

## CONFRONTING “MINIMALLY-INVASIVE MANIA”

As technology and the science of medicine continue to advance, aesthetic procedures that once required major plastic surgical intervention are gradually being replaced by more minimally-invasive and non-invasive techniques.

“There is a glut in the aesthetic marketplace of various non-invasive modalities that promise to turn back the hands of the clock, and each user heralds his or her own device as a breakthrough in facial rejuvenation,” Dr. Lee laments. “What we constantly need to remember is that we require *both* the science of medicine and the innovative state-of-the-art advances in new technology to mould our thinking processes in order to offer the right choice of treatment in the realm of noninvasive aesthetic surgery and obtain the best results that are safe and long-lasting.”

Thus, he notes, it’s as if doctors need to go “back to the future” in order to rethink the science behind their treatment modalities in order to offer the best professional treatment and results to patients.

“With the current plethora of non-invasive techniques – office-based botulinum toxin injections, injectable filler materials, growing number of non-ablative lasers and other modalities (intense pulsed light and radiofrequency devices), the science of medicine seems to have been pushed backstage,” Dr. Lee says.

as a result of the focused deep heat from the Thermage radiofrequency procedure, now have the fuel for new collagen growth – namely vitamin C (ascorbic acid) – available exactly where it is needed.

“The combination of radiofrequency and iontophoresis technology provides an exciting new frontier in the science of non-invasive facial rejuvenation that embraces both the science of healing and new collagen formation,” Dr. Lee concludes. “With more clinical trials we should be able to achieve results that are more predictable and long-lasting.” 