

## Recent Innovations in Dental Education at NYUCD

# Life, Death, and One Man's Quest

to Demystify the  
Inner Realms of  
the Human Body



NYU dental anatomy  
class circa 1950's

In 1977, Dr. Gunther von Hagens, a physician and member of the faculty at the Anatomical Institute of Heidelberg University, discovered that by replacing water and lipids in biological tissues with reactive polymers, he could produce and preserve amazingly durable anatomical specimens while eliminating toxic chemicals. He called this process “plastination,” a new technology that produces dry, odorless, perfect specimens that can last virtually indefinitely. “I found it incredible,” says Professor von Hagens, “that before that we were able to go to the moon, but we were not able to preserve bodies properly.”

Dr. von Hagens' first thought was that plastination had the potential to revolutionize how anatomy is taught and learned. Because his approach to teaching dental anatomy combines layered dissection with slices from the

head and neck, students using these pre-dissected, plastinated specimens can avoid the time-consuming process of peeling back tissue layer by layer and dissecting it into sections to learn where all the important structures are. In fact, the reverse happens. Because students are able to work from the inside out, rather than from the outside in, they can view every structure simultaneously in three dimensions: from top to bottom, from front to back, and from left to right.

But since German universities mandate that all medical and dental students dissect human cadavers as a formal part of their studies, Dr. von Hagens offered the process, which he had patented, to schools outside of Germany. Very quickly he found that his colleagues in Japan and elsewhere were eager to learn how to plastinate.

Today plastination is used at more than 40 medical and dental schools throughout the world as an adjunct to anatomical dissection.

But still more dramatic change is coming. Dr. von Hagens has joined the NYU College of Dentistry as a visiting professor to help design the first non-dissection anatomy curriculum in the U.S. to use

plastinated specimens exclusively as an educational model. According to Dr. Louis Terracio, Associate Dean for Research and a trained anatomist, “We expect that when fully implemented, this new approach will transform the

way anatomy is taught to dental students. By eliminating the time students spend creating specimens, we can maximize the time they have

to learn and assimilate anatomy. In an extremely overcrowded dental curriculum, the advantages of this innovation cannot be overstated. Moreover, because the specimens are

permanently preserved and easily available, students are more likely to continue to study anatomy once they get to the clinics and see the relevance of anatomical study to patient care.”

DR. VON HAGENS HAS JOINED THE NYU COLLEGE OF DENTISTRY AS A VISITING PROFESSOR TO HELP DESIGN THE FIRST NON-DISSECTION ANATOMY CURRICULUM IN THE U.S. TO USE PLASTINATED SPECIMENS EXCLUSIVELY AS AN EDUCATIONAL MODEL.

A human body that has been plastinated allows Dr. von Hagens to show horizontal slices through the chest at the level of the shoulder.

## Life, Death, One Man's Quest *continued*

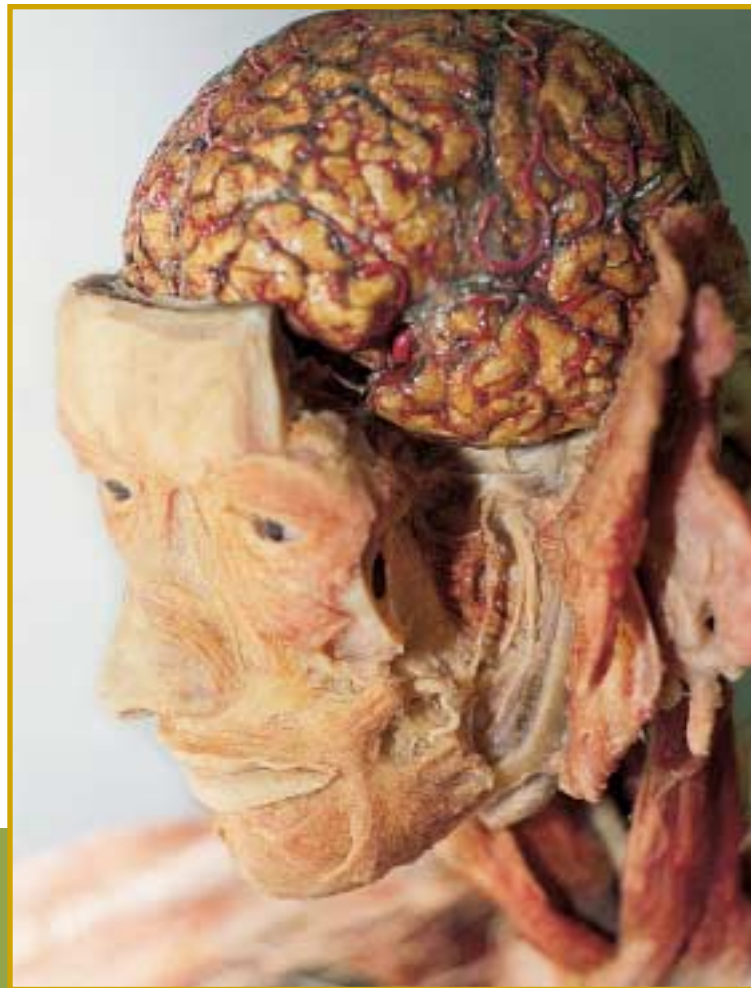
### Democratizing Anatomy

Dr. von Hagens discovered that another advantage of plastination is its ability to solidify soft tissue so that specimens can be stabilized and posed in a variety of realistic, attractive, life-like poses. That discovery led to the realization that plastination could not only make anatomy education more efficient and effective for physicians and dentists, but, as he puts it, it could also “democratize” human anatomy by making it accessible to the general public, rather than only to physicians and dentists.

In addition to helping the public to become better educated about their bodies — how and where a disease occurs and how it might be prevented, as well as where things happen during surgery — Dr. von Hagens also wanted to give potential donors a new way to determine their post-mortem existence for themselves — to keep their humanity after death, so to speak. Equally important, he

wanted to challenge long-held taboos on death and dealing with dead bodies. He was convinced that, given an opportunity to view the never-before-seen inner realms of the human body, most people would react not with revulsion, but with awe, heightened respect, and pride in the physical facts and functions of their bodies.

The result is a collection of plastinated human bodies, called “Body Worlds,” or “Körperwelten” in German, that appear to combine the stark realities of an anatomy lesson with the stylized construction of an art exhibit.



Dissection of the trigeminal nerve.

“When viewing the exhibits,” says Dr. von Hagens, “we become aware of the naturalness of our bodies and recognize the individuality and anatomical beauty inside. Plastination allows viewers to study the entirety of the body, and to understand themselves as a wonderful part of nature. The body is not wet or in fluid anymore. It is colorful, not smelly. With this approach, I can change the way people see themselves.”

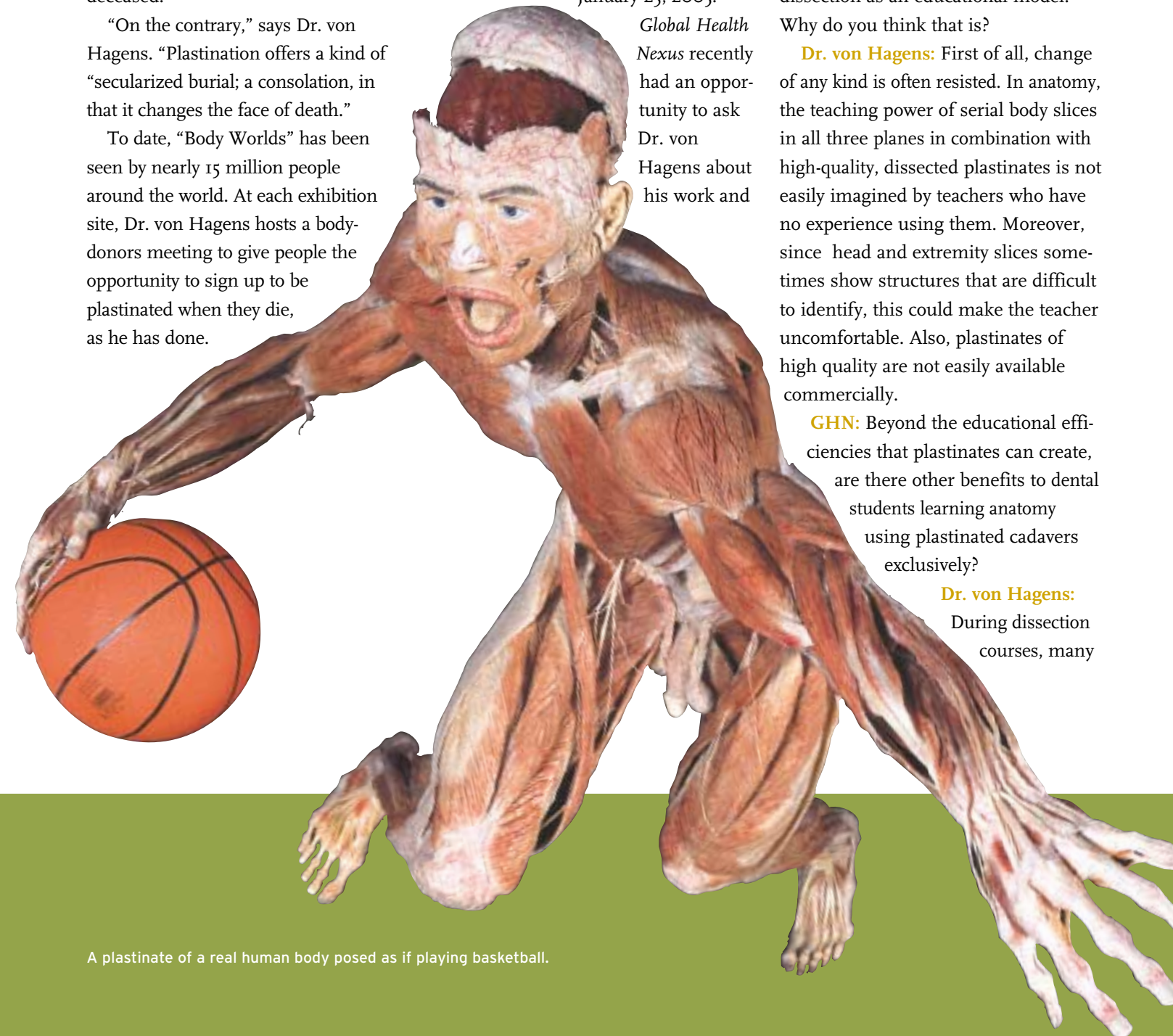
“Body Worlds” was first shown in Germany at the Museum for Technology and Labor in Mannheim during the winter of 1977-1978. The exhibition included plastinates of real human bodies posed as if playing basketball, swimming, pole-vaulting, fencing, and even a chess player (also known as The Thinker) staring down at the board with his brain exposed.

Within a four-month period, nearly 800,000 people visited “Body Worlds” — often as many as 4,000 viewers a day — underscoring Dr. von

Hagens’ contention that there was a vacuum of knowledge waiting to be filled. But while 77 percent of visitors acclaimed the exhibition, saying it evoked “a deep reverence for the human body,” others objected, arguing that the display of whole-body plastinates violates the dignity of the deceased.

“On the contrary,” says Dr. von Hagens. “Plastination offers a kind of “secularized burial; a consolation, in that it changes the face of death.”

To date, “Body Worlds” has been seen by nearly 15 million people around the world. At each exhibition site, Dr. von Hagens hosts a body-donors meeting to give people the opportunity to sign up to be plastinated when they die, as he has done.



A plastinate of a real human body posed as if playing basketball.

Approximately 6,000 people have already signed up to donate their bodies to the plastination project, fully aware of how their bodies might be used. In July 2004, “Body Worlds” traveled for the first time to the United States, to the California Science Center in Los Angeles, where it will remain until

January 23, 2005.

*Global Health Nexus* recently had an opportunity to ask Dr. von Hagens about his work and

its relevance to both academia and the public. His responses appear below.

### Questions for Gunther von Hagens

**Global Health Nexus (GHN):** More than a quarter of a century after you introduced plastination, most medical and dental schools still insist on using dissection as an educational model. Why do you think that is?

**Dr. von Hagens:** First of all, change of any kind is often resisted. In anatomy, the teaching power of serial body slices in all three planes in combination with high-quality, dissected plastinates is not easily imagined by teachers who have no experience using them. Moreover, since head and extremity slices sometimes show structures that are difficult to identify, this could make the teacher uncomfortable. Also, plastinates of high quality are not easily available commercially.

**GHN:** Beyond the educational efficiencies that plastinates can create, are there other benefits to dental students learning anatomy using plastinated cadavers exclusively?

**Dr. von Hagens:** During dissection courses, many

Life, Death, One Man's Quest *continued*

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*Dr. Guther von Hagens*

students are holding a scalpel in their hands for the first time. In the few hours available for dissection, a “massacred” specimen is too often the result. Bloating, discoloring, and surrounded by the caustic odor of formaldehyde, wet cadavers for these students are an unpleasant but necessary evil. This can have a critical psychological impact that influences their approach to patients later. Lifelike, dry, and odorless plastinates change this story. Students react like visitors to “Body Worlds” and develop anatomical pride, admiration, and are reconciled to

reality, rather than repulsed. This is proven by the comments of many students who become donors for plastination, whereas body donation

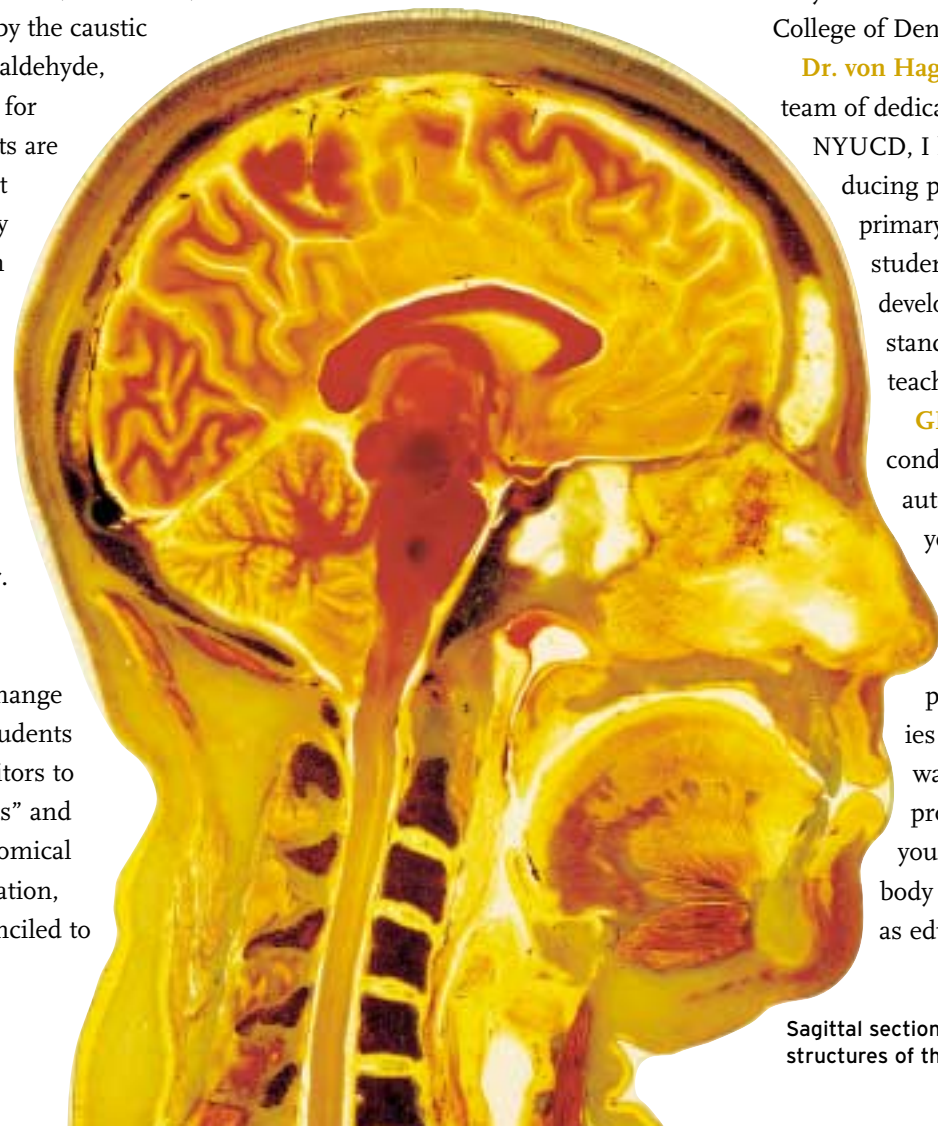
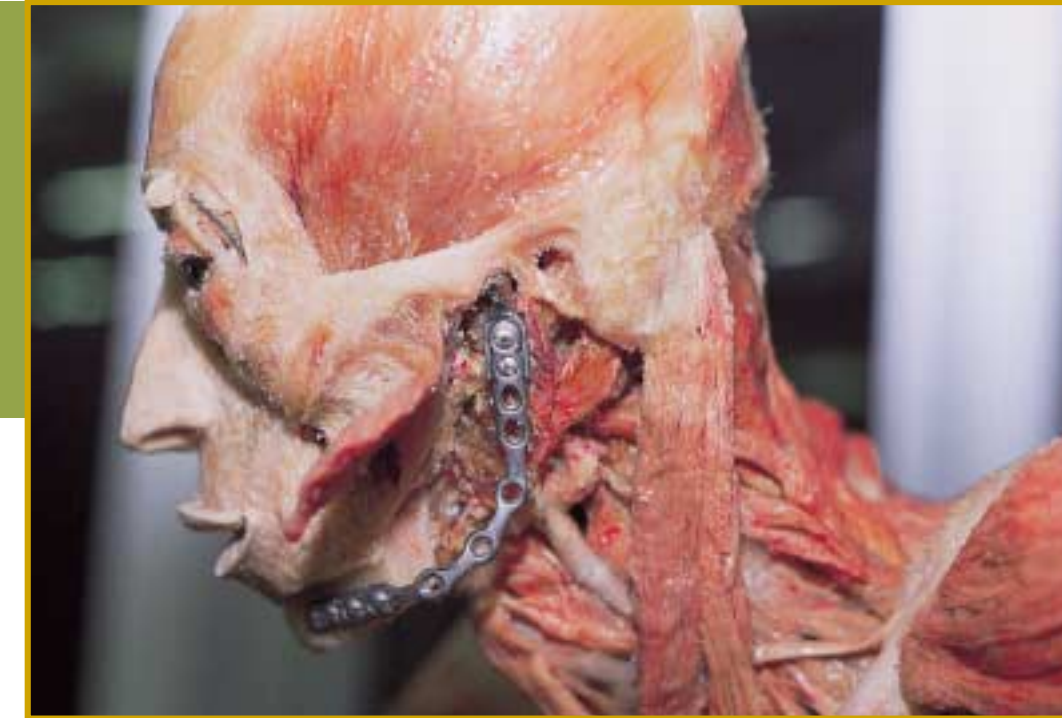
for conventional anatomy by medical and dental students is virtually unknown.

**GHN:** What are your expectations for your affiliation with the NYU College of Dentistry?

**Dr. von Hagens:** Working with a team of dedicated faculty at NYUCD, I look forward to introducing plastinates as the primary teaching aid for dental students, and ultimately to developing an accepted standard for plastinated teaching specimens.

**GHN:** In 2002, you conducted the first public autopsy in Britain in 170 years. Your argument was that public autopsy was important in order to educate people about their bodies and about death. Why was the actual autopsy process necessary since you already had whole-body plastinates available as educational models?

Jawbone prosthesis after partial resection of the jawbone because of oral cancer.



Sagittal section through the head showing structures of the brain and oral cavity.

**Dr. von Hagens:** The aim of public autopsies is to show the taxpayer and the potential subjects of autopsies this important medical procedure first-hand. If members of the public are to agree to autopsies of their loved ones, they must have the right to witness the procedure. The audience should be able to grasp the process from the first incision to the removal and examination of organs, formulation of a cause of death based on available evidence, sampling of tissues for microscopic examination, replacement of the organs, and reconstruction of the body.

**GHN:** Now that the exhibition has traveled to so many cities throughout the world, do you feel that the controversy initially surrounding it will fade?

**Dr. von Hagens:** In Germany, it took 40 years for the controversy concerning nudity in public art forms to fade. Today it is normal for a model or actor to undress if a particular aesthetic effect requires it. I am confident that one day, when permanent plastination museums are

established in many cities, people will find it unbelievable that plastinates were not universally accepted initially.

**GHN:** Is there a difference in the reception shown to “Body Worlds” overseas and in the U.S.?

**Dr. von Hagens:** The reaction to “Body Worlds” differs from country to country. In Asia, a non-European country, it was never controversial as

it was in Switzerland, Austria, Britain, and Germany, probably because of the historical memory in those countries of dissection as the ultimate death penalty, rather than as a route to knowledge. In the U.S., the exhibition has been especially positively received. I attribute this to the fact that for Americans freedom to access any form of knowledge is considered a fundamental right. Moreover, Americans are health conscious, curious, and not overly superstitious.

**GHN:** Do you have plans to bring “Body Worlds” to New York?

**Dr. von Hagens:** Hopefully in 2005, but a lot depends on finding a suitable venue in time.

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