



FACULTEIT GENEESKUNDE EN
GEZONDHEIDSWETENSCHAPPEN



CETRAS: Center for Training and Research in Anatomical Science

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What is “CETRAS”? What is the purpose?

Gross anatomy is one of the fundamental topics in **medical education**. Dissection courses still play an important role in learning anatomy, in **undergraduate** as well as in **postgraduate** education.

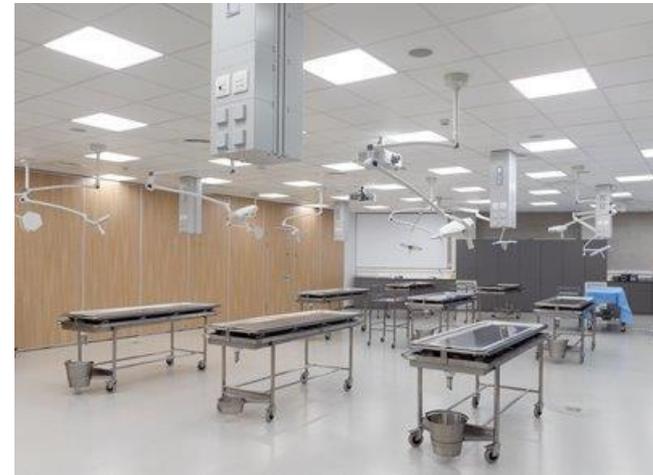
- Modern anatomy facility
- Fully equipped anatomical laboratory with technical and scientific co-workers

New **endoscopical** techniques are invented for surgery and interventional radiology and demand **improved training at postgraduate level**. **Workshops** for national and international **surgeons and aspirant-surgeons** are organized to learn already known and new invasive techniques on human bodies.

Using the **Thiel embalming method** endoscopy is introduced in education and research.



Dissection room



Photographs Lumicore



What is the target group?

Students bachelor and master undergraduate education

Postgraduate assistants, specialists in training

Senior clinicians from inside and outside our hospital UZ, national and international

Try-outs from medical industries to test new equipment

Try-outs from clinicians to test new operation techniques

Research by investigators from inside and outside our department

Fresh frozen preparations



Undergraduate practical courses

Undergraduate students: medicine, kinesitherapy, dentistry, logopedy and audiology, physical education, biomedical sciences

- **anatomical preparations** of human bodies made by assistants and senior students
- embalming with Zinc Chloride $ZnCl_2$
- preservation in salt solution or alcohol

- practical courses: about **425 hours/academic year** in total
- number: approx. **2320 students** bachelor and master students; in groups

ENDOSCOPIC applications (CETRAS)

IMPLEMENTATION of the **ANATOMAGE TABLE** in undergraduate education, will be implemented also in postgraduate courses



Anatamage
TABLE
Virtual Dissection



Touch-Interactive Display System

San Jose, California, USA

www.anatamage.com

Demonstration in PAD by Joris



Postgraduate courses: workshops

CETRAS supports the training requirements by establishing **hands-on practical training courses** by using the **Thiel-embalming method**, through which

- corpses, tissues and organs **retain their flexibility and plasticity** as in a living person
- tissues are more recognizable, **color of the organs is very similar** to in vivo
- thorax and abdomen can be **inflated** (ventilated)
- articular joints remain **freely movable**

This **low-odour low-toxicity** embalming technique is based on the use of a mixture of 4-chloro-3-methylenphenol, various salts for fixation, boric acid for disinfecting and ethylene glycol for preservation of tissue plasticity, while the concentration of formaline is kept to the strict minimum (0.8%).

Bodies are stored for approximately 4-6 weeks in an immersion solution and kept at about 4-6°C in vacuum in sealed plastic tubular sheets (otherwise mummification).



Workstations

Each station = a **dissection table** and a **video tower**.

A station can be equipped with a camera for demonstrations through internet, in a conference room or auditorium (college room).

Accompaniment

Expert clinicians: work as tutors and give intensive instructions before the participants start with the hands-on surgery.

Small groups: to facilitate practical work for each participant and to give everyone the opportunity to do the intervention him/herself.



Specific application possibilities for Cetras

- **peritoneal cavity**: can be inflated for laparoscopic procedures
- **thoracic surgery/thoracoscopy**:
 - to practice/exercise interventions such as by-pass operations
 - lung structure is very well preserved: the lungs can be ventilated
 - endoscopical endobronchial techniques/ bronchoscopy
- **orthopedics**:
 - the articular joints approximate those of a living patient
 - the structures feel supple and normal
 - the joints remain freely movable

laparoscopic bariatric surgery
open gastro-enterological surgery
thorax surgery (cardiology)

colon and colorectal surgery
orthopedic surgery/arthroscopy
endoscopic gynecological interventions



Workshops 2014

2015

2016

2017

Number (Ugent UZGent extern)

39

58

past

7

future

35

1

Participants/attendants

460

712

138

(220)

200

Set-ups (body regions used)

125

245

33

(68)

20

(Thiel, ZnCl₂, fresh frozen)



Workshops 2015: number per discipline

Education related:

ManaMa (postgraduate): 5 (orthopedics, manual therapy, ENT)

Dentistry: 2 (postgraduate implant training, undergraduate anesthesia)

CCMed (army): 6 (emergency first aid surgery: cricothyrotomy, thorax drainage placement)

Orthopedics (UZ/industry/both):

Shoulder: 3 (prosthesis, revision)

Elbow: 1 (dissection)

Hip: 5 (prosthesis, revision)

Knee: 7 (prosthesis)

Plastic surgery: 1 (skin flaps)

Thoracal/vascular surgery (clinicians UZ): 1 (lung resection, lobectomy)

Workshops 2015: number per discipline

Abdominal surgery (clinicians UZ):

- Laparoscopy/endoscopy: 1
- Bariatric: 2 + try-out: 1
- Colorectal: 2
- Liver resection laparoscopic: 3
- Oesophageal: 1

Gynaecology (UZ): 2

Pain relief techniques: 1

Ear, nose, throat discipline (UZ): 2 (FESS functional endoscopic sinus surgery, rhinoplasty)

ORSI (OLV Robotic Surgery Institute, spin off of hospital Aalst): 20 (laparoscopy, colorectal, oesophageal, prostate, thoracal, lung lobectomy, cardiovascular)



Research projects – doctoral thesis using CETRAS

Video about **surgical technics** shoulder

Testing kneebalancer Unity Knee System

Prelevation tendons upper limb

Prelevation femurs

Radiology projects

Joris Van de Velde: Delineation of the plexus brachialis for IMRT planning

Liesbeth van Hauwermeiren: Modelling of the sacro-iliac joint

Baoge Liu: Treatment of degenerative lumbar disc disease : a biomechanical study of a new anterior distractible cage

An De Crop: The Thiel cadaver as a phantome in thorax radiology

Wouter Willaert: Reperfusion of a Thiel embalmed human body

Germano Gomes: The development of a shoulder model based on cadaveric data



Conclusions

CETRAS as center for training and research in human anatomy contributes to **education and investigation** (scientific as well as material), both extremely important for **growth** of medical and related disciplines.

Thiel embalmed corpses give us **endoscopic approaches** as a tool to **teach** anatomy and to **train** specialists.

Undergraduate education

Through endoscopy and the video tower students can participate in demonstrations of thoracic, abdominal and arthrologic topographic anatomy.

Undergraduate students exercise clinical technics.

The Anatomage table shows normal anatomy and pathology.

Conclusions

Postgraduate education/training

Thanks to CETRAS one can exercise without any risks and ethically justified in a very realistic setting: **pseudo-life-situations** are created.

The greatest benefit of CETRAS is that the study process removes from the living person to the cadaver: **in vivo hands-on training without the need of a patient**. A step between first training on an animal model and later on immediately on a patient is offered: **training on human cadavers with almost the same qualities as living patients**.

The step to take from a human cadaver to a living patient is much **smaller**.

The cadavers can be used for training of both **conventional and new** surgical procedures.

The courses prepare the clinicians for the daily work and thus improve the **quality** of postgraduate training.



Demonstration in PAD: Anatomage table

Workshop in PAD: orthopedics

Speakers: Lode Blondeel

Wouter Willaert

Industry: Olympus Endoscopy towers

Hospithera

Johnson and Johnson

Microport Orthopedics

Stryker

Smith and Nephew

Biomet

Hospital Innovations

Regentis Biomaterials

Wright Medical