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Forensic BioMedical Sciences

QUALITY ASSURANCE OF FORENSIC PATHOLOGY

Forensic Pathology Service and ISO 17020

W. Van de Voorde, MD, PhD

University Hospitals LEUVEN | Forensic Medicine

Content Quality Assurance

- Why ?
  - Principles of forensic investigation
  - The role of Forensic Pathology
- Which system ?
  - ISO 1702O
  - Accreditation
- How ?

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Why Quality Assurance?

Forensic Sciences

To serve the community

- Application of sciences in the search for the truth
- Aims
  - Reconstruction of the event
  - Evidence
- Used to
  - Reveal the truth
  - Identify the perpetrator(s)
  - Prevent new event(s)

Goals of forensic investigation

- Analysis of the facts (service to the community)
  - reconstruction of events
    - determination the manner: accident-suicide-homicide-natural
    - determination of responsibilities
    - prevention (e.g. accidents, catastrophes…)
  - data gathering
    - documentation and explanation of phenomena (e.g. criminology)
    - data linking→ forensic intelligence
- Crime investigation
  - detection of crime
  - determination of type of crime
  - reconstruction of the crime
  - identification of the perpetrator(s)
  - furnishing of proof or **forensic evidence → to deliver burden of proof**

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Fundamental law of forensics

- Locard's Exchange Principle (Edmond Locard,1877-1966)

'Every contact leaves a trace'

  - transfer
  - imprint

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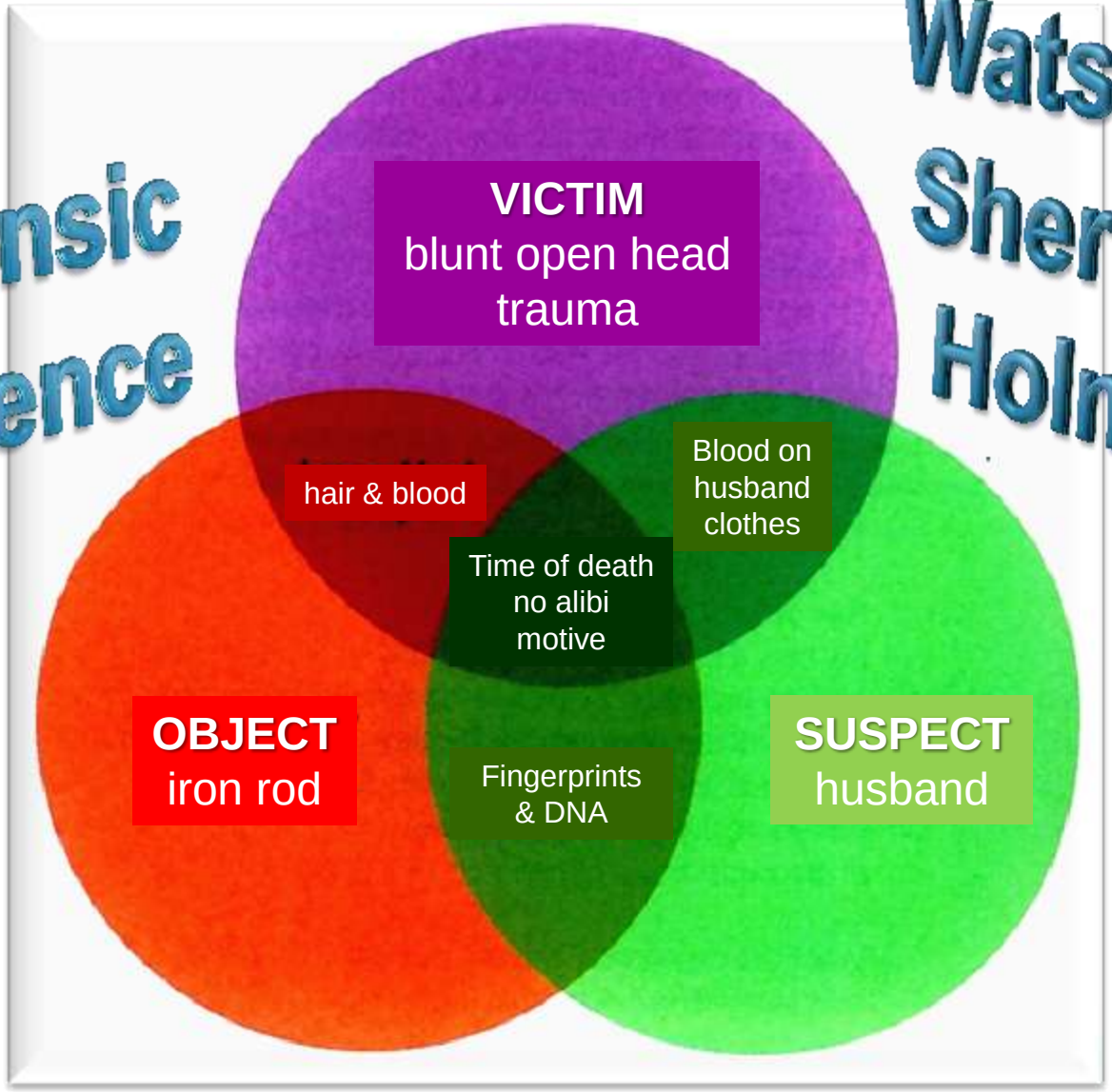
Forensic evidence

Watson & Sherlock Holmes



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Judging evidence in court

- Judge's /Jury's decision is based on
  - Forensic evidence
  - Testimonial evidence
  - Circumstantial (not eye-witnessed) evidence
- Chain of custody
  - From detection until the courtroom
  - Crime scene related evidence is not equal to crime related evidence!
- Quality of investigation/evidence
- Quality of expert opinion

Quality assessment

- Methodology (‘standards’ Frye and Daubert criteria)
  - reproducebility
  - ‘peer reviewed’
  - validation (e.g. false negatives and positives)
  - generally accepted methods
- Qualification of the expert
  - continuous education, formation and training → ‘forensic laws’!
  - deontology & ethics (independency and honesty)
  - skills
    - rational, critical and analytic thinking
    - communication
- Maintenance of chain of custody

→Quality management system / accreditation (e.g. ISO 17020/17025)

Sir Arthur Conan Doyle

"It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories instead of theories to suit facts."

dixit Sherlock Holmes

"*When the evidence is inconsistent with a hypothesis, the hypothesis must be changed to fit the evidence*" (R.F. Becker, A.W. Dutelle, Criminal Investigation, 2013)

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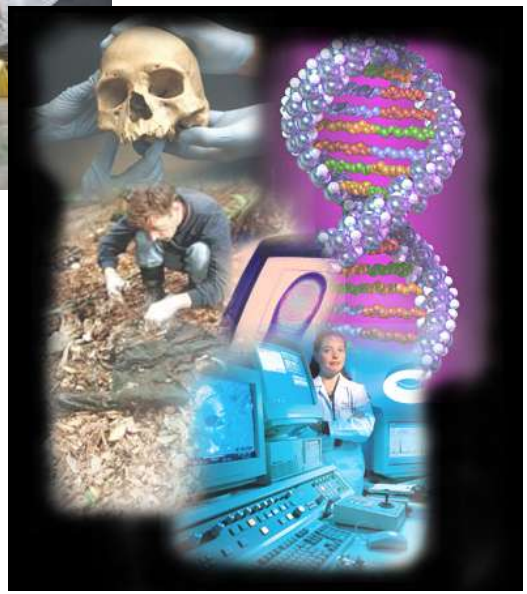
Forensic pathology and evidence



Corpse is source of evidence

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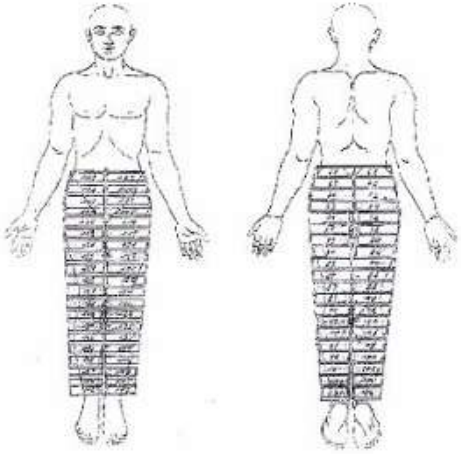
fibers and hairs (1:1 taping)

HET GEBRUIK VAN DE 1:1 TAPE LIFTING TECHNIEK VOOR DE MONSTERNAME VAN VEZELS OP EEN LIJK

Wat houdt de 1:1 tape lifting techniek in ?

Met deze techniek worden de zichtbare gedeelten van een lijk (zowel huid als kledij) op een systematische wijze door middel van smalle, genummerde kleefstroken bedekt. Dit gebeurt op de plaats van de misdaad, zo vlug mogelijk na de ontdekking van het lijk en voordat dit verplaatst werd.



In de praktijk wordt, nadat de zichtbare zijde van het lijk is bedekt, alles door middel van fotografie gedocumenteerd. De kleefstroken worden dan verwijderd en op transparanten gekleefd. Het lijk wordt daarna omgedraaid en de hele procedure wordt aan de andere zijde herhaald.

Op deze wijze wordt een projectie bekomen van de exacte positie van de vezelsporen die zich op het lijk bevonden.

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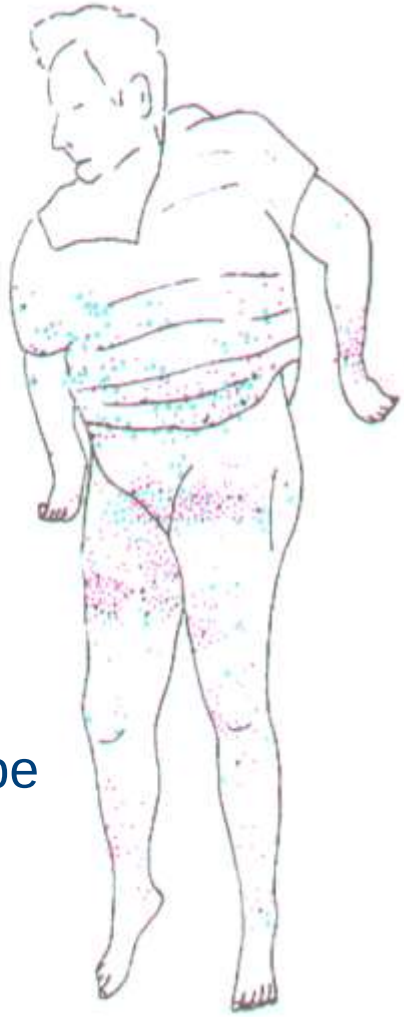
manual strangulation

rape



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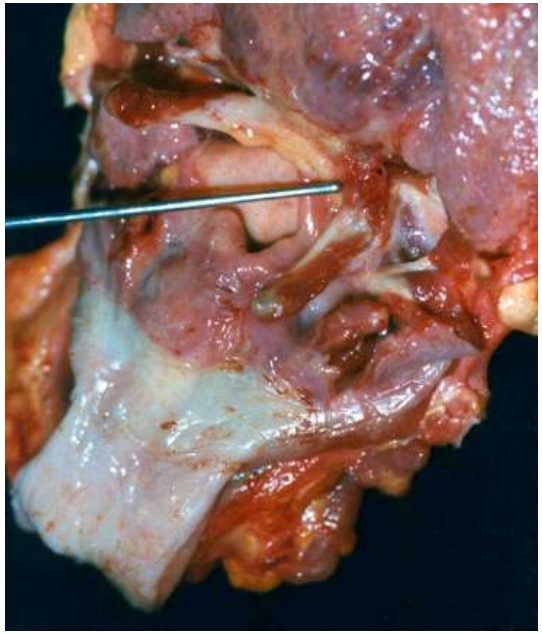
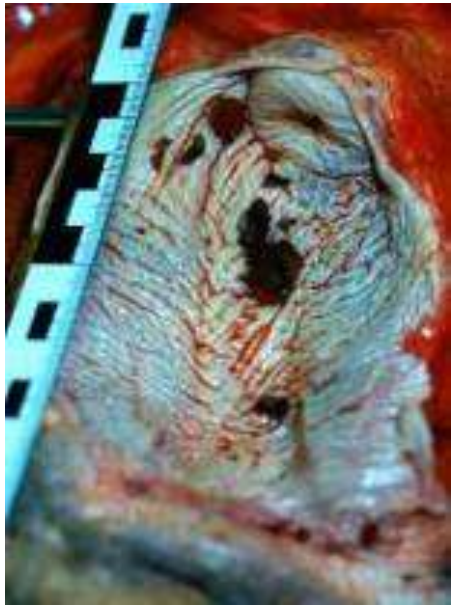
Autopsy findings





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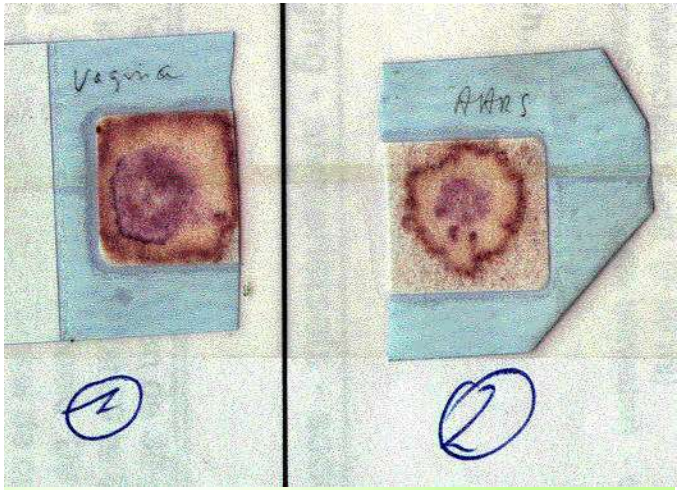
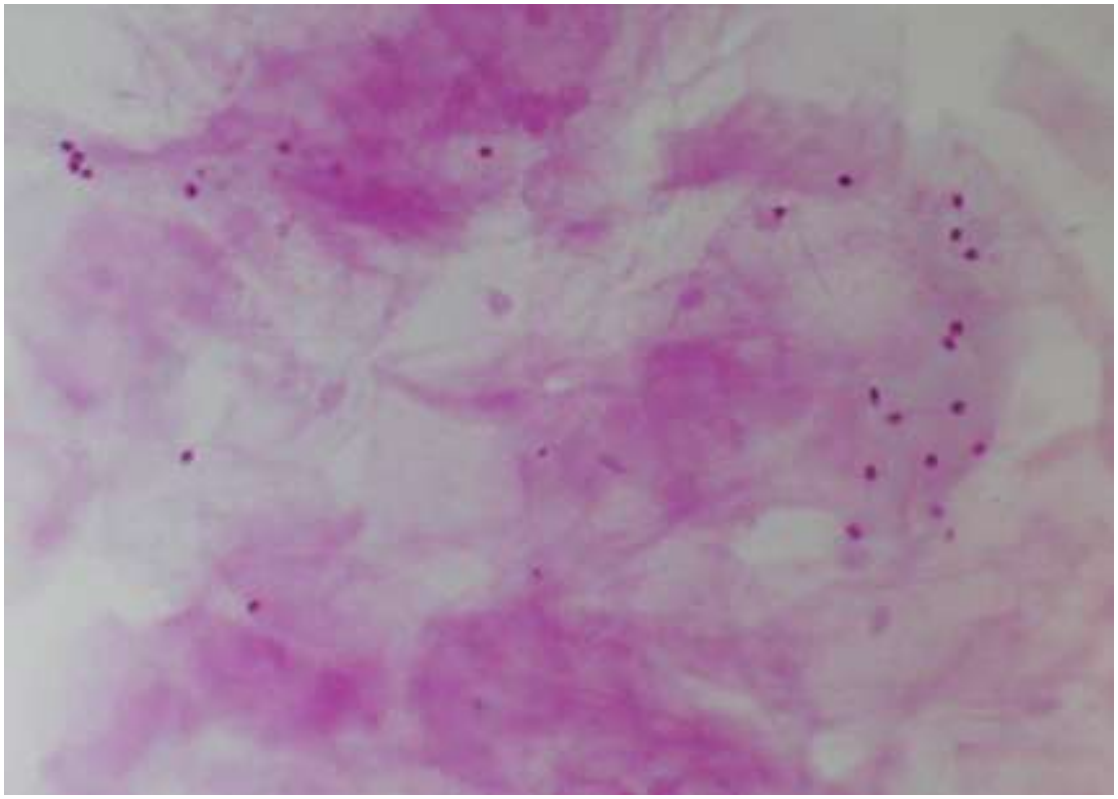
Acid phosphatase



vaginal anal



Genetics: Complete DNA-profile of perpetrator + DNA of victim on penis of perpetrator

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double swab method (DNA)

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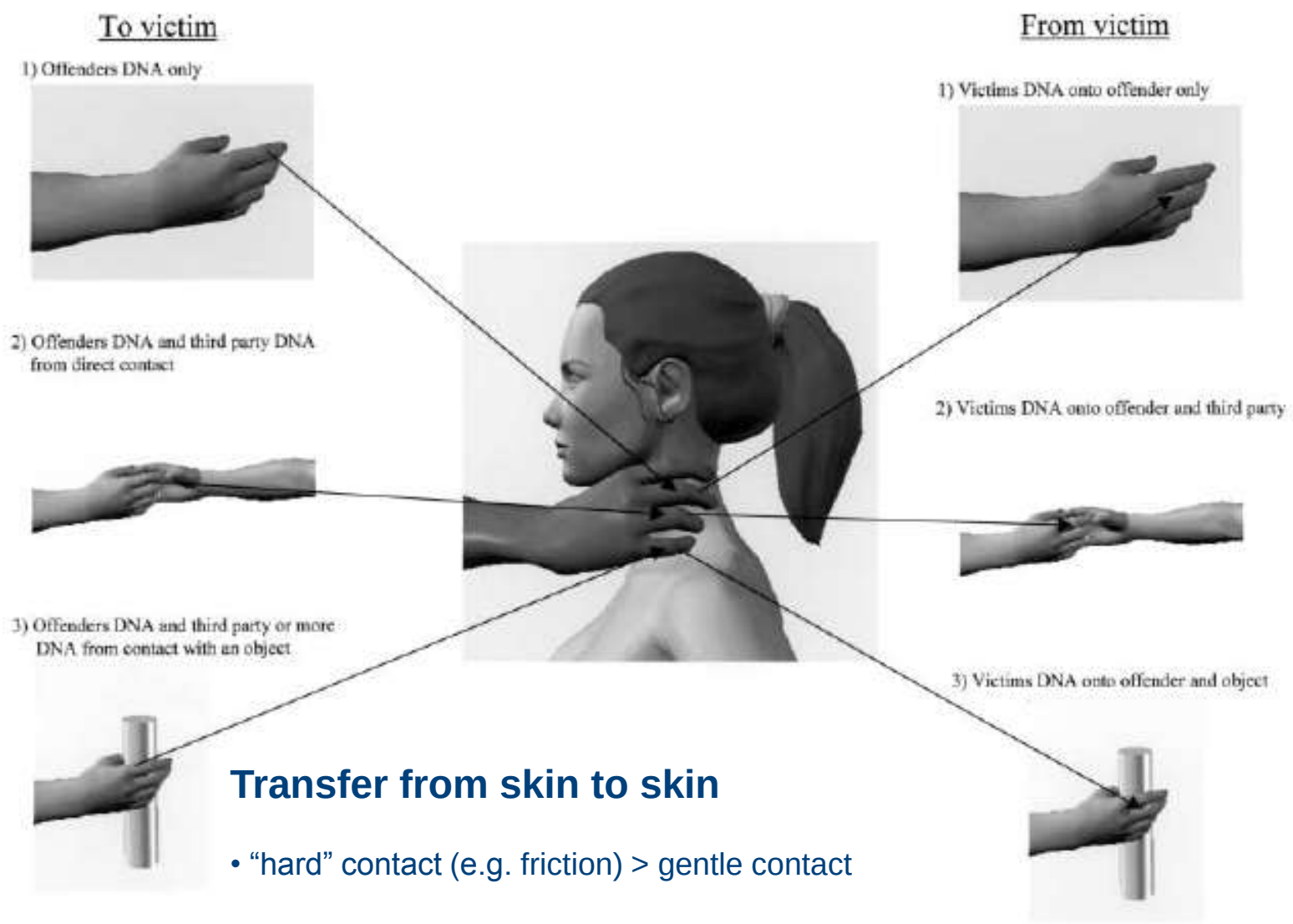


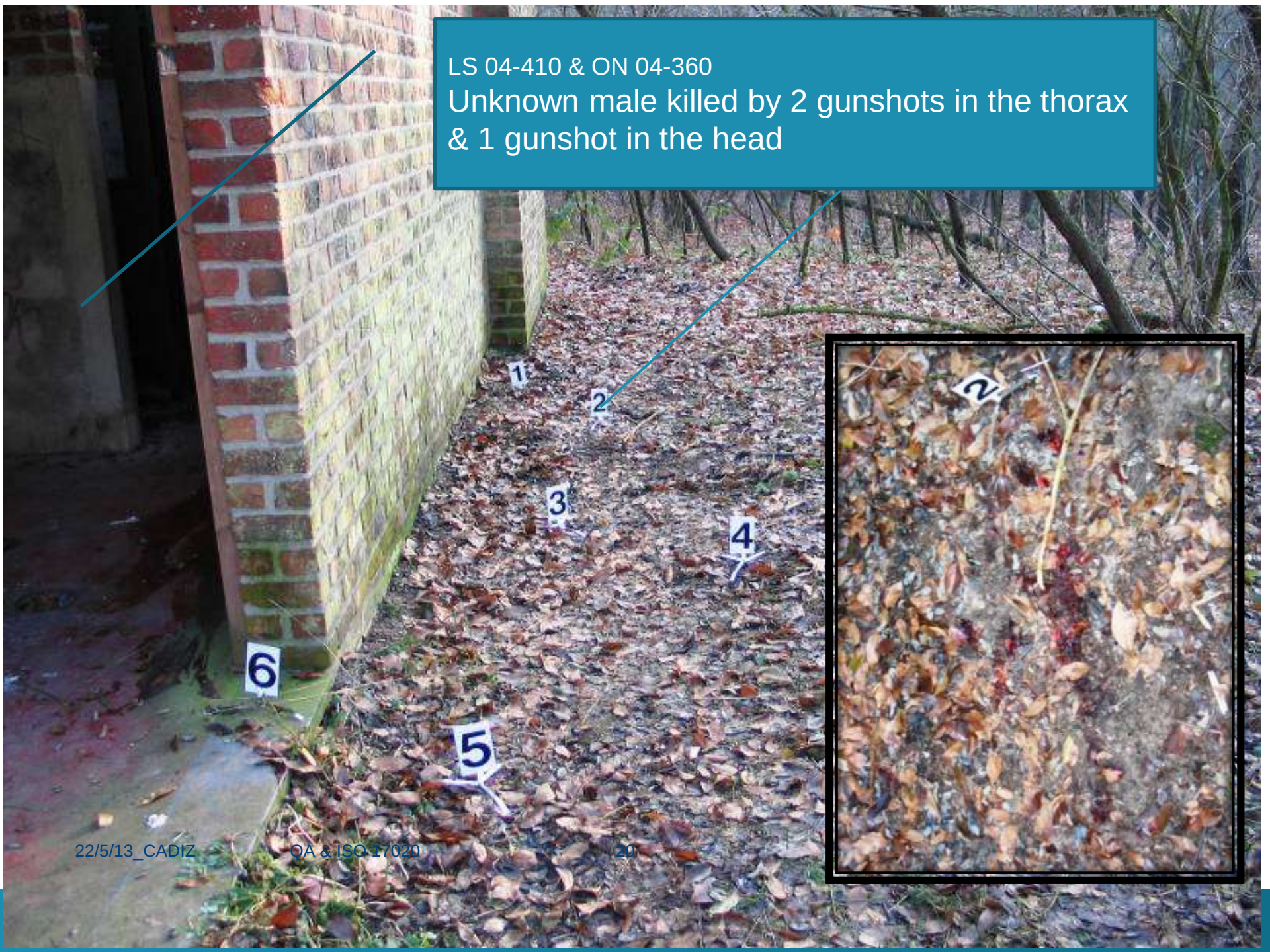
Transfer from skin to skin

- “hard” contact (e.g. friction) > gentle contact
- moist > dry trace

Rutty G.N. (2002) An investigation into the transference and survivability of human DNA following simulated manual strangulation with consideration of the problem of third party contamination. International Journal ofLegal Medicine 116:170-3 (2002)

LS 04-410 & ON 04-360

Unknown male killed by 2 gunshots in the thorax & 1 gunshot in the head



Wipe pattern of a dragged body

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Investigations

- Identification: dactyloscopy
- Stomach content→ place of last contact with 3 suspects (*french fries*)
- DNA fingerprints on the left ankle of 1 out of 3 suspects

Why accreditation ?

- Forensic medicine = application of medical knowledge for legal issues both depending on the analysis of medicolegal findings and on (biological) evidence that form an integrated whole together with other evidence → forensic evidence to solve & prove the case → chain of custody
- Standardisation of methods / methodology → (international) quality standards
- Proof of correct (= qualified) application of forensic medicine → quality assessment

ISO 17020 Accreditation

- Internationalisation of law enforcement / forensic investigation [EU: e.g. Treaty of Prüm (2005)]: cross-border cooperation in the exchange of evidence and information…
- Existing obligation for forensic DNA-labs
- Guarantee of
  - overall quality according to international standards
  - chain of custody

Forensic genetics

INTERNATIONAL STANDARD

ISO/IEC 17025

Second edition
2005-05-15

General requirements for the competence of testing and calibration laboratories

Exigences générales concernant la compétence des laboratoires d'étalonnages et d'essais

Analytical tests

Forensic pathology

INTERNATIONAL STANDARD

ISO/IEC 17020

First edition
1998-11-15

General criteria for the operation of various types of bodies performing inspection

Critères généraux pour le fonctionnement de différents types d'organismes procédant à l'inspection

Functional tests

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Fundamentals of quality system (ISO-standards)

- Quality standards for certifying
  - personnel / staff — qualification, training, supervision, evaluation
  - infrastructure
  - lab techniques
  - procedures

  } validation methodology, calibration, inventory and maintenance of equipment
- Documentation and registration of activities

  "If you do something, wright it down

  If you wright down, do it

  If it's not written down, it has not happened"

→ Quality assessment and management system (handbook)

→ Standards of Operation (SOP's) → working procedures

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ISO 17020: accreditation by BELAC

- Identification of the Organisation
  - legal, financial, deontologic…aspects
  - personnel, infrastructure, equipment
- Type material corpse
- Type inspection forensic autopsy
- Inspection mode SOP's
  - registration of
    - the corpse (identification, handling, conservation…)
    - those attending the autopsy
  - external and internal examination
    - imaging
    - dissection methods
    - sampling (and preparation) for further investigations (histopathology, toxicology, genetics, microbiology and/or biochemistry …)
    - registration and preservation of samples
  - reporting, administration

UZ LEUVEN Forensic Medicine

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Guidance for standards

COUNCIL OF EUROPE
COMMITTEE OF MINISTERS

RECOMMENDATION No. R (99) 3

OF THE COMMITTEE OF MINISTERS TO MEMBER STATES

ON THE HARMONISATION OF MEDICO-LEGAL AUTOPSY RULES[1]

(Adopted by the Committee of Ministers on 2 February 1999 at the 658th meeting of the Ministers' Deputies)

Published in Forensic Science International, 2000, 111, 5-29

Principle IV - General considerations

1. Medico-legal autopsies and all related measures must be carried out in a manner consistent with medical ethics and respecting the dignity of the deceased.

2. Where appropriate, the closest relatives should be given an opportunity to see the corpse.

3. Before beginning the autopsy, the following minimum rules should be applied:

registration

a. record the date, time and place of autopsy;

b. record the name(s) of the medico-legal expert(s), assistant(s) and all other persons present at the autopsy with indication as to the position and role of each one in the autopsy;

c. take colour photographs or video, where appropriate, of all relevant findings and of the dressed and undressed body;

d. undress the body, examine and record clothing and jewellery, verify the correspondence between injuries on the body and clothing;

e. where appropriate, take X-rays, particularly in cases of suspected child abuse, and for identification and location of foreign objects.

4. Where appropriate, before beginning the autopsy, body orifices should be appropriately swabbed for the recovery and identification of biological trace evidence.

5. If the decedent was hospitalised prior to death, admission blood specimens and any X-rays should be obtained as well as hospital records.

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Principle V – Autopsy procedures

I. *External examination*

1. The examination of the clothing is an essential part of the external examination and all findings therein are to be clearly described. This is especially important in those cases where the clothing has been damaged or soiled: each area of recent damage must be described fully and relevant findings are to be related to the site of injuries on the corpse. Discrepancies in such findings are also to be described.

2. The description of the body following an external examination must include:

registration

a. age, sex, build, height, ethnic group and weight, nutritional state, skin colour and special characteristics (such as scars, tattoos or amputations);

b. post-mortem changes, including details relating to rigor and post mortem hypostasis – distribution, intensity, colour and reversibility – and putrefaction and environmentally induced changes;

c. findings on a primary external inspection and description which, if required, include sampling of stains and other trace evidence on the body surface and a reinspection after removal and cleaning of the body;

d. inspection of the skin of the posterior surfaces of the corpse;

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e. description and careful investigation of the head and the facial orifices includes: colour, length, density and distribution of hair (and beard); nasal skeleton; oral mucosa, dentition and tongue; ears, retro-auricular areas and external meati; eyes: colour of irises and sclerae, regularity and appearance of pupils, sclerae, conjunctivae; skin (presence and absence of petechiae to be described); if fluids have been evacuated from facial orifices, their colour and odour;

f. neck: checking for excessive mobility, presence and absence of abrasions, other marks and bruising (including petechiae) over the entire circumference of the neck;

g. thorax: shape and stability; breasts; aspect, nipples and pigmentation;

h. abdomen: external bulging, pigmentation, scars, abnormalities and bruising;

i. anus and genitals;

j. extremities: shape and abnormal mobility, abnormalities; injection marks and scars; palmar surfaces, finger and toe nails;

k. material findings under fingernails.

3. All injuries, including abrasions, bruises, lacerations and other marks have to be described by shape, exact measurement, direction, edges, angles and location relative to

anatomical landmarks. Photographs should be taken. Bite marks shall be swabbed, and casts made where necessary.

4. Signs of vital reaction around wounds, foreign particles inside wounds and in their surroundings and secondary reactions, such as discolouration, healing and infections must also be described.

5. The investigation of cutaneous and sub-cutaneous bruising may require local skin incision.

6. Where appropriate, specimens from wounds must be removed for further investigations, such as histology and histochemistry.

7. All signs of recent or old medical and surgical intervention and resuscitation must be described. Medical devices must not be removed from the body before the intervention of the medico-legal expert.

8. A decision has to be taken at this stage as to the strategies of investigation and the necessity of documentation by X-rays and other imaging procedures.

II. *Internal examination*

A. *General*

1. All relevant artifacts produced by the dissection and from sampling procedures, must be documented.

2. All three body cavities – head, thorax and abdomen – must be opened layer by layer. Where appropriate, the vertebral canal and joint cavities should be examined.

3. Examination and description of body cavities include: an examination for the presence of gas (pneumothorax), measurement of volume of fluids and blood, appearance of internal surfaces, intactness of anatomical boundaries, external appearance of organs and their location; adhesion and cavity obliterations, injuries and haemorrhage.

4. The demonstration and dissection of the soft tissues and musculature of the neck have to be components of all medico-legal autopsies (see the paragraph concerning special procedures).

5. All organs must be examined and sliced following established guidelines of pathological anatomy. This includes opening of all relevant vessels, for example, intracranial arteries, sinuses, carotid arteries, coronary arteries, pulmonary arteries and veins, aorta and vessels of the abdominal organs, femoral arteries and lower limb veins. Relevant ducts have to be dissected, for example, central and peripheral airways, biliary ducts and ureters. All hollow organs have to be opened and their content described by colour, viscosity, volume (samples should be retained, where appropriate). All organs have to be sliced and the appearance of the cut surface described. If injuries are present, the dissection procedure may have to vary from the normal one: this should be appropriately described and documented.

6. All internal lesions and injuries must be precisely described by size and location. Injury tracks must be described in order to include their direction as regards the organ anatomy.

7. The weight of all major organs must be recorded.

B. *Detailed*

registration

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1. *Head*

a. Before opening the skull, the periosteum must be scraped off in order to display or exclude any fractures.

b. The head examination procedure must allow the inspection and description of the scalp, external and internal surfaces of the skull and of the temporal muscles.

c. The thickness and appearances of the skull and sutures, the appearances of the meninges, the cerebrospinal fluid (CSF), the wall structure and contents of cerebral arteries and sinuses must be described. The description of the bones must also include an examination of their intactness, including the connection between the skull and the first two vertebrae.

d. In obvious or suspected head injury (for example, if a detailed examination is required or if autolysis or putrefaction is present) fixation of the whole brain is recommended before its dissection.

e. Middle ears must be always opened and nasal sinuses where indicated.

f. The soft tissue and skeleton of the face is dissected only in relevant cases, using a cosmetically acceptable technique.

2. *Thorax and neck*

The opening of the thorax must be performed using a technique which allows the demonstration of the presence of pneumothorax and the inspection of the thorax walls, including the postero-lateral regions. *In situ* dissection of the neck must display the details of its anatomy.

3. *Abdomen*

The opening procedure of the abdomen must allow an accurate examination of all layers of the walls, including the postero-lateral regions. *In situ* dissection is necessary in certain cases, particularly for the demonstration of injury tracks and evacuation of fluids. Dissection of organs should observe anatomical continuity of systems, where possible. The whole intestine must be dissected and its contents described.

4. *Skeleton*

a. The examination of the thoracic cage, the spine and the pelvis must be part of the autopsy procedure.

b. Where appropriate traumatic deaths need a precise dissection of the extremities, possibly complemented by X-ray examination.

Chain of custody ! - archive

6. *Sampling*

The scope of the sampling procedure is to be case-dependent. However, the following minimum rules should be applied:

a. in all autopsies, the basic sampling scheme includes specimens from the main organs for histology and peripheral blood sampling (such as for alcohol and drug analyses and genetic identification), urine and gastric contents. All blood samples must be peripheral blood and not heart or thoracic;

b. if the cause of death cannot be established with the necessary degree of certainty, sampling includes additional specimens and fluids for metabolic studies and thorough toxicology. This includes blood, vitreous humour, CSF, bile, hair samples and further relevant tissues;

c. if death is related to physical violence, sampling includes the injuries, for example to determine wound age and any foreign materials in the wounds;

d. if reconstructions are desirable, the removal of bones and osseous compartments may become necessary;

e. if identification is the predominant aim, the removal of jaws and other bones may be necessary;

f. if strangulation or the application of physical force to the neck is suspected or diagnosed, the entire neck structures, musculature and neurovascular bundles must be preserved for histology. The hyoid bone and the laryngeal cartilages must be dissected very carefully;

g. biological samples must be collected in tightly closed jars, properly preserved and placed under seal and transported to the laboratory in perfect safety;

registration

o. a list of all samples retained for toxicology, genetic identification, histology, microbiology and other investigations should be included; all such specimens should be identified and attested by the medico-legal expert according to the legal system of the state concerned, for continuity of evidence;

Disclaimer / ServiceLevelAgreement

p. results of ancillary investigations, such as radiology, odontology, entomology and anthropology should be included, when such results are available;

q. one of the most important parts of the autopsy report is the evaluation of the significance of the accumulated results by the medico-legal expert. After termination of the autopsy, evaluation is usually provisional because later findings and later knowledge of other circumstantial facts can necessitate alteration and modification. Medico-legal experts must interpret the overall findings so that the maximum information and opinion can be offered. Also questions that have not been raised by the competent authority must be addressed if they could be of significance;

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Principle VI – Autopsy report

1. The autopsy report is as important as the autopsy itself, as the latter is of little value if th findings and opinions of the medico-legal expert are not communicated in a clear, accurate and permanent document. The autopsy report should be an integral part of the autopsy procedure and be drafted carefully.

2. The report should therefore be:

a. full, detailed, comprehensive and objective;

b. clear and comprehensible not only to other doctors, but also to non-medical readers;

c. written in a logical sequence, well-structured and easy to refer to in various sections o the report;

d. be in a legible and permanent form, with hard paper copy even if it is retained in electronic storage;

e. be written in a discursive "essay" style;

3. When drafting an autopsy report, the following minimum content should be included:

a. legal preface to fulfil statutory requirements, if needed;

b. serial number, computer retrieval coding and International Classification of Disease Code (ICD) code;

c. full personal details of deceased (including name, age, sex, address and occupation) unless unidentified;

d. date, place and time of death, where known;

e. date, place and time of autopsy;

f. name, qualifications and status of medico-legal expert(s);

g. persons present at the autopsy and their function;

h. name of the authority commissioning the autopsy;

i. person(s) identifying the body to the medico-legal expert;

j. name and address of the medical attendant of the deceased;

k. a synopsis of the history and circumstances of the death, as given to the medico-legal expert by the police, judges, relatives or other persons, as well as information contained in the file, where available;

l. description of the scene of death, if attended by the medico-legal expert; reference should be made to the provisions contained in Principle I above;

m. external examination; reference should be made to the provisions of Principle V above;

n. internal examination by anatomic systems, together with a comment on every organ. Reference should be made to the provisions of Principle V above;

o. a list of all samples retained for toxicology, genetic identification, histology, microbiology and other investigations should be included; all such specimens should be identified and attested by the medico-legal expert according to the legal system of the state concerned, for continuity of evidence;

p. results of ancillary investigations, such as radiology, odontology, entomology and anthropology should be included, when such results are available;

q. one of the most important parts of the autopsy report is the evaluation of the significance of the accumulated results by the medico-legal expert. After termination of the autopsy, evaluation is usually provisional because later findings and later knowledge of other circumstantial facts can necessitate alteration and modification. Medico-legal experts must interpret the overall findings so that the maximum information and opinion can be offered. Also questions that have not been raised by the competent authority must be addressed if they could be of significance;

r. based on the final interpretation, the cause of death (in the International Classification of Disease should be given. Where several alternatives for the cause of death exist and the facts do not allow a differentiation between them, the medico-legal expert should describe the alternatives and, if possible, rank them in order of probability. If this is not possible, then the cause of death should be certified as "Unascertained";

s. the report should be finally checked, dated and signed by the medico-legal expert(s).

4. The date of the autopsy and the date of the provisional report should never be more than a day or two apart. The date of the autopsy and the date of the final report should be as close together as possible.

ISO 17020 in our DEPARTMENT

-our principles in post mortem examination
-consequences of accreditation

Medicolegal autopsy - goals

- Identification
- Documenting health status
- Documenting all traumatic lesions
- Determining cause of death
  - immediate and underlying/primary cause
  - contributing factors
- Determining mechanism of death
- Determining time of death
- Collecting evidence, i.e. biological evidence (sperm, bite lesions…)

Minimal requirements → SOP'S

- External examination
  - Post mortem changes
  - Body inspection:
    - special attention at petechiae, neck, back,wounds
    - body measurements
  - Sampling of (biological) evidence
- Internal examination (always three body compartments)
  - Thorax – Abdomen - Skull
  - Registration of amount of fluid contents/organ weights
  - Dissection all organs (heart!) + biopsies
  - Neck dissection (cave artefactual Prinsloo Gordon haemorrhages)
- Sampling for ancillary investigations… (preserving at – 30 C)

Additional investigations

- Special dissections
  - Postmortem coronarography
  - Neuropathology
  - Back and limbs
  - Facial skull
- Post mortem imaging (virtual autopsy – total body CT)
- Histology (mandatory)
  - Lungs, liver, heart, kidney, lesions…
  - Wounds (histologic estimation of age of injuries)
- Toxicology (routinely)
- Biochemistry, microbiology, genetics
- Odontology, osteology, …

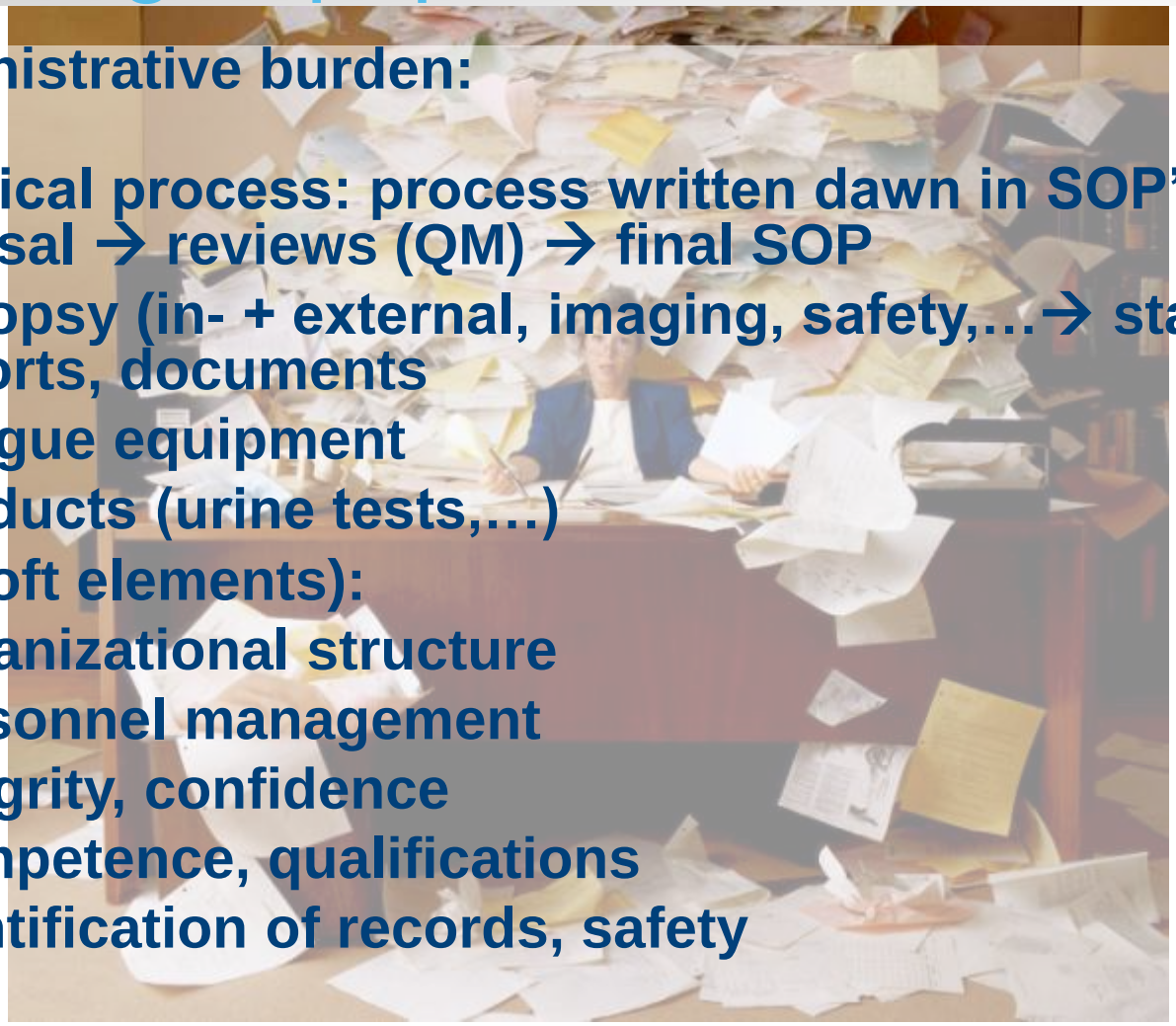
IN PRACTICE – quality management

- Procedures concerning personnel
  - job description (→ organogram)
  - qualilfications
  - duty of secrecy
  - follow up performance, (continuous) education…
  - back up
- Procedures concerning administration
  - registrations (assignements, corpses, visitors, samples…)
  - management of computers, instruments, material, machines, archives…
  - communication (internal and external contacts)
- Procedures concerning infrastructure / equipment
  - validation, callibration
  - control, registration performance parameters…

IN PRACTICE – quality management

- Procedures concerning handling of the corpses
  - Registration intake
    - unique identification by case number
    - procedure of cool storing (refrigerator)
  - Reconstitution and disposal of the body
  - Visit by the family
- Follow up of performance of the organisation
  - handling of complaints
  - planning actions
  - validation procedures
- Organizing internal and external audits

Paradigm: paper work …



Initial administrative burden:

- **Technical process: process written dawn in SOP's → SOP proposal → reviews (QM) → final SOP**
  - **Autopsy (in- + external, imaging, safety,…→ standard reports, documents**
  - **Morgue equipment**
  - **Products (urine tests,…)**
- **QH (soft elements):**
  - **Organizational structure**
  - **Personnel management**
  - **Integrity, confidence**
  - **Competence, qualifications**
  - **Identification of records, safety**
  - **…**

Standard sampling procedure

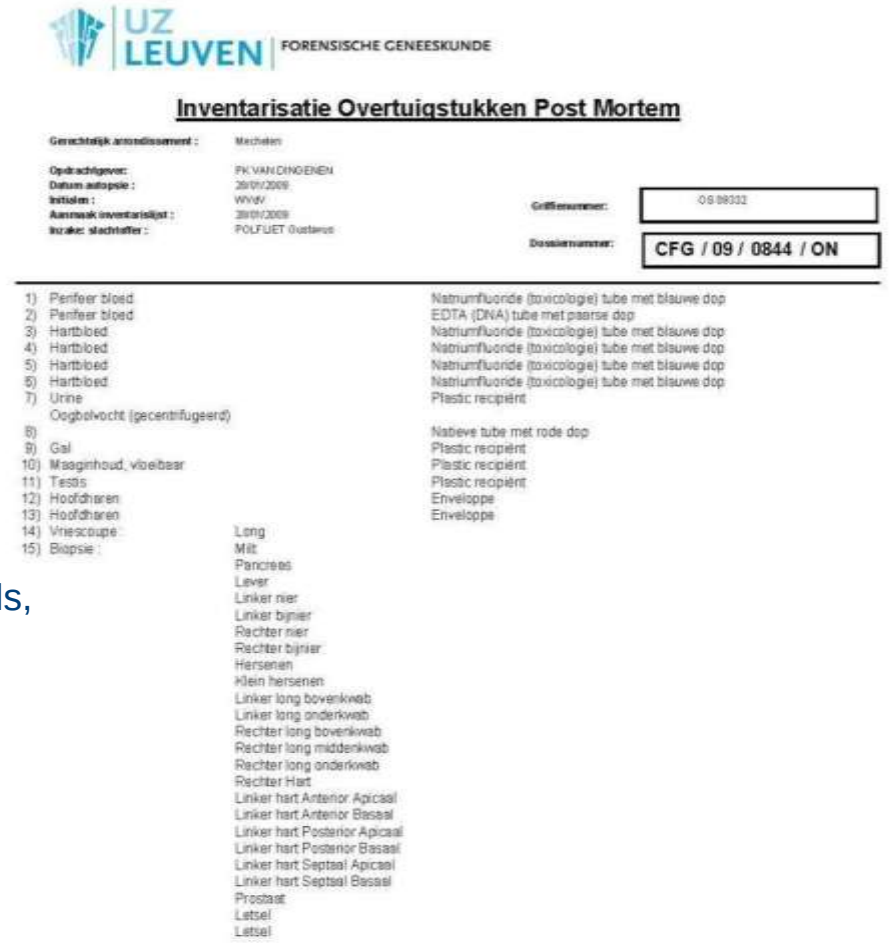
- vitreous humour (centrifuged)
-≥ 2 peripheral blood samples (sodiumfluoride)
- EDTA blood sample (genetics)
- urine
- stomach content
- bile
- 2 samples of hairs
- biopsies (formalin): heart, lung, liver, kidneys, adrenals, spleen, pancreas, brain, lesions

Suspicious / violent death

biologic samples: vaginal, oral, anal, nails, cutaneous swabs (neck, ankles, wrists)

Optional

- organ fragments for toxicology (always kidney in absence of urine)
- intestinal content (in case of suspected food poisoning)
- cerebrospinal fluid
- microbiology (i.e. SIDS…)



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Inventarisatie Overtuigstukken Post Mortem

Gerechtelijk arrondissement : Mechelen

Opdrachtgever: PK VAN DINGENEN
Datum autopsie : 28/01/2009
Initialen : WVdV
Aanmaak inventarislijst : 28/01/2009
Inzake: slachtoffer : POLFLIET Gustaaf

Griffienummer: 09/00332

Dossiernummer: CFG / 09 / 0844 / ON

1)	Perifeer bloed	Natriumfluoride (toxicologie) tube met blauwe dop
2)	Perifeer bloed	EDTA (DNA) tube met paarse dop
3)	Hartbloed	Natriumfluoride (toxicologie) tube met blauwe dop
4)	Hartbloed	Natriumfluoride (toxicologie) tube met blauwe dop
5)	Hartbloed	Natriumfluoride (toxicologie) tube met blauwe dop
6)	Hartbloed	Natriumfluoride (toxicologie) tube met blauwe dop
7)	Urine	Plastic recipiënt
	Oogbolvocht (gecentrifugeerd)	
8)		Natieve tube met rode dop
9)	Gal	Plastic recipiënt
10)	Maaginhoud, vloeibaar	Plastic recipiënt
11)	Testis	Plastic recipiënt
12)	Hoofdharen	Enveloppe
13)	Hoofdharen	Enveloppe
14)	Vriescoupe	Long
15)	Biopsie :	Milt
		Pancreas
		Lever
		Linker nier
		Linker bijnier
		Rechter nier
		Rechter bijnier
		Hersenen
		Klein hersenen
		Linker long bovenkwab
		Linker long onderkwab
		Rechter long bovenkwab
		Rechter long middenkwab
		Rechter long onderkwab
		Rechter Hart
		Linker hart Anterior Apicaal
		Linker hart Anterior Basaal
		Linker hart Posterior Apicaal
		Linker hart Posterior Basaal
		Linker hart Septaal Apicaal
		Linker hart Septaal Basaal
		Prostaat
		Letsel
		Letsel

Registration of each sample → unique number

Preservation at -20/25°C

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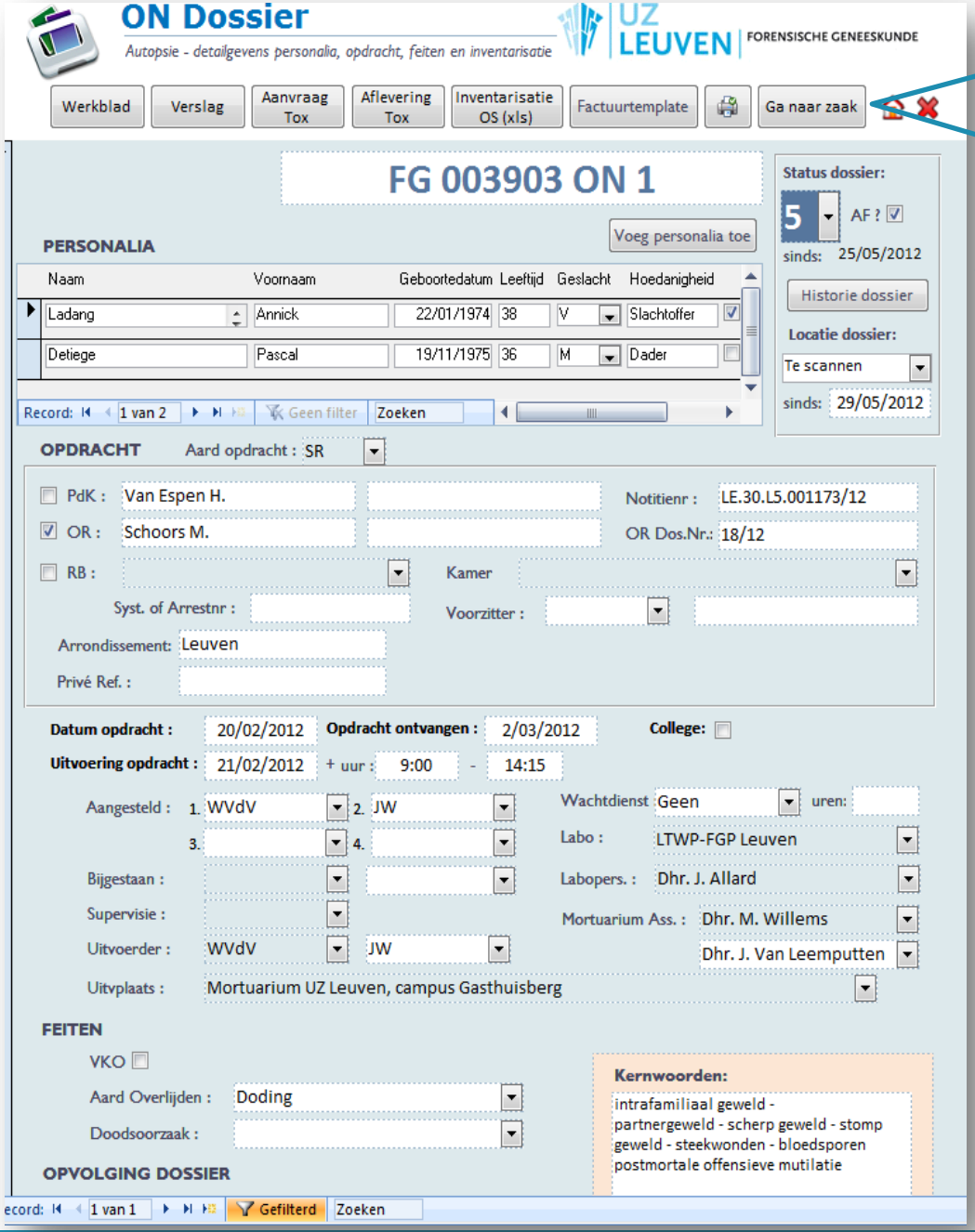

Buttons to generate templates

Registration stage of reporting

Registration data
+
Searching fields

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Easy ?

- Paradigm→ administrative conversion = ‘DAFOR’ : electronic databank system
  - registration: tracking – library
  - automation:
    - generation of reports, documents, schema’s, accounts, …
    - labeling
- Uncover old habits – change ‘corporate culture’
  - Standardized procedures
  - QA/QS teaching (different ≠ bad)

Time consuming ?

- Total time investment: 1 day/week during 1,5 y
- Actual time investment: 2 h/w
- Time investment after accreditation:
  - Autopsy unchanged
  - Sample registration ↑ (morgue employees)
  - Archiving and tracking: ↓ ↓
  - Preliminary results + final rapport: TAT ↓ ↓

Improvements

- Process control and tractability: *'chain of custody'*
- Nett (time) gain → automation administrative tasks
- Empowerment of the people involved
- Simplify :
  - Registration and tracking, follow-up files,…
  - Management :
    - Training
    - Evaluations
    - Troubleshooting

Disadvantages

- Administrative burden (~ automation)
- ↑ costs:
  - staffing need of QM
  - Internal and external (3800€!) audits
- Actually gratuitous effort
- Change ‘corporate culture’

Conclusion of the responsible pathologist

- The improvements on every level can’t match the relative increase in administration

- The accreditation of forensic autopsies is a paper tiger, it seems hazardous and awful but it isn’t…

Benefits in managing of educational institute

- Registration of
  - shortcomings
  - non-conformities
  - complaints
- Development of database and administrative automation
- SOP’s helpfull in training of
  - personnel
  - staff

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Final remarks

- It is more than worthwile because of
  - stimulated awareness of (need of) quality and quality management
  - verifiable formal working and management procedures reinforcing the organisation of departement
  - increased possibility of detecting defaults in an early stage
  - ‘airtight’ system preserving chain of custody
  - (external) appreciation of quality

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Advices…

- Accreditation is a necessity for standardized qualitative forensic work but is no guarrantee for the quality of the expert opinion !
- The start up is a difficult, personnel- and time-consuming process that needs excellent guidance of a quality expert.
- Be critical about current procedures and accept necessary changes.

- Use it to simplify, automatize and organize your work and organisation where ever and as much as possible.
- Avoid bureaucracy and do not accept that ‘formalisation’ stands in the way of good performance.
- Utilize quality management to improve continuously

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Crime scene - 61-y

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CFG, 09, 1184, ON
STUDY WALTER
*02-Jul-2009, F, 1D
STUDY WALTER
02-Jul-2009
3DPROJECTION
HPR
KUL_Gasthuisberg
Sensation 64
CT 2007S
R
RFP
L
F

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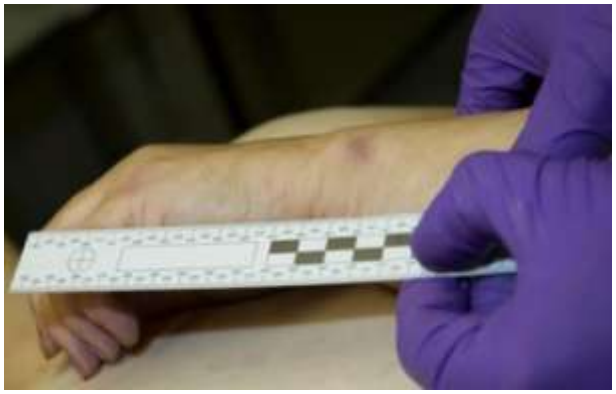
Defence



Saw toothed knife

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www.swisswuff.ch/calculators/todeszeit.php

Henssge empiric correction factor Henssge Korrekturfaktor	1.1
Ambient temperature [degrees Celsius] Umgebungstemperatur [Grad Celsius]	25.2
Initial body temperature t0 [degrees Celsius] Initiale Körpertemperatur [Grad Celsius]	37.2
Rectal body temperature tr [degrees Celsius] Rektaltemperatur [Grad Celsius]	35.11
Naked body weight Körpergewicht [kg]	86.9
Smallest output unit [minutes] Kleinste Ausgabe-Einheit [Minuten]	30
	calculate - berechnen

Estimation of time of death, Method of Henssge

Todeszeitschätzung nach Henssge

Estimating time of death is the application of one or two different combinations of estimation measures. The result of a proper estimation of time of death is never the output of a simple calculation - so any calculated output can not be taken face value without considering other results and putting the calculation results into context. This is particularly true for extreme parameters and for largely cooled down bodies. While interpreting the following results, underlying scientific literature is to be regarded as an integral part of the process of interpretation.

Die Todeszeitschätzung ist eine fundsituations-gerechte Anwendung einer oder mehrerer Schätzmethoden. Es handelt sich bei der Todeszeitschätzung grundsätzlich nicht um eine einfache Milchmädchenrechnung, deren Ergebnis unter allen Umständen Geltung hat; dies gilt insbesondere für grenzwertige Parameter und weitgehend ausgekühlte Körper. Bei der Interpretation der im folgenden berechneten Rechenergebnisse ist daher als integraler Bestandteil die zugrundeliegende Literatur zu berücksichtigen.

According to the Two-Exponential-Formula of Henssge (2002) that models a sigmoidal cooling curve of the rectal temperature, estimation of time of death could be based upon the following results:

Aufgrund eines Zwei-Exponenten-Modells (Marshall und Hoare, 1962; Brown und Marshall, 1974; Henssge, 2002) mit Modellierung einer sigmoidalen Abkühlkurve der Rektaltemperatur durch Interpolation ergeben sich für die Todeszeitschätzung die folgenden Werte:

Estimated time of death: **6h 30min** (95% tolerance: 3h 30min to 9h 0min); rounded to 30min.

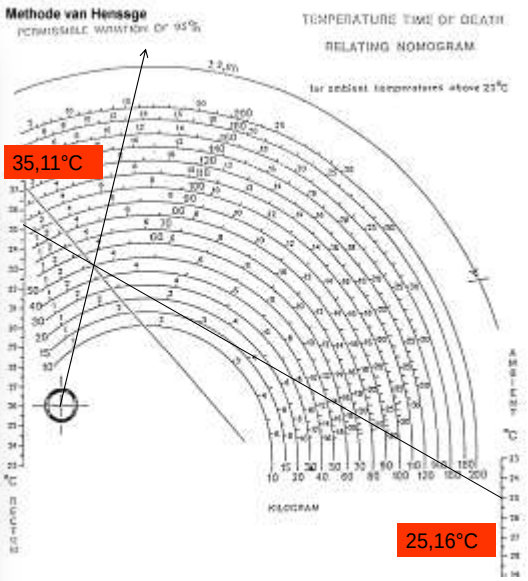
Geschätzte Todeszeit: **6h 30min** (95% Toleranz: 3h 30min bis 9h 0min); gerundet auf 30min.

For this automated time of death calculation, the following hints could be helpful: --- Bei dieser automatisch berechneten Todeszeitschätzung könnten die folgenden Hinweise hilfreich sein:

Ambient temperature lies within a temperature range that may make the choice of a correction factor other than 1 sensible (see tables 2 and 3) --- Die Umgebungstemperatur ist in einem Bereich, in dem es ev. Sinn machen könnte, einen anderen Korrekturfaktor als 1 zu verwenden (siehe Tab. 2 und Tab. 3).

pHp-code written and implemented 2005 by Wolf Schweitzer, MD, Institute of Legal Medicine, University of Zuerich, Switzerland - method described by Henssge C (2002) Todeszeitbestimmung an Leichen; Rechtsmedizin 12:112-131. -- coding was done with a simple text editor. It wasn't done because I think that Time of Death Estimation necessarily would require an internet based tool, but because it was alleged that it couldn't be done in pHp, and because I had a pretty good idea on how to do it despite that. An interesting feature of this tool is the speed with which it comes up with the results.

Version 1.2.1., 16.03.2005



Omstandigheden: geopende deuren, gelegen op tegelvloer correctiefactor:

Meting: 03.07.09 om 12.35 u **Gewicht:** 86,9 kg **Correctiefactor: 1,1 = 96 kg**

Postmortale verschijnselen: partiële lijkstijfheid, verplaatsbare lijkvlekken, geconflueerd

→PMI vlgs Henssge: 6.5 ± 2,8 (3) = 3,5 tot 9,5 uren voor de meting

→ overlijden op 02.07.09 tussen 03.05 – 09.05

† ± 03:35 – 09:05 u.

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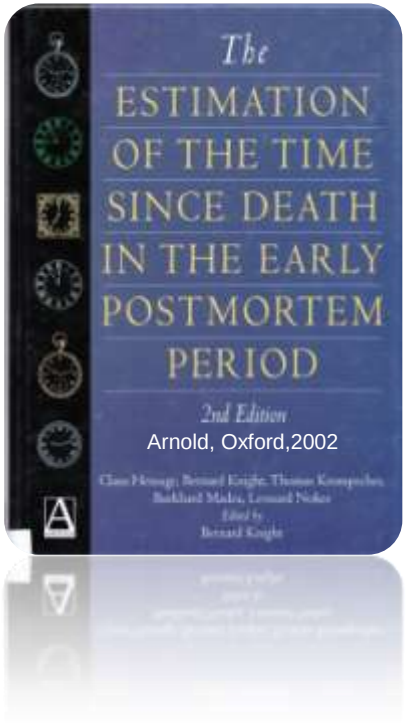
Combinated method



- Livors : displacable (< 12 h)
- Rigor : partial (3-8 h)
- Mechanic muscular reactivity: < 8 h (max. 13 h)

- Blood-serum separation : ≥ 30 min

- Toxicology: caffeïne in stomach, blood negative

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Police 09:42 am

FP 11:59 am

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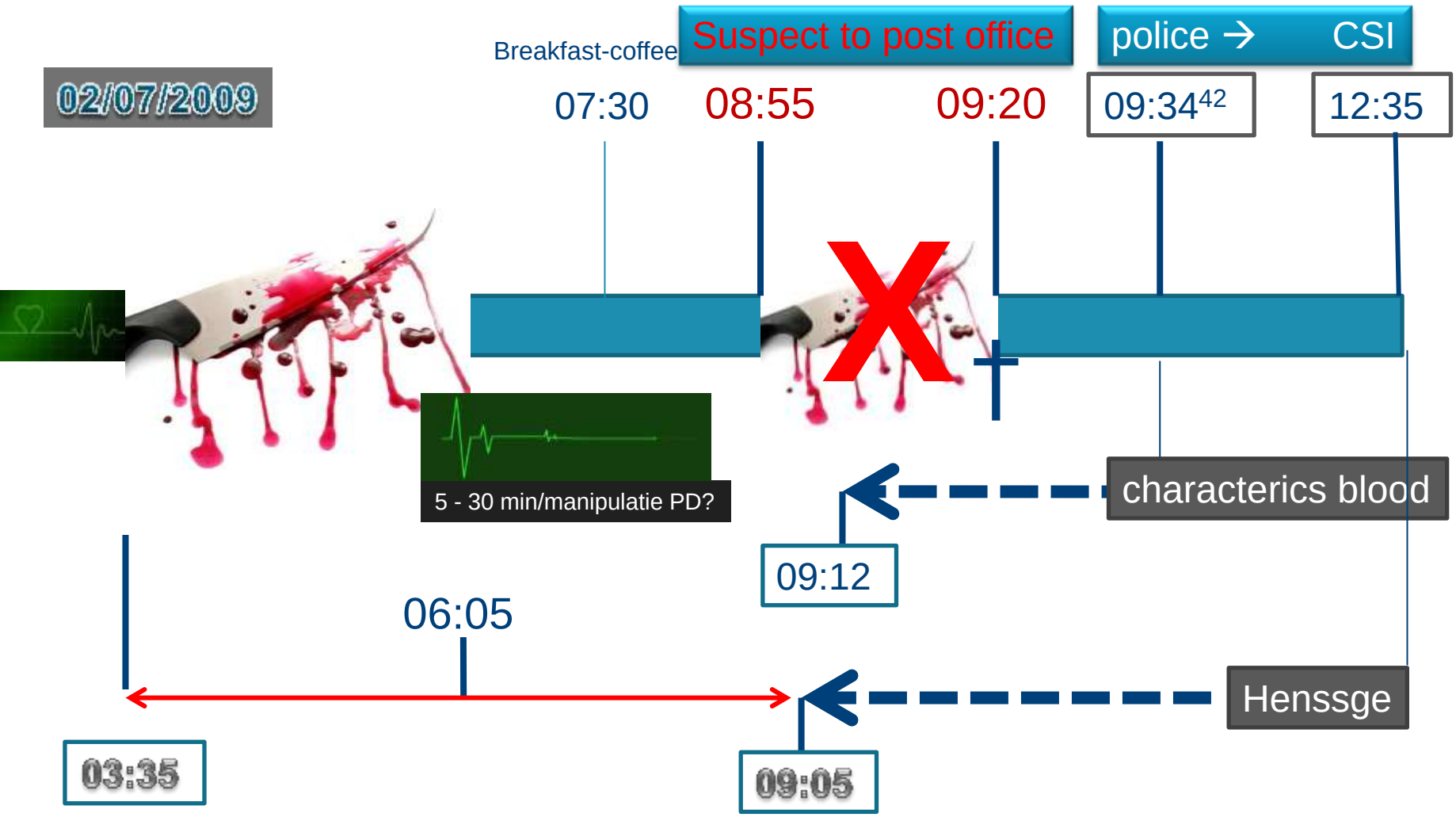
02/07/2009
Breakfast-coffee
Suspect to post office
police → CSI
07:30
08:55
09:20
09:34[42]
12:35
5 - 30 min/manipulatie PD?
characterics blood
09:12
06:05
Henssge
03:35
09:05

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No alibi…but not for the defence

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Accreditation,the unmost sexy topic?

"you can prove you are working using internationally accepted and verified methods, and procedures with qualified personnel, respecting recognized quality standards"

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