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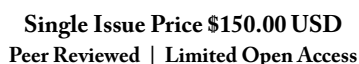
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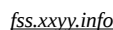
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On Construction of Fee Waiver System in Judicial Identification

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Abstract In some projects on judicial identification, the phenomenon still exists that the parties can not fully pay the high forensic costs because of economic problems. It affects judicial appraisal process due to economic difficulties, resulting in a threat to the legitimate rights and interests of citizens. So to build fee waiver system in judicial identification to safeguard the legitimate rights and interests of citizens and ensure a fair and equitable judicial system is an effective way to solve this problem. This research focus on building the judicial appraisal fee waiver system, proposes targeted measures, and gives the contribution of legal support to safeguard the legitimate rights and interests of citizens.

Keywords: Judicial authentication, Fee remission, Legal aid, Forensic science.

At this stage, because of the economic difficulties of forensic litigant, it has made a certain impact on the judicial appraisal process, for Construction of Forensic waiver system is already very widespread existence of the phenomenon. Forensic Expertise is our justice system constitutes a very important element to collect a large degree of contact with the legal rights of parties on judicial appraisal related costs, but also to protect the judicial system is fair and rational and effective way. However, at this stage in the identification of justice charges related relief regime may remain low maneuverability; rigorous content does not involve other defects. Therefore, the article author for inadequate stage of Forensic waiver system exists to

build judicial appraisal fee exemption system was thinking.

1 the identification of the judicial fee waiver system overview

1.1 the meaning of forensic waiver system

Forensic Examination fee waiver system that is performing judicial appraisal process to relevant policies, laws and regulations provide citizens with appropriate institutional safeguards to protect citizens when they Forensic Sciences to protect their legitimate rights and interests according to law, in the difficult economic situation can be obtained waiver institutional interests^[1].

1.2 Appraisal fee waiver justice

system characteristics

1.2.1 And specificity of the link between rights and obligations of citizens

In this stage of our legal equality as the main feature, but also guarantees the equality of citizens for development of civilization inevitable requirement. Therefore, the Chinese government in order to ensure the legitimate rights and interests of citizens, the need to establish the appropriate organization, provide citizens with effective system of financial support to build judicial appraisal fee waiver system to ensure the legal rights of citizens to enjoy the relevant legal provisions.

1.2.2 The administration of justice relief

During the proceedings, the

economic situation worse if the parties require a judicial appraisal, it will have been affected during the time people of the proceedings, the party faced economic problems because it will inevitably give up legal rights to maintenance. Therefore, the construction of Forensic waiver system on the basis of a means to effectively safeguard the legitimate rights and interests of the citizen suit. Judicial appraisal fee waiver regime with the relief, the parties maintain effective interest in the face of Forensic charges when on the basis of the system to protect.

2 Appraisal fee waiver justice system deficiencies exist

Present Expert Testimony in China due to the charge related to defects in the system, leading to the lack of appropriate judicial appraisal system support during the actual work by analyzing deficiency can understand present therein can be divided into the following:

2.1 Fee waiver system objects lack of specific requirements

When the parties were identified charges judicial waiver applications, for to approve the waiver object requires the absence of specific requirements, however, the relevant departments not only by virtue of one statement will approve the fee waiver requirements, so that will inevitably result in the judicial appraisal fee system relief expand the scope of, and thus a waste of available resources.

2.2 Costs associated with fee waiver party bear unreasonable

Usually the funds needed in the judicial appraisal fee waiver be borne mainly by the Department of

Forensic alone, but this arrangement is unreasonable. Because the hard work of Forensic officers on the basis of relevant labor becomes free, there will inevitably be identified personnel slack phenomenon.

3 Construction of forensic waiver system related vision

3.1 Appraisal fee waiver judicial system authorities

Construction in the judicial system during the appraisal fee waiver, the competent authorities for the identification of the main body of the executive authorities in the scope of the work included in Forensic Sciences and the relevant legal assistance to solve ^[2].

3.2 Appraisal fee waiver judicial system objects defined

According to relevant regulations, the definition of judicial appraisal fee waiver system objects can be divided into the following types.

3.2.1 The applicant must determine the presence of economic difficulties after an investigation on the basis of not fully pay the cost of Forensic applicants.

3.2.2 Determined to safeguard their legitimate interests apply for a judicial appraisal fee waiver applicant is the only way.

3.2.3 Related personnel after a detailed investigation to determine the information provided by the applicant as a legitimate real and effective.

3.3 Appraisal fee waiver judicial system application process

3.3.1 Parties to submit an application fee waiver

Judicial authority to set uniform identification forensic application fee waiver system, the system of the applicant's financial situation, apply

for a waiver of the reason, we need the relevant information provided by the applicant and the applicant must be true data valid proof provided detailed regulations. The identity of the relevant information provided by applicants which contain the applicant's proof, income status certificate or other relevant evidence ^[3].

3.3.2 Appraisal fee waiver judicial authorities for review

After the judicial appraisal fee waiver authority for the applicant to submit materials verification, the competent authority for verification of compliance with the detailed requirements of the waiver applicant in accordance with the rules and procedures apply for the next program, if the applicant authority in the verification found not to comply with the requirements, will have to be submitted in accordance with the provisions of the materials to supplement, if after the supplementary application still does not meet the requirements, the competent authority will notify the applicant in writing, its judicial appraisal fee waiver applications filed not handle.

3.3.3 Forensic Expertise event assignment

Applicants who meet the waiver of Forensic System, administration of justice agencies can take the form of random assignment of Forensic incident, forensic identification of bodies as required to complete the event within a specified period of time after receiving the identification event.

3.3.4 Identification of justice charges apply for the waiver

After the completion of the identification of bodies of Forensic Identification event, the competent authorities in accordance with the

requirements of the judicial appraisal fee waiver event the applicant applied were handled. However, in the specific process of identification, forensic authorities to conduct strict accordance with relevant provisions of Forensic Identification of the application process, and not on the basis of relevant personnel and cost reduction, based on the identification of the application for judicial procedures are omitted.

3.3.5 Appraisal fee waiver applications judicial conclusion

Judicial authorities in the identification of the applicant to complete the application for judicial appraisal fee waiver applications are reviewed, after handling the process, the need for timely conclusion of the report will be submitted to the competent authority of Forensic Sciences, at the conclusion of its report to be submitted to the authorities of Forensic additional waiver for appraisal submissions event, and by the authority of Forensic Bureau of justice will be archived after the inspection. After the completion of the organ of Forensic report submitted by the end of the inspection, legal aid agencies in accordance with the requirements of the application the applicant will be referred to the relevant application fee waiver, legal aid institutions after a detailed verification aside from certain special operating expenses payments to the judicial authorities to identify, complete the application submitted by the applicant.

3.4 Application does not meet the appraisal fee judicial relief under treatment

When submitting the application the applicant does not comply with the judicial relief under the appraisal fee, to stop the incident forensic immediately,

if the time of Forensic Sciences has ended, then to charge a fee in accordance with the relevant provisions of Forensic Sciences.

3.5 Forensic sciences personnel obligations and rights

3.5.1 Forensic Expert per the provisions dealing with the cases for the 1-3 year, if exceeded in accordance with the relevant provisions of its incentives ^[4].

3.5.2 Under normal circumstances can not be delayed, reject or stop of Forensic event handling, and staff to report incidents of Forensic Identification in accordance with the provisions of the relevant departments in a timely manner the situation.

3.5.3 Protection of national parties and not disclose their privacy

3.6 The applicant and judicial expert assumed liability

In order to ensure appraisal fee waiver judicial appraisal process is completed successfully, and to ensure that the identification process on the basis of real openness, the applicant and the following judicial identification people need to bear legal responsibility.

3.6.1 Forensic Sciences personnel costs can not refuse waiver applications submitted by the applicant for any improper reason, now found that when the cancellation of Forensic vocational qualification certificate measures.

3.6.2 The situation appears slack in the event of Forensic personnel identification process, the administration of justice institution has the right to give its deadline for closure of the punishments.

3.6.3 Applicant during the application process to ensure the authenticity of the information, if there is the phenomenon of false information found on the judicial appraisal fees to

pay double.

4 Conclusion

In summary, for this stage of Forensic Sciences in the presence of the parties because of the economic situation of problems, caused by the phenomenon of the legitimate interests of the parties affected, Construction of Forensic waiver system is an effective solution. Through the Construction of Forensic Considerations related fee waiver system to safeguard the legitimate rights and interests of citizens, safeguard judicial justice system to provide legal support.

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Toxic Plants: The Dangers of Returning to Nature

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Abstract In France, the plants are involved in about 5% of cases resulting in a call to a poison control center and toxicity (CAPTV). Poisoning plants are mainly children and are usually benign. In adults, they are rare and occur either suicidal context or by confusion with an edible plant or by use of the plant in an addictive or therapeutic purposes. Such poisoning can be serious and be life threatening. This article presents the plants where severe poisoning or death have been reported and whose toxicity is mainly cardiac and / or neurological. After a brief description of each of the following plants: aconite, belladonna, colchicum, datura, foxglove, yew, oleander, redoul and hellebore, the clinical, therapeutic and analytical corresponding poisoning will be treated.

Keywords: Plants toxic poisoning, Alkaloids antidote, Forensic science.

1 Introduction

In France, the plants are involved in about 5% of cases resulting in a call to a poison control center and toxicity (CAPTV) [1,2]. Poisoning plants are mainly children and are usually benign. In adults, they are rare and occur either suicidal context or by confusion with an edible plant or by use of the plant in an addictive or therapeutic purposes. Such poisoning can be serious and be life threatening.

In this article, we present a dozen toxic plants, in alphabetical order of vernacular name for which severe poisoning or death have been reported. These are mainly plants in cardiac toxicity and / or neurological. After a brief description of the plant [3], we discuss the clinical, therapeutic and analytical.

2 Aconite (*Aconitum napellus* L., Fig. 1)

The aconite, also called helmet of Jupiter, Wolfsbane, Venus chariot or peacekeeper (wolfsbane or monkshood, in English) is a perennial herb belonging to the family Ranunculaceae. It is a plant from 50 to 180 cm high that grows mainly in mountainous areas of Western Europe. It blooms from June to August; the flowers are purplish blue, grouped in clusters. The root is napiforme, pointed, often surmounted by a radical of the rod.

All organs of the plant, but especially the roots and seeds contain diterpene alkaloids, the main one aconitine. The aconitine acts at the level of voltage-gated sodium channels infarction, nerves and muscles. It causes persistent activation of these channels thus making them refractory

to repolarization, with the consequence, premature excitation. The aconitine is exciting and paralyzing nerve centers of the medulla and peripheral nerve endings. Its toxic action resulting in neurological and cardiac disorders. [4]

Poisonings are rare in Europe. They may be suicidal [5], consecutive to a consumption of herbal preparations or confusion with root vegetables (turnip, horseradish, celery) and exceptionally criminal. [6] Poisonings are common in Asia due to the use of aconitine in Chinese medicine for its antirheumatic properties and antineuralgic [7]. Severe poisoning can occur after ingestion of 1 mg aconitine or 2 to 4 g of fresh roots.

The symptoms appear soon after ingestion (from ten minutes to two hours) and are characterized by paresthesia oral, pharyngeal and labial and extremities, gastrointestinal disturbances (salivation, nausea,

vomiting, sometimes diarrhea), dizziness and asthenia. In severe cases occur in cardiac disorders (ventricular tachycardia, ventricular fibrillation, cardiac dysrhythmias) and a respiratory paralysis. The paresthesia association with muscle weakness and heart problems is characteristic of poisoning by aconite.

Aconite swallowed requires hospitalization in an intensive care unit with ECG and blood pressure monitoring. Digestive evacuation by vomiting, gastric lavage may be recommended if a short time (less than one hour). The indication of this digestive evacuation will depend on the assumed dose ingested, symptoms and delay. Treatment is mainly symptomatic. There is no consensus on the best treatment for ventricular arrhythmia, amiodarone, flecainide, mexiletine and magnesium sulphate [8,9] have been used with variable success depending on the case. Lidocaine was generally ineffective. In animal studies, rats, are flecainide and beta-blockers that have proven to be most effective. [10] In case of ventricular arrhythmias and refractory shock, it should be quickly put in place circulatory support.

The aconitine can be assayed in the blood or urine. The analytical method that now seems most effective for the determination of aconitine is liquid chromatography coupled with tandem mass spectrometry (LC-MS / MS). A blood concentration of 3.6 g / l can be considered lethal in the absence of treatment [9]. In a case of severe intoxication with a plasma concentration at 1.75 mg / l at the seventh hour, the calculated half-life of aconitine was three hours [11].

3 Belladonna (*Atropa belladonna*)

L., Fig. 2)

Belladonna also called beautiful lady, black button or mandrake baccifère (deadly nightshade, English) is a herbaceous plant belonging to the Solanaceae family. Present in Europe, it grows in clearings, preferably limestone terrain. It bears fruit in August / September and produces globular berries, about the size of a cherry, embedded at the center of a star chalice.

Poisoning can be consecutive to accidental ingestion in children [12,13] or confusion with edible berries in adults. [14] They rarely occur in a context suicidal or addictive.

All parts of the plant contain tropane alkaloids, including atropine, hyoscyamine (levorotatory isomer of atropine) and scopolamine. These three alkaloids have a parasympatholytic share; they inhibit competitively and reversibly binding of acetylcholine at peripheral and central muscarinic receptors, resulting sympathomimetic effects (or anticholinergic or antimuscarinic).

Symptoms appear 30 minutes to 2 hours after ingestion and include, depending on the amount ingested, one or more of the following clinical signs: vomiting, dry mouth, mydriasis, tachycardia, hyperthermia, confusion, delirium, convulsions, coma and respiratory depression.

Treatment is mainly symptomatic. Physostigmine (or eserine), reversible acetylcholinesterase inhibitor, increases the level of acetylcholine in the synaptic cleft and allows the stimulation of muscarinic and nicotinic receptors. Thanks to its tertiary amine structure, physostigmine pass the blood brain barrier and acts on both central

anticholinergic symptoms and devices. It is available in France under the name of Anticholium® and is subject to the status of temporary authorization to use registered (ATU 2007). The drug, unwieldy due to its side effects, can



Figure 1. Aconit



Figure 2. Belladone



Figure 3. Colchique

be used in cases of severe poisoning resistant to symptomatic measures. It is to be administered at a rate of 1 to 2 mg i.v. slow in adults after verifying the absence of contraindications for its use. Physostigmine is between the 5th and 20th minute after injection, and the effect persists for 45 to 60 minutes ^[15-17].

4 Colchique (*Colchicum autumnale* L., Fig. 3)

Colchicum also called meadow saffron (meadow saffron or autumn crocus, English) is a herbaceous perennial flowering from August to November. Fruits and leaves appear in the spring of the following year. The fruit is a large green capsule with three compartments, each containing 60-80 seeds. The main compound is crocus

colchicine that inhibits microtubule formation by binding to tubulin with the consequence, a blocking mitosis at the stage of metaphase.

Poisonings occur mostly in spring, by confusion leaves with those of wild garlic ^[18,19] or wild leek; they rarely occur in children by consumption of seeds or adults in a suicidal frame. ^[20]

Colchicum poisoning are serious and bring life-threatening. The first signs are gastrointestinal and occur after a delay of several hours (vomiting and profuse diarrhea quickly responsible for dehydration). In severe cases, there is the appearance in the first 24 hours of acute circulatory failure. By the third day appears myelosuppression that will last two to six days and whose risk is infection and bleeding. By the tenth day occurs alopecia. The blood test colchicine to confirm the diagnosis.

Regarding the therapeutic management: the digestive evacuation is rarely performed because of the typically long delay between ingestion and hospital admission. The administration of activated charcoal repeated doses may be effective but is generally not feasible because of severe vomiting. The volume of distribution of colchicine renders illusory the renal replacement methods. The anticolchicine antibodies are not, to date not available. Treatment is mainly supportive, guided by daily monitoring of electrolytes, blood counts and prothrombin.

5 *Datura* (*Datura stramonium* L., Fig. 4)

The genus *Datura* comprises about twenty species of which the most common is *Datura stramonium* L., also called Jimson weed, grass of the devil,

thorn apple, grass to the moles (jimson weed, English). It is a herbaceous plant belonging to the Solanaceae family, abundant in Europe where she likes wasteland and roadsides; it is widely grown for its decorative appearance. It blooms from July to October (large white flowers trumpet-shaped). Its fruit is a large thorny ovoid capsule containing many seeds.

All parts of the plant contain alkaloids including hyoscyamine (principal alkaloid), scopolamine and atropine; these alkaloids are peripheral and central competitive antagonists of acetylcholine. *Datura* causes, such as belladonna, a parasympatholytic effect but whose intensity is stronger.

The most common method of intoxication for the consumption of this plant in a goal addictive form of decoction, ingestion of seeds or use of cigarettes made from dried leaves. ^[21]

The poisoning causes anticholinergic syndrome primarily neuropsychiatric symptoms with psychomotor excitement, incoherent, visual hallucinations, disorientation, aggressiveness. Among the peripheral anticholinergic signs, we note the presence of a bilateral mydriasis while other anticholinergic signs are more fickle: dry mouth, sinus tachycardia, hyperthermia, vomiting and urinary retention. In severe cases, there may be convulsions and coma. Evolution is generally favorable in 24 to 48 hours. The diagnosis can be confirmed by blood and urine assay of alkaloids by liquid chromatography coupled to a dual-mass spectrometry (LC-MS / MS). ^[22]

Treatment is symptomatic. Physostigmine, available in France under the name of Anticholium® and subjected to a nominative ATU,



Figure 4. *Datura*



Figure 5. *Digitalis*

can be used in severe poisoning (see Belladonna).

6 Digitalis (Fig. 5)

The genus *Digitalis* includes twenty species. This is a herbaceous plant belonging to the family of Scrophulariaceae and blooming from May to September as a long unilateral cluster. In France there are three wild species: foxglove (*Digitalis purpurea* L.) or purple foxglove in English, yellow digitalis (*Digitalis lutea* L.) and *Digitalis grandiflora* (*Digitalis grandiflora* L.).

The plant contains many compounds which qualitatively and quantitatively variable cardiac glycosides (digitoxin, gitoxin, lanatoside C digitoxigenin). These cardenolides act by inhibiting the Na⁺ / K⁺ + ATPase membrane. They have a positive inotropic, chronotropic and dromotropic negative. They also a vasoconstrictor, diuretic and a central effect.

Poisoning can be a result of a confusion with borage leaves used to prepare salads or teas, or voluntary ingestion with suicidal intent. Accidental poisoning in children are rare.

Symptoms involve: gastrointestinal disorders (nausea, vomiting), neurosensory disorders (confusion, confusion, color blindness), heart problems with conduction disturbances and / or automatism (sinus bradycardia, atrioventricular block grade 1, 2 or 3, sinus or junctional tachycardia, tachycardia or ventricular fibrillation). These disorders may be associated with hyperkalemia, this intoxication gravity factor. Because of cross-reactions when cardenolides assays immunoassay,

the dosage of digoxin that is usually used to assess the severity of the poisoning; However, given the low correlation clinicobiological^[23], should be preferred clinical signs for evaluating the severity and determine the therapeutic management. A measurement of specific glycosides would be helpful if the laboratory has the appropriate techniques^[24]. Regarding treatment, indicating a digestive evacuation is to discuss on the time, the amount ingested and symptoms. Repeated administration of activated charcoal may be useful^[23]. Treatment involves the careful correction of hypokalaemia and administration of atropine in case of bradycardia. Specific treatment by antidigitalis antibodies (DIGIBIND[®]) is the treatment of choice for severe poisoning.

7 If (*Taxus baccata* L., Fig. 6)

This is a tree (yew, English) from 4 to 15 m high evergreen, often planted in parks and gardens. The fruit, falsely called "bay", is formed by a red aril sacciforme surrounding an ellipsoidal seed.

Except the aril, all parts of the plant are poisonous and contain a mixture of alkaloids and complex structure pseudoalcaloïdes. The main cardiotoxic substances are taxines A and especially B taxines, diterpene taxane core substances that are antagonists of the calcium and sodium channels and whose properties are similar to those of the class of antiarrhythmic 1. One gram of redwoods contain approximately 5 mg of taxines. Taxol (paclitaxel), antimicrotubuline cytotoxic agent originally isolated from the bark of *Taxus brevifolia* Nutt., Are present in

very small quantities (0.01%).

Severe poisoning are mainly observed in adults and may be secondary to ingestion of leaves and seeds with suicidal intent or accidental ingestion in a context of herbal treatment. In children, accidental poisoning are usually benign due to the ingestion of non-toxic fleshy part of the "bay" or ingesting a small amount of "bays" with a non-mache core.

The clinical signs appear two to three hours after ingestion and include digestive, neurological signs (coma, convulsions) and heart (ventricular conduction disorders, arrhythmias, ventricular fibrillation). The dosage of the alkaloids in biological fluids can be performed in a laboratory with the correct technique^[25,26].

Le traitement des troubles cardiaques reste mal codifié : lidocaïne, phénytoïne, anticorps antidigitaliques, assistance circulatoire et perfusion de

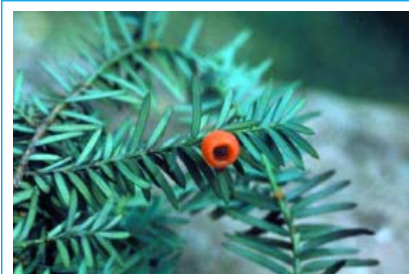


Figure 6. If



Figure 7. Laurier rose

solutés alcalins ont été utilisés avec des succès variables ^[27].

8 Laurier rose (*Nerium oleander* L., Fig. 7)

This is a shrub (oleander, English) from 2 to 3 m high belonging to the family Apocynaceae. The leaves are evergreen and flowers, pink, red or white, are present from June to September. All parts of the plant contain glycosides, the main one being the oleandrine, whose structure is similar to that of digitalis. Poisonings occur most often in adults with suicidal context ^[28,29].

The symptoms of poisoning are those of digitalis intoxication with: digestive disorders (nausea, vomiting), neurosensory disorders (agitation, confusion, color vision disorders), cardiac disorders related to inhibition of the Na⁺ / K⁺ ATPase membrane (bradycardia, conduction disorders and / or automatism). These disorders may be associated with hyperkalemia, gravity factor of this poisoning. ^[30] The dosage of oleandrine not being made in current practice, the dosage of digoxin which is generally used to assess the severity of the poisoning even

though there is no strict correlation between the measured concentration and the severity of the poisoning. The effectiveness of the activated carbon is likely, although there is no consensus on the mode of administration (single dose versus multiple doses) ^[31,32].

Treatment includes, besides the If atropine in bradycardia and careful correction of ionic abnormalities, administration of antibody antidigitalis whose indication is based on clinical, electrocardiographic and laboratory (serum potassium).

9 Redo (*Coriaria myrtifolia* L.)

This is a common shrub of Mediterranean regions whose fruit roughly resemble blackberries. All parts of the plant contain a sesquiterpene lactone (coriamyrtine) having a structural similarity with the picrotixine and anisatin. The most common cause of poisoning is ingestion of fruit, especially in children.

The symptoms usually occur between 30 minutes and 2 hours of ingestion and associate: digestive (gastrointestinal pain, vomiting), neurological disorders (in order of frequency: convulsions, confusion, hypertension and muscle cramps, fainting, coma, disorientation, lockjaw and opisthotonos, headache, agitation) and breathing problems (rapid breathing, apnea). Treatment is symptomatic ^[33,34].

10 Vératre (*Veratrum album* L., Fig. 8)

The white hellebore (known in Europe), also known as white hellebore (white hellebore or poison lilly, English), belongs to lafamille Liliaceae.

It is a perennial herb of the mountainous regions of Europe. The flowers form a long white cluster to the end of the rod. The fruits are in the form of a brown ovoid capsule containing seeds. The plant contains many alkaloids including protovératrine A and B ^[35]. The main pathophysiological mechanism of poisoning is related to the increase in the permeability of sodium channels ^[36]. Poisonings occur mainly in adults by confusion with gentian (*Gentiana lutea* L.) in the liqueur crafted from the roots, the two species share the same habitat. Symptoms appear after 30 minutes to 3 hours and are characterized by digestive disorders (nausea, vomiting, abdominal pain), cardiovascular disorders (bradycardia, hypotension, conduction disorders) and neurological disorders (visual disturbances, dizziness, paresthesia, confusion) ^[37,38]. Symptoms usually resolve within 24 to 48 hours. Treatment is symptomatic. Atropine is effective bradycardia.

11 Conclusion

A number of plants contain cardiotoxic and neurotoxic alkaloids. Their use can cause serious intoxications whose diagnosis may be disregarded in the absence of accurate history. It is therefore appropriate for every patient in a context of digestive disorders with cardiovascular disorders and / or neurological symptoms (paraesthesia, confusion, convulsions) to discuss the hypothesis of plant poisoning. A blood sample is to allow the admission, if any, to provide a measurement of specific alkaloids in order to confirm the diagnosis and to advance in the study of a clinicopathologic correlation for cases of poisoning infrequent, and caused



Figure 8. Redoul

serious by agents in our immediate environment.

Conflict of interest

The authors declare that no conflict of interest.

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Lesions Induced by Tasers of Type Taser®

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Abstract Electrical impulse guns (Les pistolets à impulsion électrique, PIE) are increasingly used in Europe in recent years, the most famous being the model Taser®. Scientific knowledge about PIE and their potential effects remains limited. We conducted a literature review to assess the potential implications of their use in terms of safety, morbidity and mortality. A unique exhibition in a healthy individual can generally be considered somewhat dangerous. Subjects at risk of complications are individuals exposed to multiple shocks, people under the influence of psychoactive substances, those who show signs of extreme agitation, or individuals with medical comorbidities. The range of complications that can occur during exposure is broad and includes injuries caused by the impacts of the electrodes, the injuries to the fall induced transient paralysis or cardiovascular complications. In this context, those exposed should be examined carefully, and any injuries should be excluded.

Keywords: Conducted electronic weapon, Incapacitating device, Electronic control device, Taser®, Forensic science.

1 Introduction

Electrical impulse guns (PIE) belong to the category of weapons called "stun" or "reduced lethality," as well as rubber bullets or tear gas. By inducing a temporary work disability, the IEP can neutralize individuals by limiting the risk of injury to themselves, their immediate surroundings or for law enforcement, by comparison with the use of firearms or to physical restraint [1,2]. Despite the controversy that exists, especially in the media, regarding their safe use [3], their use in the workplace (police, army, prison service or security agencies) or private (self-defense) is increasing dramatically during recent years.

PIE raise many questions about their side effects, in terms of morbidity, but mainly because of their potential involvement in the occurrence of

certain death. The debate, promoted especially by media coverage of the case the most dramatic and commitment of organizations such as Amnesty International [4], and goes well beyond the framework of the scientific and medical community, however, attempts to provide the answers more reliable to questions about risks to health from the use of PIE [5-7].

This article presents the current knowledge related to the use of PIE, describes the potential impacts to expect in terms of morbidity and mortality, and has the support principles in emergencies exposed patients.

2 Techniques

PIE brand best known is the Taser® (Thomas Appleton's, Swift's Electrical Rifle, Taser®, Scottsdale, Arizona). The Taser® was invented in

the 1960s by Jack Cover, an American nuclear physicist, amid upsurge in hijackings. The aim then was to offer an alternative to firearms, including flight employment showed significant risks, both for passengers and the aircraft itself. [8] The first Taser® was marketed in 1974 in the US, and this device currently dominates the [3] market.

Taser® the most used is the X26 model (Fig. 1), the first version was made in 2003 [9]. This is a gun-shaped device using compressed nitrogen cartridges for propelling two darts (electrodes) barbed (Fig. 2) at a maximum distance of 10.6 m [10]. These darts, measuring 9 mm, are connected to the gun by insulated conductors son. The mechanism of action requires most of the time the penetration of the skin, but the electrode may also transmit an electrical pulse through the clothes. [11]

The TASER® the usual discharge lasts for 5 seconds and consists of a pulsed pulse at 19 Hz. The approximate average voltage supplied to the subject is estimated at 1 200 V and the intensity of the current to 2.1 mA ^[12]. The pulse is designed to inhibit the alpha motor neurons of skeletal muscle fibers, stimulating the presynaptic component of muscle nerve ^[13,14]. Although the mechanism of action is only partially known, failure induced due to an uncontrollable contraction of skeletal muscles, preventing voluntary movement and causing secondary falling by loss of muscle tone. The Taser® can also be used by direct contact with the target, "after touching" without the darts are fired. The principal effect of such use then is the induction of major painful stimulation ^[14,15].

Civilian versions TEWL were developed (C2 Taser® particular, by a longer discharge time up to 30 seconds) with models increasingly discrete and compact. To date, only one study has been conducted with these devices civilians, involving 12 volunteers and their safety remains to be demonstrated ^[16].

3 Epidemiology and State of Knowledge

The development of PIE has been particularly rapid in recent years. Thus, in 2012, more than 17 000 military agencies or law enforcement forces were equipped with Taser® in over 100 countries. ^[17] More than 260 000 devices were also sold to individuals. ^[18]

Nearly half of the uses identified were in volunteers, as part of training or induction courses. ^[11] The number of applications in real conditions on the ground was estimated in 2013 to more than 1.9 million worldwide; in various contexts, such as escape attempts,



Figure 1. Taser® X26. The device propels two barbed darts connected to the gun by insulated conductors son, transmitting the electrical discharge (photo CEMCAV-CHUV)



Figure 2. Barbed Darts: enlargement (photo CEMCAV CHUV)

resistance during apprehension, physical confrontations, severe poisoning with state of agitation, the refusal to comply with a police order or to stop an assault or hostage taking ^[19,20]. The majority of applications were for young men ^[19,21], willingly alcohol, under the influence of psychoactive substances ^[21,22], or psychiatric comorbidities ^[21]. About 20% of them were in possession of a firearm during the use of Taser® ^[22]. When using darts mode, only one landfill was issued by the Taser® in about half of cases ^[21-23]. The most commonly affected areas

illustrate the rules of engagement and involve the chest and back ^[21-24], although any place can be affected, including sensitive areas (head, face, neck: 1.4%) or genitals (0.2%). ^[22] In "point blank", the most commonly affected areas are the limbs and the back ^[22] and some individuals are seen to apply ten successive discharges ^[7,22].

4 Regulation and Use

In most European countries, the use of Taser® is governed by precise rules of use, giving it a proportionate

method of engagement, as a last resort before the gun use. The Taser® also been médicoéthiques thoughts, especially about its use on vulnerable populations. ^[25]

MEI are regarded in France as weapons of fourth class or handguns that are not for military use. These weapons require obtaining a use permit and a specific training training ^[26]. The use of a PIE is equivalent to use of force, and therefore its use is strictly regulated (self-defense, absolute necessity, apprehension of the perpetrator of a flagrant crime, overcome resistance). Since 2004, PIE equip the army, the National Police and the French Gendarmerie. After several decrees and cancellations, a decree of Prime Minister Francois Fillon and a ministerial decree authorized since 2010 for use by municipal police. ^[26] Sale to individuals is prohibited in France. ^[27]

In order to limit abuses and document their jobs, Taser® X26 of the French police are equipped with an integrated camera recording images when the PIE is armed. The electrifying settings are also saved. In 2011, the French National Police has identified 823 deployments Taser® this figure includes not only the distance shots, but shooting without deployments and contacts "point blank". ^[28]

5 Morbidity

The effects of PIE on humans are multiple and result from direct or indirect trauma associated with their use, but also for the consequences of the passage of electrical current through the body. The level of evidence about the potential risks of EIP is limited and is based in part on studies with obvious conflicts of interest from the manufacturers. Medical knowledge on the subject and come from case reports

Table 1. Possible complications of traumatic tasers (adapted from Pasquier et al. ^[23]).

Injuries caused by the darts	Fall injuries
Wounds / superficial burns	Contusions/dermabrasions
bone penetration (Fingers, skull)	Lacerations, hematomas
Intra-Spiking	Fractures
Eye damage	Intracranial hemorrhage
Lesion of the pharynx	Facial bone fracture
Pneumothorax	Dental lesions
Testicular torsion	1.858

describing complications related to the use of CIP, but also prospective studies on humans. These volunteer studies were conducted mostly using pliers "crocodile" or electrodes, and only a minority of them used an actual exposure pulling away with ^[23] Darts. Finally it should be noted that the majority of studies on volunteers were conducted by the same group of investigators and were funded by the manufacturers or by the US federal funds ^[14,23]. An analysis showed that the studies whose authors were affiliated with the manufacturer Taser® or funded by the same company were significantly more likely to conclude that the safe use of these devices. ^[29]

6 Injury

This type of injury can be consecutive to direct injury induced by darts (Table 1) or result from a possible fall secondary to the paralysis induced by the electrical discharge. By analogy that may be encountered in the event of seizure, vertebral fractures induced muscle contractures are possible ^[23]. Ingestion of dart has also been described ^[23]. Burns caused by ignition of flammable materials are theoretically possible. Applying the precautionary principle, the manufacturer of Taser® and states that flammable or explosive liquids can catch fire if a Taser® enabled nearby.

7 Cardiovascular Effects (Except Cardiac Arrest)

The various studies on healthy volunteers exposed to PIE highlight a discrete elevation in heart rate ^[23], the effect on blood pressure itself being variable ^[23]. Studies with monitoring heart rate after exposure showed only rare anomalies, as non-specific modifications of the ST segment on the electrocardiogram, of sinus arrhythmia, or decrease a physiological PR interval in part of a tachycardia ^[23]. No changes to the QRS, QT or corrected QT was found. ^[23] Blood samples after exposure have uncovered cases of non-specific increase in troponin ^[23]. A reported case described the presence of atrial fibrillation in a teenager in the aftermath of an intervention with a commitment PIE without the causal relationship has clearly been demonstrated ^[23].

The rhythm analysis by ECG is not feasible during discharge PIE because of interference related to the pulse, some teams have made echocardiograms simultaneously, looking for possible arrhythmias. These tests showed that 66% of patients had sinus rhythm during electrification. Other examinations were uninterpretable because of the movements induced by the electric discharge, and no arrhythmia and has been objectified. ^[23]

The impact of a PIE discharge in patients with a pacemaker or an implanted defibrillator remain unknown. One reported case reports, after analysis of the pacemaker, with a rapid ventricular response induced by a discharge PIE, showing that a myocardial capture phenomenon is

possible.^[30] After using a PIE, the analysis of cases of pacemakers and defibrillators through animal studies or case reports, however, never objectified of sustained ventricular arrhythmia or dysfunction of the device or need to reprogram^[30-33]. It has been shown against implanted defibrillators could interpret a pulse PIE as ventricular tachycardia without inducing defibrillation, taking into account the usually very short exposure time^[31,32]. In case of longer discharge, and as demonstrated in animals, inappropriate defibrillation is possible^[34].

8 Other Effects

Available at The studies confirmed that the respiratory activity of individuals exposed to a discharge PIE was preserved.^[23] Metabolically, within minutes after exposure, some studies have shown a slight decrease in pH and an increase in blood lactate^[23], with a maximum value reached 17.3 mmol / l result an extended 30 seconds^[23] exhibition. However, aside from this case, changes in pH or lactate were limited and below the variations observed during intense physical activity.^[23] If elevated muscle enzymes (creatine kinase or myoglobin) could be observed in volunteers^[23], it is difficult to criminalize the PIE described in rare cases of rhabdomyolysis, given the significant number of other factors potentially contributing (such as extreme agitation, physical stress or taking toxic)^[21,35,36].

Finally, exposure to a discharge PIE has been mentioned as a potential etiologic factor in cases of miscarriage, an episode of seizures and a stroke^[23,37].

9 Mortality

If the risk of death indirectly from the use of PIE is real (fall or

drowning if used near a body of water), controversy exists as to the existence of a direct link between the use of PIE in the field and some deaths. In the absence of accurate data, both the number of deaths occurring during use of PIE that the exact number of CIP applications in the world, an assessment of the number of cases of death or mortality risk still difficult to formally assess.

10 PIE as a direct and sole cause of death

The risk of inducing cardiac arrest through a ventricular fibrillation (VF) if discharge PIE seems extremely low^[23,38], especially when you put into perspective, in suspected cases, the period found between the use of PIE and the occurrence of death^[4,39]. In a series of 56 cases died within 15 minutes after exposure to a PIE, the presence of VF could not be documented in only four patients (7%), and only one case has been considered compatible with this scenario in a patient exhibiting neither pre-existing heart disease or substance abuse.^[40] The direct risk of inducing VF with a discharge PIE as single dominant cause of death seems extremely limited. The appearance of a malignant arrhythmia, however, could be more common in individuals carrying a heart disease and / or under the influence of toxic psychostimulants^[41,42] as well as during prolonged or repeated exposure^[43].

Two articles - whose conclusions differ significantly - have recently reviewed and analyzed the deaths occurred early after use of PIE. An article published in 2012^[43] concluded that exposure to PIE could induce myocardial capture phenomenon and cause cardiac arrest on tachycardia or VF. The author - a priori independent of the manufacturer

or the police - therefore advocates use in full knowledge of the PIE, avoiding as much as possible the impacts in the torso, monitoring the individual exposed and being ready, if necessary, to perform cardiopulmonary resuscitation (ie defibrillation).^[43] In 2014, other authors-related interests that both PIE-makers have concluded that the risk of cardiac arrest induced PIE was extremely low, even zero, and that the causal link was at best speculative^[44].

11 PIE as potential contributing factors to death

Exposure to PIE is sometimes cited as a contributing factor in some potential for death^[4,23,45], especially in subjects intoxicated, highly agitated^[46] or carriers of a preexisting cardiomyopathy^[47]. The retrospective study of deaths occurring after use of PIE illustrates the difficulty in establishing a causal link because of the many confounding factors, readily present in individuals who may be exposed. Thus, over 50% of deceased subjects had underlying cardiovascular disease^[42,46], and over 75% were under the influence of psychostimulant^[42,46]. Notably, the average discharge time on these subjects was also 17 to 25 seconds^[15], a period well beyond the recommendations of use.

A review of 37 cases of death within 24 hours after the use of PIE has shown that 76% of subjects experienced an extreme state of agitation, called English excited delirium.^[46] This syndrome, recently described in this journal^[48], is characterized by a major confusion, agitation, pain tolerance, unusual force, hyperthermia, hostility, paranoid state and hyperactive behavior^[23,48]. Factors contributing to the deaths of these patients are still unknown but could include positional

asphyxia related to physical stress, hyperthermia, toxicity of illegal substances or fatal arrhythmia induced peak of catecholamines^[49]. While the cause of death in patients with an excited delirium remains hypothetical and probably multifactorial, the contributory role of the use of PIE in these patients is at present difficult to measure^[50]. It should also qualify the risk recalling that in these patients, the PIE is an alternative to physical stress measurements or even a potentially lethal firearms commitment.^[51] Caution remains in order, pending clarification on the impact on mortality of the various factors contributing to the death of these individuals.

12 Medical treatment after exposure to PIE

The management of a patient exposed to PIE includes extraction electrodes if they are still stuck in the body. The darts must be removed by applying online traction, and tetanus immunization status should be checked. If penetration of sensitive areas such as the eyes, face, genitals or skull, an examination by a specialist is recommended. Clinical examination should also include careful research of injuries may have been caused by muscle contractions (including vertebral fractures, joint dislocations) or by^[23] falls; review appropriate to repeat in some cases when the patient no longer under the influence of psychoactive substances.

In 2009, a review concluded - while acknowledging the low level of evidence Disposition- that adult subjects with sinus rhythm after exposure to PIE did not require cardiac rhythm monitoring or other cardiological investigation^[52]. More recently, in 2010, a position taken by the American Academy of

Emergency Medicine was issued to clarify the record to achieve in patients presenting to the emergency in the aftermath of exposure to PIE^[53]. The proposed approach is not routinely conduct of ECG, laboratory or special monitoring exams in conscious subjects, asymptomatic and have been exposed to a discharge of less than 15 seconds^[53]. Achieving non-systematic of a ECG or laboratory tests must consider the patient's history (including heart), the presence of symptoms (chest pain, dyspnea, palpitations, myalgia), and the time of exposure (greater than 15 seconds).^[53] Despite the lack of reliable data concerning holders of a pacemaker or an implanted defibrillator, it seems reasonable to control these devices for exposure of the subject to a discharge PIE^[23].

In potentially high-risk patients (state of agitation, acute poisoning, multiple exposures, arrest or strong compression, symptoms may evoke an excited delirium), a full assessment is required in particular for the presence of hyperthermia, d an acidosis, rhabdomyolysis, signs of intoxication and traumatic injuries, especially in the brain, chest and spine^[23,53].

13 Conclusion

Scientific knowledge about PIE-use security are relatively limited and weak evidence. The field use of these PIE is generally required for subjects at high risk of complications (including extreme agitation) than in experimental studies in healthy subjects. The medical care of an individual has been exposed to a discharge PIE depend on the patient's comorbidities, symptoms present, but also the exposure time (often difficult to specify). In all cases, careful clinical examination should be performed, especially in search of traumatic injuries. Complications

related to the use of PIE can be numerous and sometimes specific, appropriate knowledge is desirable on the part of professionals likely to support these patients. Good coordination with the police also allows to anticipate complications and provide the necessary resources to support the patient after his arrest.

Conflict of interest

The authors declare that no conflict of interest, whether commercial, financial or any other kind concerning the topic related in this article, in accordance with recommendations of the International Committee of Medical Journal Editors (ICMJE). They have in particular no link with Taser® and prepared and drafted the text independently of any relationship with the police.

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From Theory to Practice: The Biological Findings

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Abstract It is about the biological samples from the scene, and its extraction and significance on forensic science.

Keywords: Biological samples, Scene, Blood, Saliva, Sperm, Forensic science.

1 Site inspection: techniques and technologies

What is a physical test? As it can be recorded, collected and preserved? As can be gleaned the information from it? How you should interpret the information obtained?

The judicial inspection consists in the inspection and description of a location where it was committed a crime or a crime, he aims to establish the existence and type of crime, the means and manner of execution of the same, when, how and by whom the offense was committed (articles 348 and 359 of the Italian criminal procedure Code).

The purpose of scientific investigation is to answer three key priorities: "fix" the crime scene, to reconstruct the circumstances of the crime, collect useful in identifying those responsible. On this basis it is understood that, even without having read the specialized narrative or multiple television hit series, the inspection is the most important phase of the whole activity of the forensic geneticist, who must play its role in concert with police forces. An

examination of the scene with light or inexperience leads in the first case to ignore or underestimate the valuable biological material and quickly degradable, and in the second produces, even more seriously, the scenario being compromised or worse, the biological contamination of the existing tracks. This premise is a must to remember that the work of the experts at this stage will be summed up in strictly scientific conclusions so that he can then have probative value.

The complex of scientific investigation activities so begins the so-called survey on crime scenes. We speak in the plural because more often within the same crime is necessary to inspect a variety of environments, both open and closed, to collect the necessary information to the reconstruction of that happened and recover as many elements for subsequent biological investigations.

In this regard it is good to make a note on a problem that emerges about the murders and suicides or assumed. The role of the medical and paramedical staff comes sooner in place is to revive the subjects less than obvious certain death signs: decapitation, state of

advanced decomposition, presence of hypostatic or rigor mortis spots. It is clear however that in most cases you do not reveal these features, the 118 operators endeavor of bodies already cadaverous manipulating them, often in a noninvasive, and altering the scene of the crime; so investigators and forensic scientists do not look more realistic picture of the crime, and the reconstruction of the event, the determination of the times, the recovery of residues and traces on or near the body is difficult and often impossible. Certainly in these cases you can not refer to inexperience, since both the first aid providers both investigators claim the right to carry out their specific skills; is rightful concern, however, the awareness of this problem in our country because they establish guidelines or rules designed to answer that question.

There is no regulation or standardization of the survey in Italy. Rather, they follow the general guidelines based on the expertise and experience of practitioners. The scientific departments of the police in this regard, are the reference point for what concerns the management

of the crime scene, also because of the possibility of using the latest technology. The specific competence in the techniques and knowledge of forensic science, the guarantee to ensure high quality standards of their work, knowledge of safety standards and cooperative spirit with all the investigative staff members are the basic prerogatives because you can challenge themselves in the survey.

1.1 On the scene

First, the scene is frozen with planimetric measurements of the rooms, photographs and video footage of the whole, and then more and more detailed.

The scene has been looking for as much evidence and clues you can collect, and in a normal inspection may be several dozen artifacts. Many of them will prove to be not significant for investigation purposes, while others will cheer those who submit them for analysis, with the firm thought that he had solved the case. In this regard it should be pointed out that a physical

Table 1. Indicative average content of DNA recover in some typical forensic biological samples. The amount of DNA is still influenced by environmental factors.

Type of specimen	Amount of DNA
whole blood	20.000-40.000 ng/ml
Track	250-500 ng/cm ²
Sperm	150.000-300.000 ng/ml
post-coital vaginal swab	10-3.000 ng
Training pilifera (with root)	1-750 ng / radice
Training pilifera fall	1-10 ng/radice
Saliva	1.000-10.000 ng/ml
oral tampon	100-1500 ng
Urine	1-20 ng/ml
Bone	3-10 ng/mg
Fabric	50-500 ng/mg

test, a find, can not always be associated with a person, place or object; ie they would not be "individualized". In most cases, in fact there may only be limited to "identify" a physical test, referred to then be able to confirm the maximum compatibility with a subject, and in any case not establish the association to one and only one subject but to a group or class. Find textile fibers, a fragment of paint or a trace of blood without being able to extrapolate a highly informative DNA profile are examples of identification. In contrast, a piece of plastic or tape with margin perfectly corresponding to a reference, complete a fingerprint, a DNA profile are individualized tests.

The inspection looking for biological evidence proceeds by chronological phases:

- 1.1.1. observation of the scene;
- 1.1.2. fixation with photographs and video reproductions;
- 1.1.3. execution of sketches and measurement environments;
- 1.1.4. recording and documentation of the location of physical evidence;
- 1.1.5. Research of minimum or latent tracks.

In particular, the search for physical evidence should not be carried out in a confused way or just in the vicinity of the victim. Every detail could be crucial for the reconstruction of the crime. For this reason, the search must be carried out in a systematic manner, using for example a spiral criterion, subdividing

the area into grids let you search by parallel lines or following a centrifugal criterion. Similarly, the inspection must cure before passing progressively larger objects into smaller ones. A methodical research approach thus reduces the amount of energy and maximizes the effectiveness in recovering even the smallest details.

Chi vanta esperienza nei sopralluoghi tecnici conosce molto bene l'importanza della precocità del primo accesso alla zona. Prima si interviene sulla scena, più probabile è che eventuali prove non vengano distrutte e che le prove biologiche presenti in minime quantità possano essere processate velocemente e con maggiore successo. Ciò nonostante è spesso necessario ritornare, anche più volte, sulla scena, ad esempio in seguito a nuovi indizi emersi durante gli esami autoptici, le prime analisi di laboratorio o indicazioni emerse dalle indagini.

At the crime scene may be present a wide variety of organic substrates: blood (Fig. 1), semen, hair, and a wide variety of epithelial cells isolated sources, such as saliva, dandruff, sweat, cigarette filters, dishes and glasses, urine, vomit, feces, or plantar digital fingerprints. The various media average guarantee amount of different cells and otherwise storable (Table 1). fresh tracks allow to obtain genetic profiles also as low as a few cells. On the contrary, from biological sources dated



Figure 1. Blood trail on the edge of a plastic bucket; It turned out to belong to the victim of an assault with an ax and then burned alive. The papillary ridges drawn from the blood have identified the fingerprint of the alleged attacker.

or corrupted by physical or chemical agents (high temperatures, chemicals and inhibitors of Taq polymerase) is necessary to increase the amount of extracted DNA to increase accordingly the fraction of DNA used, and therefore not degraded, for get profiles. However, if the level of degradation is high they will not be possible to generate genetic profiles, although the biological trace is relatively recent.

The source of DNA that is found more often is bloody nature predominant in cases of violent crime. The saliva instead requires more detailed techniques to be detected, since it is not visible to the naked eye. You search on glasses, cutlery and crockery, bite marks; also it is valuable to identify the forms that its contamination draw in cases of choking, gagging and, typically, within hood of robbery suspects. Also important is the macroscopic analysis of semen traces, especially in cases of sexual violence or suspect that, even before his individualization through DNA. The same procedure is useful, with the techniques of which more later, to define areas soaked with sweat, such as those contained in the attacks in which you grab violently the victim. Finally, there is a wide range of exhibits from which to extrapolate isolated cell matrices. typically of cigarette butts we speak, glasses or cups, dandruff residues, cuffs, collars and underwear, toothbrushes and even fingerprints. Not breaking the hair formations, especially if torn, and then with the root and the hair bulb intact, are sources of large amounts of DNA.

Technologies increasingly purposes allow to increase from year to year, the threshold of sensitivity of the molecular DNA analysis. This is undoubtedly a great advantage for forensic geneticists, since it is now possible to get useful profiles even from minimal sources of biological material. However,

this potential can be a disadvantage since, in the same way of the tracks of interest, also the external contamination are enhanced by laboratory analysis. It becomes essential so that the protection, understood both as a protection of the scene both as self-protection of the operators in the survey. Not infrequently, in fact, the same investigators unknowingly waive their cells or, more often, their fingerprints.

1.2 Scene Safety

A safe scene must meet two requirements: to be preserved from people or things that may alter the conditions in which there was the crime itself and be insulated carefully to prevent the place itself can become source of danger to those present. Must be emphasized that safety concerns not only the contamination problems but above all personal safety.

Accidents in private buildings, industrial or public, air or boat, can expose hazardous, chemical or biological risk, or even a combination of several risks. In recent years, for example, the warning against the possibility of mass disasters caused by terrorism is very high. For this reason it should not be allowed to any forensic operator access, until after the

environment has been locked down and only with adequate protection.

1.3 Personal security

It prevents contamination from the operator himself, as we have said. Moreover, intervene on the scene of a crime, especially if it is a violent crime, it means potentially exposing themselves to risks: environmental, chemical and microbiological sometimes, more often organic; Prevention becomes essential, and should be implemented right from access outermost stage wearing sterile coveralls, boots and protective masks and obviously disposable gloves; the romantic image of the coroner in suits narrated in the style of Andrea Camilleri is exceeded (Rutty et al, 2003).

Particular attention and preparation should also be given in cases of suspected terrorist attack, potentially with chemical or bacteriological risk, a condition in which it is necessary the intervention of intervention units trained for such emergencies that adhere to international guidelines specially prepared.

Collect notes and findings at the crime scene is not enough, you must faithfully record what you observe to be able to document in court with



Figure 2. Example of reconstruction of an environment with the 3D rendering technique. These techniques allow you to view more carefully the dynamics of a crime and show more clearly the reconstruction of the event.

as much precision as possible. In this regard it can be made simplified diagrams of the location of objects, bodies and blood stains, even using the photo shoots (called sketching photo). Also today flock to the aid software that allow you to perform faithful reconstructions of the scene and victims based on technical CAD (Computer-Aided Drawing) and two is three-dimensional (rendering), that help for example to better understand the bullets trajectories or blood stains and the incident dynamics (Fig. 2).

2 Collection, storage and archiving of reports

The effectiveness of the presentation of evidence in court is also deeply influenced by the methods of collection and storage of artifacts. Their integrity, both scientifically and legally, must be preserved since the inspection stage. The specific collection methods depend on the state of preservation and the sample conditions. In general, a considerable amount of biological material should always be removed in order to make sure to recover a sufficient amount of DNA for subsequent genetic testing; nevertheless it is good practice to keep an adequate amount of material available to duplicate the analysis or to enable the other parties to be able to perform the same test, when authorized. During the step of collection of the sample it is also crucial to limit the removal of dirt, grease or other materials in the area of unknown nature, as they may prevent some subsequent genetic analysis.

The collection and storage of exhibits are crucial steps of the investigation carried out. In court, in fact, the admission of evidence may be questioned if the test does not fulfill the requirement of an accurate photographic documentation before collection of the specimen; Moreover,

the evidence he has collected or improperly influenced a find and the possibility of having it exposed to contamination can be used to discredit the results of DNA analysis.

Taking into account that today's extraction and PCR systems are quite sensitive, a significant problem can be represented by the phenomena of contamination, especially because they can lead to false exclusions or artificial mixed profiles rather than false inclusions.

Biological samples such as blood, semen, tissue, bones, hair, urine and saliva can be recovered directly from the bodies, from clothing, from the objects or areas of the crime scene. The body fluids are collected by making them adhere to specific cellulosic or synthetic supports (pads or special and sterile filter papers) or aspirated and deposited in test tubes if they are still in the liquid state. Once they have been deposited on a support become "tracks" biological. The finds no fluids, such as hair or tissue, can be removed by direct contact. Findings that are transferred from a person, an object or an environment through an intermediary (person or object) make up the so-called "secondary transfer". Secondary transfers may, but not necessarily a direct link between subject and crime. Almost always these findings, also referred to as "micro-traces", contain small quantities of DNA and require more sensitive typifications (low copy number PCR, mtDNA, minisatellites).

In principle, all biological traces found on the scene have or may have as a result of a probative value. Many of them may be subjected to DNA analysis, but not for all will be necessary. Of a "pink" of blood splashing it is certainly not the genetic determinant result of each one, but rather the analysis of the size, the shape and the trajectory (Blood Pattern Analysis, BPA). The techniques and

new technologies now make it possible to bring in large amounts of evidence to the court. Paradoxically, in many cases, this does not help to define the dynamics of a crime. A significant amount of biological traces could burden its analysis and interpretation of results; also it might be a limiting factor, offering to critical defense and observations regarding the exchange of samples, contamination, deviations from the listed protocols, ambiguous interpretation of the results.

Classroom often discussed on a critical element linked to the traces of biological material: the age of the same. The information that provides a spot of blood or sperm, for example, is great but sometimes its meaning can be easily diminished since it is not possible to establish when it has been produced. For example, if during an inspection you can date a track and to show that it is closely associated with the crime in question, it can be dated assumptions the crime itself. Conversely, if you know the exact time of the crime, and you can date a track associated with it, the dating of biological trace itself could exclude the suspect from the accusations. Some efforts have been made in order to estimate the age of a track, especially of the blood spots (Anderson et al, 2005; Alvarez et al, 2006), but it is still too selective methods to be applied to most cases. Although in the near future you will be able to develop or improve techniques for the estimate in question, at present it remains extremely unlikely to run an age of a track evaluation.

3 Finding biological traces

3.1 Forensic light sources

The light is a form of electromagnetic energy of which only a small part of the whole spectrum consists of visible waves, and then white light. The human eye is able to

perceive the entire visible spectrum, from 400 to 700 nm, however, it shows greater sensitivity around 550 nm; the sensitivity is minimum in the violet, below 450 nm, and in the red region, above 650 nm.

The so-called forensic light sources are emission of light systems able to filter the same into individual wavelength bands. This filtration system allows to highlight the detection of evidence through interaction of luminous phenomena that include fluorescence, absorption and oblique light. The majority of biological fluids has natural fluorescence (light emitted only during excitation); if latent, their location, shape and intensity can only be disclosed with forensic light sources.

The first screening in the search for biological traces is performed with the aid of systems equipped with light-emitting lamps in the ultraviolet range

of the visible and capable of enhancing the observation, the photographic recording and collection of artifacts. These instruments (Crimescope CS16, Minicrimescope 400 or Polilight) allow the identification of digital and palm prints, footprints, body fluids (Fig. 3), hairy formations and fibers, contusions, bruises and skin lesions, traces of drugs and even documents or counterfeit money.

The instrument is equipped with a light source (metal halide lamp 400 C), a long liquid waveguide 2 meters wide and 10 mm; Subsequent filters allow you to select individual wavelengths, typically from 365 to 630 nm. Glasses with different filters (white > 400 nm, orange > 550 nm, red > 590 nm) also allow you to use the lamp without incurring damage.

3.2 Microscopy

After macroscopic observation with

the naked eye, the analysis of small traces of presumed biological nature can be significantly enhanced thanks to the use of microscopic techniques. In particular it is commonly employed the stereomicroscope. The main difference between a stereomicroscope and a common optical microscope compound is that, while the second shows the sample from only one direction, the stereomicroscope allows you to see the object from two slightly different angles, in a mode analogous to the human binocular vision. The vision of the objects is based mainly on the use of reflected light and its power typically ranges from 5 to 50X magnification, much less so than a standard optical compound microscope. The use of microscopy is of particular importance in the identification of the origin of hairy formations and their comparison.

3.3 Guidance testing and especially for blood, saliva and semen

A wide range of so-called "presumptive test", or guidance tests, is now available for the analysis of alleged biological traces. A difference of species tests are described further below, the guiding tests do not confirm with certainty the existence or the state the nature of a given biological sample; allow only to exclude the presence of a given substance, since a variety of compounds provides an equally positive result. Because it is not confirmatory tests but exclusion, all tests performed with guidance test must be confirmed by other methods.

Their usefulness for investigation purposes is important not only to skim the large number of non-organic traces that can be found on the scene, but especially for the reconstruction of the dynamics, providing important circumstantial evidence or probative.

These tests must be safe, simple and cheap to be carried out to interpret, the more sensitive as possible so as to minimize the amount of sample



Figure 3. Highlighting a sweat contamination through forensic light source (455 nm). The subsequent DNA analysis has allowed to obtain the genetic profile of the aggressor.



Figure 4. Evidenziazione with Luminol of the presence of latent blood on an apparently clean knife. Hemoglobin human nature was confirmed by immunoassay and DNA extracted from the blade coincided with that of the victim of aggression.

necessary for the test. Finally, the test should not affect subsequent analyzes of extraction and amplification of DNA.

4 Blood

4.1 Catalytic tests

The research methods of the blood traces benefit the activity of the heme peroxidase present in hemoglobin in red blood cells (in a microliter of blood are present up to 5,000 red blood cells).

On the individual nature of alleged blood traces are typically used test strips (Roche Combur Test[®], Hemastix[®]) impregnated with an organic hydroperoxide (dimethyl-dihydro-perossiesano) and a colorimetric indicator (tetramethylbenzidine), which turns from yellow to green-blue if there is hemoglobin which catalyzes the oxidation.

The test is very sensitive, so as to detect the presence of blood diluted up to one hundred thousand times. However there is a wide range of compounds, such as catalase and peroxidase animal or vegetable, detergents containing hypochlorites, metals (especially copper and iron) that have a similar peroxidase activity and can therefore produce false positives.

Alleged latent traces of blood is usually employed the Luminol test. The compound is an alkaline solution (pH 10.4-10.8) of luminol (3-aminofthalidrazina) and sodium carbonate in which the peroxidic component is given by sodium perborate or hydrogen peroxide (Fig. 4), the latter, however, limits the highlight of the source blood a few tens of seconds. The described solution is sprayed finely on the area (may also be treated very extended surfaces, such as integers domestic environments) and the reaction with hemoglobin produces a bright blue emission more visible in the dark environmental conditions;

Positive reactions can also be obtained if the bloodstains were washed (Fig. 5). As the benzidine test, even the Luminol test produces false positive results if there are peroxidase, hypochlorite and metal oxides. Nevertheless an expert eye can discern between the highly bright luminescence of the blood and the most glittering, uneven and most ephemeral of other substances. considerable limits of the technique are the toxicity of the solution, whose individual components are irritants, the shortness of the luminescent reaction, the difficulty of performing the test on smooth surfaces and on minimal traces that can be hopelessly diluted following the test.

There are also other methods for

the detection of latent blood; some employ fluorescein less sensitive reactions, most indaginoso although more durable and feasible under normal light conditions (Tobe et al, 2007). The spread of these substances it should still at the lower impact on the operator's health than the Luminol, although recently has been demonstrated substantial harmlessness (Larkin et al, 2008).

4.2 Test immunocromatografia

The guidance catalytic tests offer the possibility to determine the possible presence of blood, or better of hemoglobin, without however being able to establish the kind of membership. Specific tests for the diagnosis of the human species of the

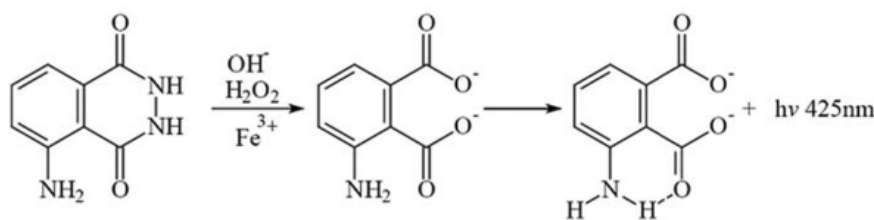


Figure 5 The reaction of luminol in the presence of hemoglobin.

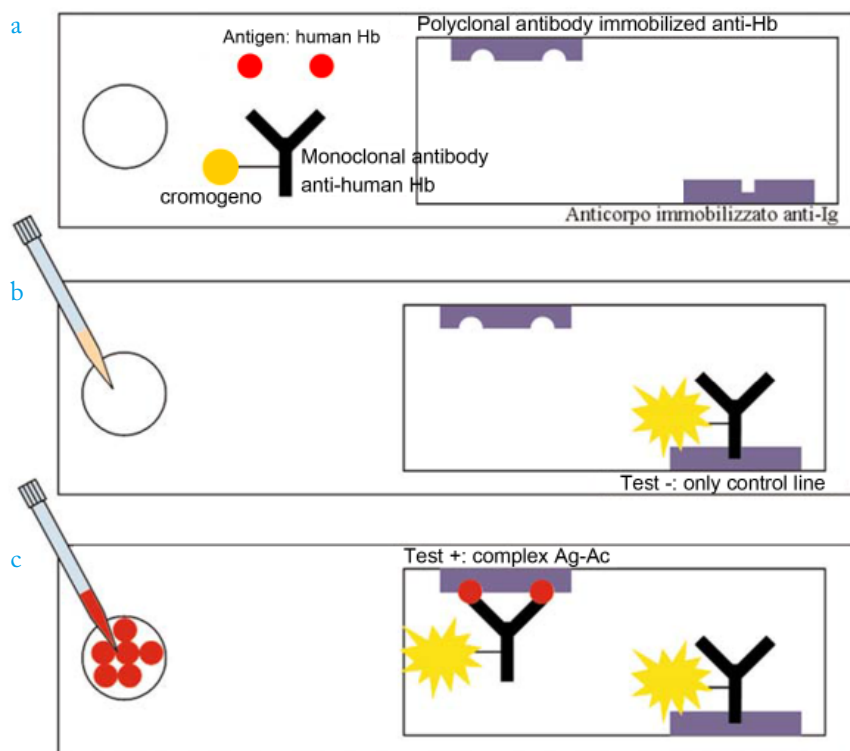


Figure 6 Principle of operation of a chromatographic immunoassay for the detection of human blood. Explanation in the text.

blood consist immunocromatografiche reactions routinely used for occult blood in the stool, and now widely distributed among the laboratories of scientific investigations.

The test utilizes monoclonal antibodies mobile anti-human hemoglobin conjugated with a chromogenic substance (Fig. 6a). After sowing a small aliquot of blood traces, if there is the human blood hemoglobin-antibody complex migrates along the membrane until it meets a test strip on which are immobilized antibodies polyclonal anti-human hemoglobin. The complex concentrates the particles of chromogen forming a colored line in the space of a few minutes (Fig. 6c). The verification that the reaction has proceeded correctly is given by mobile monoclonal antibodies not bound which, continuing the migration to a second test strip with immobilized anti-Ig antibodies, determine a second colored control band (Fig. 6b).

4.3 Histological analysis

The cell analysis of traces of blood may eventually provide information about the origin of the same, if necessary. For investigative purposes could be crucial to know whether it is likely to be blood epistassico (presence of epithelial cells of the nasal mucosa), menstrual blood (presence of the endometrium cells, the epithelium of the vaginal mucosa as well as bacteria) or rectal (mucinous epithelial cells). Recently finer are based on quantitative PCR assays for the analysis of expression profiles of tissue-specific genes tested methodologies to determine the origin of the biological traces.

5 Saliva

The saliva detection, even more the shape and size of the halos that it produces, it may be important for investigative purposes on clothing

(balaclavas, scarves), sheets and pillows, signs due to bites, tape or other items for ' gagging. A strong luminescence is emitted from salivary stains if you look at low wavelengths.

tests are only approximations for dell' α -amylase detection, a digestive enzyme that catalyzes the hydrolysis of α -1,4 glucoside bonds, producing simple sugars. In different isoforms, it is found in high concentrations in saliva (also called ptyalin) and pancreatic juice, but in small amounts can also be found in the sweat, blood, semen, urine and breast milk.

It is possible to evaluate the hydrolytic activity, and therefore the presence, amylase by measuring the optical density of the reaction products. Faster and less expensive, colorimetric and immunological tests are used in clinical chemistry to diagnose acute pancreatitis, and are used in forensics as guidance test. The first is based on the use of a solution containing a substrate, of starch microspheres purified conjugated to chromogenic, whose

hydrolysis with amylase operates in the track produces by-products with optical density such as to be observed with the naked eye, or detected with techniques spectrophotometric. The seconds, of at least two orders of magnitude more sensitive, are immunochromatographic assays with monoclonal antibodies anti-human α -amylase.

The technique allows to obtain very sensitive results, able to detect the presence of a few tens of ng / mcl of amylase, or a few nL of saliva. This represents an undoubted advantage in order to not consume valuable material for subsequent DNA analysis. As the guiding test for blood, also these assays do not allow to date to be able to distinguish a trace of human saliva from that of some animals, eg household rodents. In the market there are also more coarse and less sensitive systems consist of special filter papers already impregnated substrate and chromogen with which it is sufficient to buffer the saliva track to obtain a colorimetric result. The examination of

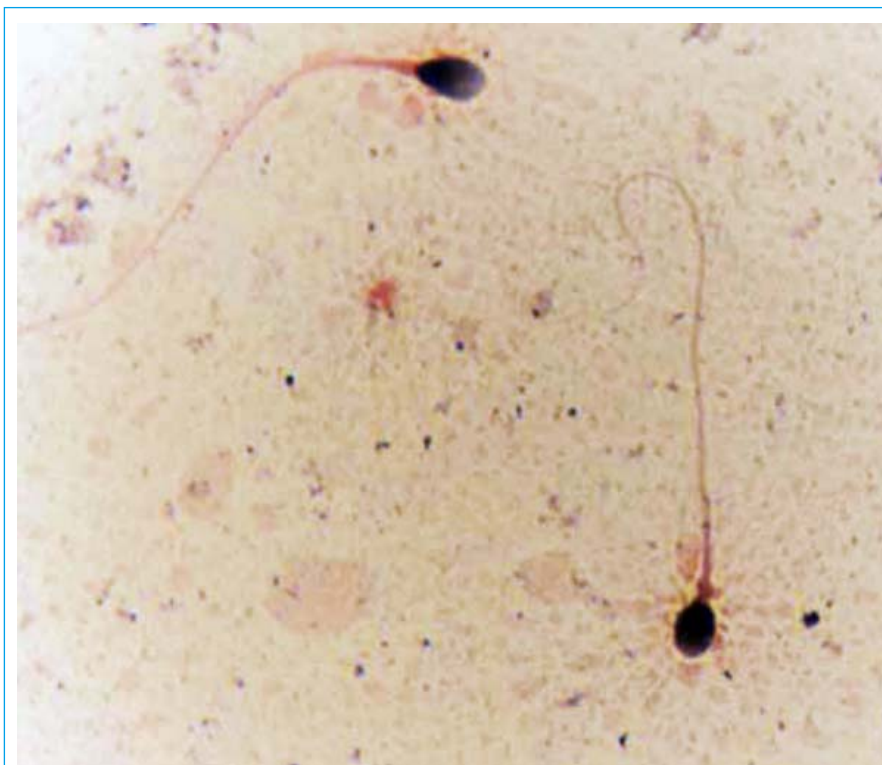


Figure 6 Microfotografia di due spermatozoi. Estratto da traccia su indumento risultata positiva sia all'osservazione con fonte di luce forense, sia al test immunocromatografico per la presenza di p30-, ematossilina-eosina, immersione 1000x.

the DNA can ultimately be considered the most stringent confirmatory test for the presence of human saliva.

6 Sperm

The semen analysis is crucial in cases of suspected sexual violence. Its composition can be simplified to two components, the seminal fluid and sperm. The first consists of a fluid rich in protein primarily produced by the prostate and the seminal vesicles. The seconds are male gametes, or sex cells, which some men produce in very limited quantities or can not produce at all because of birth defects, diseases, vasectomy interventions. For this reason, the semen analysis must always cover research analysis both of the seminal fluid is sperm.

The main source of research of traces of semen are the forensic light sources, since the sperm, along with the saliva, tends to emit more fluorescence than the other body fluids. The areas highlighted by the light source are then tested first with catalytic methods, so immunochromatographic and cytology.

The main screening test for the presence of semen is the detection of prostatic acid phosphatase (PAP) and prostate specific antigen (PSA), prostatic enzymes present in large quantities in semen; in amounts 50-100 times lower it is also present in the blood, saliva, urine and vaginal secretions. This test usually takes α -naphthyl phosphate and diazo blue as colorimetric agent. At pH 5.2 acid phosphatase catalyzes the hydrolysis of the ' α -naphthyl phosphate releasing α -naphthol which reacts with the chromogen salt; positivity is given by the color change to purple.

The samples positive results to the orientation analysis for the presence of seminal fluid may be subjected to specific tests to confirm the presence of sperm, by histological staining or

search for specific proteins of sperm.

There are various staining methods commonly used, although the most common are staining with hematoxylin-eosin (Fig. 7) and the specific staining "Christmas Tree" that uses the nuclear fast red staining (red, stains nuclei of epithelial cells) and picro indigo carmine (green \ blue, colors the cytoplasm). The limiting factors of the cytological detection of sperm are mainly the time elapsed from the time of the attack and the initial quantity of spermatic material, even if the staining "christmas-tree" seems to be more effective than the others.

It is also possible to prepare that immunohistochemical staining, using anti-human sperm monoclonal antibodies, allow to obtain a highly specific confirmatory tests, especially in the case of complex mixed tracks.

Because in rare cases the absence of sperm cytological analysis could not rule out the presence of sperm (eg in subjects oligo- or azoospermic), more specific confirmatory tests are represented by the search for the specific protein of human sperm PSA (prostate antigen specific), also known as p30 (also present in trace amounts in human breast milk and in any tumors of the breast) or semenogelina (Sg), secreted by the seminal vesicles (also present in minute traces in muscle, kidney, colon and in lung cancer).

For some time, they are commercially available immunochromatographic methods for the rapid detection which exploit the presence of immobilized anti-p30 or anti-Sg. These tests are quick (10 minutes), inexpensive and very sensitive (up to 2 ng / mL PSA, dilutions of 50,000 times for Sg).

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Child Abuse - An Overview from a Forensic Point of Perspective

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Abstract Die rechtsmedizinische Beurteilung in Fällen von Kindesmisshandlung und -missbrauch findet eine zunehmende Verbreitung. Kern der Beurteilung ist dabei häufig eine Plausibilitätsprüfung: Sind die Angaben aus der Vorschichte mit dem festgestellten Verletzungsbild zu vereinbaren? Ein weiterer Aspekt ist der Hinweis auf zu klärende Differenzialdiagnosen (z. B. Hauterkrankungen oder angeborene Erkrankungen des Knochenstoffwechsels). Bei Verdacht auf sexuellen Missbrauch ist in besonderem Maß eine professionelle Herangehensweise geboten. Diese reicht von der angemessenen Durchführung der Untersuchung bis zur verantwortlichen Beurteilung von Befunden. Fehlerhafte Diagnosen (falsch-positiv oder falsch-negativ) können bei allen Verdachtsfällen dramatische Auswirkungen für die Eltern und ihre Kinder haben. Daher ist eine gute Zusammenarbeit mit allen beteiligten Fachdisziplinen innerhalb und außerhalb der Medizin im Sinne der Kinder geboten.

Keywords: Medical jurisprudence, Child sexual abuse, Shaken baby syndrome, Plausibility check, Interdisciplinary cooperation, Forensic science.

1 Introduction

A generally accepted definition of "child abuse" There can be no response to the different events that can be described as such, and due to the dependent of the social normalization component in this designation. Among the different types of child abuse are counted:

- the physical abuse,
- sexual abuse,
- neglect, this both in physical as well as emotional / psychological respects.

If statistics on the distribution of the different species present abuse, dominated the neglect (Sierau et al. 2014). This statement is probably true for Germany.

In suspected cases of child abuse, the main task of forensic medicine in the assessment of physical findings and

abnormalities in terms of their origin and the examination of plausibility in terms of sequences of events notified. This includes the assessment of anogenital findings in suspected cases of sexual abuse, this review is not undertaken by all legal medical / forensic institutions due to the human and spatial conditions necessary for or can be. Reliable information on the frequency of physical abuse / sexual abuse of children is not available for Germany. According to the figures of the police crime statistics, the reported cases of sexual abuse predominate (2014; just over 12,000 cases) compared to the "maltreatment of charges", in which children are affected (3649 reported cases in 2014; Bundeskriminalamt 2014). According to the information to Inobhutnahmen by the Youth Office have this in 2014 as further fed accepted (over

48,000 Inobhutnahmen 2014; Statista 2016). After the comprehensive presentation of the National Centre on Early Prevention (2016, <http://www.nzfh.de>) were in more than 124,000 cases in 2014 risk assessments of the discovery of suspected cases made by youth welfare offices in Germany. The range of situations in which a child endangerment may be present is, of course, much wider than that of a physical abuse. Under a child endangerment is understood (although this is basically a vague legal concept which must be assigned in individual cases with events / facts) in principle (according to § 1666 para. 1 of the Civil Code, BGB) a threat to the physical or mental interests of the child.

The Inobhutnahmen the keyword child abuse was "only" in about 8% of the cases referred (sexual abuse "only" in 1.3%).

Due to the particular constellation of a child who is in preverbal age (of abuse are mostly children under 6 years, be even more affected children from 0 to 3 years; Trube-Becker 1987) is the legal processing of child abuse cases difficult. This is especially the so-called shaking trauma (see below;... Heath et al 2015).

2 Physical abuse

Legal basis. According to § 1631 of the Civil Code children have a right to non-violent upbringing: *Corporal punishment, psychological injuries and other degrading measures are prohibited.*

The amendment to § 1631 BGB has led to the entry into force in 2000, in recent years, to a certain change of attitude towards different educational measures and may, at least partly, explain the increased use of youth services in child welfare hazards. In addition, a rise in social attention, which leads to more frequent releases / advertisements. Through a raised awareness in kindergartens, other child care facilities and schools directly the children in the institutions will be presented for Forensic Medicine increasingly through the youth offices, where suspicious lesion should be assessed. It usually is observed on the skin surface abnormalities.

Another important legal change was the enactment of the Federal Law on Child Protection on 1.1.2012. For doctors order a warrant Standard was inter alia established in suspected cases -.. To be able to turn to the Youth Office - under refraction of medical confidentiality. While taking into consideration the legal interests of / the doctor / physician this was previously possible even with the use of § 34 StGB (justifiable emergency); with the

entry into force of the Federal Law on Child Protection it is increasingly used by our perception.

3 Forms of violence

The most common use of force in the context of physical abuse is the blunt trauma (Jacobi et al. 2010). As blunt force is called the surface mechanical action on the body, which can thus lead either to hematomas in tangential action also grazes and very vigorous action also to fractures and injuries to internal organs. But the clumsy handling of a child (if they do not entail significant accidents) does not typically fractures or organ injury. The type of action ranging from strokes with the flat of his hand and his fist up to kicks and punches used with Gegenständen. Werden objects to Schlagbeibringung so shaped lesions can then give instructions (Fig. 1). The investigation also concealed body regions such. As the back ear region or derMundvorhofs Schleimhäute is required to initially not to overlook non-obvious findings. In the differentiation between accidental and miss hand-lung associated injuries also the location of the injury is a role (Fig. 2).

Fallen hematoma in a child, so the study on coagulation disorders to exclude differential diagnoses of internal cause is required in addition to the implementation of a whole-body examination, depending on the extent of the injury. It is worth noting that even a child can be abused with a clotting disorder, wherein the clotting disorder then the size of the hemorrhage accentuated, but does not affect their formation per se. If this differential diagnosis excluded once again, this investigation needs depending on the then present bleeding

patterns after a certain time to be repeated, since z. B. may be due to the intermittent occurrence of the disease at the present time a modification of the



Figure 1. Loops imprints on the outer side of the left thigh after multiple strokes with a set to form a loop rope.

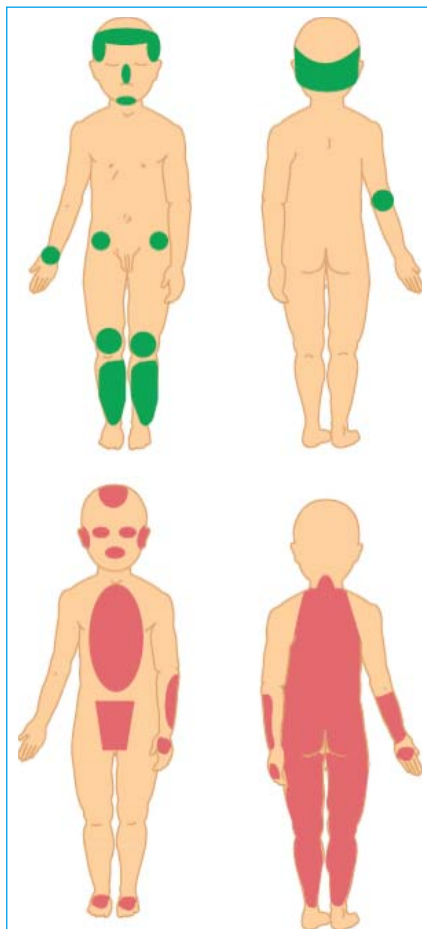


Figure 2. Typical hematoma distributions. Top accidents, down mistreatment. (Herrmann et al. 2010).

bleeding pattern (King et al. 2015).

Furthermore (brittle bone disease called.) Must at present fractures in the differential diagnosis of osteogenesis imperfecta are thought especially if multiple fractures occur in very young children. The required extensive, partly molecular genetic diagnosis should be corresponding centers reserved.

A special form of physical abuse is the so-called. Shaken. It is a predominantly infants concerned Misshandlungsart wherein the infant at the torso or upper arms ge-packed and is so rudely shaken that the not held by the relatively weak neck muscles head back and forth kicks and falls into rotational movements. This rough shaking is acutely life-threatening. The mortality rate is 12-27% (Herrmann et al. 2010). By shaking it comes to shearing injury of the brain tissue and rupture of bridging veins, which can lead to narrow, mostly filmy subdural hemorrhage. The hemorrhages are typically not relevant volume so neurosurgical procedures to relieve the bleeding are required only in exceptional cases. In contrast, the damage to the brain tissue is in the foreground. Whether these occur solely by the acting shear forces, or in some cases by a primary respiratory arrest at schüttelbedingter damage the respiratory center, is the subject of ongoing scientific discussion (Matschke et al. 2015). Another key feature of this mechanism of injury occur retinal hemorrhages, to partly vitreous hemorrhage. To help diagnose an ophthalmological examination is therefore essential. For the exclusion of other differential diagnoses, a coagulation status should be carried out in any case. Other possible differential diagnoses such. B. called the. Glutaracidurie type I, are currently far in the discussion, as that the

pattern of results is made significantly different for the disease and confusion with a Shaken with typical disease development findings can not happen if experienced examiner to make the assessment.

If the children survive, they are z. T. significantly psychomotor damaged to severely disabled. The severity of injury is currently at diagnosis unpredictable because it exist no methods. Even the question of how exactly was shaken, currently must remain open yet because no appropriate experimental approach to the study exists. Publications on simulations such. B. with finite elements, are present, have, however, in the assessment of the case not yet established (Roth et al. 2007). For questions about the ultimate extent of the damage must at a later date (the well may be present during the performance of the trial), the attending pediatricians are interviewed.

4 Sexual abuse

The legal basis concerning sexual abuse are normalized in § 174 of the Criminal Code (sexual abuse of charges), § 176 of the Criminal Code (sexual abuse of children, including the serious sexual abuse and sexual abuse resulting in death). A special feature is § 179 of the Criminal Code (sexual abuse of persons incapable of resistance) when to allow the sexual abuse drugs / drugs were administered, which can lead to death (Mehling et al. 2016).

The range of possible actions for sexual abuse ranging from showing pornographic material ("hands-off" measures arose) to actual physical contact between perpetrator and victim ("hands-on" measures arose). As part of the sexual abuse occurs only rarely, according to some studies in less than 5% of cases (Herrmann et al. 2014)

to actual physical findings. Proof end findings are yet more rare; these include the detection of sperm in the child's body or at the child's clothes, an existing pregnancy, characteristic injury or even the presence of sexually transmitted diseases (Herrmann et al. 2014). The physical examination of children in a suspected case of sexual abuse must be targeted at persons who are familiar with the conduct of the investigation and the interpretation of the observed findings and are experienced, since in this area both false-negative and false-positive diagnosis positions dramatic consequences for can have the child and the caregivers. This is the latest. Since the so-called Worms processes and other major known. Abuse processes in Münster and Mainz became apparent in the 1990s (Steller, 2000).

The interviewing children come here, even this has become clear in these processes, is of particular importance, this survey explicitly is not done by forensic scientists / inside, as they are usually not trained. If the investigation is carried out in an Institute of Forensic Medicine, the issue underlying must advance (prosecutor / police / youth welfare office) to be clarified with the caregivers or the client.

To interpretation of findings are optimally based knowledge of the events described. Owing to the multiple possible action spectrum and often larger time interval between the last event possible abuse and forensic research an abuse can not be excluded by the absence of physical findings.

5 Differential diagnoses

Both the physical abuse as well as the sexual abuse possible differential diagnoses must be considered when

interpreting the findings. In addition to the above mentioned possibilities of finding modification by coagulation disorders or pre-existing bone disease (lichen sclerosus called.) Is on dermatological diseases such as infections, the z. B. can be confused with thermal injuries, and chronic lesions in the genital area thinking (Todt et al. 2015). Partly perform other hautverfärbende findings or diseases, such as the so-called. Mongolian spots, to create confusion with hematomas, and this can be resolved fairly quickly after a medical idea and possibly retest after a short time interval (Diers et al. 2013).

6 Interdisciplinary cooperation

Dealing with the described suspect cases, requires a high degree of professionalism in all disciplines involved within and outside the medical field. Especially in cooperation with the authorities responsible for legal proceedings youth services, exercising the state office of guardian and possibly call the Family Court, may demand a clear communication "at eye level" are not overestimated (in both directions). Regarding the cooperation between youth welfare and health care (to which, in this context, the right medicine also belongs) should the Federal Child Protection Act, u. A. The creation of a power standard for reporting suspicious cases, bring about changes to achieve better cooperation. This has been achieved at the different locations, with varying degrees of success and ensure further expandable. One element would thereby creating a forensic outpatient clinics (or other permanent structures) for a low threshold access to medical-legal expertise. This is a requirement (and frequently voiced desire), which is fulfilled in some states, but by no

means in all, at least in promising approaches.

Compliance with ethical guidelines

Conflict of Interest S. Banaschak, K. Janssen and M. A. Rothschild indicate that no conflict of interest.

This post contains no conducted by the authors studies on humans or animals.

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Bloodstain Pattern Analysis in Snow – Examination of Bloodstain Patterns in Icy and Soft Powder Snow Conditions

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Abstract Blood shedding events occurring in snowy conditions are conceivable and potentially likely in alpine environments. An examination of the current literature indicates there is limited information on the topic of bloodstain pattern analysis (BPA) in snow or icy conditions. The aim of this study was to replicate classic bloodstain patterns including drip and spatter stains, to record observations to increase knowledge in the discipline. Due to the weather conditions during this study, the “hardness” of snow had an effect on reproducing bloodstains patterns consistently. Reproducible bloodstain patterns were produced in powder snow and icy snow, indicating the potential for investigators to reconstruct and understand the bloodshed events associated with a crime scene. Hence, the bloodstain analyst working in areas where snowfall is likely should develop an understanding of how blood will react with snow.

Keywords: BPA, Bloodstain pattern analysis, Snow, Ice, Forensic science.

1 Introduction

Crime scene examinations generally are associated with dwellings or structures. In reality many crime scenes involving bloodshed may occur outside including wilderness environments. While examination within a dwelling may take significant time to process, it will not degrade dramatically as the surrounding structure provides protection. In contrast, the outdoor scene is subjected to the full gambit of the environmental and weather conditions.

Although approximately two thirds of the Australian continent is classified as arid or semi-arid, with one third classified as desert, Australia also possesses mountainous, snow covered, wilderness areas which are popular with tourists, particularly in the winter ski season.^[1] As these snowy, wilderness

areas become more appealing to hikers, and there is an increased potential for incidents involving blood shedding events to occur, whether criminal or accidental.

A search of the current literature was only able to locate a limited number of articles about BPA in snow and freezing conditions.^[2-5] James, Kish and Sutton^[4] indicated that, “bloodstains are frequently recognizable in snow and should be recorded.” Hence the bloodstain pattern analyst working in areas where snowfall is likely should develop an understanding of how blood will react with snow.

2 Method

The location for the study was near the summit of Ben Lomond, Tasmania, Australia with an approximate height

of 1600m (5200 feet) Average day time temperatures were approximately 0°C (32°F) with evening temperatures of −7°C (19°F). Blood was drawn from a healthy male and used immediately to create spatter and drip stains, which were the focus of this research. Transfer stains were omitted due to the unlikely possibility that they would produce recognisable bloodstain patterns.

The bloodstains were produced over two days, with the first day on hard, icy snow and the second day on soft, freshly fallen powder snow. The effect of snow covering existing bloodstains was also observed.

Drip stains were dropped from a pipette at 10cm, 20cm, 30cm, 50cm and 100cm heights. These were produced on both days and on both hard and soft snow. Spatter stains were produced by casting blood directly from vials onto the snow. These were produced on the

soft powder snow only.

3 Results

3.1 Drip Stains

Day 1: On hard, icy snow

Drip stains from all heights displayed ill-defined perimeters and the size of satellite stains increased in diameter with the increase in drop height (Fig. 1). Due to the hard, irregular target surface, resultant drip stains were distorted with irregular perimeter features. Satellite stains were also distorted.

Day 2: On soft, powder snow

The blood was dropped as per Day 1 onto an approximate 5cm depth of soft, powder snow which had fallen the evening before. Drip bloodstains from the previous day were still observable under the layer of snow (Fig. 2).

Individual drip stains produced from heights of 10cm, 20cm and 30cm failed to penetrate the snow and displayed similar irregular perimeter characteristics, although they were notably less distorted than the drip stains on the icy snow.

The drips stains gradually increased in size when dropped from increasing heights between 10cm to 30cm inclusive, with the diameter ranging between 12mm and 15mm across the widest part of the stain (Fig. 3). At 50cm and 100cm the blood drops penetrated into the soft snow causing small depressions. The size of the resultant drip stains in the soft snow were reduced to approximately 7mm to 8mm in diameter, with the perimeter edge sharp and near circular in shape (Fig. 4 and 5). Satellite stains were not observed in soft powder snow for all heights.

3.2 Blood into blood drip patterns

Drip patterns were produced by

dripping blood into blood on soft, powder snow (Fig. 6). As the warm blood accumulated, the central portion of the blood pool melted and penetrated the snow. The blood flowed vertically downwards producing a drip pattern with three dimensional characteristics. The satellite spatter remained on the surface of the snow.

3.3 Day 2: Spattered bloodstains

Using a small blood sample vial, spatter stains were produced by

projecting blood onto soft, powder snow using a lateral cast off action at an approximate height of between 80cm to 100cm. Small blood drops produced typical spatter stains that were elliptical in shape with a spine angled away from the direction of projection. It was observed that the larger blood droplets upon impacting the snow produced a concave depression in the snow at the impact point. Much of the snow in the concave depression was unstained



Figure 1. A drip stain onto icy snow from a height of 50 cm. Note the irregular shape and deformed satellite spatter.



Figure 2. Bloodstains deposited onto icy snow (from Day 1) observable under a layer of snow which fell between Day 1 and Day 2.

or lightly stained, with the blood accumulating at the distal end of the bloodstain (Fig. 7).

The larger blood drops produced larger depressions at the initial contact point with the snow. The amount of bloodstained snow inside the depression varied with an accumulation of blood at the distal end of the bloodstain. Smaller blood droplets did not create noticeable depressions in the snow.

4 Discussion

Bloodstains will almost certainly be present following blood shedding

events in snow conditions. The variability of icy weather conditions affect the physical properties of snow and will likely continue to provide challenges for bloodstain pattern analysts faced with examinations in sub-zero outdoor environments. When comparing hard, icy snow to soft, powder snow considerable differences in bloodstain shapes and patterns were displayed. In all experiments, the blood drops did not penetrate the hard, frozen snow. Although Morris^[2] and Leak^[5] both reported changes in the colour of frozen bloodstains, no observable change in bloodstain colour

was observed in these experiments. Rather, the frozen blood retained the red appearance of freshly drawn blood.

The most noticeable difference in stain appearance observed was the irregular shaped perimeter of drip stains on hard, icy snow compared to the near circular shape in soft, powder snow. In addition, in soft, powder snow blood drops of similar volume produced drip stains that initially increased in size up to a maximum width of approximately 15mm, when dropped from heights up to 30cm inclusive. At 50cm and 100cm the width of drip stains on soft, powder snow decreased with the blood drop penetrating the snow causing a small depression. The approximate diameter of these near circular bloodstains reduced to approximately 7mm in diameter, with the perimeter edge sharp and near circular. This is in contrast to what was expected and aligns with what is observed on rigid, non-porous surfaces, where generally the stain diameter increases with increased dropping height (Fig. 8)^[4] until terminal velocity has been reached.

The decrease in approximate diameter was likely due to one or a combination of reasons. The porous nature of the soft snow allowed the blood drop to penetrate on impact, which inhibited the lateral spread of the blood. That is, as the blood drop contacted the snow, it was absorbed into the snow, which reduced the resultant stain diameter creating the pattern observed. It is suggested that the greater acceleration of blood dropped from increased heights is the main reason for the variation in the diameter of the drip stains in powder snow. The higher velocity and kinetic energy of the blood drop acted to compress the snow producing smaller, symmetrical drip stains with similar diameters to the blood drop that caused the stain.



Figure 3. Drip stains on soft snow from a height of 30cm. Note the similar size and shape, with irregular stain perimeters.



Figure 4. Drip stains from 100cm in soft snow resulting in a depression in the snow, reduced stain size (compared to 30cm drop height) and a near circular perimeter.



Figure 5. Drip stains in soft snow from 100cm angular perspective displaying the depression into the snow.



Figure 6. Blood dripping into blood in soft snow conditions. Note the smaller satellite spatters have not penetrated the snow, whereas larger general spatter has.



Figure 7. Spattered bloodstains into soft, powder snow. The blood drops were projected from left to right side of the image as indicated by the arrows. Depressions in the snow are visible on the larger bloodstains.

The temperature of the blood drop also had an influence on stain appearance under the test conditions, in particular causing soft powder snow to melt on contact with the warmer blood, resulting in depressions in the snow. The effect of temperature was particularly noticeable for the three dimensional patterns caused by blood dripping into blood. Although Morris^[2] found blood droplets appeared “flash frozen” in temperatures of -16°C (2°F) this was not observed in this study at 0°C (32°F). The relative warmer temperature of the air and the snow experienced in this study likely affected the resultant bloodstain patterns.

Spattered bloodstains on hard, icy snow displayed similar physical characteristics when compared with spatter on hard, rough non-porous surfaces. The irregular surface disrupted the blood drop resulting in distorted spatter stains. In contrast,

spatter angularly deposited on soft, powder snow produced two clear physical characteristics. Due to the compressible nature of soft snow, larger blood droplets consistently produced three-dimensional spatter stains, with the snow depressing at the area of initial contact and the majority of the blood culminated at the distal end of the resultant stain depression. The blood drops with larger mass and higher energy easily depressed the snow at the area of initial contact, which then gouged out the snow in the direction of flight causing concave, three-dimensional patterns. The depressions were deeper at the end of initial contact, and shallowed as the blood travelled across the snow. Blood pooling at the distal end is another a feature also observed in spatter stains on non-porous surfaces. Understanding this potentially diagnostic feature of spatter in soft, powder snow may aid

bloodstain pattern analysts during investigations.

Although there are a wide variety of snow types from icy snow through to soft, powder snow, and all variations between, documentation bloodstains in these conditions may provide investigators with insight into events leading to their deposition. The irregular shape of some bloodstains may make distinguishing between spatter and smaller transfer bloodstains difficult. This study has shown that there are potential diagnostic features that may assist in the interpretation of spatter and drip stains in different types of snow.

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Determine the Content of Ethanol in Blood by Headspace Gas Chromatography

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Abstract *Objective* To establish a rapid detecting method for the determination of ethanol content in blood by headspace gas chromatography (HSGC). *Method* Blood samples were tested by HSGC with flame ionization detector. Compared with the standard controls operating parallelly, the retention time was used as the qualitative basis. Peak area ratio of ethanol to the internal standard substance was quantified ethanol concentration through the internal standard method. *Results* Under the optimized conditions of analysis, the coefficient of association was greater than 0.999 within the linearity range 10–300 mg/100 mL. The lowest minimum mass concentration of ethanol in blood was 1 mg/100 mL. The recovery rate was 97.76%–106.55% and the RSD of the degree of precision was less than 2%. *Conclusion* It was rapid, accurate and highly sensitive that the method could be used to detect ethanol content in blood.

Keywords: Ethanol, Headspace auto-injection, Gas chromatography, Internal standard method, Forensic science.

1 Introduction

Ethanol (common name is alcohol and molecular formula is C_2H_5OH) is widely used in daily life. However, drunk driving and alcoholism have been increasing in recent years. The determination of blood alcohol content, which therefore becomes a routine test of forensic identification and clinical diagnosis, is a critical evidence for traffic accidents and criminal cases. Now the methods to detect the content of ethanol in blood are gas chromatography, enzyme and chemical process, etc^[1–5]. All these methods have limitations^[6]. This article adopts HSGC (Headspace Gas Chromatography) for analysis and the accuracy and repeatability are favorable.

2 Materials and Methods

2.1 Instruments and Equipments

GC-2010 Plus; FID (Flame Ionization Detector); Quartz Capillary Column (Rtx-WAX, 30 m×0.25 mm×0.25μm); GCsolution Ver 2.32 workstation; DANI HSS 86.50 Headspace Autosampler; Pipettor; Headspace vials with matched caps; Sealing Plier.

2.2 Reagents

The standard substances: 99.9% anhydrous ethanol (chromatographically pure), 99.5% tertiary-butanol (analytically pure) as the internal standard. Make the preparation of 8000 mg/100 mL ethanol as stock solution, store it in the refrigerator of 4°C. Dissolve appropriate tertiary-butanol into

ultrapure water in the volumetric flask, preparing 50 mg/100 mL as working solution of the internal standard.

2.3 Instrumental Working Conditions

Headspace autosampler: oven temperature: 70°C; manifold temperature: 105°C; delivering tube temperature: 110°C; incubation time: 15.0 min.

Chromatographic column temperature: 40°C; flow velocity: 3.0 mL/min; purge flow velocity: 4.0 mL/min; H_2 flow velocity: 40.0 mL/min; Air flow velocity: 400.0 mL/min; make-up gas flow velocity: 30.0 mL/min; injection port temperature: 150°C; detector temperature: 250°C; split ratio: 20.0.

2.4 Experimental Methods

2.4.1 Drawing of calibration curve

Make a preparation of 100 mg/100 mL, 200 mg/100 mL, 500 mg/100 mL, 800 mg/100 mL, 1000 mg/100 mL, 1600 mg/100 mL, 2000 mg/100 mL, 3000 mg/100 mL ethanol standard series. Add 0.09 mL blank blood respectively to 0.01 mL standard series solution and 0.1 mL internal standard

working solution in the headspace vials, seal and blend them and wait for determination.

2.4.2 Sample preparation

Add 0.1 mL blood to be measured to 0.1 mL the internal standard working solution in the vial, seal and blend it and wait for detection. Fetch 0.1

mL blank blood and 0.1 mL internal standard working solution in the vial, as blank control.

2.4.3 Detection

Place vials of blank control, standard series and sample to be tested into HS autosampler, under the set condition of instrumental working

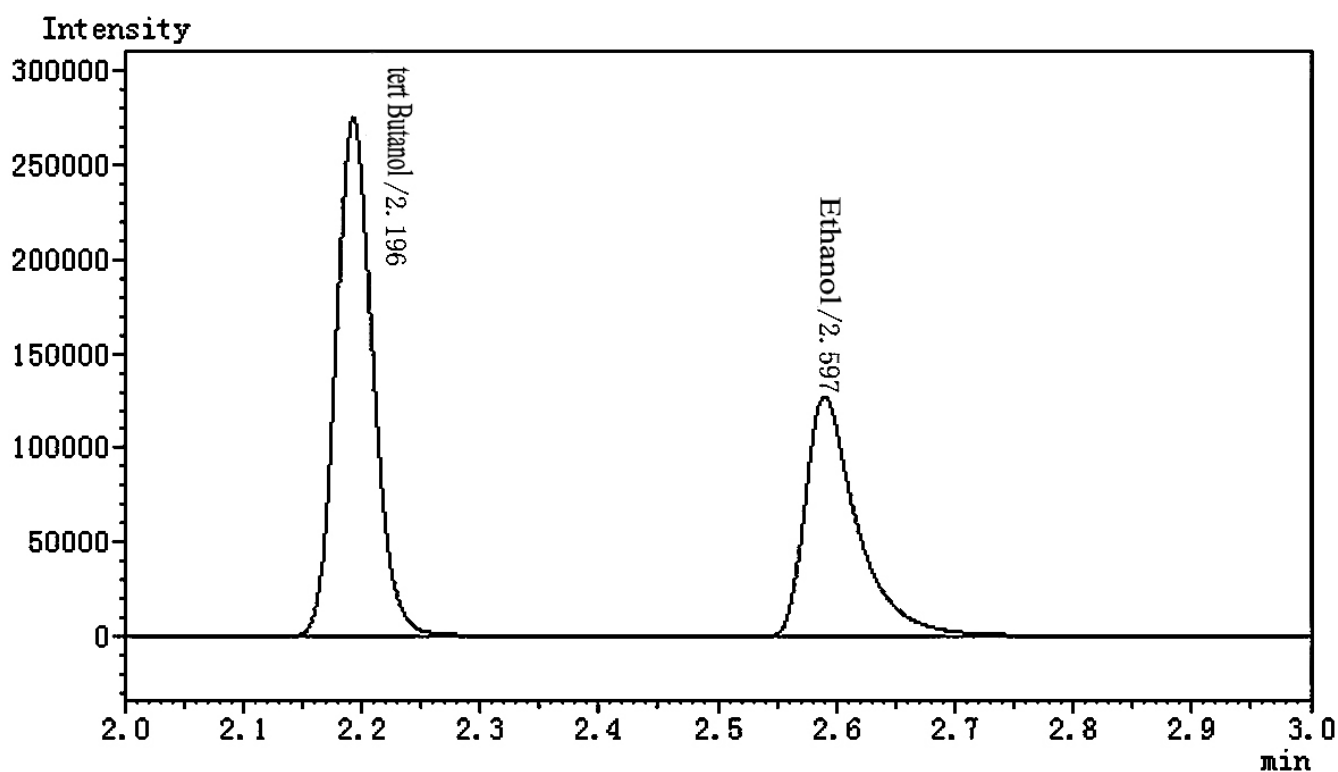


Figure 1. Chromatogram of Ethanol in Blood.

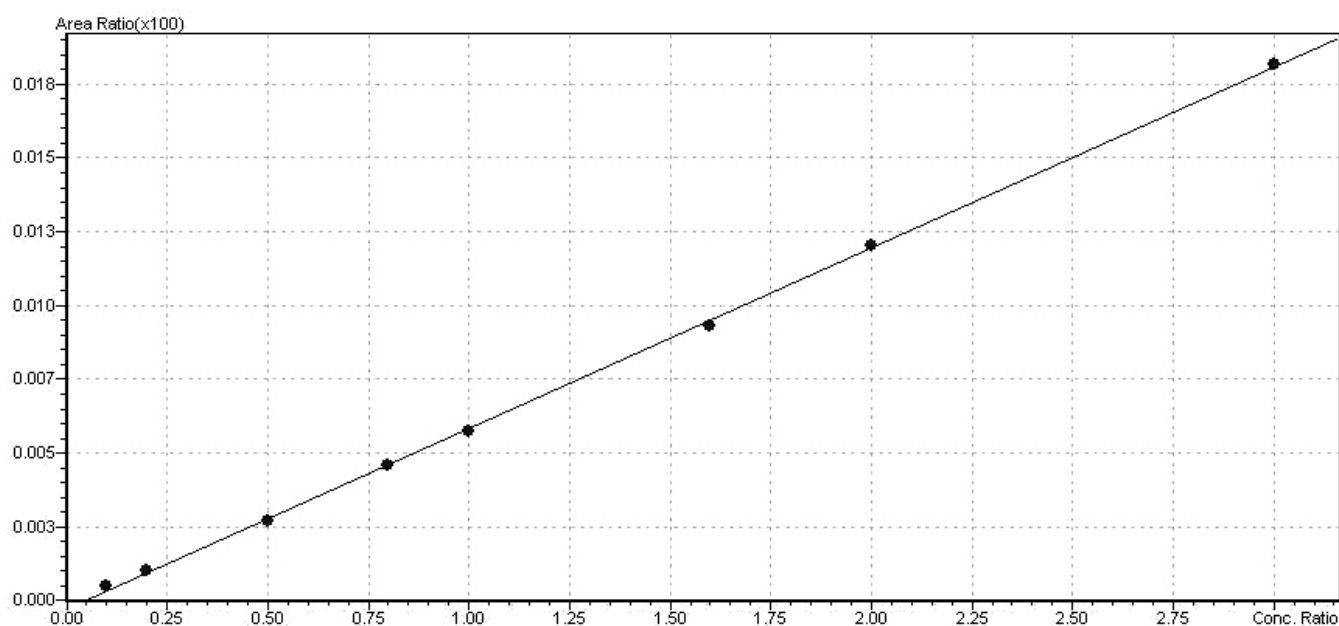


Figure 2. Calibration Curve of Ethanol Standard Series.

Table 1. Method Degree of Precision Test.

Sample Concentration		Measured quality (mg/100 mL)					Average (mg/100 mL)	RSD (%)
Low	21.87	21.93	21.93	22.17	22.41	21.85	22.03	0.9985
Medium	78.82	80.87	81.34	80.64	81.34	80.46	80.58	1.158
High	156.39	161.70	161.58	163.67	165.28	162.32	161.82	1.858

Table 2. Method Degree of Accuracy and Recovery Test.

Number	Addition (mg/100 mL)	Measured quality (mg/100 mL)	Recovery rate (%)	Average recovery rate (%)	RSD (%)
1	20	21.30	106.50	106.55	1.197
2	20	21.57	107.85		
3	20	21.06	105.30		
4	80	78.52	98.15	99.29	1.099
5	80	79.52	99.40		
6	80	80.26	100.33		
7	160	158.09	98.81	97.76	1.024
8	160	154.90	96.81		
9	160	156.24	96.81		

conditions, get these samples injection. The retention times of ethanol and tertiary-butanol are 2.597 mins and 2.196 mins.

3 Results and Discussion

3.1 Determining of Blood Sample (Fig. 1)

3.2 Linear Regression Equation and Correlation Coefficient of Method

Use peak area ratio of ethanol to the internal standard as ordinate, the concentration of ethanol as abscissa, and get the linear regression equation $Y = 0.6118 X - 2.698 \times 10^{-2}$. The correlation coefficient is $R^2 = 0.9996$, and the good linear range for ethanol concentration is 10 mg/100 mL–300 mg/100 mL. See ethanol standard series adjusting graph in Figure 2.

3.3 The Lowest Limit of Detection

Make an attenuation of ethanol standard solution 100 mg/100 mL to 50 mg/100 mL, 25 mg/100 mL, 10 mg/100 mL and 5 mg/100 mL solution. Add 0.09 mL blank blood respectively to 0.01 mL standard solution above and 0.1 mL internal standard working solution in the vials, seal and blend them and wait for determination.

According to $S/N \geq 3$, the lowest minimum mass concentration of ethanol in blood is 1 mg/100 mL.

3.4 The Degree of Precision of Method

Prepare low, medium and high mass concentration of ethanol, and each concentration get 6 paralleled samples introduction. The results in Table 1, it is clear that the degree of precision is 0.9985%–1.858%, which meets the requirement.

3.5 The Recovery Test of Method

Get blank blood prepared to 3 groups of solution in which ethanol concentration are 20 mg/100 mL, 80 mg/100 mL and 160 mg/100 mL, respectively. Each group has 3 paralleled samples tested to calculate the recovery rate of standard addition. The results in Table 2 obviously show that the recovery is 97.76%–106.55%, and the RSD is far lower than 2%, both which indicate the method is accurate and reliable.

4 Conclusion

The method is quick and simple, merely needing a small volume of blood, while the result is accurate. We do think it has practical value of the content check of ethanol in blood.

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Psychiatric Post: Outcomes Following Discharge Forensic Psychiatric Patients from the Clinic

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For decades, the number of patients who are accommodated in forensic psychiatric facilities is increasing - not only in Germany but also in other countries. Some authors are already speaking of a re-institutionalization of psychiatric patients (Priebe et al. 2005). However, the benefits of accommodating keep some researchers previously for insufficient evidence. In British Journal of Psychiatry now appeared a systematic review with meta-analysis of Fazel et al. (2016), were analyzed in the outcomes after discharge forensic psychiatric patients and compared with data from other groups. As previously existed only individual studies, observing the patients after their release, these studies were combined to provide an overview of the state of research.

Relevant primary studies were identified through a systematic search in electronic databases and by hand searches. The computer-based literature review included the search for publications in 11 different electronic databases (z. B. PubMed, Google Scholar, ProQuest Dissertations and Theses) defined by March 2013. By means Searches publications were traced, forensic patients after their discharge from a observed clinic and results on mortality, readmissions

or relapses reported. In addition, the literature references of identified studies were searched for additional matching literature. Articles that were not written in English, have been translated. The quality of the identified studies was assessed using a rating scale (Newcastle-Ottawa Quality Assessment Scale for Cohort Studies).

In the review only observational studies were included. Studies in which validated forecasting tools or interventions were evaluated were excluded in order to avoid a distortion of the results due to sample selection.

From the primary studies in addition to the main findings and data to the background of the study and the sample was extracted. Since the time period during which the patient a study were observed varied from study to study, the common measure of person-years was selected for the synthesis of the data. Person-years were calculated as the product of the number of patients and the median of the follow-up periods of all primary studies. They are the years of observation time per person or the sum of the risk of times for each individual. The respective rates (z. B. the death rate) were calculated by the number of events in relation to the person-years, d. H. Risk time set.

About the raw data, a meta-analysis

was calculated using the "random effects" model. This pooled estimates were determined for mortality, suicidal tendencies, recoveries and relapses. The "random effects" - model are all studies similar weight and produces an estimator of the heterogeneity of the studies. Moreover, in addition comparisons z. B. with prisoners or general psychiatric patients were performed with other groups.

Von 182 durch die Suche identifizierten und möglicherweise relevanten Publikationen wurden 35 Studien aus 10 verschiedenen Ländern (England und Wales, USA, Schweden, Australien, Neuseeland, Italien, Kanada, Japan, Norwegen) in den Review eingeschlossen. Die Publikationen stammten aus den Jahren 1982–2013 und umfassten insgesamt 12.056 Patienten, von denen 53% Gewaltdelikte begangen hatten. Im Durchschnitt waren die Patienten 34,5 Jahre alt. Zu 75% handelte es sich um männliche Patienten. Follow-up-Messzeitpunkte lagen für die Mortalität zwischen 1,5 und 13,6 Jahren, für Wiederaufnahmen zwischen 1,8 und 9,4 Jahren und für Rückfälle zwischen 1,5 und 13,6 Jahren. In den Primärstudien wurden verschiedene Quellen genutzt, um Informationen zum Followup zu sammeln, z. B. Klinikunterlagen,

Unterlagen der Gerichtsmedizin oder nationale Datenbanken.

Mortality

Eight primary studies reported results for mortality in 9 cohort (n = 2226); Two additional studies reported only suicides (n = 4502). The absolute number of deaths was 368, of whom 143 (39%) suicides. The pooled estimate for the crude death rate was 1538 per 100,000 person-years or people per year (95% confidence interval [95% CI]: 1175-1901). In other words: If one track 100,000 patients a year, would in 1538 die from it. For England and Wales, mortality was slightly lower than for the other countries. Results for suicidality were presented from 6 studies. The suicide rate was 325 per 100,000 person-years (95% CI: 235-415).

The 6 studies were identified that compared mortality in groups reported, including released prisoners or general psychiatric patients (n = 7,667,645). The rates ranged depending on group 850-3344 per 100,000 person-years for all-cause mortality and 155-561 per 100,000 person-years for the suicide rate. The mortality rate of released forensic patients was higher than the rate of released prisoners and was similarly high as the mortality rate of patients with disorders of the schizophrenic spectrum.

Recovery

Twenty studies of 21 cohorts were concerned with re-admissions of patients in a clinic (n = 3522). The absolute number of readmissions was 1171. The raw data ranged 2926-16461 revivals per 100,000 person years. The pooled estimate was 7208 revivals per 100,000 person-years (95% CI: 5.916 to 8.500). the percentage

of the variation between studies, which does not come by chance, but by heterogeneity existence - - However, the heterogeneity was with $I = 92\%$ are highly valued. By meta-regression analyzes potential sources of heterogeneity were examined. It showed: studies with a higher proportion of mentally ill patients reported a higher recovery rate than studies with a higher proportion of patients with antisocial personality disorder. In addition, a (statistically not significant) trend returned to patients were admitted with prolonged hospital stay more again. Other characteristics such as age or type of offense made no significant contribution to the explanation of the heterogeneity.

Compared with other studies, the highest recovery rate showed for outpatients offenders with mental disorders. However, hardly observational studies were found, report the rate for general psychiatric patients, so that a comparison was difficult.

Relapses

There 30 primary studies were identified that reported on criminal relapses. The rates ranged from 0 per 100,000 person-years to 24,244 per 100,000 person years. The pooled estimates of relapse rate was 4484 per 100,000 person-years (95% CI: 3679-5287). The heterogeneity was very high, which partly could be explained by the fact that previous studies showed higher rates.. Other features contributed no significant contribution to educating high heterogeneity.

The relapse rate of dismissed prisoners was related to recidivism of forensischpsychiatrischen patients. In this laid-forensic patients showed a lower relapse rate. The prevalence ratios ranged from 1.4 to 7.7 in English

studies, 1.9 to 4.1 in studies from the United States and 2.7 to 5.0 in the Swedish studies.

The authors speculated that the increased mortality of released forensic patients probably (smoking, substance abuse), and unequal access to health services could be in a rather unhealthy lifestyle. According to the authors clinics should also target its interventions on health behavior. The high suicide rate should get more attention.

Conclusions on the resumption rates were difficult because the numbers between the studies varied widely. One possible explanation could be that the proportion of patients with mental illnesses and personality disorders between studies varied widely. The higher the proportion of mental disorders, the higher the recovery rate. In addition, the regulations of each country for a resumption distinction. It also lacked background information: In the primary studies was usually not stated whether the resumption was carried out in a forensic or in a general psychiatric hospital.

Also with regard to relapses incidence rates for primary studies differed greatly. Explanations, the authors could not find. However, there was evidence that forensic patients lower relapse rates than prisoners. It must be noted that prisons and forensic psychiatric patients differ in a variety of characteristics (offenders with minor offenses such as drug offenses, which have a higher risk of relapse, are for example more in prison than in the forensic psychiatry).

Overall, the companies included in the review and meta-analysis of studies published very heterogeneous, making it difficult to data aggregation and further conclusions. Many background information that could shed light on the reasons for the difference in results

were not reported in the primary studies. The studies also came from the years 1982-2013, which makes comparisons between cohorts since have changed treatment measures over time. The involvement of different countries complicates the synthesis of the data - the institutions, admission criteria and treatments differ sometimes significantly from one another. Problems that already appeared in the primary studies, also could not solve the Review: For example, no status for follow-up time of measurement could be determined in the primary studies for some patients, so some unfavorable outcomes may not be received in the results. In addition, the majority of primary studies took their data retrospectively from files.

Although the meta-analysis by Fazel et al. provided interesting results, are still too few and too heterogeneous studies to get a meta-analysis to final reviews, in particular the usefulness of forensic psychiatric treatment.

Compliance with ethical guidelines

Conflict of interest J. Sieß indicates that no conflict of interest.

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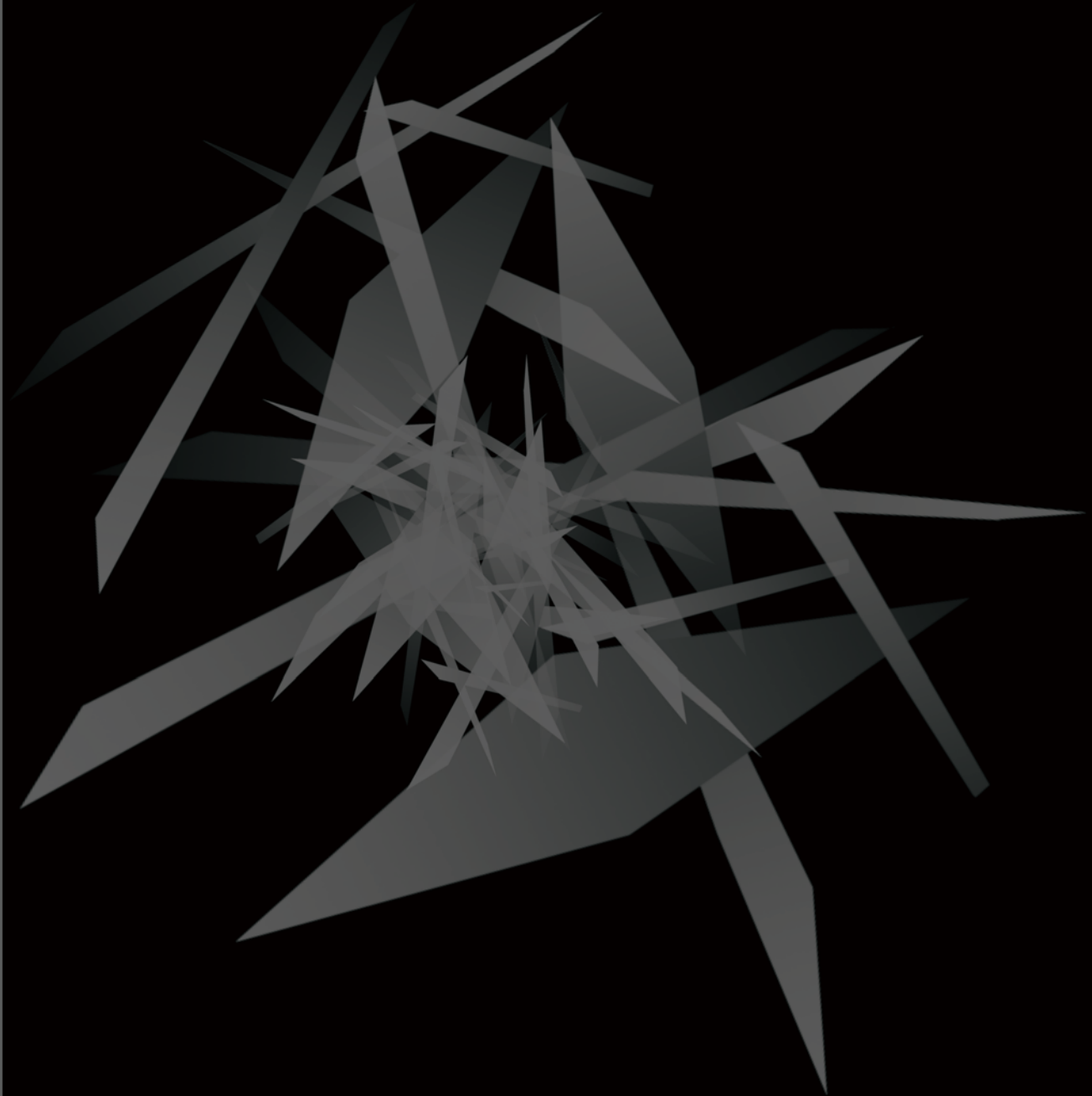
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