ERRORS IN CRIMINALISTICS: THE POSSIBLE APPLICATION OF SYDNEY DECLARATION'S PRINCIPLES IN THE ITALIAN CONTEXT

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Introduction

In recent times, criminalistics has been trying to adapt to scientific progress, but at the same time, it shows signs of decline. This latter is generated by the occurrence of errors which irreparably affect the probative value of a trace. There have been many attempts to stem this problem (guidelines and protocols), but none of these has led a full resolution.

All that remains is to dwell on the Sydney Declaration's principles.

Methods

A case study on judicial files to understand the presence of the error, the fate of the traces collected and the possible strategies that can be used to stem the phenomenon.

Figure 1

Results

In a peculiar way, the analysis of the investigative activities carried out allows errors and deficiencies to emerge in the identification and collection of individual traces, in the failure to change personal protective equipment and in the analysis in laboratory.

Figure 2

Conclusions

Although the Police Forces equipped themselves with specific non-binding documents, the possibility of making mistakes still appears very strong.

Only the fine-tuning and compliance with the regulatory instruments by the operators can guarantee a full development of criminalistics.

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Introducing a biological marker into forensic medical practice as a supplement to macroscopic and microscopic examination of organs when determining the cause of death by drowning

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Introduction

The presence of diatoms in the lung tissue can provide strong evidence that the person drowned and can also help investigators determine the location of the drowning. This can help forensic medicine to determine the cause of death and provide important evidence for legal proceedings.

There is no specific diagnostic procedure that would help with the cause of death and the diagnosis of drowning.

Non-specific microscopic signs are very similar and common to all mechanical asphyxia.

The main goal of diatom analysis on forensic is to differentiate a death by submersion from a post-mortem immersion of a body in water optimization the "Diatom Test" method in forensic medicine in Bosnia and Herzegovina.

Methods

A total of 32 adult albino rats (8 in each group) were divided into groups (A, B, C, D):

A (mechanical asphyxia + drowning 1 hour after death);
B (mechanical asphyxia + drowning 72 hours after death);
C (rats that were immediately autopsied after drowning, with the cause of death determined as drowning);
D (rats that underwent a 48-hour postmortem period after drowning).

Figure 1. Detailed view of the sampling area: Sampling location of water and phytobenthos algae

Results

Microscopic analysis revealed the presence of diatoms in the lungs of rats. Diatoms were not observed within groups A, B, and C, but were found within group D. Within group D, in samples 3, 4, and 5, diatoms were identified: Navicula sp. (U3 and U6) and Ulnaria ulna (U4).

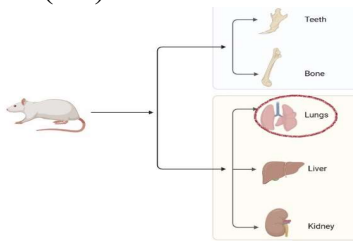

Figure 2. Original schematic representation of the experimental design (©Biorender, 2023)

Figure 3. *Navicula* sp. (G-D3)

Figure 4. *Navicula* sp. (GD-6)

Conclusions

Optimization of the "Diatom Test" method could potentially lead to its future use as a routine method within experimental settings.

The diatom test must be used in conjunction with other evidence and information to make a conclusive determination of the cause of death.

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Evaluating the Use of RapidDNA Technology in Kinship Analysis

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ÜSKÜDAR ÜNİVERSİTESİ

Introduction

RapidHIT™ ID is a system that reduces conventional procedures to a single step, reduces the risk of contamination by reducing the number of analysts, and provides results by obtaining CODIS-compliant DNA profiles in as little as 90 minutes. Rapid DNA technology, which is known to work with reference samples and is still under development, has been used since 2012 [1,2,3,4].

In Forensic Sciences, it is very important to establish the relationship between the event and the people who are thought to be related to the event. To determine this relationship, the steps of DNA isolation, DNA quantification, polymerase chain reaction, capillary electrophoresis, and interpretation of the profiles obtained as a result of this process take approximately one full day [1,5].

In this study, it was aimed to compare the DNA profiles obtained by conventional methods, which are internationally accepted as valid and reliable, from biological samples taken from the mother, father, and child trios to be used in the kinship analysis, with the DNA profiles obtained by rapid DNA technology, which gives results in as little as 90 minutes, and whether it is possible to conclude forensic cases more quickly as a result of this study. In this way, it was also aimed to determine the usability of rapid DNA technology in kinship analysis.

Figure 1 *RapidHIT™ ID System (ThermoFischer Scientific)*

Methods

Sample Preparation

In the study, 2 buccal swab samples were taken from 30 families (father, mother and child) total of 90 individuals.

Rapid DNA Analysis The prepared sample cartridges were placed in the instrument and the instrument was started. Automatically in 90 minutes on the RapidHIT™ ID System: Direct PCR (Amplification), Electrophoresis, and Results are reported with RapidHITTM ID System v1.1.2 software (Fig 2).

RapidHIT™ ID ACE GlobalFiler™ Express cartridge PCR (Amplification) Step according to the user manual: 1 minute at 95 ºC, as a 32 cycle (94 ºC 5 seconds - 61 ºC 40 seconds- 60 ºC for 8 minutes) [6].

Routine DNA Analysis

Exratction: DNA samples were manually extracted with the PrepFiler® Forensic DNA Extraction Kit (ThermoFisher Scientific), and DNA quantitation was performed using Qubit™ 4 Fluorometer with Qubit™ dsDNA HS Assay Kit (Thermo Fisher Scientific).

PCR: PCR process was performed by using the GlobalFiler ™ PCR Amplification Kit (Applied Biosystems) [7].

Electrophoresis: The PCR samples were run on ABI 3500 Genetic Analyzer - capillary electrophoresis in 36 cm capillary POP-4 polymer by selecting the GlobalFiler™ filter module and profiles were obtained (Fig 2). DNA profiles were analyzed with GeneMapper™ ID-X software.

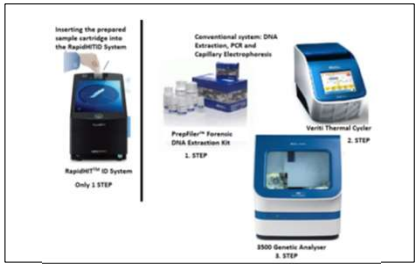

Figure 2 *Rapid DNA System and Conventional System Analysis Steps in Forensic DNA Analysis*

Results

In this study, the RapidHIT™ID System was compared with conventional systems for its usability in kinship analyses. The study included 30 families, i.e. 90 individuals.

DNA profiling generated by the RapidHIT™ID System workflow, 9 out of 30 families had different problems. The details on DNA profiling on families showed in Table 1.

Table 1 Details on locus spesific discordant from profiles generated by the RapidHIT ID System workflow

Locus	Type of Problem	Total Problem	Percentage
SE33	• 7 out of 90 person had an un-call allele	7	7.77%
D19S433	• 3 out of 90 person had an un-call allele • 2 out of 90 person people had a misscall allele as a varient	5	5.55%
TPOX	• 2 out of 90 person allele called and labeled with yellow quality flags • 1 out of 90 person people had an un-call allele	3	3.33%
D2S1338	• 2 out of 90 person allele called and labeled with yellow quality flags • 1 out of 90 person had allelic drop out	3	3.33%
D16S539	• 1 out of 90 person allele called and labeled with yellow quality flags • 1 out of 90 person had an un-call allele	2	2.22%
CSF1PO	• 1 out of 90 person had un-call allele	1	
THO1	• 1 out of 90 person had an stutter peak	1	1.11%
vWA	• 1 out of 90 person was called and labeled with an OB	1	1.11%
D21S11	• 1 out of 90 person allele called and labeled with yellow quality flags	1	1.11%
D1S1656	• 1 out of 90 person allele called and labeled with yellow quality flags	1	1.11%
D5S818	• 1 out of 90 person allele called and labeled with yellow quality flags	1	1.11%

Kinship analysis:

Totaly 9 families had problems with the automatic kinship analysis reports;

- In two families (Families 21 and 24), direct exclusion was given to the father due to allelic mismatches between father and child due to allelic dropouts or allele misscall.
- In two families (Families 4 and 5), there were no linkage or exclusions in the maternal and child lineage due to partial DNA profiles of the mother and child.
- In three families (Families 17, 18, 25), the father was excluded for one or more alleles due to allele dropout or misscall allele, but the probability of paternity was still calculated as 99.99%.
- In two families, the **probability of paternity** was calculated as **99.42% for Family 20 and 99.85%** for Family 26 due to allelic dropout and misscall allele (Fig 3, Table 2).

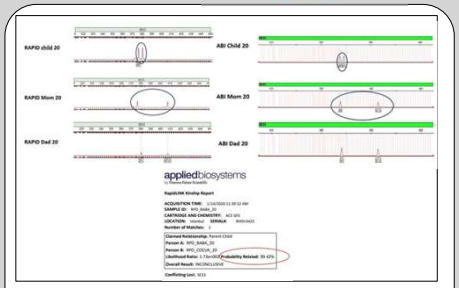

Figure 3 *Electrophoregram and kinship report sample of families with problems in DNA profiling and kinship analysis*

Table 2. Alleles obtained at the SE33 locus of family 20 in RapidHIT™ID System and ABI 3500 Genetic analyzer

Family 20, SE33 Locus	*RapidHIT™ID System*	*ABI 3500 Genetic Analyser*
	Alleles	Alleles
Children	20-20	20-21
Father	21-27,2	21-27,2
Mother	--	20-27.2

Conclusions

- ❖ In this study, 9 out of 30 families (30%) and 16 of the 90 STR profiles (17,7 %) in which kinship analysis was performed with the RapidHIT™ID System had problems with the kinship analysis.
- ❖ Generally, although DNA profiles were obtained, there were problems in kinship analysis due to the inability to un-call allele. For this reason, the software of the device needs to be improved.
- ❖ It was concluded that RapidHIT™Software should be reviewed in terms of signal quality, allele un-call problem and reliability and validity tests should be performed.
- ❖ Regardless of the problems encountered, in mass disasters such as terrorism and natural disasters, where extremely fast results are required, Rapid DNA technology is considered to be a pioneering analysis that will be of great benefit as it has the potential to provide fast results and to take it to the crime scene because it is mobile.

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DNA Extraction from Blood Samples Exposed to Constant Concentrations of Hydrochloric Acid and Sodium Hydroxide Solutions

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Introduction

In cases of injury and death by firearms and sharps, blood samples are often found at the crime scene. In some cases, it is known that the perpetrator tries to clean and remove these blood stains and uses strong cleaning materials for this purpose.

Even if the perpetrators are able to visually remove these bloodstains, not all of the stains disappear, and stains can be detected at the crime scene as a glow with luminol chemical treatment. In some crime scenes, the perpetrator may try to destroy the evidence by using various laboratory or chemical materials with acidic and basic properties because they think it may be a more effective solution.

This research was conducted to determine whether people can use these chemicals to destroy bloodstains and whether DNA recovery is possible as a result.

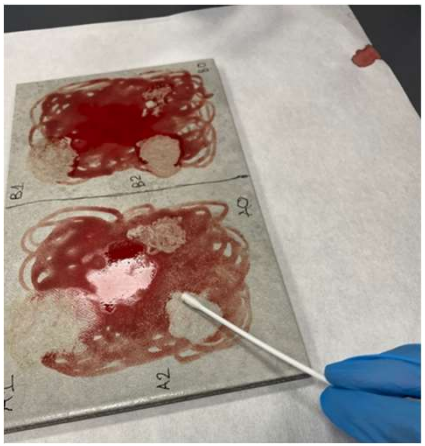

Figure1: *Sample collection on blood-stained tiles*

Methods

Blood samples from 10 healthy people were dripped onto different tiles to create a stain.

Samples were taken by using swab from the stained areas (Reference Sample).

A part of the stained area was wiped with HCl and a part with NaOH.

Separate samples were taken by using swab from the HCl and NaOH wiped areas.

DNA isolation was analyzed by using the QIAamp DNA Investigator Kit.

Quantification was analyzed by using Qubit 4.0 Fluorometer and Qubit dsDNA HS Assay Kit.

The results obtained were compared with reference samples and interpreted.

Figure2: *QIAamp DNA Investigator Kit*

Results

In this study, assuming that cleaning agents containing strong acids and strong bases such as ***spirit of salt and caustic soda*** were used to wipe blood stains at crime scenes, the effects of these substances on the amount of DNA in blood samples were examined and the results were evaluated. According to the results obtained; an average of ***3.7ng/µl*** DNA was obtained in control blood samples that were not exposed to chemicals. While an average of ***1.31ng/µl*** DNA was obtained in samples taken from surfaces wiped with HCl, ***64.59%*** of the DNA amount was lost. In samples taken from surfaces wiped with NaOH, an average of ***0.55ng/µl*** DNA was obtained while ***85.13%*** of the DNA amount was lost.

Control blood samples that have not been exposed to the chemical	3.7ng/µl DNA
Blood samples taken from surfaces wiped with HCl	1.31ng/µl DNA
Blood samples taken from surfaces wiped with NaOH	0.55ng/µl DNA

Figure3: *Mean DNA quantification values of blood samples collected from surfaces wiped and not wiped with HCl and NaOH solutions*

Conclusions

- ✓ The basic sodium hydroxide was found to disrupt the DNA structure more than hydrochloric acid. However, neither solution was able to completely remove the DNA from the tile floor.
- ✓ This feature of DNA is very valuable for forensic science and identification. In this study, it was observed that DNA was not completely destroyed even under harsh conditions.
- ✓ According to the sensitivity of the GlobalFiler kit, it will be possible to obtain a complete profile from all samples at the identification stage since the DNA amounts of all samples obtained are higher than 0.125 ng/µL.

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DNA Recovery from Blood and Seminal Fluid Samples Exposed to Diluted Sodium Hypochlorite (Bleach)

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Introduction

Perpetrators may clean biological evidence to avoid being detected, and situations can arise where psychological pressures result in unintentional or deliberate tampering of evidence (1,2). The study aimed to extract DNA from fabrics exposed to diluted sodium hypochlorite, carrying blood and semen stains, followed by washing. Its objective was to evaluate the feasibility of DNA profiling from evidence treated with diluted sodium hypochlorite, whether done intentionally or due to psychological factors.

Methods

Blood and semen samples from 10 males and blood samples from 10 healthy individuals were used to create stains on cotton and denim fabrics. Stained fabrics were treated with diluted sodium hypochlorite, washed with detergent at 90°C, and exposed to UV light and luminol screening. DNA recovery. In the context of DNA isolation studies, the QIAamp® DNA Investigator Kit by QIAGEN was employed, and protocols tailored for the specific requirements of blood and semen stains were meticulously executed(3,4). The quantification of the completed DNA isolation study samples was conducted using the Qubit 4.0 Fluorometer instrument, employing the Qubit dsDNA HS Assay Kit (5). The study aimed to evaluate DNA recovery after treating biological stains with diluted sodium hypochlorite on denim and cotton. Fabric samples underwent washing, drying, preliminary screening, DNA isolation, and quantification.

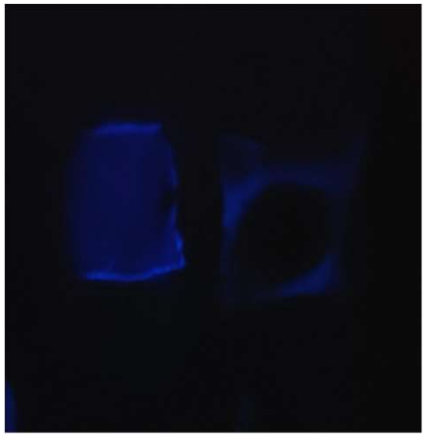

Figure 1: The appearance of semen stains under UV light (denim fabric on the right, cotton fabric on the left) following exposure to diluted sodium hypochlorite (bleach) and washing at 90°C.

Results

The study successfully extracted DNA from fabric samples with blood and semen stains. These samples underwent 15-minute treatment with diluted sodium hypochlorite and machine-washing at 90°C. DNA isolation employed the spin column method for stained fabric samples, consistently resulting in effective. While DNA retrieval was feasible across fabric types, quantities varied. Some showed increased yields, while others had decreased amounts

Cotton fabric samples stained with blood, exposed to diluted sodium hypochlorite (bleach), and subsequently laundered at 90°C, yielded DNA in the range of 0.0899 ng/µl to 3.06 ng/µl. In denim fabric, under analogous conditions, DNA was obtained in the range of 0.474 ng/µl to 2.70 ng/µl.

Cotton fabric samples, exposed to diluted sodium hypochlorite (bleach) and washed at 90°C after being stained with semen, yielded DNA in the range of 0.0564 ng/µl to 1.77 ng/µl. In denim fabric, DNA was obtained in the range of 0.0380 ng/µl to 2.76 ng/µl under similar conditions.

Figure 2: The quantities of pure DNA and DNA admixed with protein measured in a sample

Conclusions

Fabric samples with semen and blood stains, treated with diluted sodium hypochlorite for 15 mins and washed at 90°C, showed DNA recovery of 0.0389 to 3.06 ng/µl using the spin column method. Regardless of fabric type (cotton or denim), both were suitable for DNA retrieval. Denim yielded more DNA due to its adhesive surface. This study demonstrates DNA recovery is possible even when evidence is intentionally destroyed or washed away in sexual assault cases. This study represents the first demonstration of the feasibility of DNA recovery from blood and semen samples exposed to diluted sodium hypochlorite (bleach) followed by detergent washing at 90°C. It has contributed to the existing body of literature by aligning its methodology with that of the referenced studies. Additionally, it has expanded on this foundation by showcasing the possibility of DNA recovery from samples exposed to sodium hypochlorite, with a particular emphasis on the diversity of fabric types from which these samples were obtained (1,2,6,7).

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Advancing Forensic DNA Analysis: Externally Visible Traits as Phenotypic Markers

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Introduction

DNA identification traditionally relies on comparing short tandem repeats (STRs) between unknown and reference profiles. In cases where references are lacking, exploring alternative identification methods becomes essential.

Forensic DNA Phenotyping (FDP) refers to the process of using DNA analysis to predict physical traits or characteristics of an individual, such as eye color, hair color, facial features, and more, based on their genetic information.

Recent advancements in FDP analysis incorporate externally visible characteristics (EVCs) as predictive markers for physical traits. These markers are utilized in identifying disaster victims or when suspects are unavailable.

The aim of this study is to explore and assess the utilization of EVCs as markers for DNA identification, especially in scenarios without available reference samples (1,2).

Methods

EVCs encompass eye, hair, and skin color, height, facial features, age estimation, biogeographic ancestry, and baldness (androgenic alopecia) (Figure). Classical methods such as DNA sequencing and array technologies can be utilized in forensics. However, recent technological advancements have led to the development of forensically suitable DNA technology, significantly boosting multiplex capacity. This breakthrough enables the concurrent analysis of numerous DNA predictors via targeted massively parallel sequencing (MPS) (3,4,5).

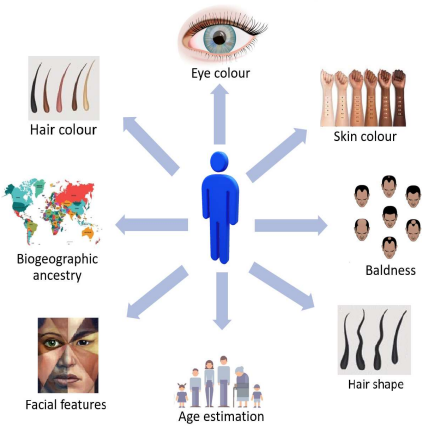

Figure: Genetic Identification of EVCs

Results

Several genes have been discovered to be linked with EVCs (Table).

Forensically validated MPS-based Forensic DNA Phenotyping (FDP) tools have emerged, enabling predictions derived from crime scene DNA, combined appearance traits and ancestry, as well as age estimation from various tissue types (1-3).

Table: Genes are associated with EVCs

Eye Color	Hair Colr	Skin Color	Biogeographic ancestry	Hair shape	Age estimation	Facial features	Baldness
HERC2, OCA2, SLC45A2, TYR, IRF4, SLC24A4	MC1R, OCA2, SLC24A4, HERC2, TUBB3, ECOC2, SLC45A2, KITLG, IRF4, TYR, PIGU, TYRP1	SLC24A4, SLC24A5, SLC45A2, ASIP, ANKRD11, BNC2, DEF8, HERC2, IRF4, KITLG, MC1R, OCA2, PIGU, RALY, , TYR, TYRP1, DEF8, MYEF2, CTXN2, CEP152	AIM INDEL Panels, SNaPshot, SNaPforID 34-46 Plex	AR/EDA2R, EBF1, HDAC9, TARDBP	ELOVL2 FHL2 KLF14 C1orf132 TRIM59	DCHS2, PDE8A, SCHIP, ASPM, DLX6, DYNC1L1, EDAR, HOXD1-MTX2, WDR27, PAX3, TP63, PABP1-C1L2A, HADC8, THEM163, COL17A1, PARK2, OSR1-VVDR35, PAX9, SLC25A2, MIPOL1, FOXA1, MAFB,	EDAR, TCHH, ERRF11, PTK6, OFCC1, KRTAP2-3, HOXC13, WNT10A, KRT71, PADI3, GATA3, PEX14, LIPH, TGFA, HRNR, LGR4, TCHHL1, RPTN, S100A11, FRAS1, LCE3E, LINC01494, PRRS53, FLG-AS1, TRAF2, RPTN

Conclusions

The utilization of EVCs provides a distinct advantage by revealing numerous phenotypic characteristics of associated individuals. This negates the requirement for reference samples and streamlines the identification process.

It's important to note that the accuracy and reliability of EVCs methods can vary, and they are often used in combination with traditional DNA profiling methods, such as STRs, to enhance identification.

While recent advancements hold promise for enhancing FDP's impact in criminal casework, achieving precise appearance, ancestry, and age predictions from crime scene DNA requires sustained scientific research, technical advancements, rigorous forensic validations, and adequate funding.

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Analytical Approaches to Examining PSA (Prostate Specific Antigen) Concentration in Semen Samples

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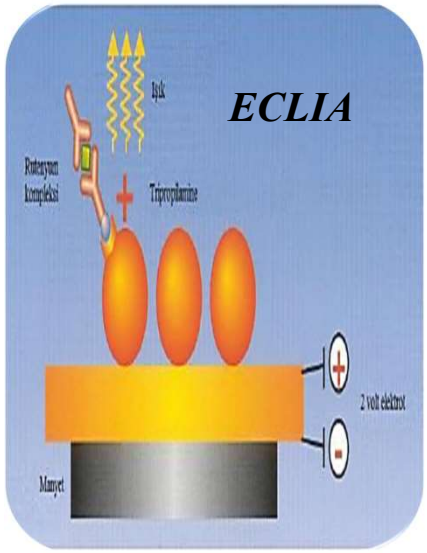
Introduction

In cases of sexual assault, one of the most important medical evidence in terms of proving the alleged assault and identifying the attackeris the presence of semen at the scene. In our study, we determined the method of showing the presence of semen by searching for chemical compounds or enzymes, which is one of the two types of methods used to detect this semen, by measuring PSA concentration, which is an important marker in the detection of semen.

Methods

Basic principle of the electrochemiluminescence method;

Light is emitted as a result of the classical antigen-antibody reaction on the surface of a magnetic microbead containing ruthenium complex and tripropylamine.



Results

Dilution rate	Results mg mL^{-1}
1/10000	0.197
1/50000	0.244
1/100000	0.790
1/500000	1.490
1/1000000	3.050

Very high levels of PSA were measured in all dilutions. The increase in the results obtained in parallel with the increase in the dilution rate showed that the hook effect was lost.

Conclusions

Low results may occur due to the hook effect

Dilution should be done.

Assay time 18 minute.

Low sample volume.

High sensitivity

It is possible to obtain a positive result at a very high dilution in practice. It is clear that it will create great advantages.

We would like to thank everyone who supports our work.

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DNA Recovery From Different Blood-Stained Fabrics Discarded in a Lake

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Introduction

The persistence of biological material depends on environmental factors. Prolonged exposure to or contact with water can affect the structure of DNA and therefore its availability. It is difficult to preserve and recover DNA structure in biological samples collected from crime scenes with bodies or evidence discarded in lakes or seawater. This study evaluates DNA recovery from different blood-stained fabrics discarded in a lake and exposed for different durations [1,2].

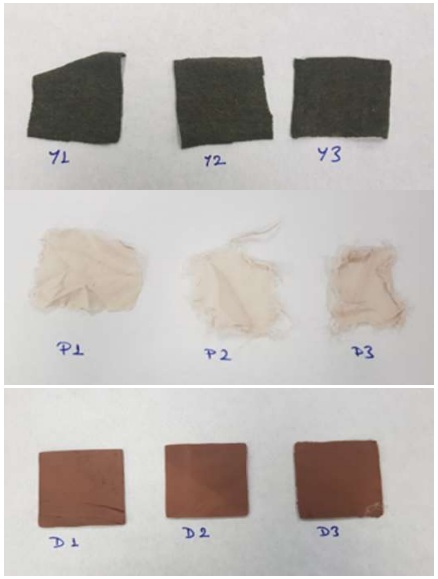

Figure 1. Prepared samples

Methods

In this study, blood-stained wool, cotton, and leather fabric samples were used and soaked in lake water for one week, one month, and three months and then DNA recovery from these samples was evaluated after DNA extraction and quantitation [Fig. 1].

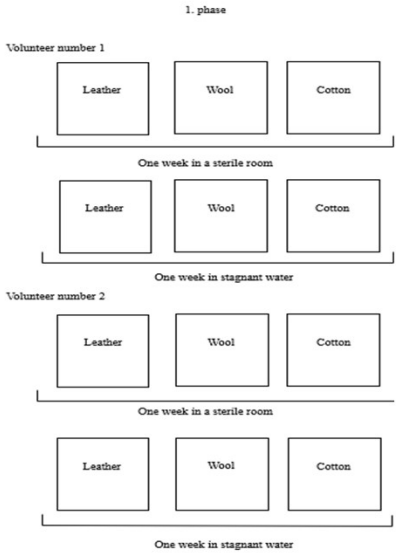

Figure 2. Phase one flowchart

Results

Our results suggest that cotton fabric is the best material for preserving DNA in aquatic environments. This is likely due to the fact that cotton is a hydrophilic material, which means that it absorbs water well. This may help to protect the DNA from degradation. Additionally, soaking cotton fabric in lake water for one week may help to remove any inhibitors that could interfere with DNA recovery.
[Fig. 2,3].

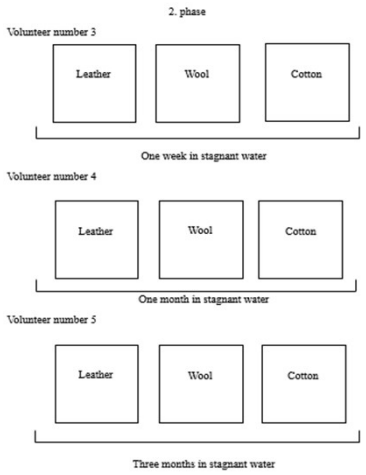

Figure 3. Phase two flowchart

Conclusions

In general, the highest amount of DNA was obtained from cotton fabric samples, while the lowest amount of DNA was obtained from wool fabric samples. Cotton fabric samples were soaked in lake water for one week and showed the highest DNA recovery. Interestingly, leather fabric also yielded high levels of DNA recovery, regardless of the fabric type. This suggests that leather may be another good material for preserving DNA in aquatic environments. However, more research is needed to confirm this finding

Regardless of the fabric type, the highest DNA recovery was obtained from leather fabrics among the samples left for three months.

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EVIDENCE COLLECTION PROCEDURES IN SEXUAL ASSAULT CASES: A MODEL PROPOSAL FOR TURKEY

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Introduction

The importance of providing medical and forensic support services to victims of sexual assault in an integrated and coordinated model is a practice unanimously recognized by WHO and other international organizations (1,2).

In Turkey, the standards on this issue are not fully established and these procedures are still being implemented in pilot centers. In response to challenges faced in the legal process of collecting evidence related to sexual assaults, this study proposes a comprehensive solution (1,3,5).

The goal is to establish a standard for collecting evidence and selecting appropriate medical personnel for victims of sexual assault that is both in line with international guidelines and protocols and that respects the country's legal regulations (6,9).

Methods

The study encompasses an in-depth analysis of current victim care and monitoring practices. It also evaluates potential collaborations among key institutions, particularly focusing on partnerships involving the Ministries of Justice and Health (2,4).

Non-physician healthcare roles, including midwives and nurses, are examined for their relevance in this context (2,4,7). The study evaluates existing models to ensure their alignment with both global standards and domestic laws.

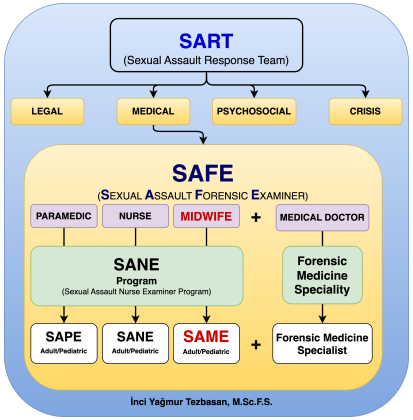

Figure 1: The Role of the Midwife Performing the Sexual Assault Examination in the Sexual Assault Response Team

Results

The research introduces a victim-centric service model aimed at mitigating the risk of secondary victimization (7).

The proposed operational care and victim care center for victims emerges as a central outcome. Furthermore, the study identifies the specific healthcare professionals suitable for staffing the center and defines the standards to govern the collection of physical evidence within the criminal justice system (5,10).

It is critical to support this model, which includes a systematic sexual assault examination and evidence collection process. The functioning of the criminal justice system will be facilitated by the systematized forensic process with the established model.

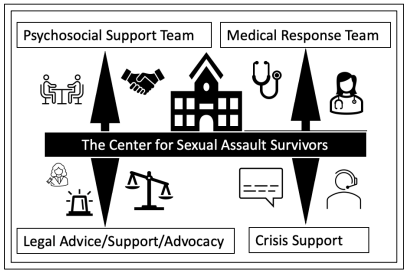

Figure 2: Sexual Assault Victim Response Center Team

Conclusions

By crafting a model that harmonizes with both international norms and local legislation, this study pioneers a service-oriented approach that caters to victims of violence and crime alike (3,5). The comprehensive framework recommended here underscores the significance of adhering to established guidelines while emphasizing a compassionate and thorough approach to evidence collection and victim support.

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FORENSIC NURSING IN DISASTERS AND ITS IMPORTANCE IN THE CHAIN OF EVIDENCE

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Introduction

- Forensic nursing was accepted as a new specialty in nursing with the establishment of the International Association of Forensic Nurses in 1992.
- They provide services in forensic medicine, biology, toxicology, narcotics etc.
- The duties of a forensic nursing include recognizing suspicious behaviors and findings of the patient admitted to the health center as a forensic case and creating a safe place for victims

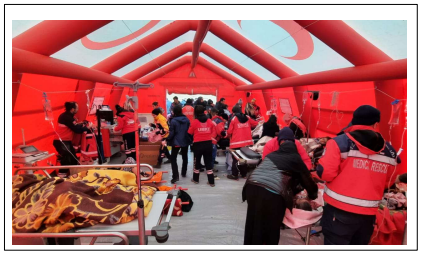
Background

- In our country, forensic nursing is still not included in the laws and regulations as a specialty branch.
- Nevertheless, nurses are involved in taking medical care of victims and suspects. So they have important rol in the chain of evidence.
- In disasters, crime opportunities arise in an environment of social disorder and lack of control.

Results

- The place where people are injured during a disaster can also be considered as a crime scene.
- Nurses are working with medical national rescue teams or rescue teams from different countries. Chain of evidence and protection these will be important than before.

Figure 1



Conclusions

- The specialty of forensic nursing needs legal regulations; the assignment of forensic nurses in hospitals, trained on the criminal elements that occur in disasters will improve multidisciplinary work with forensic authorities.

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