

UNIVERSITY OF PORTO

BIOMEDICAL SCIENCES INSTITUTE “ABEL SALAZAR”

# **DNA studies in cases of Child Sexual Abuse**

Integrated Master in Medicine

Academic Year 2012/2013

Scientific dissertation

Medical Research Article

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## RESUMO

O abuso sexual de crianças cursa frequentemente com ausência de indicadores físicos, sendo os seus achados muitas vezes inespecíficos. A existência de material biológico pode ser a única evidência do abuso e pode, por isso, ter implicações na investigação criminal e na definição das medidas de proteção da criança.

Este estudo tem como objetivo principal contribuir para a melhor caracterização dos casos de abuso sexual de crianças em que foi colhido material biológico para estudos de ADN, no sentido de compreender o tempo máximo após o qual é possível detetar ADN heterólogo, a proporção de *kits* de colheita que apresenta resultados positivos e correlacionar a idade da vítima, bem como a presença de lesões, com os resultados obtidos nos testes de ADN.

Foi realizado um estudo retrospectivo com base na revisão dos processos relativos aos 231 casos de suspeita de abuso sexual a vítimas menores de 18 anos de idade observadas no Instituto Nacional de Medicina Legal – Delegação Norte (Porto) entre 2004 e 2011, em que foi colhido material biológico para estudos de ADN.

Os casos seleccionados correspondem a 25.4% (n=231) do total de 911 suspeitas de crimes sexuais contra crianças, tendo-se verificado que 79.7% das vítimas eram do sexo feminino e 85.3% dos alegados abusadores do masculino. Foi identificado ADN heterólogo em 59 casos (25.5%): 9 em crianças menores de 10 anos de idade e 35 nas primeiras 24 horas após o alegado abuso. Em 3 casos os resultados foram positivos apesar de as colheitas terem sido realizadas mais de 72 horas após o abuso. A proporção de resultados positivos foi maior para o vestuário (30%) do que para o corpo da vítima (14%). Foi observada uma relação com significância estatística entre a presença de

ADN e a presença de lesões ( $p=0.016$ ), o menor intervalo de tempo entre o abuso e a perícia médico-legal ( $p=0.000$ ) e a idade mais elevada da vítima ( $p=0.001$ ,  $t=3.388$ ).

O exame médico-legal deve ser realizado perante qualquer situação de suspeita de abuso sexual de uma criança, com colheita de amostras para estudos de genética forense nos casos em que o tempo que mediou entre o último contacto e esse exame assim o indique; em casos específicos, pode haver colheita de amostras para além do limite atualmente recomendado de 72 horas.

## **ABSTRACT**

Child sexual abuse is frequently associated with normal or nonspecific physical findings. Biological evidence may be the only evidence of abuse, therefore having serious implications on perpetrator's conviction or child protection measures.

This study aims to characterize the cases of child sexual abuse in which biological samples were collected for DNA studies in order to better understand for how long it is possible to find DNA evidence after the abuse, the proportion of samples that yields positive results and the influence of the victim's age, the presence of physical injury and the type of practices in DNA findings

A retrospective study was conducted based on the analysis of 231 reported cases of suspected sexual abuse of victims younger than 18 years old in which samples were collected for DNA identification, that were observed at the Portuguese National Institute of Legal Medicine (INML) – North Delegation (Porto) from 2004 to 2011.

The selected cases correspond to 25.4% ( $n=231$ ) of the 911 suspected cases of child sexual abuse. In 79.7% of the cases, the victims were female and 85.3% of the abusers

were male. Identifiable DNA was found in 59 cases (25.5%): 9 in children younger than 10 years old and in 35 cases less than 24 hours after the alleged abuse. In 3 cases, DNA was found despite sample collection having occurred over 72 hours after the abuse. The proportion of positive DNA results was higher for samples collected from the clothes (30%) than for those collected from the victim's body (14%). A significant correlation was found between the presence of identifiable DNA and physical injury ( $p=0.016$ ), a shorter interval of time between the abuse and sample collection ( $p=0.000$ ), and older victim's age ( $p=0.001$ ,  $t=3.388$ )

Forensic medical examination should be performed whenever there is a suspicion of child sexual abuse, with collection of biological samples for DNA identification in all cases in which the time between the last contact and the said exam justifies it; in specific cases, sample collection may be performed beyond the currently recommended limit of 72 hours.

## **PALAVRAS-CHAVE**

Abuso sexual; crianças; ADN; exame médico-legal.

## **KEYWORDS**

Sexual abuse; children; DNA; forensic medical examination.

## INTRODUCTION

Child sexual abuse (SA) can be defined as any kind of sexual activity with a child, performed for the sexual gratification of an adult or an older child. These activities include physical contact (with or without oral, vaginal and/or anal penetration), exposure to sexualized activities (e.g. pornographic materials) or exploitation (e.g. prostitution) (1, 2).

The incidence is higher in females and up to 25% of females and 10% of males may have been victims of SA by the age of 18 (2, 3).

Perpetrators are usually male and frequently known to the victim (2, 3). Intra-familial abuse represents a particular challenge to forensic medical practitioners, since in most cases there may be no physical injury or biological evidence. The reasons for this include, but are not limited to, less physically intrusive practices without subsequent injuries and late disclosure of the abuse by the child, if he/she is already able to understand the abuse and report it, since in these cases the abuser has easy access to and may intimidate the child (through verbal or physical threats), what may cause a large delay between the last abusive event and disclosure, resulting in a complete loss of forensic evidence (4-6).

When evaluating the alleged SA, biologic evidence collection for DNA studies acquires particular importance, as a positive DNA result proves sexual contact and in some cases allows the identification of the abuser, therefore being associated with an effective prosecution in court. (7-9).

Biological evidence collection should be performed as soon as possible, as DNA destruction can occur through several mechanisms which include, but are not limited to: degradation of seminal fluid components, drainage of semen from the cavity or wash

from the mouth, dropping of dried secretions from the body or clothing. Furthermore, a variety of events such as bathing, urinating, clothes disposal, among others, may occur leading to the loss of biological evidence (10, 11).

Guidelines from the *American Academy of Pediatrics* recommend considering forensic evidence collection for up to 72 hours after the alleged assault (12). Studies regarding the time of spermatozoa survival after sexual intercourse in adult women have supported this timeframe (13, 14). However, several authors reported few or no positive DNA results when the forensic medical examination (FME) takes place more than 24 hours after the sexual contact (15-17). Nevertheless, none of these studies included DNA amplification techniques, which have higher sensitivity. Therefore, the forensic medical practitioner should be aware about the rapid advance of DNA identification techniques and consider evidence collection on a case-by-case basis.

Two studies have shown that the use of Y-chromosome short tandem repeats (Y-STRs) analysis can detect trace amounts of DNA and is a powerful screening tool in child SA (10, 18). Moreover, Maiquilla *et al.* recommended that Y-STR DNA profiling should be performed in all cases within 72 hours after sexual assault, regardless of the victims' hygienic practices and knowledge of whether there was ejaculation or not, as well as when the timing of last sexual contact is not known but there is a significant chance that it may have occurred in the previous 72 hours (18).

Collecting evidence beyond the 72 hour limit may yield positive results, and may be considered in specific cases depending on the location or type of sample collected (19).

Thus, the main goal of this study is the better understanding of child SA, through the characterization of DNA forensic evidence findings and its determinants, from a

forensic perspective, as well as through comparison with other findings described in literature and current guidelines for forensic sexual examination.

## **MATERIAL AND METHODS**

A retrospective study was conducted based on the analysis of FME reports and their respective legal outcomes, related to alleged cases of children (under 18 years of age) SA in which samples were collected for DNA studies, from 2004 to 2011. The study was carried on in the North Branch (Porto) of the National Institute of Legal Medicine (INML).

After reviewing 911 reports of alleged children SA, 231 cases were selected (25.4%). The respective legal outcomes were requested from the Public Office and Court regarding the cases up to 2010, in order to give enough time to have available judicial outcomes. However, only 12 (5.2%) judicial outcomes were obtained.

A specifically customized data collection form was used and applied always by the same investigator, who was previously trained, to guarantee data reliability. Data aimed to characterize the victim, the family context, the alleged abuser, the alleged abuse, the forensic medical conclusions and the legal outcome. Due to the retrospective nature of the study, it was not possible to collect all data regarding these different variables.

For cases involving multiple abusive sexual practices or multiple “objects” of abuse, only the most physically intrusive was considered.

The classification of the evidence as diagnostic, suggestive or unspecific was made according to the *Guidelines for Medical Care of Children Evaluated for Suspected Sexual Abuse* (20).

The database was built using the *Excel* 2010 spreadsheet software and the descriptive statistical analysis was carried out using PASW18 for *Windows* (IBM SPSS software) for *Windows*. The Chi-square ( $\chi^2$ ) test was applied when comparing categorical variables to verify the dependency and the existence of relations between variables. For the numerical type variables, the Student's t-test was applied. A level of significance of 0.05 was considered.

## RESULTS

Two hundred and thirty one cases were considered, corresponding to 25.4% of all suspected SA against children reported to the North Branch of the INML during the 8 studied years.

The number of children examined for suspected SA, in which evidence was collected for DNA identification has increased 62%, from 44 in 2004/2005 to 71 in 2010/2011.

### 1. Characterization of the alleged victim

The majority of the alleged victims were female (79.7%). The mean age for both genders at the time of FME was 12.03 years old (min=1.1; max=17.9; SD=4.15); 66 children (28.6%) were younger than 10 years old.

A significant correlation was found between the setting of the abuse (intra/extra-familial) and mean victim's age ( $t=-5.698$ ,  $p=0.000$ ). Victims of intra-familial abuse

were significantly younger (mean=9.5 years-old; SD=4.6) when compared to those abused in an extra-familial setting (mean=13.3 years-old; SD=3.4)

Regarding the occupational activity, 79.2% (n=183) were students, 14.3% (n=33) were too young to be in school, 1.7% (n=4) were unemployed and 1.7% (n=4) were employed at the time of abuse.

In 9 cases (3.9%) there was a pathological background, which included epilepsy, attention deficit hyperactivity disorder, suspected borderline personality, cerebral palsy, cognitive deficiency, Down's syndrome and psychomotor impairment; only 1 child had physical impairment. Six children (2.6%) had a previous history of psychology or pedopsychiatry consultations.

Drug abuse was identified in 4 (1.7%) cases, delinquency in another 4 (1.7%) cases and school failure in 12 (5.2%). In a 14 year-old girl, erotized and self-mutilatory behaviors were also identified.

Regarding the type of family, most victims lived in a nuclear family (29%). Institutionalization was described in 14.3% of the cases (Table I).

## **2. Characterization of the alleged abuser**

The majority of the alleged abusers were males (85.3%, n=197). In 3 cases they were both parents, and only in 1 case there was a single female perpetrator, but none of these 4 cases yielded positive DNA evidence. No information could be obtained about the remaining 34 cases, mostly because the suspicion was due to the presence of signs or symptoms suggestive of abuse in smaller children, who were too young to disclose,

or because the victim was rendered unconscious before the assault took place. In 5.1% of the cases (n=22) there was more than one suspect (max=4).

In the majority of cases, the abuse was perpetrated in an extra-familial setting (57.1%; n=132), while 27.7% of all suspected cases (n=64) were intra-familial. No information could be obtained about the remaining 35 cases (15.2%).

The perpetrator was unknown to the victim in 15.2% of cases and the father was the abuser in 16% of all cases (Table II).

In the majority of cases (60.2%; n=139) information about the perpetrator's age was not available. Of the remaining 92 cases, the mean age was 27.3 years old (min=8; max=65; SD=13.13).

Regarding the alleged abuser's previous deviant behavior, 15 (6.5%) had a history of alcohol or drug abuse, 1 suspect had prior delinquent behavior and 1 had a past history of prostitution. In 3 cases domestic violence was documented. Five suspects (2.2%) had a previous history of child SA, in 2 of these cases against the same victim as in this accusation.

### **3. Characterization of the alleged abuse**

About the frequency of abuse, 50.6% (n=117) of the cases were reported as a single event; in 6.9% (n=16) the victims were abused sporadically and in 6.5% (n=15) the abuse occurred regularly; no information was available for the remaining 83 (35.9%) cases. Within the cases in which the abuse occurred more than once, the duration varied between 1 and 84 months.

Sexual practices consisted mostly in vaginal, anal and/or oral penetration (43.3%); attempted penetration was described in 9.5% of cases, contact between genitals in 4.3%, oral contact in 1.3% and fondling in 1.7% of the cases. These results are further described in Table III. In the cases where only fondling was described the forensic expert decided to perform evidence collection based on the FME findings.

Concerning the “object” of abuse, the penis was most the commonly used, being described in 55.8% of cases. The use of condom was reported in 5.6% of all cases and ejaculation in 23.8%. The most common site of ejaculation was the genital area (n=16) (Table IV).

The first suspicion was most commonly raised by the mother (22.1%, n=51), followed by a teacher (4.3%, n=10). The most commonly described motives for suspicion were history revealed by the child (33.3%, n=77), sudden disappearance (17.3%, n=40) and physical or biological signs suggestive of abuse (10.4%, n=24). The hospital was the main location where cases were first identified (22.5%, n=52), followed by law enforcement agencies (20.3%, n=47).

After the abuse, 126 children (54.6%) were assisted at the hospital. The forensic expert was promptly contacted in 67 of these cases (53.2%). No information was available about the hospital’s primary approach in 32 of those 126 cases (25.4%).

#### **4. Characterization of the forensic medical examination**

Regarding the time elapsed between the alleged sexual contact and the FME, the results were coded in 4 categories: (a) less than 24 hours (n=89); (b) less than 48 hours (n=89); (c) less than 72 hours (n=24); (d) more than 72 hours (n=9). The cases in which

there was no information about this aspect (n=61) were included in the latter group for statistical convenience.

In 49.8% of the cases (n=115) there was no physical injury reported, 25.1% had nonspecific findings and 24.7% had injuries suggestive of sexual contact. All injuries were classified by the same reviewer, applying the standard criteria proposed by Adams (20). Only 1 case of a 12-year-old girl resulted in pregnancy.

Regarding the site of evidence collection, samples were collected from the genital area in 71.4% of the cases and from clothing in 51.1%. These results are further described in table V

Twenty one cases yielded positive results for Brentamine screening test (Table VI). In 7 cases spermatozoa were identified through direct microscopic visualization, all from genital samples: 1 case was positive for vulvar and vaginal swabs, 3 cases for vaginal and rectouterine pouch swabs and in 3 cases only vaginal swabs were positive. Identifiable DNA was found in almost all cases where these screening tests were positive. The only exception was the case of a 16-year-old girl allegedly abused by her stepfather, who had a positive Brentamine test but no DNA was identified.

Of the 231 observed cases, 59 (25.5%) yielded positive DNA results.

The sites of evidence collection associated with higher proportion of DNA findings were clothing (34%) and body surface (30%). Results are further described in table V.

From the cases that had positive DNA findings, 22 (37.3%) were associated with vaginal, anal and/or oral penetration, 6 (10.2%) with attempted penetration, 6 (10.2%) with contact between genitals, 1 (1.7%) with oral contact and 2 (3.4%) with fondling. In the remaining 22 (37.3%) cases with positive DNA there was no information about the type of practices.

A positive comparison test was described in 18 cases (7.8%) (Table VII). The concordance assessment between these findings and legal outcomes could not be performed due to the insufficient number of judicial decisions obtained.

A statistically significant correlation was found between DNA findings and:

a) The victim's age at the time of the abuse ( $p=0.001$ ,  $t=3.388$ ): the mean age was higher in the group where DNA was identified (mean age=13.3yo,  $SD=3.1$ ), compared to the other group (mean age=11.6yo,  $SD=4.4$ ). From 66 children younger than 10 years old, 9 (13.6%) had a positive DNA result;

b) Physical injury ( $p=0.016$ ): DNA was identified in 22 out of 57 (38.6%) children with findings suggestive of abuse, compared to 37 out of 174 (21.3%) when there were only normal or nonspecific findings;

c) The time passed between the abuse and the FME ( $p=0.000$ ): DNA was found in 35 out of 89 children (39.3%) with suspected abuse in the past 24 hours. This proportion decreased to 25% (18 out of 72) when evidence was collected between 24 and 72 hours after the abuse. DNA was identified in 3 cases in which evidence was collected after 72 hours, yet only in clothing samples (underwear and sheets) - one of these cases had positive screening tests for vaginal and rectouterine pouch samples, but no DNA was found. DNA was also identified in 3 cases in which the timing of evidence collection was unknown, 2 of them from clothing samples and 1 from vaginal swabs.

No significant correlation was found between DNA identification and the setting of the abuse (intra/extra-familial) ( $p=0.135$ ) or the type of sexual practices ( $p=0.131$ ).

Microbiological studies were performed in 29% (n=67) of the cases. Only 1 case was positive for Hepatitis B: a 12-year-old girl allegedly abused by the stepfather during the last 10 months.

Psychological assessment was performed in 34.6% (n=80) of the cases. From these, 30% (n=24) showed consistent clinical indicators with an experience of SA.

Taking into account the description of the alleged abuse and the results of the FME, conclusions were unspecific for the diagnosis of SA in 57.6% (n=133) of the cases, suggestive in 13.4% (n=31) and diagnostic in 18.2% (n=42).

## **5. Judicial outcomes**

Information about the judicial criminal decisions was only available in 12 cases (5.19%). From these, 5 were filed because there was not enough evidence to go forward with prosecution at the prosecutor's office level. The remaining 7 cases went to trial: 4 were convicted for child SA (article 171º of the Portuguese Penal Code), 2 were convicted for rape (article 164º of the Portuguese Penal Code) and 1 was acquitted. From the ones that resulted in conviction, the defendant was incarcerated in 5 cases (mean=9.6 years; SD=3.23; min=6.5; max=14) and the sentence was suspended in 1 case.

The concordance assessment between FME findings and legal outcomes was not performed due to the small number of judicial decisions obtained.

## DISCUSSION

We have observed an increasing number of sample collections for DNA identification in the studied period. Factors contributing to this trend may include a growing awareness of the problematic of child SA, as well as more information on how to properly report the situation, specifically an early contact with the forensic medical services (21).

Our results regarding gender and victim's age distribution are concordant with previous studies (3, 22).

We found that victims were significantly younger when intra-familial abuse was present, as has been established in previous studies. Intra-familial abuse is usually associated with an earlier age of onset, less physically intrusive practices and later disclosure (6, 23-26). Such characteristics may also be a possible explanation for the significant correlation found between a higher victim's age and positive DNA findings.

No significant association was found between DNA findings and the setting of the abuse. These results might be explained by a possible selection bias, since only cases in which biological samples collection was performed were considered in this study. This implies that the said cases would have involved more physically intrusive practices to begin with, regardless of the setting of the abuse, and therefore would have been more likely to leave biological evidence.

The fact that no significant correlation was found between positive DNA findings and the type of sexual practices could be explained by the fact that the majority of positive DNA findings was collected from the clothes rather than the victim's body.

Healthcare facilities were frequently the first site to be notified about a possible case of child SA. Therefore, healthcare professionals must be aware of how to correctly approach this situation in order to achieve a faster contact with forensic experts, appropriate treatment and child protection. In our study, from the 126 (54.6%) cases that were observed at the hospital after the abuse, the forensic expert was promptly contacted in only 67 (53.2%) cases, despite the fact that this report is mandatory according to the Portuguese law. However, since no information was available in 32 of those 126 cases, this proportion might be falsely reduced.

Before entry into school, the physician may be the only professional who has isolated contact with the child. Considering that some children may not promptly disclose the abuse, there can be a significant delay between the SA and the FME. This delay, along with fast and complete healing of anogenital injuries, can account for the absence of physical and biological findings, even when accompanied by a detailed history (6, 21, 27-29). Therefore, in a correct approach to these victims, the forensic interview should precede other approaches, so as not to contaminate the report (6).

Few previous studies have considered DNA identification as part of the FME in suspected child SA (8, 9, 19). In this study, 59 of the 231 (25.5%) cases tested positive for DNA, with at least 35 (59.3%) of these having been collected in the first 24 hours after the abuse. Our results support previous findings, which stated that while the majority of children with positive biological findings undertook the FME within 24 hours of the assault, evidence can be found beyond this limit. In 3 cases DNA was found in samples collected after the 72-hour limit recommended by the *American Academy of Pediatrics* (12). Moreover, identifiable DNA was collected from a child's body even in cases in which the child had a normal/ nonacute anogenital examination at

the time of collection and/or perpetrator's ejaculation was denied by the victim. Based on these results it becomes apparent that forensic specimens collection should be performed regularly, even in the presence of normal or nonspecific findings, as opposed to having a "targeted" strategy based solely on discrete indicators such as child's disclosure of abuse or child's age, since the latter will result in a significant number of missed opportunities to identify the perpetrator's DNA. Furthermore, current recommendations on the time limit for evidence collection should be interpreted carefully, as samples collected more than 72 hours after the assault may yield positive DNA results (19).

Previous investigators stated that a significant proportion of evidence is collected from clothing rather than the children's body (15-17). Our study supports this conclusion, with the proportion of cases with positive samples recovered from clothing being higher (34%) than that of samples collected directly from the body (14%). Possible explanations may include the fact that some children misperceive simulated intercourse as "penetration" practices, in which case it is unlikely to find semen inside the vaginal cavity. A lack of information about the occurrence and site of ejaculation may also be a contributing factor, since semen may be deposited in sites where it could be easily destroyed and/or evidence collection might be difficult (e.g. child's mouth or abdomen). It may be possible that evidence found in the child's body has a stronger proof value than that collected from nonbody objects, but no studies have been published on this matter (9).

Another important finding was the positive correlation between DNA evidence and the presence of physical injury ( $p=0.16$ ), with 22 out of 57 (38.6%) children with suggestive injuries yielding positive DNA evidence, as has been previously described

(8, 16). In spite of this, the majority of children (75.2%) evaluated for suspected SA had normal or nonspecific findings. This occurrence has been reported in several studies, and previous attempts to explain it were based on the rapid healing of mucosal tissues and the inability of the child to properly clarify the details of the assault (9, 20, 27). In this study a considerable proportion (21.4%) of children with normal or nonspecific findings had positive DNA evidence.

Only one microbiological study yielded positive results: Hepatitis B in a 12-year-old girl allegedly abused by the stepfather during the last 10 months. This finding should be interpreted very carefully: it is possible that it was the father who sexually transmitted the disease; however, we cannot exclude familial contact as a cause of infection. Microbiological tests should always be performed nonetheless, since a positive result may be the only evidence of abuse (20, 30).

Several limitations to this study have been identified:

- a) Like most investigations about child SA, this was a retrospective study, with incomplete data for some of the studied variables;
- b) A potential confounding factor in this study may be the fact that in some cases the exact time elapsed between the abuse and FME was unknown.
- c) A selection bias may be present, since only cases in which biological samples collection was performed were considered in this study.

## CONCLUSIONS

DNA evidence may be an essential tool for the evaluation and diagnosis of child SA.

In our study:

- a) Biological evidence was collected in 25.4% of all cases observed for suspected child SA, reported to the North Branch (Porto) of the INML in the studied period;
- b) Collected samples yielded positive heterologous DNA in 25.5% of the cases;
- c) Older victim's age at the time of abuse, physical injury suggestive of abuse and a shorter time interval between the abuse and the FME were predictors of DNA identification;
- d) However, heterologous DNA was identified even when samples were collected over 72 hours after the alleged abuse, as well as in children with normal or nonspecific physical findings. Therefore, evidence collection should be performed even in the presence of normal or nonspecific findings and, regarding timeframe questions, this decision should be considered on a case-by-case basis;
- e) Clothing specimens yield positive results more frequently than body swabs;
- f) Microbiological studies returned positive results only in one case. However, according to current recommendations, such tests should be performed routinely;
- g) No conclusions could be obtained regarding the judicial outcome due to lack of judicial decisions obtained.

The increasing sensitivity of DNA tests is likely to continue to extend current time limits for evidence collection. Further prospective studies are needed, controlling for variables in which information is usually absent.

## **ACKNOWLEDGEMENTS**

To Professor Teresa Magalhães, for the availability to supervise this project and for all the comments and suggestions to improve the manuscript.

To Doctor Patrícia Jardim, for all the assistance and constructive reviews during the project.

To Doctor Fernanda Rodrigues, for allowing data collection in the Clinical forensic services.

To Professor Laura Cainé, for supporting data collection at the INML.

To Doctor Maria João Alves and Doctor Ricardo Escada, for their availability in solving administrative issues.

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## TABLES AND LEGENDS

**Table I** – Characterization of the type of family (n=231).

|                       | n  | %    |
|-----------------------|----|------|
| Nuclear               | 67 | 29.0 |
| Recombined            | 22 | 9.5  |
| Maternal monoparental | 14 | 6.1  |
| Paternal monoparental | 1  | 0.4  |
| Extended              | 13 | 5.6  |
| Institutionalization  | 33 | 14.3 |
| Grandparent family    | 3  | 1.3  |
| Host family           | 8  | 3.5  |
| Unknown               | 70 | 30.3 |

**Table II** – Characterization of the relation between the perpetrator and the victim (n=231).

|                     | n  | %    |
|---------------------|----|------|
| Unknow to victim    | 35 | 15.2 |
| Known <sup>a</sup>  | 41 | 17.1 |
| Friend              | 12 | 5.2  |
| Neighbour           | 13 | 5.6  |
| Boyfriend           | 16 | 6.9  |
| Colleague           | 14 | 6.1  |
| Teacher             | 1  | 0.4  |
| Father <sup>b</sup> | 37 | 16.0 |
| Stepfather          | 8  | 3.5  |
| Brother             | 4  | 1.7  |
| Uncle               | 8  | 3.5  |
| Cousin              | 5  | 2.2  |
| Other <sup>c</sup>  | 2  | 0.9  |
| No information      | 35 | 15.2 |

a – abuser known to the victim, but none of the listed. b – in 3 of these cases the abusers were both parents c – godfather and distant cousin.

**Table III** – Characterization of the type of sexual practices (n=231)

|                                            | n  | %    |
|--------------------------------------------|----|------|
| Fondling                                   | 4  | 1.7  |
| Oral contact <sup>a</sup>                  | 3  | 1.3  |
| Contact between genitals                   | 10 | 4.3  |
| Anal penetration attempt                   | 10 | 4.3  |
| Vaginal penetration attempt                | 5  | 2.2  |
| Anal and vaginal penetration attempt       | 2  | 0.9  |
| Anal and oral penetration attempt          | 2  | 0.9  |
| Anal, vaginal and oral penetration attempt | 2  | 0.9  |
| Anal penetration                           | 16 | 6.9  |
| Vaginal penetration                        | 54 | 23.4 |
| Oral penetration                           | 4  | 1.7  |
| Anal and vaginal penetration               | 4  | 1.7  |
| Anal and oral penetration                  | 8  | 3.5  |
| Anal, vaginal and oral penetration         | 5  | 2.2  |
| Vaginal and oral penetration               | 9  | 3.9  |
| Unknown                                    | 93 | 40.3 |

a – includes all contact between the perpetrator's mouth and the body of the victim

**Table IV** – Characterization of the site of ejaculation (n=55)

|              | n  | %    |
|--------------|----|------|
| Clothes      | 2  | 3.6  |
| Body surface | 5  | 9.1  |
| Mouth        | 4  | 7.3  |
| Anal         | 3  | 5.5  |
| Genital      | 16 | 29.1 |
| Other        | 13 | 23.6 |
| Unknown      | 12 | 21.8 |

**Table V** – Characterization of the site of evidence collection (n=231)

|                     | Collected samples       |             |                       | Identifiable DNA       |                                |
|---------------------|-------------------------|-------------|-----------------------|------------------------|--------------------------------|
|                     | Number of cases (n=231) | % of cases  | % of cases (subgroup) | Number of cases (n=59) | Proportion of positive samples |
| <b>Clothes</b>      | <b>118</b>              | <b>51.1</b> |                       | <b>40</b>              | <b>34%</b>                     |
| Underwear           | 109                     |             | 92.4                  | 31                     | 28%                            |
| Pants               | 14                      |             | 11.9                  | 2                      | 14%                            |
| Shirt               | 12                      |             | 10.2                  | 4                      | 33%                            |
| Absorbent           | 6                       |             | 5.1                   | 2                      | 33%                            |
| Other               | 6                       |             | 5.1                   | 3                      | 50%                            |
| <b>Faneras</b>      | <b>7</b>                | <b>3.0</b>  |                       | <b>1</b>               | <b>14%</b>                     |
| Hair                | 2                       |             | 28.6                  | 0                      | 0%                             |
| Nail bed            | 2                       |             | 28.6                  | 0                      | 0%                             |
| Pubic hair          | 1                       |             | 14.3                  | 1                      | 100%                           |
| Other               | 2                       |             | 28.6                  | 0                      | 0%                             |
| <b>Body surface</b> | <b>23</b>               | <b>10.0</b> |                       | <b>7</b>               | <b>30%</b>                     |
| Face                | 5                       |             | 21.7                  | 2                      | 40%                            |
| Neck                | 6                       |             | 26.1                  | 2                      | 33%                            |
| Breasts             | 7                       |             | 30.4                  | 2                      | 29%                            |
| Abdomen             | 4                       |             | 17.4                  | 1                      | 25%                            |
| Upper limbs         | 5                       |             | 21.7                  | 1                      | 20%                            |
| Lower limbs         | 4                       |             | 17.4                  | 1                      | 25%                            |
| <b>Oral</b>         | <b>25</b>               | <b>10.8</b> |                       | <b>2</b>               | <b>8%</b>                      |
| Peri-oral           | 24                      |             | 96.0                  | 2                      | 8%                             |
| Fundo do vestibulo  | 4                       |             | 16.0                  | 0                      | 0%                             |
| Sublingual          | 1                       |             | 4.0                   | 0                      | 0%                             |
| Other               | 1                       |             | 4.0                   | 0                      | 0%                             |
| <b>Genital</b>      | <b>165</b>              | <b>71.4</b> |                       | <b>22</b>              | <b>13%</b>                     |
| Perivulvar          | 73                      |             | 44.2                  | 1                      | 1%                             |
| Vulvar              | 84                      |             | 50.9                  | 2                      | 2%                             |
| Vaginal             | 129                     |             | 78.2                  | 15                     | 12%                            |
| Rectouterine pouch  | 46                      |             | 27.9                  | 7                      | 15%                            |
| Glans               | 3                       |             | 1.8                   | 0                      | 0%                             |
| Dorsum of the penis | 4                       |             | 2.4                   | 1                      | 25%                            |
| Other               | 2                       |             | 1.2                   | 0                      | 0%                             |
| <b>Anorectal</b>    | <b>65</b>               | <b>28.1</b> |                       | <b>7</b>               | <b>11%</b>                     |
| Perianal            | 38                      |             | 58.5                  | 1                      | 3%                             |
| Anal                | 59                      |             | 90.8                  | 6                      | 10%                            |

**Table VI** – Characterization of the positive Brentamine test results (n=18)

|                     | Number<br>of cases | % of<br>cases |
|---------------------|--------------------|---------------|
| <b>Clothes</b>      | <b>12</b>          | <b>66.7</b>   |
| Underwear           | 9                  |               |
| Shirt               | 2                  |               |
| Absorbent           | 1                  |               |
| <b>Body surface</b> | <b>1</b>           | <b>5.6</b>    |
| Abdomen             | 1                  |               |
| Upper limbs         | 1                  |               |
| <b>Genital</b>      | <b>8</b>           | <b>44.4</b>   |
| Vaginal             | 8                  |               |
| Rectouterine pouch  | 4                  |               |

**Table VII** – Characterization of the positive DNA comparison test results (n=18)

|                     | Number<br>of cases | % of<br>cases |
|---------------------|--------------------|---------------|
| <b>Clothes</b>      | <b>13</b>          | <b>72.2</b>   |
| Underwear           | 8                  |               |
| Pants               | 1                  |               |
| Shirt               | 2                  |               |
| Absorbent           | 2                  |               |
| Other               | 2                  |               |
| <b>Faneras</b>      | <b>1</b>           | <b>5.6</b>    |
| Pubic hair          | 1                  |               |
| <b>Body surface</b> | <b>3</b>           | <b>16.7</b>   |
| Face                | 1                  |               |
| Neck                | 1                  |               |
| Breasts             | 1                  |               |
| Abdomen             | 1                  |               |
| Upper limbs         | 1                  |               |
| <b>Oral</b>         | <b>1</b>           | <b>5.6</b>    |
| Peri-oral           | 1                  |               |
| <b>Genital</b>      | <b>6</b>           | <b>33.3</b>   |
| Vulvar              | 1                  |               |
| Vaginal             | 2                  |               |
| Rectouterine pouch  | 2                  |               |
| Dorsum of the penis | 1                  |               |
| <b>Anorectal</b>    | <b>4</b>           | <b>22.2</b>   |
| Perianal            | 1                  |               |
| Anal                | 3                  |               |