

DNA typing in forensic casework in Norway:
Strategies and experiences

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INTRODUCTION

During the last four years, VNTR typing has been offered in forensic casework as a supplement to traditional diagnostics.

Probes presently used are MS1 (D1S8), YNH24 (D2S44), MS31 (D7S21), and MS43A (D12S11). Extraction and electrophoresis are performed according to "EDNAP standards"; e.g. using enzyme HinfI, TBE-buffer and SeaKem agarose (Schneider et al. 1991). Fragment sizes are determined using the automated scanning equipment developed at the Metropolitan Police Forensic Science Laboratory.

At present, the police is charged per sample. When they decide whether to have carried out a DNA typing, they thus take into consideration the importance of having the DNA evidence as well as the costs of it.

Here we present some statistical data of our casework illustrating the development in DNA typing strategy. We also give selected examples illustrating the kinds of cases chosen for DNA analysis by VNTR typing.

CASEWORK STATISTICS

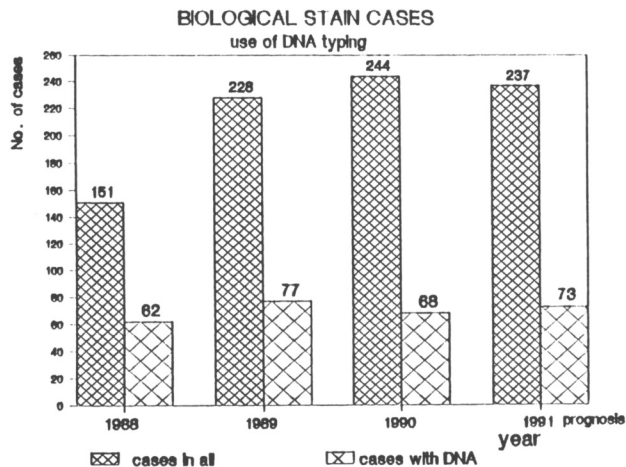


Fig. 1. The development of the total number of cases with biological evidence and the number of cases chosen for DNA typing

We have experienced a wide variety of case types. Rapes and other cases involving sexual assaults are the most common ones, but cases under investigation for murder or incest, or body identification cases are also relatively frequently seen.

Choices largely made by the police, have caused that the number of cases chosen for DNA typing has remained constant even if the total number of casework has increased (Fig. 1).

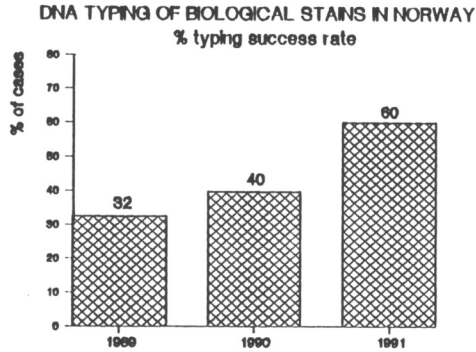


Fig. 2. DNA typing success rates (per cent of successfully typed cases in cases chosen for DNA typing) in stainwork in Norway

During the last three years, the success rate expressed as the percentage of cases where DNA types was achieved in critical samples, has gradually increased (Fig. 2). High success rates were achieved in stains or material from underwear/clothing, vaginal swabs, organs/biopsies etc. Low success rates were experienced in sigaretttes, masks, mouth swabs, rectum swabs, narcotic's syringe, old hairs, and in some fabric.

The overall achievements by DNA typing may be illustrated by the following numbers: In 1989 DNA typing identified 18 offenders and excluded 9 suspects, in 1990 the numbers were 21 and 100, while the prognosis for 1991 is 41 and 22, respectively.

EXAMPLES

1 Hit and run motor car accident

A six year old boy was found killed, obviously hit by a car. The next day a lorry at a slaughterhouse 80 km from the scene of the accident was examined. Samples collected from the tyre and the wheelarch proved to be of human origin. DNA patterns from the stain material matched those from the deceased (Fig. 3).

2 One rapist - several victims

Three rape cases from different parts of the country were linked by technical evidence as well as by similar "modus operandi". DNA analyses of semen stained exhibits in the three cases indicated that one particular man was involved in them all. In addition, in two of the cases, DNA fragments from altogether three more men showed up (Fig. 4).

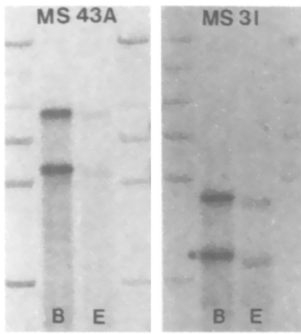


Fig. 3. DNA patterns in a hit and run accident. Probes used are indicated. B: body, E: Exhibit, material from tyre and wheelarch

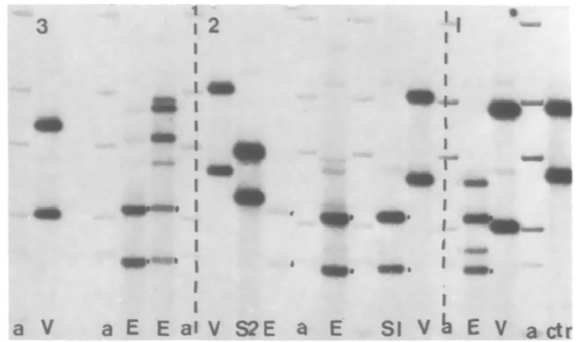


Fig. 4. DNA patterns in three rape cases. A: Amersham ladder, S1, S2, S3: suspects, V: victim, E: exhibit, semen from vag. swabs and underwear

3 Incest - chorion biopsy

A young married woman was sexually abused by her father. After getting pregnant, she did not know whether her husband or her father was the father of her child. A paternity test was requested for guidance as to the continuation of the pregnancy. Chorion villus sampling was performed. DNA typing excluded the grandfather. The woman decided to carry through the pregnancy (Fig. 5).

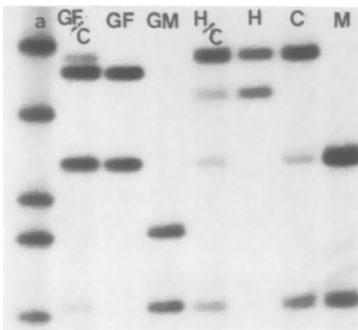


Fig. 5. DNA types in an incest case. GF: grandfather, GM: grandmother, C: chor.vill.biopsy, M: mother, H: husband

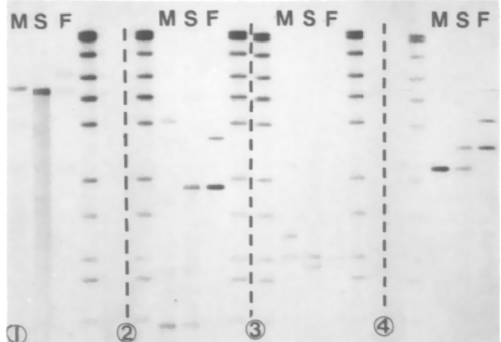


Fig. 6. DNA types in identification. S: burned body, M: mother, F: father

4 Identification of a burned body

DNA type comparisons between DNA from a burned body and blood DNA from parents of the missing person, led to identification (Fig. 6).

REFERENCES

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