

Technical Associates, Inc.

Forensic Science Consultation and Laboratory Testing

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TA Case 1458

Commonwealth v. Dirk K. Greineder

DNA Analysis:

1. **Written Report**
2. **Laboratory Notes/Summary**
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(1) Prosecution

(1) TAI Case file

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Summary Report

TA Case # 1458

Commonwealth v. Dirk K. Greineder

Date: May 16, 2001

Background:

Technical Associates, Inc. was requested to investigate secondary and tertiary transfer of DNA from one individual to another and then to a pair of gloves.

Method:

The first experiments were designed to investigate the transfer of DNA to the face of another person by kissing that individual on the cheek and then the subsequent transfer of DNA from that individual's cheek to a pair of gloves used to grab that individual on the face. One individual kissed a second individual and a third individual used the gloves to grab the face of the second individual. Following the kiss the individual's face was allowed to dry before contact with the glove. This experiment was performed using dry gloves and gloves moistened by a spray of sterile water.

The second experiments were designed to investigate the transfer of DNA from the face of one individual to a clean towel, followed by transfer of DNA to another individual's face from the towel and subsequently to a pair of gloves used to grab that individual on the face. These experiments were done on a different day than the first experiments and all individuals had bathed in between. DNA was transferred to the towel by having a person wash their face with water and dry their face with a clean towel. That towel was then used to wipe a second person's face. The individual's face was allowed to dry after contact with the towel and before contact with the gloves. A third individual used the gloves to grab the second individual's face. This experiment was performed using dry gloves and gloves moistened by a spray of sterile water.

The gloves utilized in these experiments were men's work gloves, "Mini Dot for Sure Grip!" Size: Men's, Style No. 4012, manufactured in Hong Kong of vinyl and cotton by Durable Products, Division of Norman Librett Inc., 64 Main Street, New Rochelle, NY 10801.

The individual using the gloves to grab the face of another individual wore clean latex gloves inside the work gloves.

The individual gloves, designated .01A through .01I, were treated as follows:

- .01A Control glove wet with water only
- .01B IND. #1 kissed right side of IND. #2's face. IND. #3 simulates grabbing IND. #2 so dry glove contacts kiss at thumb.
- .01C As .01B but IND. #1 kissed left side of IND. #2's face. IND. #3 simulates grabbing IND #2 so wet glove contacts kiss at thumb.
- .01D IND. #2 kissed right side of IND. #3's face. IND. #1 simulates grabbing IND. #3 so dry glove contacts kiss at thumb.
- .01E As .01D but IND. #2 kissed left side of IND. #3's face. IND. #1 simulates grabbing IND #3 so wet glove contacts kiss at thumb.
- .01F IND. #1 washes face with tap water and dries on clean face towel. IND. #2 rubs face with IND. #1's towel on right cheek. IND. #3 contacts right cheek with dry glove at thumb.
- .01G As .01F but IND. #2 rubs face with IND. #1's towel on left cheek. IND. #3 contacts left cheek with wet glove at thumb.
- .01H IND. #3 washes face with tap water and dries on clean face towel. IND. #1 rubs forehead with IND #3's towel. IND. #2 contacts right side of forehead with dry glove at thumb.
- .01I As .01H but IND. #2 contacts left side of IND. #1 forehead with wet glove at thumb.

Portions of each contact thumb area approximately 8mm x 25mm were sampled and cell pellets prepared for extraction utilizing a large volume water wash. Standard phenol/chloroform extraction procedures were used to isolate the DNA. These samples are designated .../EC in the table of results. Digests of the cloth were also prepared, however, due to large quantities of black dye present in the extracts, these were not amplified.

The thumb area of each glove surrounding the previously excised sample was swabbed using sterile swabs and sterile reagent water. Cell pellets were prepared utilizing a large volume water wash and extracted using standard phenol/chloroform extraction procedures. These samples are designated .../2.

The extracted DNA was subjected to polymerase chain reaction (PCR) amplification and DNA typing at the DQA1, LDLR, GYPA, HBGG, D7S8 and GC genetic loci in addition to the amelogenin locus for sex determination.

Results:

Each item with the corresponding alleles detected is listed in the table below:

Sample	DQA1	LDLR	GYPA	HBGG	D7S8	GC	AMEL
IND. #1 reference sample	1,2,4.1	B	A	A,B	B	A	Male
IND. #2 reference sample	2,3	A	A,B	B	A,B	C	Female
IND. #3 reference sample	4.1,4.1	A	A,B	A,B	A	A,C	Female
1458.01A/2 Control glove H ₂ O only	t3	tB	tA	NA	tA,B	NA	NA
1458.01A/EC Control glove H ₂ O only	NA	tB	tA	tB	tB	tC	NA
1458.01B/2 IND. #1 kiss IND. #2 face dry	2,3w1.2, 4.1	AwB	A,B	BwA	A,B	CwA	Mix
1458.01B/EC IND. #1 kiss IND. #2 face dry	2,3t1.2, 4.1	AwB	A>B	BtA	A,B	CwA	Mix
1458.01C/2 IND. #1 kiss IND. #2 face wet	2,3>1.2, 4.1	A>B	A>B	B>A	B>A	C>A	Mix
1458.01C/EC IND. #1 kiss IND. #2 face wet	1.2,2,3, 4.1	B>A	AwB	B>A	B>A	A,C	Mix
1458.01D/2 IND. #2 kiss IND. #3 face dry	2,3w4.1	A	A,B	BwA	A,B	C>AtB	Female
1458.01D/EC IND. #2 kiss IND. #3 face dry	w2,3,4.1	wA	wA,B	wBtA	wA>B	wC>A	Female
1458.01E/2 IND. #2 kiss IND. #3 face wet	4.1w2,3	A	A,B	A,B	A>B	A,C	Female
1458.01E/EC IND. #2 kiss IND. #3 face wet	4.1>2t3	AtB	A>B	B>A	A>B	A,CtB	Female
1458.01F/2 IND. #1 towel IND. #2 face dry	2>3t4.1	A>B	A,B	B	A,B	C>A	Female
1458.01F/EC IND. #1 towel IND. #2 face dry	t1.2,3	tA,B	tA	tB	tB>A	tA,C	Mix
1458.01G/2 IND. #1 towel IND. #2 face wet	2,3>1.2, 4.1	A>B	A,B	B>A	B>A	C>AtB	Mix
1458.01G/EC IND. #1 towel IND. #2 face wet	2,3>1.2 t4.1	A>B	A>B	B>A	A,B	C>A	Mix
1458.01H/2 IND. #3 towel IND. #1 fhead dry	1.2,4.1	B	A	A,B	B	A	Male
1458.01H/EC IND. #3 towel IND. #1 fhead dry	w1.2,4.1	wB	wA	wA,B	wB	wA	Male
1458.01I/2 IND. #3 towel IND. #1 fhead wet	1.2,4.1	B	A	A,B	B	A	Male
1458.01I/EC IND. #3 towel IND. #1 fhead wet	1.2,4.1	B	A	A,B	B	A	Male

w = weak t = trace NA = no activity (1.2) = the 1.2 allele may be present but not detected
 NP = not performed > = intensity greater than < = intensity less than

All negative extraction and negative amplification controls gave no typing results, NA, and all positive controls gave the expected results.

Conclusions:

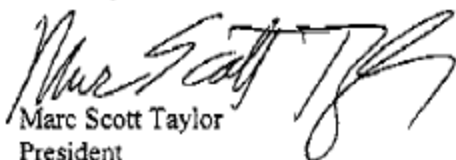
Transfer of DNA is seen with variable degrees of efficiency in each of the two types of transfer experiments conducted. In most cases the transferred DNA was at a lower concentration than the DNA of the individual to whom it was transferred, however, this was not observed in all instances.

In the experiments involving a kiss to the face, DNA or cells containing DNA were transferred by a kiss to an individual's face and then to a glove in all of the experiments run in this study.


In the experiments involving transfer of DNA via a towel, DNA or cells containing DNA were transferred to a towel, then to an individual's face and then to a glove in all experiments with one of the towels and in none of the experiments with the other towel. In each of these sets of experiments the towel was exposed to the individual's DNA from only one face washing and drying. Larger quantities of DNA would be expected to be deposited on the towel from multiple uses of the towel.

If you have any questions regarding this work please contact me at the telephone number above.

Sincerely,


Marc Scott Taylor
President

Reviewed by:


Elizabeth A. Johnson, Ph.D.
Senior Forensic Scientist