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## RESEARCH ARTICLE

### STUDY OF ABO GROUPING OF BLOOD STAIN MIXED WITH OTHER STAINS

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#### ABSTRACT

Blood or blood stain is the evidentiary exhibit which is abundantly encountered in the scene of evidence. Contamination of blood is often seen with substances that are used in day to day life, like person killed in hit and run over by train bares stains both of blood and engine lubricating oils or grease. Or other stains like ketchup stain, stain of tea, juice or cooking oil could be found associated with blood in stains. In this present study five different such materials were considered as materials which were mixed with blood of known blood groups. The grouping examination of such mixed stains were carried out to find out if the above mentioned stains have got any capacity to interfere with absorption elution blood grouping method. After examining four hundred samples comprising of such mixed stains along with blank and control sample, it was concluded that the above mentioned materials cannot interfere the absorption elution blood grouping process.

#### INTRODUCTION

It is an establish fact, that laboratory investigation involving biological fluids play a vital role in crime investigation. It is useful scientific evidence as it forms an important link in chain of evidence or supports circumstantial evidence<sup>1</sup>. Blood is the most abundantly encountered biological evidence from the scene of crime or in other form of evidence like blood stain clothes, weapons, soil samples. Though DNA analysis is full proof technique absence of nuclear material negates its superiority<sup>13</sup>. Blood stain is often found to be contaminated by different factors such as other biological fluids, stains, microorganisms and other factors, which can destroy its evidentiary value. Stains provide crucial data in establishing the link between the suspect and the scene<sup>2</sup>. The examination of blood as a form of evidence has been developed almost a century ago. Present days, the laboratory instant kits for different examination like identification and origin determination are available. Though in the era of DNA profiling, grouping of blood has become less important method to pinpoint as an evidence for personal identification, still it is not an obsolete method. Blood grouping is being treated as an important examination which can reduce and segregate the number of DNA profiling cases prior to DNA analysis just to narrow down and especially if infrastructure of DNA profiling is not available or established.

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It is often noticed while examination as either the blood is contaminated or not collected and preserved properly which create difficulty during forensic examination of blood grouping. In 1923, Vittorio Siracusa was the first to have used the absorption-elution technique for the ABO blood typing of blood stains. The absorption-elution test has tremendous forensic utility because it can be used to identify old and severely dried blood stains. This method is very sensitive, highly specific and it has also been found that the material once used is available for reuse with practically not losing its antigenic properties. Present study has been conducted to determine whether commonly encountered stains like Tea, Oil, Ketchup, Juice and Grease affect the results of ABO blood grouping or not.

#### MATERIALS AND METHODS

In this study the samples were prepared over five different cotton jeans fabric by known blood samples, A, B, AB and O, drawn from blood bank. The material required for preparing the samples are five cotton fabrics, all four Blood groups and five different stains i.e. Tea, Juice, Oil, ketchup and Grease. These fabrics were cut into small pieces and divided into five categories for five artifact stains. Then the artifact material was spread on them. The prepared samples have been kept for 24 hrs. for drying. Then each of the sample categories was stained with blood of three different groups and allowed to dry again for 24 hrs. Thus all the samples have been prepared in the same way as details in different fabrics with different

Table. Observation

Type of fabric	Blood Group Examined	Different Artifact Materials																			
		Ketchup				Juice				Oil				Grease			Tea				
		K+B	B	K	BL NK	J+B	B	J	BLN K	O+B	B	O	BL NK	G+B	B	G	BL NK	T+B	B	T	BL NK
I Type	A <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	B <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	H <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
II Type	A <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	B <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	H <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
III Type	A <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	B <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	H <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
IV Type	A <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	B <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	H <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
V Type	A <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	B <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-
	H <sup>gr</sup>	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-	+	+	-	-

**Legends**

K+B= Ketchup with Blood;

J+B= Juice with Blood;

O+B= Oil with Blood;

G+B=Grease with Blood;

T+B= Tea with Blood

A<sup>gr</sup> = A Blood GroupB<sup>gr</sup> = B Blood GroupH<sup>gr</sup> = H Blood Group

K = Only Ketchup;

J = Only Juice;

O = Only Oil;

G = Only Grease;

T = Only Tea BLNK= Blank

B = Only Blood;

blood groupings along with their controls separately. The total number of samples, thus, prepared is four hundred and they were analyzed using the absorption-elution method. The material required for conducting the experiment is fabric, Blood, Antiserum, Saline (0.8%), Refrigerator, Incubator and cavity slides.

**Absorption elution method:** Absorption elution technique is a method to determine the blood type of a dried sample of blood. There are four main blood types i.e. A, B, O and AB. Red blood cells contains special proteins (called antigens) on their surfaces and these four blood types are determined by which antigens are found on the red blood cells. Antibodies are proteins produced by immune system. Antibodies are attracted to specific antigens.

**Procedure for sample preparation**

- A clean and dry cavity slide (12 cavities) was taken and was marked as columns A, B, H.
- Cuttings from the sample were taken in the form of small threads and kept in each cavity.
- Those threads were dipped in anti A, B and H respectively and kept at 4 °C for overnight.
- Antiserum was removed by 3 - 4 washing with ice chilled normal saline.
- After the last wash all chilled saline was removed and one drop fresh normal saline was added.
- Kept at 56°C for 45 minutes for incubation.
- After incubation, one drop A, B and O indicator cells were added in the respective cavities and kept at 4 °C for 2 hours.
- Cavities were examined the for agglutination both macroscopically and microscopically.

**RESULTS**

Results have been tabulated according to the blood groups, stain, mixture of both and their controls separately. Five different types of fabrics were denoted as Fabric I, II, III, IV &

V. Nature of stains were of four types that are stain material with blood, only blood, only stain material & blank, i.e no stain on the fabric.

**DISCUSSION**

All five types of fabric baring different type of stains mixed with known A, B & H blood group were successfully examined with positive identification of corresponding groups. There was no false positive or false negative findings in any sample, which was confirmed by the findings in control and blank cavity. el-Habashi reported ABO grouping of dry blood stains was not affected by different substrata or cloth fabrics. 30% of the samples gave erroneous results when exposed to temperature at 150 degrees C for 2 hours. Storage for 6 months at room temperature ranged from 29 degrees -44 degrees C, representing the ambient temperature met with in Riyadh, gave no effects. It seems to be that effect of Tea, Oil, Ketchup, Juice and Grease stain mixed with blood in blood grouping have not been studied and not yet reported. However effect of time factor with all above mentioned factors need to be studied.

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