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# Effects Of Fabric Materials On Abo Blood Grouping Of Blood Group A And B From Blood

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***Abstract:*** ***Forensic Investigation of Biological specimen has now become a significant part of any crime Investigation especially when human subjects are concern. In Forensic examination blood may be found as important evidence. Mostly blood found as stain in very small amount from various samples at the scene of crime. In the study blood stains were prepared on different fabric materials in the laboratory as such the mimic of crime scene was created. Blood grouping examination was done for the piece of different fabric material between the time intervals of 24 hrs. The present study was undertaken to find out the maximum duration for which blood grouping is possible when the stains are obtained from different fabric materials.***

***Keywords: Blood stains, Blood Grouping, Fabric material***



## I. INTRODUCTION

Forensic Investigation of Biological specimen has now become a significant part of any crime Investigation especially when human subjects are concern. In Forensic examination blood may be found as important evidence. Blood at crime scenes, on the victim, suspect, or witnesses (clothing or persons) can be considered significant and treated as such when documenting, collecting, and preserving. Traditionally blood at crime scenes has been documented and collected for identification, through Blood grouping and DNA, at a crime laboratory. If these samples are properly documented and collected at a scene, these can give information about people involved in crime. If the blood may found on any fabric material from crime scene then the piece of that fabric material is send to the laboratory for the analysis.

Blood samples may be important in a situation like, Crime against a person, Crimes against property, Mass Fatality Incidence, Motor vehicle Incidence, Paternity cases and illegal poaching.

The ABO blood group system is widely credited to have been discovered by the Austrian scientist Karl Landsteiner, who identified the A, B, O and AB blood types in 1900. ABO blood types are determined by a cell surface marker that indentifies the cell as belonging to that individual. These cell surface markers are characterized by a protein or lipid that has an extension of a particular arrangement of sugars. The arrangement of sugars that determines each of the A, B & O blood types and each is identical, except that blood types A and B have an additional sugar: N-acetylgalactosamine for blood group A, and D-galactose for blood group B. All the features and characteristics are controlled by genes which exist as units of inheritance within the nuclei of living body cells. These genes are carried on chromosome no.19.

ABO blood grouping examination is done to identify or the primary screening of an individual.

Although Forensic examiner routinely inspect blood stains on fabric during crime scene investigation and their presence in forensic examination can have enormous significance in the evaluation of crime scene reconstruction. Although in most of crime blood found as evidence on fabric material on either of suspect or a victim. As the person may wear any fabric material and the found blood on fabric material can give relevant and important information so it is necessary to determine the effect of that fabric on blood for blood grouping examination.

The fabric materials taken into consideration during the research are widely used material in the almost all culture of India. Cotton fiber is mainly composed of cellulose with some non-cellulosic components surrounding the cellulose core. The non-cellulose components are waxes, proteins and pectin and are mainly found in cuticle layer and the primary wall which is the outermost layer of the cotton. Georgette fabric is a textile

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traditionally made from silk, the thing that makes georgette distinctive is the crinkly crepe like texture.

Linen fabric is made from the cellulose fibers that grow inside the stalks of the flax plants. Jute Khadi is hand woven cloth made in India and primarily woven from Hemp and may also include wool. Silk is produced by the silkworm *Bombyx mori* is a composite material formed by the two fibroin filament surrounded by a cementing layer of sericin. Velvet is a type of tufted fabric in which the cut threads are evenly distributed with a short dense pile and can be made from either synthetic or natural fibers.

## II. MATERIALS AND METHODS

Blood samples are the major requirement for the research study. Blood samples were collected from volunteers of department of life science, Gujarat University, Ahmedabad with care and in aseptic condition by the expert with consent. Blood was collected up to 5ml approx. by the use of syringe in EDTA vials so clotting can be prevented. Blood was collected on the basis of selected ABO blood grouping, such as Blood group A, Blood group B and Blood group AB. After collecting blood sample analysis was done immediately and remaining sample was preserved in refrigerator at low temperature in EDTA vials. Different cloth materials such as Cotton, Silk, Linen, Thread, Jute Khadi, Georgette & Velvet etc were purchased from market for the analysis.

In almost all crime scenes when blood found as evidence is in dried form. So as here in study the mimic of crime scene was created in laboratory. For the forensic analysis Blood which was collected was dipped in different fabric and allowed to dry on different fabric surfaces in laboratory condition as shown in figure I. Thread was taken as control as used by forensic scientist at the scene of crime.


*Figure 1: Fabric samples dipped in blood allowed drying*

ABO blood grouping for each dried sample was done by Absorption-elusion method. This is followed by cutting the stain fabric about 2mm long as followed by the procedure done in forensic investigation of real crime scene.

For ABO blood grouping normal saline was prepared by mixture of 0.9gm NaCl in 100 ml of Distilled water. ABO blood grouping agglutinating antisera was purchased from Span Diagnostics Ltd. That contains monoclonal Anti-A & Monoclonal Anti-B.

Absorption-elusion method: Two clean and dry test tubes were taken for each individual sample and marked as A and B. One extra test tube was taken and marked as control. Then stained fabric was cut about 2mm long for each sample and was added in test tubes. Then one drop of antisera was added on basis of markings Anti-A was added in A and Anti-B was added in B test tubes for each sample. All tubes were allowed to put in refrigerator at 4°C overnight. Next day all tubes were washed by chilled normal saline to remove excess antisera. Washing was repeated 3-4 times. Then all tubes were plugged by cotton and incubated in water-bath at 50-60°C about 20 min for elusion. Then blood cells of blood group-A and blood group-B in respective tubes of A and B and in control any of them were added. Tubes were allowed to put in refrigerator at 4°C for 30 min. as shown in figure II. And result for agglutination was observed under light microscope. The method was repeated at the time interval of 24 hours for each sample till the results appear to be negative.

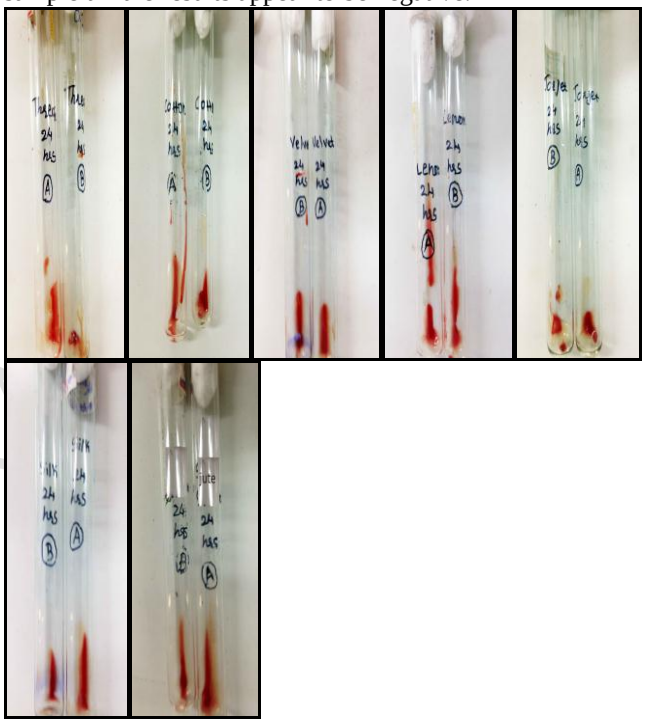

*Figure 2: Tubes for Thread, Cotton, Velvet, Linen, Georgette, Silk and Jute khadi respectively after adding known blood cells*

## III. RESULTS

| Time (Hours) | Thread | | Cotton | | Velvet | | Linen | | Georgette | | Silk | | Jute | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B | A | B | A | B |
| 24 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 48 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 72 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 96 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 120 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 144 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 168 | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ | +++ |
| 192 | ++ | +++ | ++ | + | ++ | +++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| 216 | ++ | +++ | ++ | + | ++ | +++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| 240 | ++ | ++ | ++ | + | ++ | ++ | ++ | ++ | ++ | + | ++ | ++ | ++ | + |
| 264 | ++ | ++ | ++ | + | ++ | ++ | + | ++ | + | + | ++ | ++ | ++ | + |
| 288 | ++ | ++ | + | + | + | + | + | ++ | + | + | ++ | ++ | + | + |
| 312 | ++ | ++ | + | + | + | + | + | ++ | + | + | + | + | + | + |
| 336 | ++ | ++ | + | + | + | + | + | ++ | + | + | + | + | + | + |
| 360 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 384 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 408 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 432 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 456 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 480 | ++ | ++ | + | + | + | + | + | + | + | + | + | + | + | + |
| 504 | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 528 | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| 552 | + | + | - | - | - | - | - | - | - | - | - | - | - | - |

*Table 1: ABO blood grouping from different fabric materials with respect to time*

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Where, +++ = very good result, ++ = visible to eye, + = moderate result, - = negative

## IV. DISCUSSION

From the table I we can conclude that in Cotton fabric material when grouping done from 24 till 168 hrs results visible in tubes after that at 192 and 216 hrs results decreases to slightly visible. At 240 and 264 hrs results in blood group-A remains same and results decrease in blood group-B visible only microscopically till 528 hrs. From 288 hrs till 528 hrs results visible microscopically in blood group-A and results got negative in both at 552 hrs. In Velvet fabric material when grouping done from 24 hrs till 168 hrs results visible in tubes after that at 192 and 216 hrs results slightly visible in blood group-A and results same as in blood group-B. At 240 and 264 hrs results in blood group-A remains same and results slightly decrease in blood group-B. From 288 to 528 hrs results microscopically visible in both blood group. At 552 hrs results got negative in both blood groups. In Linen fabric material from 24 to 168 hrs results visible in tubes after that results decreases to slightly visible at 192 and 216 hrs. At 240 hrs results decreases in blood group-A, results visible only at microscopically till 528 hrs and in blood group-B results remains same till 336 hrs. From 360 to 528 hrs results decreases in blood group-B and only visible to microscopically. At 552 hrs results got negative in both blood groups. In Georgette fabric material from 24 till 168 hrs results visible in tubes after that results decreases at 192 hrs results slightly visible. At 216 hrs results in blood group-A remains same and results decreases to microscopically visible in blood group-B till 528 hrs. At 240 hrs results decreases in blood group-A microscopically visible till 528 hrs. At 552 hrs results got negative in both blood groups. In Silk fabric material from 24 till 168 hrs results visible in tubes. At 192 till 264 hrs results decreases to slightly visible. At 288 hrs results decrease in blood group-A to visible only at microscopically till 528 hrs and in blood group-B remains same. At 312 hrs results also decreases in blood group-B to visible microscopically till 528 hrs. At 552 hrs results got negative in both blood groups. In Jute Khadi fabric material from 24 to 168 hrs results visible in tubes after that result decreases to slightly visible at 192 hrs to 216 hrs. At 240 hrs results decreases in blood group-B to visible only microscopically till 528 hrs and results in blood group-A remains same till 264 hrs. At 288 hrs results also decreases in blood group-A to visible only microscopically till 528 hrs. At 552 hrs results got negative in both blood groups.

## V. CONCLUSION

Most of the time blood found at crime scene in very small quantity though its potency is very high. If blood is affected by any circumstances then it is difficult to identify the individual or a person involve in crime. As Blood may be found on any cloth material either from suspect or victim so the study signifies the time period up to which blood grouping can be done. The study mainly signifies to prevent the false interpretation of the blood grouping examination during forensic investigation.

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