

# FORENSIC IDENTIFICATION OF HANDWRITING ON CURVED SURFACES ESPECIALLY TREE

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## **ABSTRACT**

*Handwriting is an attribute of the person's mind. Each person has their own exclusive style of handwriting or their signatures. **Background:** Suicide notes are repeatedly turned up at the transgression scenes and they are an indispensable facet of any fugitive investigation. The professional usually encountered complications in the investigation and analysis of such notes and substantiating the handwriting, frequently when striking on unusual surfaces at the scene of crime such as handwriting displayed on trees, embankments, furniture, etc. **Result:** Handwriting on conventional and unusual surfaces can be equated on the premise of Handwriting Attributes of an individual. Some specific handwriting characteristics have individualized the handwriting of an individual. These peculiarities are Slant, Relative size, Alignment, and Spacing. **Conclusion:** The raised course reveals that the handwriting of an individual on two distinctive surfaces can establish the conclusive identification by relating the handwriting characteristics.*

**Keywords:** Handwriting, unusual surfaces, handwriting characteristics

## **INTRODUCTION**

All handwriting exhibits identifying elements which will hereafter be referred to as its "characteristics". The characteristics of a handwriting fall into two classes. These are (a) class characteristic, and (b) individual characteristics. [1]

Pervasively, Questioned Document examiner desideratum to scrutinize a chronicle which was written on a sheet using ink as a writing instrument and paper as a writing surface. The examination of documents also comprises cases for an expert opinion where the questioned writings were executed on an unusual surface. [2]

Unusual writing surface can be a concrete facade, mirror, woods, body etc. may be written on with a pen or pencil succumb on the writing surface, aerosol paint can be spent on a concrete wall surface in instances involving graffiti, other surfaces like digital tablets, may have a slick surface or may cause palm of the hand to stick to the surface while writing. Writing on paper backed by uneven surfaces (i.e. the fabric on a sofa arm, the leather on an automobile seat, or stucco wall) frequently causes unusual competence in writing that can be falsified for simulation. [3]

A sample of an individual's writing can be collated to that of a written document, to work out and substantiate the written document. If they coincide, it is inevitable that one person had written both the documents. The intent of the present study is to similitude the handwriting on unusual surfaces and the handwriting on usual surfaces and to evaluate the characteristics of handwriting that helps in the positive correlation of individual's handwriting on conventional and unusual surfaces.

## **MATERIALS AND METHODOLOGY**

Color pen, color pencil, measuring scale, protector, calculator, A4 sheet, glossy sheet, Performa, hand lens, transparent graph sheet, unusual surface (tree), camera etc.



**Fig.1 Stationary Material**

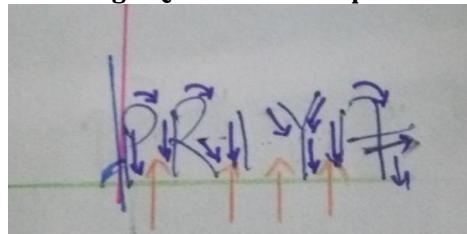
At the introductory stage, Questioned Samples were planned on unusual surfaces or contoured surface such as trees with the aid of a pointed instrument like key, knife, or pointed stone. After soliciting the Questioned Samples, shot were taken with the help of a 32-megapixel camera. The photographs were captured from the varied angles so that the lucidity of photographs can be sustained and inspection can be carried from a peculiar angle. While photographs were taken, a measuring scale was employed for resolving the relative proportion of the Questioned Sample and then the shot was captured having the measuring scale over the top of the Questioned Samples.

A Performa was prepared which consists of the following describes such as sample number, date, name, age, and sexuality. After holding these entries, on an average 10 Control Samples of handwriting were received on a Performa from each individual. Each individual is instructed to be in the same posture as they were at the time of presenting the Questioned Samples and later all the samples were collected likewise.

By working hand lens and transparent graph sheet Questioned Samples and Control Samples were analyzed and compared on the assumption of Handwriting Characteristics, these are: Class Characteristics - Direction, Rhythm, Skill, Speed, and Proportion and Individual Characteristics - Slant, Alignment, Line quality, Movement, Spacing, Strokes, Pen Pressure, Letter formation, Pen Pressure, Pen Pause, Pen Lifts, Hesitations. Each Control Samples were compared with the Questioned Sample with the help of transparent graph sheet and a hand lens and thus the characteristics were noted down. The handwriting characteristics were marked by using the color pen in Questioned Samples and color pencil in Control Samples. All the noted characteristics of handwriting in questioned and controlled samples were tabulated for comparative observation.



**Fig.2 Questioned Sample**



**Fig.3 Control Sample**

## RESULT

The handwriting on usual and unusual surfaces was examined by comparing the 50 Questioned Samples with that of 50 Control Samples of individuals. The handwriting characteristics observed were spacing between the letter, length of the letter, breadth of the letter, number of angularity, and number of alignment.

**Table 1 - Descriptive Statistics of Control and Questioned Sample**

S. No.	Variables	Usual Surface			
		Min.	Max.	Mean	S.D
1.	<b>Spacing between the letters</b> <b>(C)</b> <b>(Q)</b>	0.1	0.7	0.243	0.2174
		0.3	3.0	0.846	0.7172
2.	<b>Length of the letters</b> <b>(C)</b> <b>(Q)</b>	0.0	1.2	0.658	0.2696
		1.8	4.3	2.650	0.8435
3.	<b>Breadth of the letters</b> <b>(C)</b> <b>(Q)</b>	2.0	7.5	3.996	1.6800
		8.3	22.5	13.686	4.7105
4.	<b>Number of angularity</b> <b>(C)</b>	1.0	6.0	3.880	1.3649

5.	<b>(Q)</b> <b>Number of alignment</b> <b>(C)</b> <b>(Q)</b>	2.0 1.0 0.0	6.0 6.0 7.0	3.820 3.520 3.160	1.2887 1.8097 1.7769
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The following characteristics of both the sample were compared then on the basis of the mean value obtained from the table above, the change is observed in the length of the letter and breadth of the letter but there is no significant change is observed in spacing between the letters, number of angularity and number of alignment as represented in table 1.

**Table 2 – Correlation between the Handwriting Parameters of Control and Questioned Sample**

S. No.	Variables	R	P
1.	Spacing between the letters	0.909**	0.0005
2.	Length of the letters	-0.289*	0.042
3.	Breadth of the letters	0.814**	0.0005
4.	Number of angularity	0.881**	0.0005
5.	Number of alignment	0.735**	0.0005

\*Correlation is significant at the 0.05 level

\*\*Correlation is significant at the 0.01 level

A significant co-relation between handwriting characteristics of control and questioned sample can be seen. A positive correlation could be observed between the handwriting characteristics of an individual on usual and unusual surfaces such as spacing between the letter, breadth of the letters, number of angularity, and number of alignment at the 0.01 level of significance. A negative correlation can be observed in one of the handwriting characteristics that is length of the letter at the 0.05 level of significance (table 2).

**Table 3 – Correlation between the Handwriting Parameters of Questioned Sample**

S. No.	Variables	R	P
1.	Spacing between the letters – Length of the letters	00.231	0.107
2.	Spacing between the letters – Breadth of the letters	0.286*	0.044
3.	Spacing between the letters – Number of angularity	-0.190	0.187
4.	Length of the letters – Number of angularity	-0.164	0.254
5.	Number of alignment – Length of the letters	-0.022	0.881
6.	Number of alignment - Breadth of the letters	-0.099	0.496
7.	Number of alignment – Number of angularity	0.316*	0.025

\*Correlation is significant at the 0.05 level

A significant co-relation between handwriting parameters of questioned samples can be seen. A positive correlation could be observed in spacing between the letters and breadth of the letters and number of alignment co-relate with the number of angularity at the 0.05 level of significance (table 3).

## DISCUSSION

Writing plays a crucial role in our everyday existences. It serves as an indispensable complement to the oral modality for communication between mortals. Currently, the probabilities for dissemination, repository, and assistance afforded by skimming the handwriting modality, establish performance for information processing much steeper than those traditionally afforded by paper support, which remains frequently employed for rational, fiscal and cultural reasons.

Despite the substantial momentum and inflation of computer processing power, the performances of handwriting recognition systems are nevertheless incredibly meager compared to human ones mainly because of the tremendous volatility of writing style between writers. [4]

In the course on the "Effect of writing surface and author's position on handwriting", DeAngelis C. M. considered that abnormal substrates affected the overall presence and line quality of a writer's writing including abrupt interruptions, unevenness, and manifest of leaps by the writing instrument. [5]

In the consideration of "Forensic document examination principle and practice", Koppenhaver K. M. indicated that the graffiti often involve media other than paper, such as walls, lockers doors, or mirrors. The graffiti may be spray-painted, scribbled out with subtle equipment, or written with lipstick or chalk. She advocated that, whenever feasible, the document examiner should arrange to study the original. Finding a section of writing on unusual surfaces with unusual writing instrument can never be overlooked. Hence the potential modes and processes must be practiced on a periodic support by the forensic experts as well as

practitioners and new possibilities must always be explored for identifying and authenticating the actual author of the Questioned document. For the purpose, class, as well as individual handwriting characteristics, should be carefully evaluated and taken into consideration while comparing the unconventional writing. [6] In the consideration of "Four writing instrument, two surfaces, and one writer", Moran T. L. reported the loss of identifying details with a variation in the type of writing instrument but was of the perceiving that there are even many recurring elements that are of benefit in determining the authorship. [7]

In the investigation of a case "Unusual suicide note was written on the body", Demirici, S et al. mentioned two suicide death cases in which suicide notes were written on the bodies of the victim's. The initial instance was of a 32-year-old man, who carried out suicide in his dwelling by hanging. When they examined the body externally, they had discovered that there were some words written on the forehead of the body with a pen. The second case was of a 39-year-old woman, a housewife who was being physically violated by her husband and committed suicide by devouring a defoliant. They found a suicide note written on the left leg with a pen saying that she could not support being battered by her husband in a charge of the inheritance dispute between him and her elder brother. [8]

In the consideration of "Characteristic study of suicide notes written on the walls in a suicide pact", Rai G. et al. discussed a specific event of family suicide pact involving six adults and two children of the same household. The handwriting and signatures in the suicide notes did not reflect the complicated mental condition in their strokes, they were found to be relatively the normal writings of the individuals in spite of the fact that these writings or signatures were written on walls by three different male individuals engaged in the family suicide pact. They had further asserted the peculiarities of wall writings, the normal writings and the sense of recording significant conclusions from the spot by the document examiner himself regarding the quality of the surface, writing instruments desired and further proper photography of such writings. [9]

In another investigation of "Suicide note on the palm: Three case reports and discussion of medico-juridical views", Behera et al. presented three trials in which they discovered a handwritten note on the palm of the deceased at the time of autopsy. The casualty had drafted a succinct note in their own handwriting, alluding to the reasons for committing suicide. The suicide notes in one case also mentioned details regarding the incarceration of the victim's children to be given to her mother. Suicide notes are usually written by the victim on paper or readily accessible things such as notebooks, walls or mirrors. [10]

## CONCLUSION

Handwriting on unusual surfaces (trees, walls, furniture etc.) once turned up at the scene of the crime. Handwriting attributes show a symbolic aspect of the analogy of each sample on both the surfaces. Some specific handwriting tendencies serve to individualize the handwriting of a person. These characteristics are Slant, Relative Ratio (length and breadth), Alignment and Spacing. In the suggested course, it is accomplished that the handwriting of an individual can be identified on Unusual Surface by relating the above alluded to peculiar handwriting characteristics with the Control Sample or known handwriting.

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