



## FORENSIC ASSESSMENT ON THE EFFECT OF AGE ON HANDWRITING

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### ABSTRACT

Handwriting is an acquired skill and a neuro-muscular process which involves 27 bones and 40 muscles to work in coordination and is unique to each individual. Handwriting is a physical motor activity referred to as psycho-motor activity. It employed in illicit actions involving documents with text on them. It serves as physical evidence linking the culprit, victim, and the crime scene. Handwriting is studied using the class characteristics and individual characteristics that helps to narrow down a writer. This research is conducted in order to “Examine and analyzing the class characteristics of Handwritings of old age people”. This study has a great forensic significance in current scenario which aims at analyzing the handwriting characteristics, such as Alignment, line quality, pen pressure, size, slant, speed and tremors. The result of the study shows that the handwriting of individuals characteristics is remaining same despite of the age. It indicates the handwriting remains same for some individuals demonstrating peculiar characteristics irrespective of age.

**Keywords:** Forensic science, Handwriting analyzing, Neuromuscular, Class Characteristics, Question document.

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### INTRODUCTION

Handwriting is defined as any written format that contains writings or any symbols which can be seen and not necessarily convenings the meaning of that. Examination on document means involves analysis identification of handwriting by the comparing or differentiating individual handwriting characteristics. Forensic examiner further authenticates the information as evidence to demonstrate the crime or the innocence of the person (1).

Handwriting is the neuromuscular coordination of the human body which can be influenced by the age and neurological illness of an individual. (2) Every person has unique handwriting style. It normally changes the variation of range but the age also assesses the deviation after the range of natural variation. Various studies shows that the handwriting changes cautiously with time. (3)(4)(5) This research is done to get more knowledge about the handwriting and their factors like speed, stress, pressure, of the penholder, pressure of pen point on the paper and how it varies in aging process.

The aim of study is to analyze the effect of age on individual characteristics because as a person grows their will be changes occur time to time period on their behaviors and also the size of their hands and fingers when a person grows older there are changes such as decreased shaking of hand at old age due to eyesight issues also occur which also affect the handwriting in the research we try to know the effect which came in handwriting with age difference in person to person is the handwriting change in vary ways or it keeps some of the character of their handwriting which are coming from adult age.

### HANDWRITING AND PERSONALITY

Handwriting is a neuromuscular activity which also helps the experts to know about a person's personality through their handwriting. Correlation of handwritten work and signature is subjected to class and individual qualities of person. Penmanship is a learning procedure, so the pictorial appearance of the comparing can change from youth till youthfulness anyway the differentiation won't change.

### CHARACTERSTICS OF HANDWRITINGS

Features of characteristics of handwritings are:

Class characteristics – class characteristics are writing traits common to a group or specific class of writers.

Individual characteristics – Individual characteristics are specific to the person which is acquired by him/her over years.

### CLASS CHARACTERSTICS OF HANDWRITING ARE:

- 1) Terminal stroke – Stroke which forms the final position of the letter e g: d, e, f, s, b
- 2) Connecting stroke – A stroke joining to a letter together.
- 3) Diacritics – Dots over I and J, 2 types
- 4) Cross Bars – It is a horizontal stroke used to complete character.
- 5) Eye dot – It is circle or dot over a letter.
- 6) Alignment – It should be equal and up down manner.
- 7) Spacing – Line spacing – spacing seen in between line are called line spacing.
- 8) Word spacing – Spacing seen in between words are called word spacing.
- 9) Slant – The letter is in different slants which is measured by protractor.
- 10) Movement – when a person writing we have to check that the person writing with finger, hand, wrist, whole arm, and fore arm.
- 11) Line quality – The thickness, strength and flow of the letter, some factors are if the letter are flowing, shaping and very thick.
- 12) Size – The size of the letter is small, moderate, large
- 13) Pen pressure – The pressure applied on paper while writing or formation of letter.
- 14) Pen lift – The person lifting the pen to form another letter or word
- 15) Pen pause – The stopping of pen, to form another stroke.
- 16) Speed – The speed of the pen we found depression of letter is more the speed of letter is less.
- 17) Ornamentation – The writing or formation of letters good or bad.

18) Bow – A vertical curve stroke has in capitals.

19) Initial stroke - The first writing movement of a letter and u had lig.

## **MATERIALS AND METHODS**

Handwriting of old age person collected.

The materials used in the study included a standardized handwriting task and with a stylus pen for participants to complete the task. The task consisted of copying a standardized paragraph of text in handwriting, which was chosen for its complexity and variability of characters. Participants were asked to complete the handwriting task on the digital tablet, using the stylus pen. Participants were instructed to write the paragraph of text as neatly and accurately as possible, with no time limit. The researcher monitored the participants during the task to ensure that they followed the instructions correctly. The handwriting samples were analyzed using objective measures to determine differences in handwriting characteristics between the three age groups. The measures included:

1. Slant angle: The angle between the baseline of the text and the slant of the writing.
2. Size: The size of the writing, measured by the height of the letter
3. Spacing: The distance between words and letters.
4. Pressure: The pressure applied to the pen while writing.
5. Speed: The time taken to complete the handwriting task.

## **OBSERVATION**

### **SAMPLE OBSEVATION**

#### **SAMPLE 1**

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

#### **SAMPLE 2**

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Only few shaky strokes are observed.

SAMPLE 3

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 4

- Line Quality – Good handwriting, medium thickness terminal strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

SAMPLE 5

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 6

- Line Quality – Good handwriting, medium thickness terminal strokes are observed
- Alignment – Downward Alignment
- Slant – No slant has been observed.
- Pen pressure – No pen pressure
- Speed – Very slow
- Connecting strokes – The letters are slightly joined to strokes
- Tremors – Shaky strokes and trembling pattern of writing.

SAMPLE 7

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed

- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 8

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting strokes – The letters are slightly joined to strokes
- Tremors – Shaky strokes and trembling pattern of writing.

SAMPLE 9

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – No slant has been observed.
- Pen pressure – No pen pressure
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 10

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

SAMPLE 11

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 12

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed.
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – High
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

SAMPLE 13

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 14

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure observed.
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 15

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Upward Alignment
- Slant – No slant was observed.
- Pen pressure – No pen pressure
- Speed – Slow
- Connecting strokes – No connecting strokes were observed.
- Tremors – Only few shaky strokes are observed.

SAMPLE 16

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure observed.
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.

- Tremors – Only few shaky strokes are observed

SAMPLE 17

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Only few shaky strokes are observed.

SAMPLE 18

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant –No slant was observed
- Pen pressure – No pen pressure observed.
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 19

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 20

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

SAMPLE 21

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.

- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 22

- Line Quality – Good handwriting, medium thickness terminal strokes are observed
- Alignment – Slight Alignment
- Slant – Not present
- Pen pressure – Present through out the content
- Speed – Slow
- Connecting Strokes – Sharply present.

SAMPLE 23

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 24

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Upward Alignment
- Slant – No slant was observed.
- Pen pressure – No pen pressure
- Speed – Slow
- Connecting strokes – No connecting strokes were observed.
- Tremors – Only few shaky strokes are observed.

SAMPLE 25

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Light pen pressure.
- Speed – Slow
- Connecting Strokes – The letters are not connected by strokes.
- Tremors – Shaky strokes are observed.

SAMPLE 26

- Line Quality – Good handwriting, medium thickness terminal strokes are observed
- Alignment – Slight Alignment
- Slant – Not present
- Pen pressure – Present throughout the content



- Speed – Slow
- Connecting Strokes – Sharply present.
- Tremors – Shaky strokes are observed.

SAMPLE 27

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – No slant has been observed.
- Pen pressure – No pen pressure
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 28

- Line Quality – Medium handwriting, medium thickness uniform strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Normal running letter because a smaller number of connecting strokes.
- Tremors – Only few shaky strokes are observed.

SAMPLE 29

- Line Quality – Good handwriting, medium thickness uniform strokes are observed
- Alignment – Downward Alignment
- Slant – In few letters right slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting Strokes – Mostly each word has connecting between letters.
- Tremors – Absent

SAMPLE 30

- Line Quality – Medium handwriting, medium thickness initial strokes are observed
- Alignment – Straightly Alignment
- Slant – In few letters left slant observed
- Pen pressure – Medium, the embossing's on the opposite side of paper is medium
- Speed – Medium
- Connecting strokes – The letters are slightly joined to strokes
- Tremors – Shaky strokes and trembling pattern of writing.

**RESULT**

The handwriting of thirty old age persons collected while analyzing and examining the handwriting. The study found that some changes has been occurred in the handwriting but

positive identification could be related to individual's characteristics like strokes, connections, initials, terminations are more retained even as time progress. The handwriting of individuals characteristics is remaining same. It indicates the handwriting remains same for some individuals.

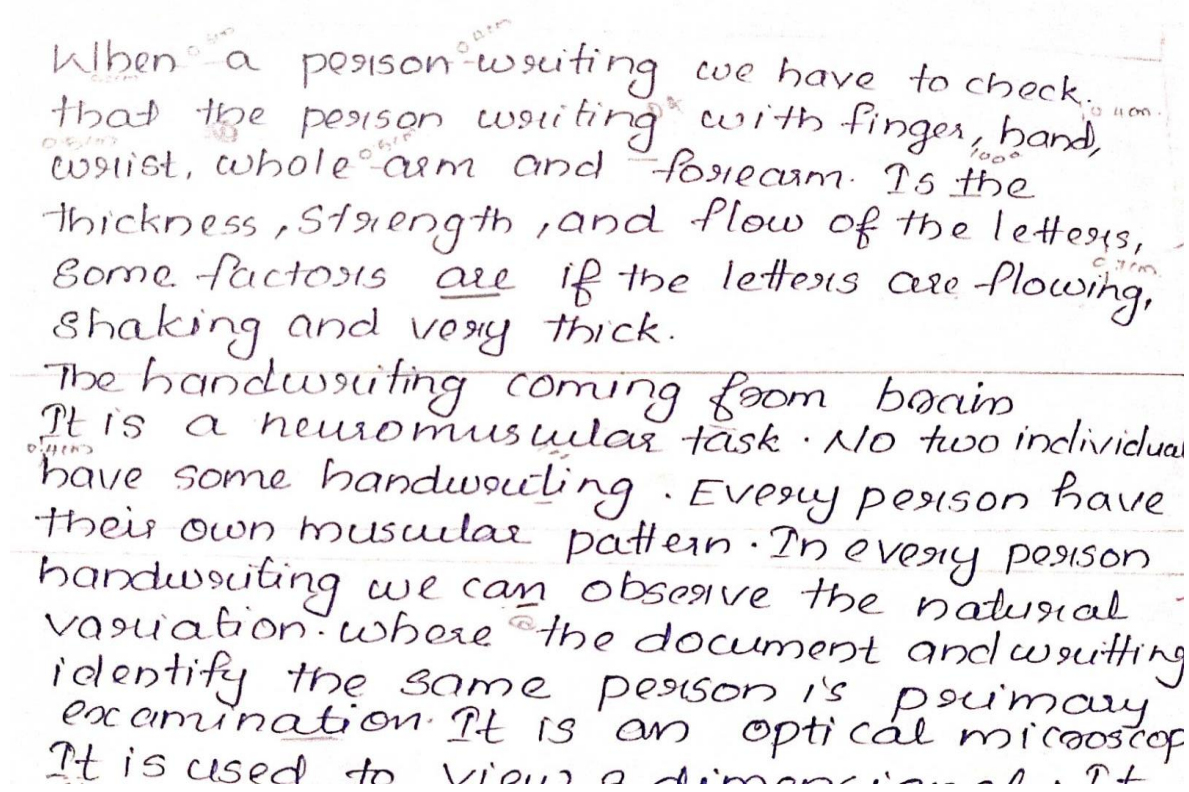


FIG 1 The handwriting sample old age person shown the downward alignment and the medium speed.

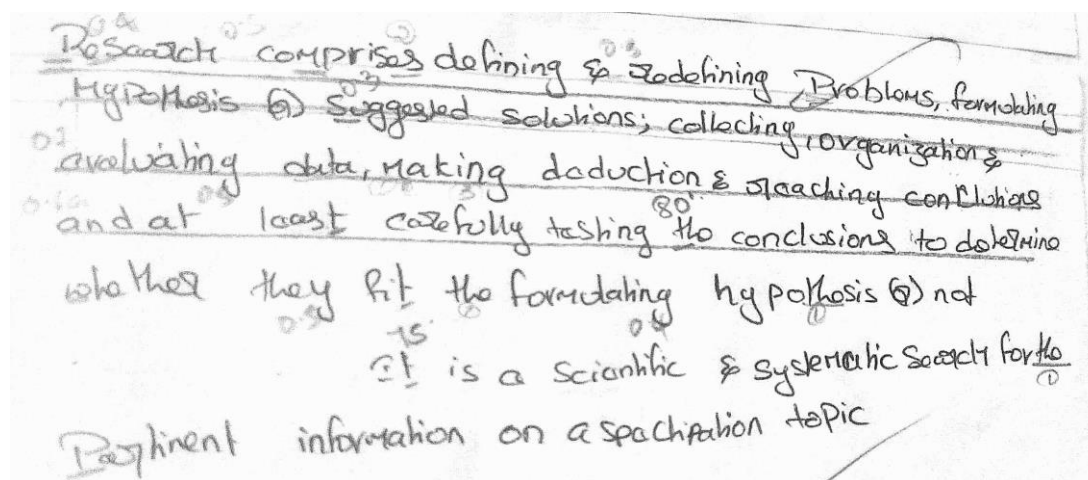


FIG 2 The handwriting sample of individual shows the straightly alignment and the medium speed.

TO WHOMSOEVER IT MAY CONCERN

I am very much concern about the FUEL CESS against the CENTRAL Govt. Because it is ~~not~~ present at the time of Caste on Rule at the time of Womans

~~matter~~

FIG 3 This sample shows the high pen pressure, tremors and connecting strokes.

Went to Sookambria on  
 27.11.2022 by train from  
 Shornur Junction at 10.50 AM  
 Reached here at 6.50 AM on 28.11.2022  
 Stayed at Hotel 'Chalukya'  
 Discovered Kudajadi, Udapi, Mercedes  
 and returned on 29.11.2022

FIG 4 This sample shows the good handwriting with medium thickness, uniform strokes are observed and, in few letters, right slant observed.

The First Paragraph Typical Business Letter is used to state the main point of the letter.

FIG 5 In this sample the line quality is poor in some factors are the letters are flowing, shaking and very thick.

## DISCUSSION

Handwriting is as unique as a fingerprint. It varies from individual to individual. It is an average process. It takes arm, hand and finger movement necessary to write. It is a form of forensic science that is unique. It is somewhat subjective. It has a great significance in forensic science in cases like fraud, documents, forgery, cheques, suicide cases etc. It acts as a link between victim, criminal, and a crime scene.

The aim of the research was to examine and analyze the handwriting characteristics of old age persons and to find out the differences in their class characteristics of handwriting. 30 samples were taken and class characteristics were used for analysis. In sample 1 it is observed that the person has the downward alignment with right slant with medium speed and the connecting strokes. In sample 2 The person having straight alignment with right slant with medium speed and with the connecting strokes and pen pressure and also found few tremors. In sample 3 It found straightly alignment with left slant and medium pen pressure and have normal running letter with small number of connecting strokes and found few tremors. Sample 4 It is observed that the person has the downward alignment with right slant with medium speed and the connecting strokes. In sample 5 found that straight alignment with no slant and light pen pressure and very slow speed and some shaky and trembling pattern of writing. (1) in this paper analyzing the handwriting and this study about the examination of handwriting and signature in their spite of aging process. It has the little similarity with this paper in sample 6 It is found that downward alignment with no slant and pen pressure and very slow speed with slowly joined connecting strokes and the shaky and trembling pattern of writing. In sample 7 It is found that straightly alignment with few left slants with medium speed and pen pressure and the normal running letter and small number of connecting strokes and few shaky tremors were found. In sample 8 It is found the straightly alignment with few left slant and medium pen pressure and slightly joined connecting strokes and few tremors were found. In sample 9 It is found the downward alignment with no slant and no pen pressure and normal running letter with smaller number of connecting strokes and few tremors found. In sample 10. (2) This paper is about the normal changes the variation of range but the age also assesses the deviation after the range of variation. This study helps to understand the changes of variation in the handwriting. It is found the downward alignment with few right slants with medium pen pressure with medium speed with connecting strokes. In sample 11 It is found that the straightly alignment with few left slant and high pen pressure with few tremors were observed. In sample 12 It is found that the straightly with few left slant and medium pen pressure with high speed and connecting strokes and found few tremors. In sample 13 It is found that the straightly alignment with few left slant and light pen pressure with medium speed and connecting strokes with few tremors. In sample 14 It is found that the straightly alignment with the light pen pressure with medium speed with normal connecting stroke with few tremors. In sample 15 It is found that the upward alignment with no pen pressure and no slant with slow speed and with no connecting strokes and few tremors were also found. (3) in this study found that the six cases of the range of curvature in related letter and range of angle between linking strokes varies according to age. This study helps to understand the curvature of letter and range between the strokes according to the individual's age. In sample 16 It is found that the straight alignment with few left slant

and light pen pressure with medium speed and normal running letter with small number of connecting strokes and with few tremors. In sample 17 It is found that the straightly alignment with few right slants and with medium pen pressure with medium speed with connecting strokes and few tremors. In sample 18 It is found that the straightly alignment with no slant and no pen pressure with medium speed and no connecting strokes and few tremors were also observed. In sample 19 It is found that the straight alignment with few left slants and with light pen pressure with slow speed and no connecting strokes with few tremors. In sample 20 It is found that the downward alignment with right slant and medium pen pressure with medium speed and the connecting strokes. In the sample 21 It is found that the straightly alignment with few left slants and high pen pressure and slow speed with connecting strokes with few tremors. In sample 22 It is found that the slightly alignment with not slants and the pen pressure is present through the out of the content with slow speed and tremors were present very sharply. In sample 23 It is found that the straightly alignment with few left slants and the light pen pressure with slow speed and no connecting strokes with few tremors were observed. In sample 24 It is found that the upward alignment with slow speed and few tremors were found. In sample 25 It is found that the straightly alignment with few left slants and the light pen pressure with slow speed and no connecting strokes with few tremors were observed. In sample 26 It is found that the slightly alignment with not slants and the pen pressure is present through the out of the content with slow speed and tremors were present very sharply. In sample 27 It is found that the downward alignment with normal connecting strokes and the few tremors were present. In sample 28 It is found that the straightly alignment with the few left slants and medium speed with medium pen pressure and most of the letters have connecting strokes with few tremors were observed. In sample 29 It is found that the downward alignment with right slants and with medium speed with medium pen pressure and most of the letters have connecting strokes. In sample 30 It is found that the straightly alignment with few left slants and medium speed with medium pen pressure and slightly joined connecting strokes with shaky trembling pattern of tremors have been found. So finally, we go the result that while analyzing the samples the study found that some changes occurs but positive identification could be related to individuals' characters like strokes, connections, initials, termination are more retained even as time progress. It indicates the handwriting remains same for some individuals.

## CONCLUSION

The handwriting analysis is based on the idea that because each person's handwriting is unique, the handwriting analysis can give a good indication of persons personality structure, ability to grow and develop and their integrity. The aim of the research was to examine and analyze the handwriting characteristics of old age persons and to find out the differences in their class characteristics of handwriting. 30 samples were taken and class characteristics were used for analysis. In this study, some of the differences analyzed include good handwriting among few people, medium thickness with uniform strokes and also tremors. In most handwriting, straight Alignment were present and in few of the letters the slant was right and left. Few people had medium pen pressure, since the embossing's on the opposite side of paper was medium. Different individual characters were visible in certain handwriting while

the cursive character remains the same among a group, but the individual characteristics were visible in various letters and words. So finally, we go the result that while analyzing the samples the study found that some changes occurs but positive identification could be related to individuals' characters like strokes, connections, initials, termination are more retained even as time progress. It indicates the handwriting remains same for some individuals.

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