Adli Tıp Bülteni, 2016; 21(2): 116-125

Adli Tıp Bülteni
The Bulletin of Legal Medicine

www.adlitipbulteni.com

OLGU SUNUMU / CASE REPORT

doi: 10.17986/blm.2015220397

Changes in Handwriting due to Alzheimer's Disease: A Case Report

Alzheimer Hastalığına bağlı el yazısı değişiklikleri: Bir olgu sunumu

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Abstract

Handwriting and signature comparisons are frequently performed in forensic investigations of documents. Mistakes in conclusion might be due to lack of sufficient documentation and information. Many factors can affect handwriting and signature. These factors are divided into two groups: dependent or independent of the individual at the time the handwriting or signature is made. Therefore, the situations leading to differences between individuals and in the individual's own handwriting and signature should be determined. Currently, average life expectancy and quality have increased due to the developments in health services. Thus, an increasing number of elderly people are engaged in an active daily life and trade. Alzheimer's Disease (AD) can develop in the elderly; this is a condition that could alter handwriting and signature considerably over time.

In forensic document examination, comparing the document in question containing handwriting or signature with the original documents prepared before the document in question was prepared is important. However, if alterations have developed secondary to a disease, the documents prepared before and after the disease affected the individual should be assessed together.

Likewise, in the present case, the examiners making comparisons using handwriting and signatures from different periods reached entirely different conclusions.

The case is a bill prepared in 1994. The payee of the bill is a male born in 1925 and diagnosed with AD shortly before his death in 1998. The indebted person in the bill is the payee's spouse. For the assessment of handwriting and signature, the first endorsement consisting of the handwritten name and signature was used. Several expert reports regarding the same document had been commissioned; these reached different views. The document was sent to The Council of Forensic Medicine to assess the identification and the previous reports. After re-evaluation, the handwriting was declared to belong to the payee.

In this study, the reason that the experts delivered opposing opinions on the identification of a document handwritten by a person with AD after being referred to court was investigated.

Based on the judicial file, the document examiners did not have the opportunity to evaluate all factors affecting the handwriting or signature of the individual, and an adequate number of handwriting and signature examples were not collected for comparison. Consequently, the examiners reached different opinions. Thus, the above-mentioned factors are necessary to derive a satisfactory and accurate opinion regarding the identification of handwriting or signature.

Keywords: Forensic sciences; Handwriting; Signature; Alzheimer's Disease.

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Geliş: 23.02.2015 Düzeltme: 26.05.2015 Kabul: 26.06.2015

Özet

Pek çok faktör el yazısı ve imzalarda değişikliğe sebep olmaktadır. Bu faktörler, yazı ve imzanın oluşturulduğu andaki çevresel koşullar ve kişiye bağlı değişiklikler olarak iki grupta toplanır. Bu nedenle, el yazısı ve imzalarda kişiden kişiye oluşan farklılaşmalar ile kişinin kendisinde değişikliğe neden olan durumların adli belge incelemelerinde nasıl bir farklılaşmaya sebep olduğunun bilinmesi büyük önem taşımaktadır. Alzheimer Hastalığı da, zaman içerisinde el yazısı ve imzalarda büyük oranda değişikliklere sebep olan durumlardan biri olduğu bilinmektedir.

Adli belge incelemesinde genel olarak, el yazısı ve imza içeren inceleme konusu belgenin belge düzenlenme tarihinden önce yazılmış ve samimi olarak nitelendirilen karşılaştırma belgeleri ile değerlendirilmesi büyük önem taşımaktadır. Ancak, el yazısında herhangi bir hastalığa bağlı değişiklikler içeren olgularda, gerek hastalık öncesi ve gerekse de hastalık sonrası dönemlere ait el yazısı örneklerinin birlikte değerlendirilmesi şarttır. Nitekim sunacağımız olguda da, farklı zamanlara ait yazı ve imza örnekleri ile karşılaştırma yapan incelemeciler tamamen farklı sonuçlara ulaşmışlardır.

Bu çalışmada, Alzheimer Hastalığı olan bir kişinin oluşturmuş olduğu belgelerin dava konusu olmasından sonra inceleme yapan değişik bilirkişilerin neden farklı ve zaman zaman hatalı sonuçlara ulaşmış oldukları irdelenerek, el yazısı ve imza incelemesi yapan incelemecilerin, el yazısı ve imzalar üzerinde değişikliğe neden olacak tüm sebepleri bilmesi ve bunun yanı sıra yapacakları incelemede değişik tarihlerde düzenlenmiş çok sayıda el yazısı ve imza örneğinin toplanarak, incelenecek belgenin bu örnekler ile birlikte değerlendirilmesinin doğru sonuca ulaşmada ne derece önemli faktörlerden birisi olduğu irdelenmektedir.

Anahtar Kelimeler: Adli belge incelemesi; El yazısı; İmza; Alzheimer Hastalığı.

1. Introduction

Missing documents and lack of information can lead to errors in handwriting and signature comparison studies, a frequent question in document examination. In addition, other information—such as age, educational status or disease history—should be considered. In some cases, age or disease can be estimated using changes in handwriting or signature. Aging, various diseases or circumstances may cause natural changes in handwriting or signature over time. Due to the improvements in medical treatment and rehabilitational medical care, average lifespan and quality of life have increased globally. Therefore, the elderly participating actively in social and commercial life increased. Consequently, document examiners are confronted more frequently with handwriting and signature examinations of elderly people (1-6).

Advanced age and associated diseases, along with the changes in handwriting and signature related to this period of life, have been investigated previously, but because document examiners are presented with an increasing number of documents prepared by the elderly, the importance of this subject has increased.

Many factors are involved in handwriting and signature, of which the brain is the most important. Writing is learned mainly in the brain, ensuring that this ability can be developed and utilised. Of the many diseases in this age group, dementia affecting brain functions is particularly important. Dementia is a non-congenital, progressive disease involving disorders in brain functions and leading to cognitive disorders in social, professional and daily life activities. In 21 - 72% of patients, clinicians may not recognise early stage dementia or may mistakenly consider the disorder as part of the normal aging process. AD is considered a primary degenerative condition caused by dementia. AD represents 75% of dementias and 50% of all dementia types. Although AD is rarely observed in subjects under the age of 65 years, its frequency increases after that age (7-12).

Early disease symptoms include memory disorders, difficulties in solving problems, decreased response to daily events, deficiencies in attention and concentration, disorders in speech, perception, orientation, defects in agility, troubles in arithmetic calculations and changes in behavioural and emotional status. These disorders may lead to changes in handwriting and signature. The main disorder causing the changes in handwriting and signature is the cognitive function of the brain. Disorders in handwriting abilities begin before AD can be diagnosed clinically, and become more obvious over time. With the progress of the disease, the affected subject has difficulty in recalling the text he or she intended to write and remembering letters and signature forms. The most typical indicator of this finding is an inability to write the dictated text and the individual can only copy the figures that they can see. In the later stages of AD, patients can no longer write a text without a model. This is particularly important in forming signatures, because a signature is more complex and a more swift and automatic form of handwriting. The movements following the first movement in a signature are swift and speedy. If a person cannot imagine the signature in the brain and a model has to be used to establish the signature, the signature will be slow and include interruptions. Other changes in handwriting resulting from AD are forgetting letters within the text, unnecessary repetition of letters and unreasonable connection lines between words. These findings become more obvious during the progress of the disease and in later stages the handwriting is no longer legible. In the latest stage, the patient is unable to write (13-18).

Although signatures and text written at different times and different places with various purposes before the date of the document in question are of great value in handwriting and signature comparison studies, in diseases in which handwriting and signature change, documents for comparison prepared after the date of the document in question become more important. In cases of neurological dementia, forensic document examinations should include the period before and after the date on which the document in question was prepared. In fact, the date of the document in question could be wrong or misleading; therefore, obtaining documents for comparison that were written over a wide time period is crucial (19).

2. Case

Our case includes two documents, a voucher (Figure 1) dated 1994 and a protocol (Figure 2) dated 1996, containing four reports from three experts designated by civil courts and two reports prepared by The Council of Forensic Medicine. During the legal process, the judgment of the local court becomes final with the confirmation of the Supreme Civil and Criminal Courts, but the documents are sent once again to The Council of Forensic Medicine following the request for correction of the judgment. The creditor of the voucher with the sum of 80 billion TL is YNÖ, who was born in 1925 and died in 1998. AD was diagnosed shortly before his death. The debtor of the voucher is NAÖ and the creditor his wife. The claim is that YNÖ signed the back of the voucher to endorse it and gave it to the third party who was the final creditor and his accountant until the date of the document. The protocol, which is the second document in question, was prepared in 1996 by the final creditor as the payment

was not fulfilled at that time, indicating that both parties came to an agreement over the payment method. The experts designated by civil courts in 1996 and 1997 stated that upon examination, the signature on the front of the voucher belonged to NAÖ, but the signature on the back of the voucher did not. Although the first report of The Council of Forensic Medicine stated the same opinion regarding the signature on the front, it pointed out that the signature on the back had to be accepted as YNÖ's signature due to the similarities in his handwriting after a certain date. Since the local court was requesting only for these topics, other findings obtained from the documents were not recorded in the reports. In the new legal process following the request for the correction of the judgment commenced in the criminal court for major crimes, the documents were sent for the second time to The Council of Forensic Medicine to investigate the possibility of fraud for both the signatures and the text on the documents. The report prepared by the experts of The Council of Forensic Medicine stated that the signatures on the documents in question were produced by NAÖ's hand, but that the present text was written later using the free space on the documents. However, when considering the disorders in handwriting and signature in the

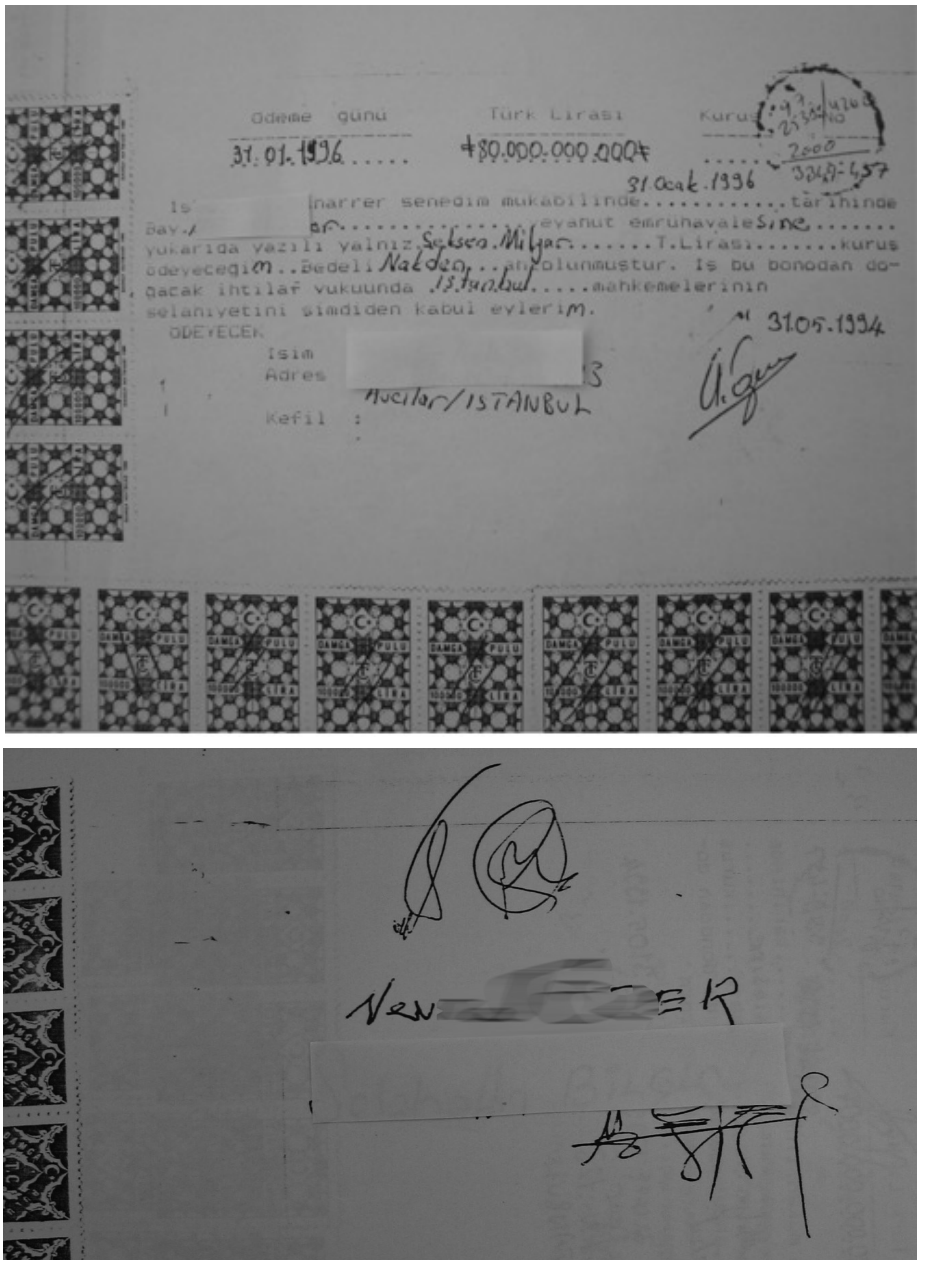


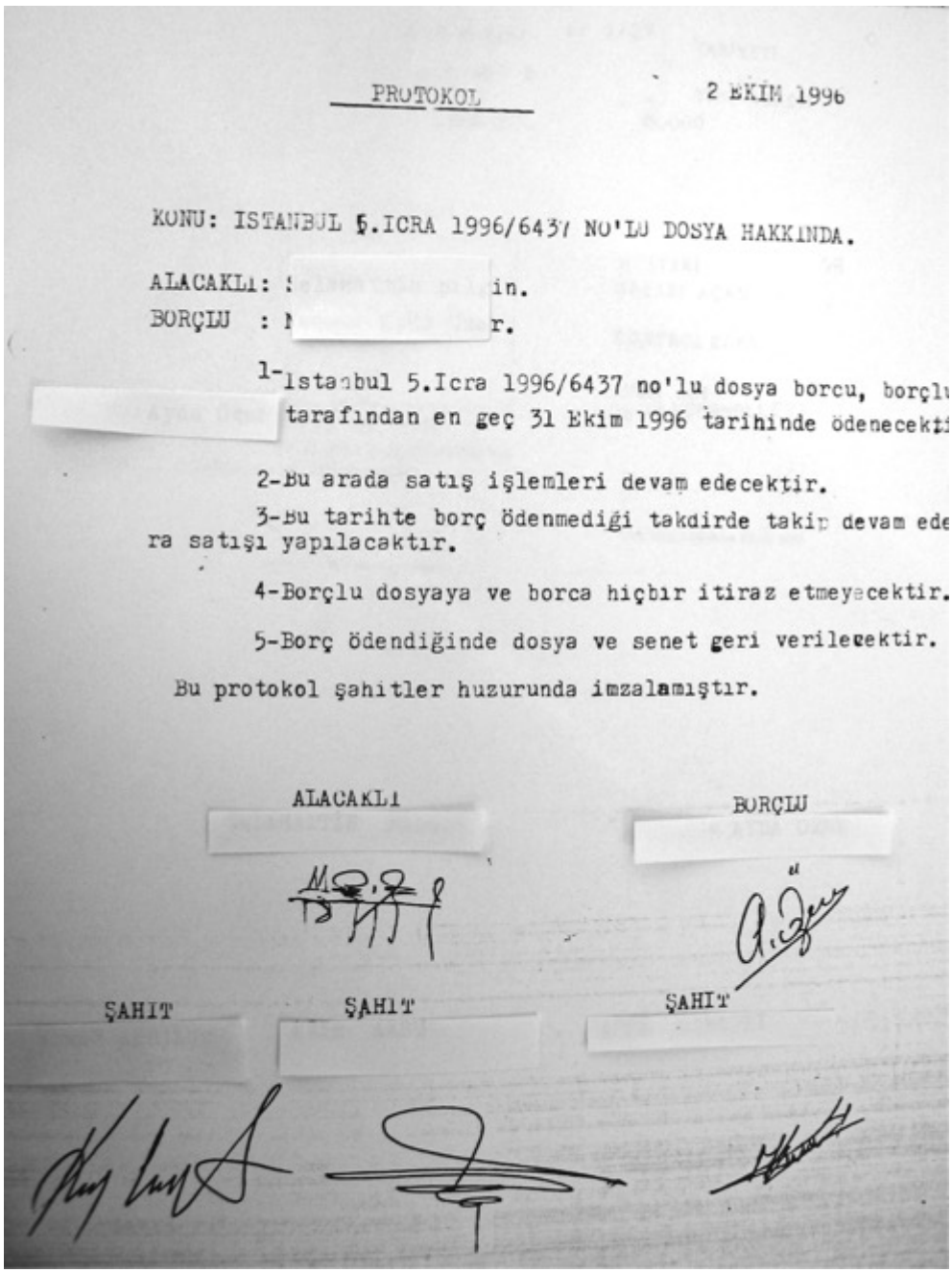
Figure 1. Upper figure is the front view and bottom is the back view of the voucher in question. There is only one signature on the front view without stamps. There is an endorsement signature on the back of the voucher. This signature belongs to YNÖ. The debtor signature on the front of the voucher belongs to AÖ (NÖ's wife).

other documents and the 1998-dated medical record of YNÖ, which now existed in the file indicating that YNÖ was diagnosed with AD, similarities were found with the comparison documents (Figures 3-11) belonging to later stages of the disease, so the signature and name written on the back attributed to YNÖ was declared as belonging to YNÖ.

3. Discussion

Document examination is an important part of daily forensic medicine work (20). Legal authorities rely increasingly on decisions and reports from forensic medicine specialists (21).

Similar to the present case, the number of legal records of people with chronic disease sent to experts is increas-



PROTOKOL 2 EKİM 1996

KONU: ISTANBUL 5.ICRA 1996/6437 NO'LU DOSYA HAKKINDA.

ALACAKLI: [redacted] in.

BORÇLU : [redacted] r.

1-Istanbul 5.Icra 1996/6437 no'lu dosya borcu, borçlu [redacted] tarafından en geç 31 Ekim 1996 tarihinde ödenecekti

2-Bu arada satış işlemleri devam edecektir.

3-Bu tarihte borç ödenmediği takdirde takip devam ede ra satışı yapılacaktır.

4-Borçlu dosyaya ve borca hiçbir itiraz etmeyecektir.

5-Borç ödendiğinde dosya ve senet geri verilecektir.

Bu protokol şahitler huzurunda imzalanmıştır.

ALACAKLI BORÇLU

ŞAHIT ŞAHIT ŞAHIT

Figure 2. The protocol in question submitted to the court 4 months after submittal of the voucher in question. As per submitted protocol, the debtor accepts to pay the amount mentioned on the voucher by October 31, 1996. The document states no objection to the debt and voucher will be returned to the debtor after the payment. There are five signatures on the document. The signatures in the first row belong to the creditor (left signature) and the debtor (right signature). Three signatures in the second row belong to the witnesses.

ing daily. Without the perspective of a physician, even the most experienced experts can draw erroneous conclusions since the basic forms of handwriting and signature are similar but the changes due to chronic disease vary over time.

In the present case's final report, a very important point is stressed by the statement that the signature attributed to YNÖ was made at a later stage of his disease. Although technically, the precise time at which the documents were written cannot be determined currently, based on the changes in handwriting due to the disease, the approximate date of writing could be determined in our case. Moreover, in diseases such as AD leading to typical changes in handwriting and signature, the disease onset can be determined approximately if handwritings and signatures can be dated chronologically .

Another important consideration is whether experts should state their opinions regarding topics unrelated to the case. Although both reports from The Council of Forensic Medicine were identical despite being issued 5 years apart, the findings determined on the documents but not stated were implied only in the first report because they were not requested and stressed in the second report, which could lead to the legal authorities making different judgments. This is a result of the current Turkish legal system. The expert must stay within the limits of the question in requests related to civil trial method procedures, but in expert requests related to criminal trial method procedures experts can be more flexible and present reports based on all documents in the file. However, discussion of this topic is not within the scope of this study and should be the subject of a legal platform.

Various factors affect the changes in handwriting and signature, some may be revealed immediately but some remain unresolved even after great effort and a considerable amount of work (19). In particular, files sent with the request of document examination belonging to elderly people should include a medical report indicating the writer's health status, medical history, information of drug usage and the existence of any disease that may change the handwriting. This will help the examiner to evaluate the document in more detail and broaden his perspective; therefore, the most accurate assessment can be made. Furthermore, the necessity of handwritten text and fingerprints should be discussed in addition to signatures and the legal arrangements in this field.

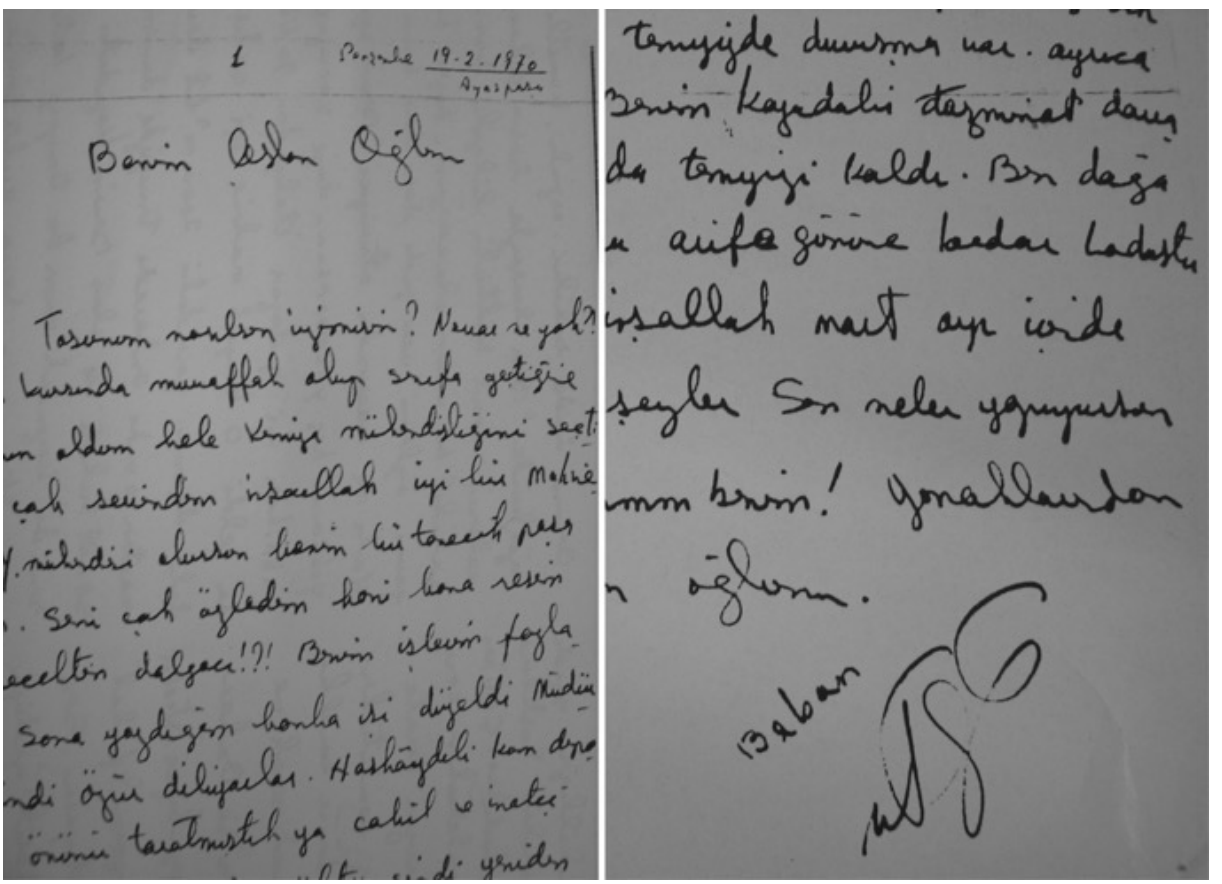


Figure 3. Handwritten letter and signature by N**Ö** written to his son in 1970. Handwriting and signatures show no indication of changes due to Alzheimer's disease (AD).

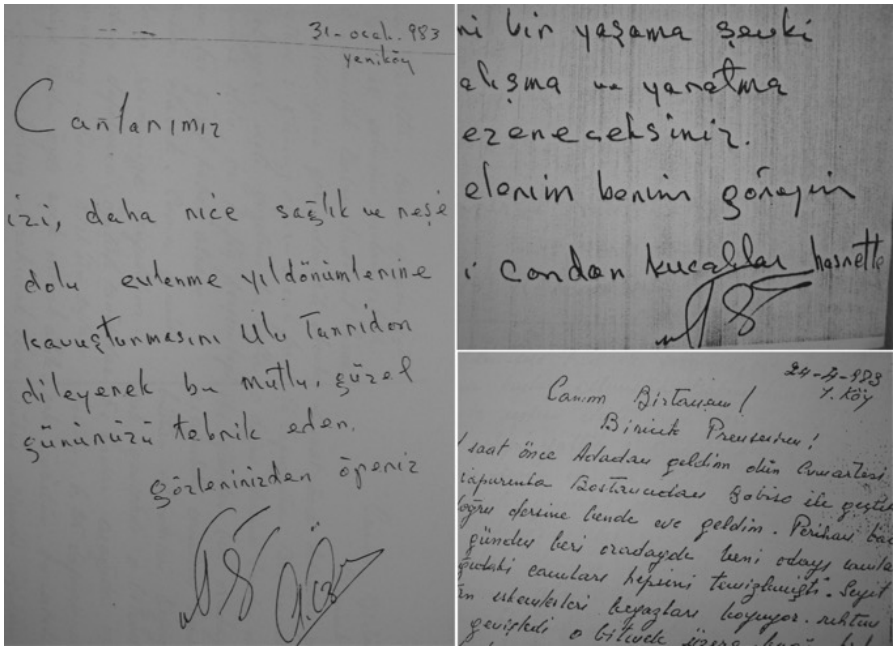


Figure 4. Handwritten letter and signatures by NÖ and signature by AÖ written to their family in 1983. No indication of changes in handwriting and signatures due to Alzheimer's disease (AD).

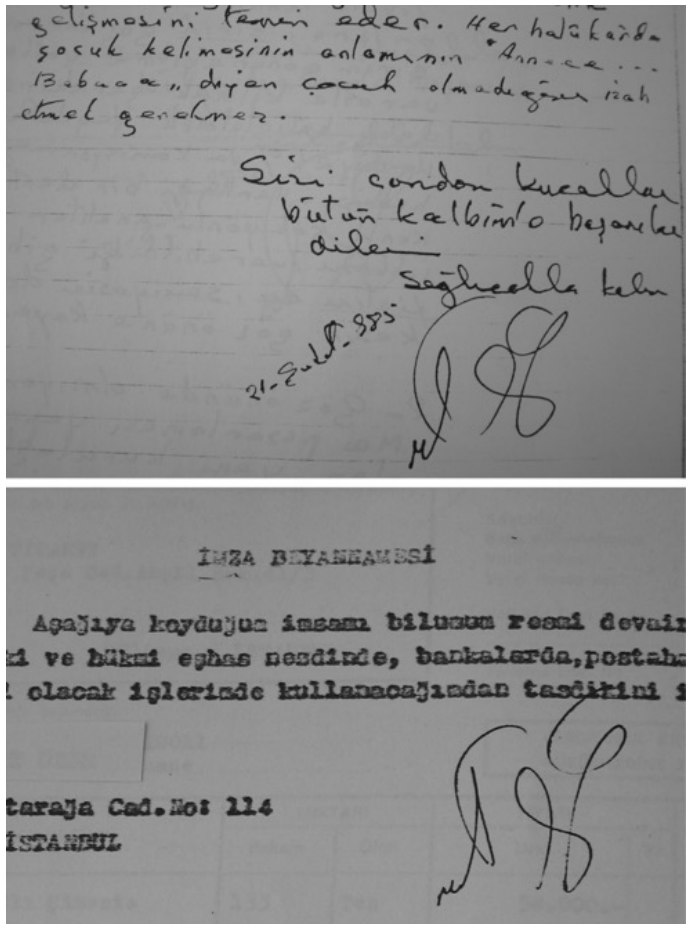


Figure 5. Handwritten letter and signatures by NÖ written to his family and an official document including only his signature in 1985. No indication of changes in handwriting and signatures due to Alzheimer's disease (AD).

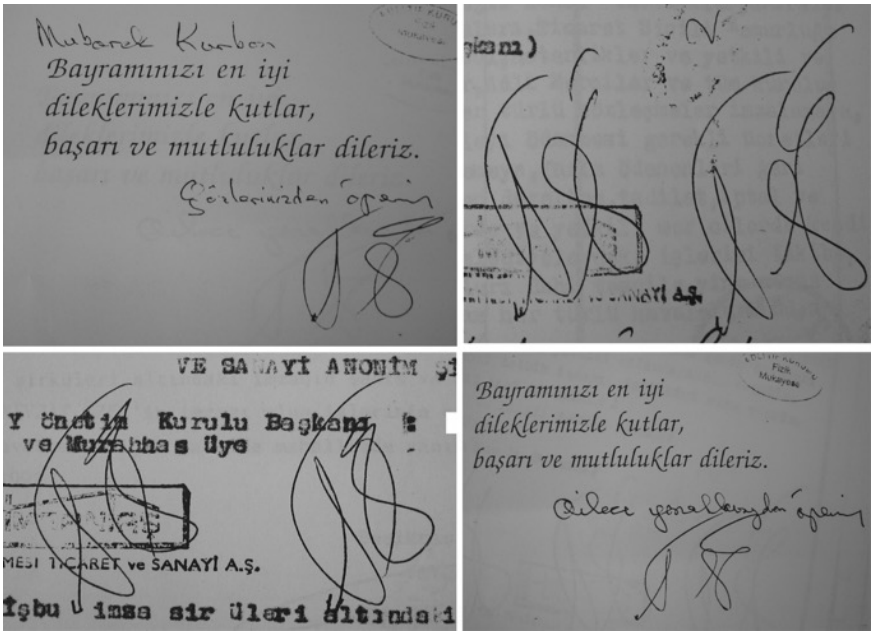


Figure 6. Four documents including handwriting and signatures by NÖ in 1991. First and very minor indications of changes in his signatures due to Alzheimer's disease (AD). The first letter "N" at the beginning of his signatures is deformed and illegible. At that time he was not officially diagnosed with AD.

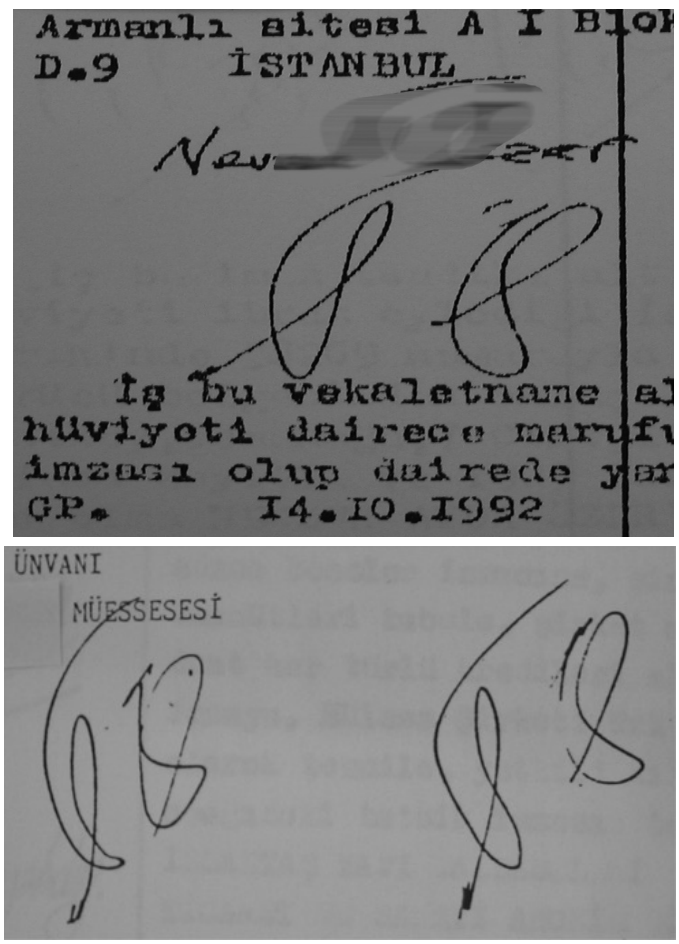


Figure 7. Two official documents including handwriting and signatures by NÖ in 1992. In addition to the changes in his signature in Figure 6, the signature size was increased and more lines were added to the signature.

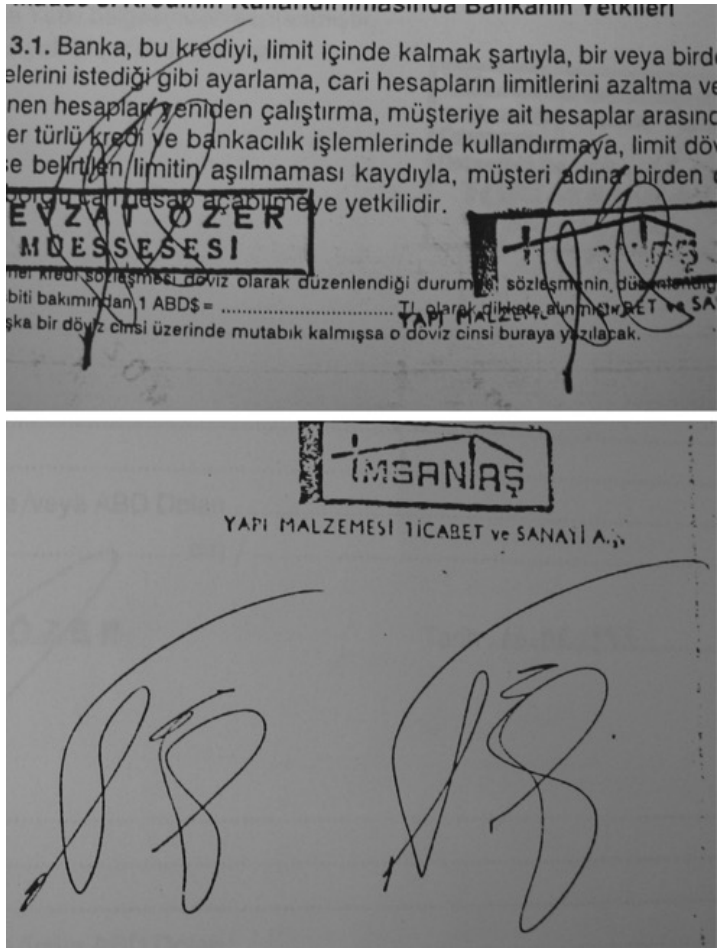


Figure 8. Two official documents including signatures by NÖ in 1993. Findings similar to those in Figure 7 are also evident in this figure.

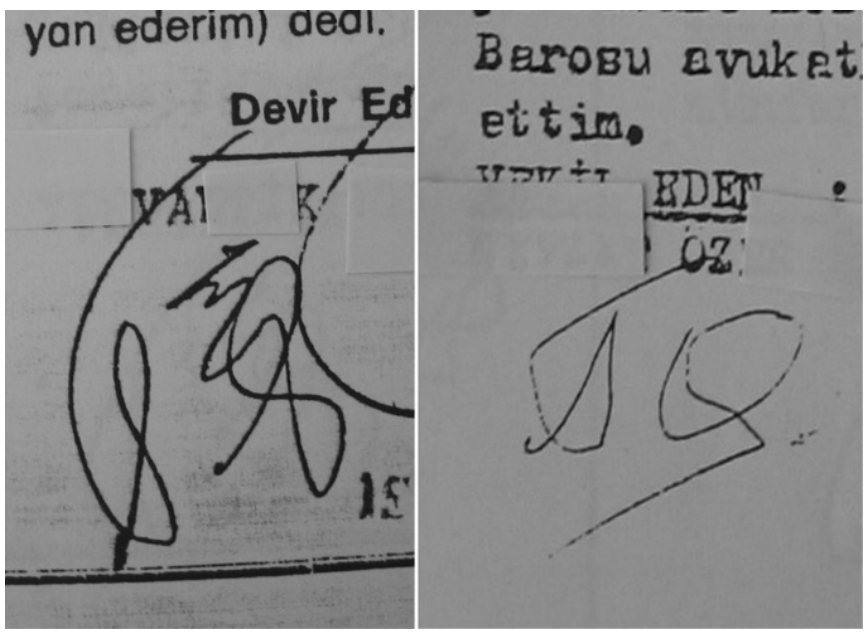


Figure 9. Two official documents including signatures by NÖ in 1995. The signature is completely deformed; the signature is formed from incomprehensible lines, there are discontinuities, hesitation, excessive pen lifts and tremor in lines.

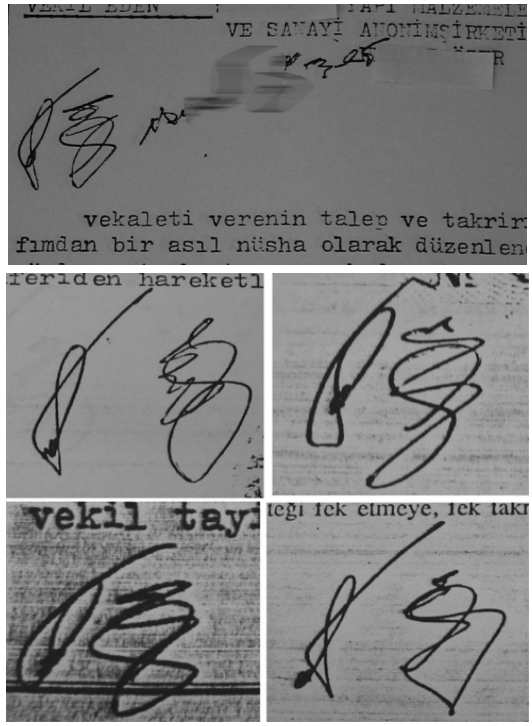


Figure 10. Five official documents including handwriting and signatures by NÖ in 1996. Handwriting and signature are completely deformed; the signature is formed from incomprehensible lines, there are discontinuities, hesitation, excessive pen lifts and tremor in lines. Some letters in his handwriting are not clearly identified.

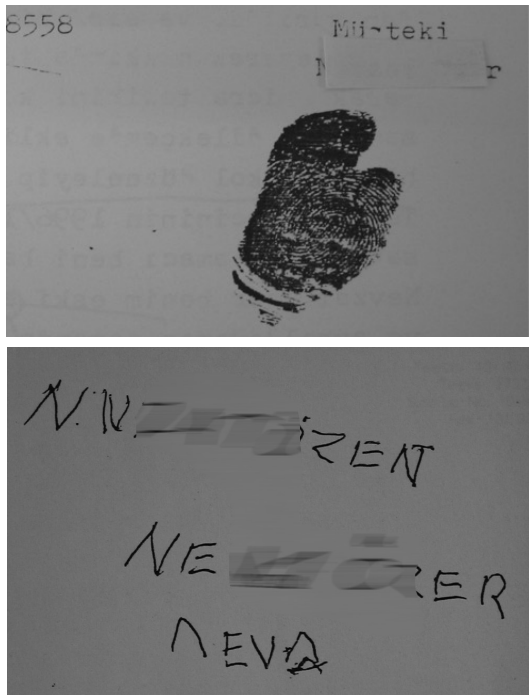


Figure 11. Two official documents submitted to the court shortly before his death; the first is the fingerprint on an official document as he was incapable of writing his signature and the next is the sample of his handwriting for comparison. Documents dated late 1997 until the subject's death in 1998 reflect forgotten letters, repeated letters, increased distance between consecutive letters, and disorder in handwriting showing letters not in a straight line.

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