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**Limited Forensic Assessability of Soft Tissue Injuries.
Contrastive Terminological Analyses of Hungarian, Austrian and
German Medical Diagnostic Reports**

Theses of the PhD Dissertation

by

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1. Introduction

Medical diagnostic reports on injuries (MDRI)

When injuries are caused by accidents or assaults, patients are usually treated at departments of traumatology. The primary issue in such circumstances is providing first aid, and in many cases, saving lives or preventing long-term health complications. Besides this kind of stress and grave responsibility they are also required to register each case for the reasons mentioned above. Occasionally, in the case of a law suit being initiated later, a court-appointed forensic expert is asked to give expert opinion on the injuries, based on the medical report.

Forensic problems with ambiguous MDRIs and their possible consequences

In Hungary, forensic experts have called the attention to the fact that several injuries are impossible to assess due to insufficient clinical descriptions, although a specific form for describing injuries exists. Other studies carried out by insurance physicians have shown that numerous patients' claims were rejected by insurance companies due to insufficient or ambiguous medical documentation. A survey conducted in Germany on the documentation of injuries caused by domestic violence revealed that a lot of injuries were not described in sufficient detail and the use of terms was not accurate enough for a later forensic reconstruction.

In case the assessment cannot be accomplished by a forensic expert due to insufficient registration of injuries or inconsistent terminology, further examinations must be conducted. However, soft tissue injuries cannot be properly assessed at a later date because by then the healing process will have started and the appearance of injuries (e.g. that of haematomas and superficial wounds) may have changed significantly. Besides financial consequences, an unsuccessful reconstruction of injuries may also have legal and ethical implications. If the underlying mechanism and the weapon involved cannot be identified in certain soft tissue injuries, only a less serious injury can be proved. Consequently, the defendant cannot be convicted of the crime he might have committed but only of a less grave one. Thus, victims are neither served justice nor can they claim appropriate compensation for immaterial or material damage.

Linguistic approach to MDRI

From the linguistic point of view, medical diagnostic reports on injuries are regarded as samples of a specific medical genre. So, MDRI were analysed and described at the terminological and lexico-grammatical levels to reveal both the frequency and the possible linguistic causes of insufficient communication between primary treating doctors and forensic experts.

For the purpose of a comparative analysis, MDRI cited by Hungarian, Austrian and German forensic files were examined to facilitate terminological comparison between practices of recording injuries in these three countries. As the terminology describing injuries originates from medical Latin, which was translated into the national languages of Europe, differences and similarities in the use of terms could be shown in the three-language corpus. The common historical origin of the Hungarian and Austrian terminology at the time of the Austro-Hungarian Empire facilitated its comparison with that used in Germany.

The present study aimed to compare MDRI collected in countries within the continental legal system, where forensic experts act as impartial interpreters of medical findings, as opposed to the Anglo-Saxon legal system.

The role of MDRI in Germany, Austria and Hungary

Although the laws of Germany, Austria and Hungary stem from the continental legal system, the role of MDRI slightly varies from country to country.

In several cities of Germany, an institution for performing immediate examination of injured people called outpatient forensic clinics (*Forensische Ambulanz*) has recently been established in university forensic departments. It allows patients to require expert opinions in case they wish to report offences following injuries. In the case of hospitalisation, probands are also examined in hospitals. As opposed to the German system, in Austria injuries are usually assessed by forensic experts solely on the basis of clinical findings. In Austria the injured can be examined by forensic experts only in exceptional cases, which, for instance, is possible in the Forensic-Clinical Centre of Graz. In Hungary, the forensic assessment of injuries works in the same way as in Austria. The only slight difference is that in Hungary, concerning lawsuits, the findings of the injuries are required by the prosecution written on a specific form called 'visual findings' (*látlelet*).

2. Goals and hypotheses

The present study aimed to analyse the genre of MDRI from the linguistic point of view in order to describe the genre and to find out to what extent forensic assessment is influenced by the use of terms. It also intended to describe typical lexico-grammatical word patterns which can be detected in MDRI as in any other medical genre and to contrast them between the three analysed countries. As forensic assessment of soft tissue injuries is often hindered at a later date, and adequate terminology is highly important for a forensic reconstruction, the analysis concentrates on injuries of the soft tissue.

The insufficiency in forensic reconstruction of soft tissue injuries is caused by communication problems between primary treating doctors and forensic experts. Primary treating doctors do not always seem to be aware of the fact that their documentation might at some point constitute legal evidence, and that their target audience does not always consist of physicians of the same speciality. This results in mixing terms and generic characteristics called interdiscursivity, which is due to the following factors in the analysed corpus:

1. Use of terms at various levels of terminologisation not having a (definite) denotative meaning.
2. Inconsistent use of nominal collocations due to different classifications of injuries in other fields of medicine.
3. Frequent occurrence of synonymy.
4. Diverse implementation of the same concepts and different ways of recording injuries.
5. Numerous words borrowed from various levels of professionalism within medical communication.
6. Missing essential information e.g. exact localisation and wound characteristics, which results in limited forensic assessability of soft tissue injuries.

3. Material and methods

In the present study 339 Hungarian, 106 German and 101 Austrian forensic files collected from the period between 1995 and 2011 were examined, using the methods of corpus and statistical analysis to reveal the occurrence and the linguistic causes of limited forensic assessability in the case of soft tissue injuries. The anonymised files were provided in digital format by forensic institutions of different regions of Hungary, two university departments of

forensic medicine in Germany and one forensic university department in Austria. Each file contained both the clinical medical documentation of soft tissue injuries and the related forensic expert opinion.

In Hungary, 60 files were collected from the Department of Forensic Medicine at the University of Debrecen, 57 ones from the IFEFR (Institute of Forensic Experts and Forensic Research = Igazságügyi Szakértői- és Kutatóintézet) in Szekszárd, 62 ones from the IFEFR in Győr, 51 ones from the IFEFR in Kaposvár, 58 ones from the Department of Forensic Medicine at the University of Pécs and 51 ones from the IFEFR in Veszprém.

In Germany, 56 files were provided by the Department of Forensic Medicine at the Johannes Gutenberg University of Mainz, and 50 were made available by the Forensic Department of the University of Freiburg. In Austria, 101 files were obtained from the Department of Forensic Medicine at the University of Graz.

For the purpose of corpus analysis, files were grouped in sub-corpora according to the countries and in further sub-corpora according to the regions of countries they were collected from. Only three parts of each file were taken into consideration: the detailed descriptions of injuries (designated part A), the related diagnoses (designated part B) - the latter two as parts of the MDRI - and the opinion formulated by a forensic expert (designated part C).

For statistical analysis, numeric codes were assigned to all the 2437 injuries included in the corpus on the basis of a main and a sub-category designating the types of injuries.

- I. main type:
 - 1. injuries without epithelial lesion e.g. 'haematoma'
 - 2. injuries with epithelial lesion e.g. 'incised wound'
 - 3. unidentifiable terms (without exact definition of an injury, e.g. 'tenderness')
- II. subtype: 33 synonymous groups of terms in Hungarian, Latin and German

Statistical analysis was performed using Microsoft Excel and SPSS 19 to list all terms applied for types and characteristics of soft tissue injuries in the whole corpus. The linguistic analysis consisted of the examination and comparison of collocations, lexico-grammatical patterns and terminology specific to the genre of MDRI in all three countries, using the concordancing software WordSmith 5.0.

4. Results

Results of general statistics

The cause of injuries recorded in the MDRI was in about 80-90 percent of the cases assault in the Hungarian and German sub-corpora, however, in the Austrian sub-corpus almost the same amount of assaults and accidents was registered.

The primary treating doctors registering MDRI were in the Austrian and German sub-corpora exclusively clinicians, while in the Hungarian one almost 10 percent were general practitioners.

The registration of the exact date of treatment was detected in almost 100 percent of the MDRI in the Austrian and German sub-corpora, however, in the Hungarian one it was recorded in 86 percent of the cases. As opposed to the date aspect, the exact time of the examination was found only in about one-third of the MDRI in all three sub-corpora.

No reference to consumption of alcohol and narcotics was made in about 80-90 percent of the German and Austrian files. However, in Hungary not registered positive or negative findings accounted for only about 60 percent.

The assessability of MDRI by forensic experts was examined on the basis of exact references made in the expert opinions. If a reference to an impossible reconstruction was found in an expert opinion, the *whole MDRI* was regarded as *partially assessable* in the corpus, even if only one injury was not assessable in it. In the Austrian and German sub-corpora limited assessability was detected in about 20 percent of the files, while in the Hungarian one in about 14 percent.

Terms for soft tissue injuries in the Hungarian sub-corpus

In the Hungarian sub-corpus no significant territorial differences were found concerning the use of terms depicting soft tissue injuries. Altogether 1119 soft tissue injuries were recorded by physicians in the *descriptions* of MDRI, of which 24.1 percent were not identifiable as any specific kind of soft tissue or other injury. In the *diagnoses*, about 50 percent of the findings belonged to unidentifiable injuries.

The concordance analysis showed that 4 of the 9 *incised wounds* were diagnosed as *chop wounds* and 2 as *lacerated* ones. Therefore only 3 came up in the diagnoses as *incised wounds*. It was also possible to show that most terms depicting unidentifiable injuries like ‘*tenderness on pressure*’ and ‘*injury*’ in itself changed in the diagnoses into ‘*bruises*’.

Since the official form of MDRI used in Hungary requires the diagnoses to be also registered in Latin, it was possible to compare the Hungarian and Latin terminology. In 7 percent there was no correlation between the two, although they intended to depict the same injury.

In the Hungarian sub-corpus, 997 soft tissue injuries were mentioned in the *expert opinions*. In injuries caused by blunt force, forensic experts chose the term ‘*repszett seb*’ = literally ‘*ruptured wound*’, while the term ‘*zúzott seb*’ = literally ‘*bruised wound*’ was used much less frequently by experts than by physicians to describe the same entity. Another apparent phenomenon was that experts characterised more injuries as ‘*lacerated wounds*’ than physicians did, and vice versa, experts diagnosed less ‘*haematomas*’ than primary treating doctors. However, the unidentifiable term ‘*bruise*’ was detected in the expert opinions with the same frequency as in the physicians’ diagnoses.

Terms describing soft tissue injuries in the Austrian sub-corpus

As there was no possibility to collect forensic files from different regions in Austria, regional differences in the use of terms depicting soft tissue injuries cannot be analysed. In the *descriptions* 303 injuries were described, most of them belonging to the group of unidentifiable injuries, especially to the synonymous group ‘*tenderness on pressure*’. In the *diagnoses*, about one-half of the terms depicted unidentifiable injuries. In the Austrian sub-corpus the term ‘*bruise*’ was also registered very frequently in both the MDRI and expert opinions.

Terms describing soft tissue injuries in the German sub-corpus

In the German sub-corpus 339 soft tissue injuries were recorded in the *descriptions* part, of which only about 30 percent belonged to the unidentifiable injuries. In the *diagnoses*, the latter accounted for about 40 percent. By far the most frequent synonymous group was ‘*haematoma*’ (with about 85 percent). The statistical analysis showed that 15 ‘*incised wounds*’ were diagnosed as ‘*stab wounds*’.

Since German forensic experts personally examine probands more often than their Austrian and Hungarian colleagues, it was not possible to compare the terminology of expert opinions with the terminology of MDRI on the same basis as in Hungary and Austria. In the German expert opinions injuries were described in much more detail than in the MDRI due to the forensic approach. Consequently, in the *expert opinions* almost three times as many (1015) injuries were described as in the MDRI (399).

However, it was possible to contrast the synonyms used by clinicians and forensic experts. While physicians seem to prefer the term *Platzwunde* for lacerated wound, this term was not detected in the expert opinions. The same applies to the term *Schürfwunde* meaning ‘abraded wound’ and ‘*Prellung*’ being a synonym of ‘bruise’. ‘*Prellmarke*’, another synonymous term of ‘bruise’, was found in the expert opinions even more frequently than in the MDRI.

Regional differences in the use of terms in Germany

In both sub-corpora most injuries were not listed among the diagnoses, although they were described. In the files collected in Freiburg there was a disproportionate distribution of ‘*incised wound*’ (= *Schnittwunde*) and ‘*stab wound*’ (= *Stichwunde*) between the descriptions and the diagnoses. The synonymous group ‘*haematoma*’ appeared almost three times more frequently in Mainz than in Freiburg. Furthermore, in Mainz there were a lot more stab wounds described than incised ones, but much fewer of both were listed in the diagnoses. Among descriptions of subjective symptoms belonging to the synonymous group ‘*tenderness on pressure*’ the same term (in German *Druckschmerzhaftigkeit*) was more frequently applied in the region of Freiburg, while the term ‘*pain*’ (*Schmerz*) was more often used in Mainz. The most frequent synonym of the group ‘*lacerated wound*’ was in both regions ‘*Platzwunde*’ (= literally ‘*burst wound*’), and the terms ‘*Riss*’ (=literally ‘*rupture*’) and ‘*Riss-Quetschwunde*’ (= literally ‘*ruptured-bruised wound*’) were only found in Freiburg. In the synonymous group ‘*bruise*’ most injuries were described as ‘*Prellmarke*’ (= ‘literally ‘*bruise mark*’) and ‘*Prellung*’ (=‘*bruise*’) in both regions.

Comparison between the use of terms in Hungary, Austria and Germany

The concordance analysis showed that there were similarities not only between the synonymous groups but even between the particular synonyms used in Hungary and Austria. In the synonymous group ‘*lacerated wound*’ the only term which cannot be literally translated from Hungarian is ‘*Platzwunde*’, because in the Hungarian collocation the collocater word

(the word describing the base noun with general meaning) is *'repszett'* meaning *'ruptured'*, while the Austrian term *'Platzwunde'* refers to *'burst wound'*. The only synonymous group in Austria which does not have all its synonyms in Hungarian was *'bruise'*. While the Hungarian term *'zúzódás'* refers literally to *'crushing'*, the term *'Prellung'* in Austria depicts a meaning more similar to *'bouncing from or off something'*.

In the corpus analysed a great difference between the Austrian and German primary treating doctors' approach could be observed. While Austrian physicians, similarly to Hungarians, seem to apply more *'general'* terms like *'swelling'*, *'tenderness on pressure'* and *'sprain'* with all their synonymous terms, German doctors tend to describe injuries with more exact terms like *'haematoma'* and specific types of wounds. While German physicians mostly use the Latin-root word *'Hämatom'* for *'haematoma'*, Austrians prefer the *'germanised'* forms *'Blutunterlaufung'* and *'Bluterguss'*. In the nominations of *'lacerated wounds'* there is also a significant difference to establish. German physicians predominantly use the term *'Platzwunde'* (=literally *'burst wound'*), whereas Austrians seem to prefer *'Riss-Quetschwunde'* (literally *'ruptured-bruised wound'*) instead.

Correlation between injuries in descriptions (A), diagnoses (B) and expert opinions (C)

Since in numerous cases there were different synonymous groups and terms found in the descriptions (A) and in the diagnoses (B) in all three countries, the question arose which part of MDRI's the expert opinions were mostly based on.

The chi-squared test showed a significant correlation ($p < 0.001$) between the synonymous group correspondence variables A-B and B-C. According to the results of the statistics, Hungarian forensic experts base their opinions more on the descriptions (A) than on the diagnoses (B) of MDRI's, while Austrian forensic experts seem to make only a slight difference between descriptions (A) and diagnoses (B) when assessing injuries. Besides the fact that in the German files a personal examination of the proband was reflected, even the statistical results confirmed that only in very few cases are MDRI's applied for the assessment of injuries.

Synonymous groups of unidentifiable injuries in A, B and C

The object of this analysis was to reveal how the most frequently used terms for unidentifiable injuries in the descriptions (A) were diagnosed (B) and later assessed by experts (C). In the Hungarian sub-corpus the synonymous group *'tenderness on pressure'* was mostly diagnosed

as 'bruise', and the same term was mostly repeated in the expert opinions as well. If the description was bruise, in most of the cases it was also found in the diagnoses (B) and in the expert opinions (C).

In the Austrian files only after '*Schmerz*' (= '*pain*') was '*Druckschmerzhaftigkeit*' (= '*tenderness on pressure*') the most frequent unidentifiable description. The related diagnoses were mostly missing or sometimes '*Prellung*' (= '*bruise*') was present, while in the expert opinions these injuries were usually not mentioned. If the description registered a bruise, in both the diagnoses (B) and the expert opinions (C) the term '*Prellung*' (= '*bruise*') was the most frequently used term; however, '*Prellmarke*' (= '*bruise mark*') was also used by forensic experts (C).

The marked diversity of the systems did not allow to compare Germany to Austria and Hungary in terms of terminological relations between MDRI and expert opinions.

Terminology of lacerated wound

Since the synonymous group '*lacerated wound*' belonging to the type 'injury with epithelial lesion' yielded the widest range of synonyms, the use of this group was followed in A, B and C in all three countries. In the Hungarian descriptions (A) the most frequently used term was '*repszett seb*' (= '*ruptured wound*') which was diagnosed (B) as '*ruptured wound*' or more often as '*zúzott seb*' (= '*bruised wound*'), and in the expert opinions (C) the term '*repszett seb*' (= '*ruptured wound*') was the most frequent one. In Austrian descriptions, diagnoses and expert opinions the term '*Riss-Quetschwunde*' (= '*ruptured-bruised wound*') was the only one detected. However, in the German descriptions (A) and diagnoses (B) the most prevalent term was '*Platzwunde*' (= '*burst wound*'), as opposed to Austria. Nevertheless, German experts seem to prefer '*Riss-Quetschwunde*' (= '*ruptured-bruised wound*') and '*Risswunde*' (= '*ruptured wound*').

Registered characteristics of injuries

The statistical analysis showed a significant difference in the registration of size between the three analysed countries. Primary treating doctors most often registered the exact size in mm or cm in each sub-corpus. Compared to the other two countries, German physicians more frequently put the words 'about' or 'ca' before the numbers, using so called approximate sizes. Hungarian physicians indicated sizes in about 20 percent through comparisons e.g. 'the

size of a thumbnail’, while Austrians in about 30 percent of the cases used relative terms like ‘big’ or ‘small’.

Using chi-squared test, significant differences ($p=0.039$) were found in the recording of the numbers of injuries between Hungary, Austria and Germany. In several MDRI's indefinite numerals (e.g. many, multiple) or the terms of injuries in plural were registered instead of definite numerals (numbers). The highest cases of not evaluable numbers of injuries were found in Hungary.

The shape, direction, base, depth, tissue bridges, side-walls, edges, colour according to different types of injuries were only recorded in very few cases in all three sub-corpora. The average number of registered characteristics in one injury was 0.87 in Hungary, 0.55 in Germany and 0.28 in Austria. However, a Mann–Whitney U test yielded the result that *the number of characteristics recorded did not influence assessability in the analysed sub-corpora*.

Registration of the exact location of soft tissue injuries

In several cases the registration of the affected side was missing or the recorded side was not in accord in the different parts of MDRI's (A and B). According to the statistics, only 26.3 % of the Hungarian, 17.4 % of the Austrian and 13 % of the German files recorded the same side in the descriptions, the diagnoses and the expert opinions. However, only cases where all three parts of the file registered the affected side were taken into consideration.

Registration of location

Using the WordSmith 5.0 concordancing software the descriptions of injuries were examined to show how detailed locations were recorded by physicians in MDRI's and by experts in forensic expert opinions. It was revealed that most descriptions as well as diagnoses only consisted of two elements, the side and the affected body part. Only seldom were there 3 elements detected. From the linguistic point of view, the inconsistent use of side aspects in combination with body regions was found in numerous cases, e.g. ‘left head’ or ‘right back’. However, in the descriptions by German forensic experts usually 4-6 elements were listed.

Lexico-grammatical analysis

The lexico-grammatical analysis suggested that each structural unit of the genre analysed contains typical lexico-grammatical features of the professional language use. However, besides the typical overuse of possessive attributes, ellipses and participles, which are present in all three countries to a similar extent, a special listing character can be observed, with lists consisting of lexico-grammatical patterns which are more specific to MDRI than other kinds of medical reports

5. Discussion

In accordance with the main hypothesis, a high level of interdiscursivity was established in the analysed corpus. The factors by which the interdiscursivity manifests itself were listed in minor hypotheses 1-6.

Hypothesis 1 was proved in all three sub-corpora, as in the MDRI of each one there were terms with various levels of terminologisation not having an explicitly defined meaning. Not even the university text books offer exact and consistent definitions.

Hypothesis 2 postulated that inconsistent use of nominal collocations can be detected in MDRI due to different classifications of injuries in other fields of medicine. This hypothesis was only proved in Hungary, based on concordance analysis and a comparative study with the terms used in surgery. In Austria and Germany, however, compound words instead of collocations were found, which also slightly differed from those in surgical use. Consequently, the second part of the hypothesis, namely the confusion of terms in different fields was verified by contrasting the terminology applied in forensic medicine and surgery both in Hungarian and German.

Hypothesis 3, a frequent occurrence of synonymy was also confirmed by the concordance and statistical analyses in all sub-corpora included in this study. In the corpus analysed, synonymy is also due to the lack of exact definitions pertaining to manifestations, underlying mechanisms and types of injuries.

Hypothesis 4 suggested diverse implementation of the same concepts and different ways of registering injuries in the analysed countries. This hypothesis was confirmed because the way of registering injuries in Hungary differs from that used in the other two countries, while in Germany the forensic assessment is more frequently performed on the basis of a personal examination. Different implementation of the same phenomena was proved comparing the word-for-word translations of

types of injuries, as well as definitions describing muscle strain and lacerated, stab and incised wounds in the three countries. There was also a significant difference found in the registration of wound features in the three countries. However, the validity of results yielded by the corpus analysis must be restricted to the use of LSP in the regions discussed in the present study. Establishing generalisable results pertaining to the terminology in the documentation of injuries in all three countries requires further research.

Hypothesis 5 postulated that numerous words of MDRI were borrowed from various levels of professionalism within medical communication. This hypothesis was also confirmed, since a large number of - from a forensic point of view – unidentifiable injuries were found. These were described by physicians either at the professional colloquial level or at a workshop level, using terms which lack exact definitions in forensic medicine.

Hypothesis 6 suggested that missing essential information e.g. exact localisation and wound characteristics leads to interdiscursivity. This hypothesis was not confirmed in the present corpus. Although a high number of missing or inconsistent data were detected in MDRI of all three sub-corpora, the statistical analysis did not confirm the existence of significantly impaired forensic assessment. However, in about one-fifth of the cases impaired assessment was proved. The missing significance of this phenomenon might be due to a kind of subjectivity in forensic reconstruction.

Consequently, as a high degree of interdiscursivity was shown in the present analysis, standardisation is indicated in the genre of MDRI in all three countries. ICD (International Classification of Diseases) does not contain specific types of injuries according to underlying mechanisms which are relevant from the forensic point of view. Thus it seems to reflect statistical aspects. Because the use of ICD has not proved to be a reliable method of standardisation, current users of the genre should initiate the development of exact definitions and the introduction of terms at a national level.

The present study intended to draw attention to the major communication problem which frequently occurs between primary treating doctors and forensic experts in accidents and assaults pertaining to the documentation of soft tissue injuries by clinicians or GPs. This problem can lead to limited or in several cases even to impossible forensic assessability. The linguistic causes revealed and data yielded by a large corpus of forensic files might serve as the basis for standardisation promoted by professional language users.

6. Conclusion

The results of the present study confirm the hypothesis that MDRI can be characterised by interdiscursivity, predominantly due to the inconsistent use of terms and the absence of important features of soft tissue injuries in the three analysed countries. These factors can be attributed to the supposition that clinicians do not always seem to be aware of the fact that their medical findings might be used as legal evidence when a crime or forbearance is investigated. Another reason might be that they only concentrate on the acute treatment, which they often have to perform at night or under aggravated circumstances. There are neither standardised forms to fill in nor terms made available for physicians formulating findings on injuries. Consequently, it can hardly be expected that primary treating doctors should provide MDRI which are perfectly applicable to forensic reconstruction.

Therefore, in order to simplify and facilitate clinical documentation of injuries in everyday life, the use of a terminology in an effectively developed structure would be advisable. It could be standardised with the help of forensic experts and offered to clinicians in the form of a computer software in the three countries included in the present study. This software could help primary treating physicians throughout the process of registering findings by asking relevant questions and digitalising data. In case the software was integrated in the usual databases of hospitals, it would allow the attachment of imaging findings and photo documentation as well.

As a by-product of a more practical and effective documentation, an increased forensic assessability might even be achieved due to the use of terms, which are standardised and defined also from the forensic point of view. The software would support the maintenance of lexico-grammatical patterns specific to the genre of MDRI in each national language. These patterns could be taken into consideration, while laying the bases for international or at least European standardisation. The Hungarian version of such a computer software is being developed in cooperation with the Department of Forensic Medicine at the University of Pécs.

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