

# Quality assurance in forensic odontology

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## ABSTRACT

Quality assurance or quality control is a term and concept coming from the industry. Here it is most important. All products must have a minimum quality and variation in size, for example, must be kept within certain strict limits. There must be a system to control this. May be not every single product is controlled, but spot tests must be taken. Measures must be taken to improve the quality if it is not good enough.

This concept has been transferred to medicine, odontology, and consequently also to forensic odontology. These areas have in common with industry the production of that certain products. However, they are usually handmade and not produced in an industrial process. In addition, dentistry is a great deal of art and judgement and quality control of these factors may be difficult. In this paper, I will focus on forensic odontology. What are the problems? What can we do and cannot do? In addition, how can we assure the quality of the work, the assessment and conclusion, and the report? I have some personal opinions on that and I will give some suggestions.

Quality assurance on an international level is difficult. Conditions and juridical systems are different in different countries. Especially forensic odontologists are different and have different opinions. This presentation will be relevant to the ongoing discussion and attempts at revising the IOFOS' guidelines for quality assurance.

## QUALITY CONTROL IN INDUSTRY

Quality assurance is an idea coming from the industry. There they call it quality control. In the production of certain products, there is a need to keep the variation of each sample within certain dimensional limits. Only a minimum variation is acceptable. In addition, there is a need to make sure that the quality is good enough so that the product will not stop functioning after a short time. Therefore, certain descriptions defining the quality are set up. Often the quality controllers have a special task to control that the quality is satisfactory and that products that do not satisfy the defined quality should be withdrawn from the market.

## NEED FOR QUALITY CONTROL IN MEDICINE AND DENTISTRY

Obviously, in both medicine and dentistry patients may be dissatisfied with the quality of the service or treatment offered because of a poor technical quality or poor patient treatment.

This may sometimes lead to claims for compensation. It is also bad for the reputation of doctors and dentists. Therefore, the idea that some kind of quality control could improve the situation came up both on a state level, from the health authorities, and from the professional organizations.

It is possible to produce a description of what is intended as quality. However, the professional organizations and the professionals have had difficulties in accepting quality controllers, because there is no tradition for looking into the work of a dentist or a doctor. Especially, dentists feel uncomfortable in accepting that a control of their works is performed by other persons. Therefore, they invented a new system to make sure the quality was good enough. That was quality assurance. They wanted to implement systems whereby the dentist could control the quality of his own work.

### **QUALITY ASSURANCE**

Quality assurance by definition implies that all measures are taken to assure that the quality of the given service is satisfactory both for the patient and for the dentist. A textbook describing the final product and the procedure to follow to obtain a satisfactory result is part of the quality assurance. Naturally, all teaching and demonstrations contribute to quality assurance. Scientific research in the subject can also help to improve quality. Diagnosis and treatment should as far as possible be based on scientific evidence. Professional organizations have been mostly involved in the definition of the steps in the procedure, implying that following the procedure properly the result will be satisfactory. In dentistry may be difficult to define an acceptable final result and also it may be difficult to control that. The starting point in a restoration may be very variable and very often improvisation may be required. This is almost impossible to judge and understand afterwards. The recommendation is that you should not be too eager to criticize the work of other dentists.

Most state authorities and professional organizations have therefore focused their activity to obtain acceptable quality and on the steps to follow, and how to perform these steps. This has resulted in a point for point description of the procedures to be followed. The state health authorities may thus require that the dentists write a procedure handbook available in the practice. Updates of such a book must be

done from time to time, and the updates dated. This may also simplify the record keeping. Important steps in a procedure, which you should normally note, can be omitted by just referring to the procedures. However, any deviations from the procedures and why they actually occurred become important and should be recorded.

The understanding that quality is important is not new neither in medicine nor in dentistry. People have tried to set up systems to improve the quality of the service and work. Long before the definition of the concept of quality assurance, the preparation of forms to use was a way to make sure that the surgeon did not forget important steps. If you followed the form, you should therefore have an optimal chance of having performed a quality treatment.

### **MINIMUM QUALITY/OPTIMUM QUALITY**

It is always a question if the quality obtained is an optimal quality or a minimum quality. In industry, the quality defined will always be a minimum quality. However, in dentistry you never see a minimum quality defined: it will always be an optimal quality for the case. Given that only few dentists may be able to deliver optimal quality treatments, there will always be the possibility of a quality improvement. This is a part of quality assurance called quality development.

### **QUALITY ASSURANCE IN FORENSIC ODONTOLOGY**

As a part of dentistry, also forensic odontology should have some kind of quality assurance. Anyone who had the opportunity to read reports from forensic odontologists must admit that sometimes the quality of the reports could have been better. Forensic odontology is a special subject but only in a few countries, it has an acknowledged specialty in the field. In other countries, any dentist can call himself a forensic odontologist. Thus, there is also no special education in the field. Naturally, the knowledge of forensic odontology may be variable. In addition to university-affiliated dentists, many private practitioners become interested in forensic odontology. They often consider forensic odontology a practical area with just a little need of a theoretical background. Accordingly, they are not so interested in reading scientific articles in that field.

Since the time of Amoëdo at the turn of the 18<sup>th</sup> century, many textbooks have been published. These books have often put the emphasis on histories and cases rather than the more boring technical notes. As examples of this, we may consider the identification. It has been used as an expression without any more discussion of what it really means. Obviously, it may mean different things to different persons. Authors seem to be able to identify without doubt most dead persons. There is no mention that you may never be 100% sure of an identification. Moreover, it is the task of the police, ID-commission or coroner to make the final identification. The forensic odontologist should only make a comparison report, not an identification report. The forensic odontologist is thus only responsible to assess how much the dental evidence may make for the final identification. The forensic odontologist is not responsible for the final identification.

Another technique for quality assurance, especially in identification procedures, is the use of a form. In a form, there are specific spaces to fill in for each important observation. This is excellent, but in my experience, a number of dentists have still not understood that they should fill each field of the form, leaving none of them empty. You should state this explicitly even if there is no information. Otherwise it is not possible to take full advantage of a form.

With the introduction of quality assurance in medicine and odontology, a more formal step by step procedure was suggested. It became mandatory to have a handbook describing the procedures in practice step by step. This also affects the forensic odontologist practice, even if few of us have such a handbook. Many professional organizations, however, introduced procedural steps that the dentists could use. The last edition of American Manual of Forensic Odontology included also description of the procedural steps to follow in bite-mark cases<sup>1</sup>. There is the danger that such procedural steps could tend to cement a procedure and may be an obstacle to improvements. The other problem is that forensic odontologists tend to have their own opinion, which is difficult to change.

The agreement upon the number of steps, and how to perform them, may be extremely

difficult. Within one country, as it in the US for instance, it is possible to force the practicing forensic odontologists to follow the accepted procedures. This might not be valid on an international level. This became obvious in an IOFOS meeting at Lillehammer in 2003. Several forensic odontologists from different countries met to draft recommendations for quality assurance for IOFOS. It was practically impossible to agree upon anything. Some people wanted to include procedures which others thought were unnecessary. It became soon clear that on an international level forensic odontologists will never agree upon the exact procedures. It was therefore decided only to define the steps and not to describe how to do them<sup>2</sup>.

### **AMERICAN MANUAL OF FORENSIC ODONTOLOGY AND OTHER BOOKS**

This book have been rewritten many times and the 6<sup>th</sup> edition is now under preparation. The manual, which covers most of the fields in forensic odontology, is actually a textbook, with different chapters written by different authors, authorized by the American Academy of Forensic Odontology (AAFS)<sup>1</sup>. It is, however, unknown which control the AAFS have on each author and the exact text. It also covers the history of forensic odontology and it has a chapter on forensic medicine and jurisprudence and the expert witness testimony, both useful for a thorough understanding of the background of forensic odontology. The book contains also a lot of good advice for practical casework. The chapter on bite-marks also includes the American Board of Forensic Odontology (ABFO) standards for the investigation and the final report as a step by step approach to the work. It also contains a recommendation for a second expert reviewing of the work and conclusions to ensure the quality and reliability.

Another recent textbook from England is Forensic Odontology<sup>3</sup>. It is an easy introductory text, which considers most fields of forensic odontology included the role of forensic odontologists in the protection of vulnerable people. The field of dental injuries in connection with crime or prime target of a crime has however been forgotten. However, this book can be considered an excellent introduction to forensic odontology for dentists who want to go into this field.

## **IOFOS RECOMMENDATIONS FOR QUALITY ASSURANCE**

In 2003, the IOFOS executive took an initiative to call a working meeting to draft recommendations for forensic odontology work. The meeting took place in a mountain cabin close to Lillehammer, Norway. The participants came from many countries of Europe, Asia and Africa. Some suggestions had been sent out to the participants beforehand and the participants were divided in groups to discuss the different fields of forensic odontology. The subjects were age estimation, identification and identification after large disasters, dental injuries, tooth-marks and the forensic odontological report. It was clear that an agreement detailed requirements on technique to execute each step would be extremely difficult to obtain. Therefore, it was decided to agree upon the different steps in the procedure to follow during a case without discussing how to perform the steps. Detailed recommendation on the technique to use should be set up by to the national associations. However, it turned out that there were great differences also in the views of which steps the participants considered necessary. Thus, the steps on which the participants agreed on were written in black, while steps that some would include while others thought they were unnecessary were written in blue <sup>1</sup>.

The 2014 Interpol Guide does not contain so much about forensic odontology and seems more a guide for the administrative police work <sup>4</sup>. It is however important for the forensic odontologist to have some knowledge and understanding of it. Only little is included about forensic odontology. Under the PM examination the guide says however that two or three odontologists should work together. It divides the roles of the forensic odontologists in examiner, recorder and radiography assistant. The Interpol Guide also recommends a double recording of the findings with one forensic dentist as the examiner and another forensic dentist who repeats the data to ensure a correct data entry. In my opinion, this is an unnecessary doubling of the time for the examination, and also the comparison of the data by two persons is time consuming. If there is something the dentist knows, it is recording of teeth and fillings. The procedure, as it is recommended by the Guide, is a distrust of dentists, as such a procedure has not been recommended for any other specialist groups. It

is important to use the accepted Interpol nomenclature and forms for the registrations especially in the identification procedure of a foreign individual when the body and report are being sent to another country.

Much of the text is devoted to the excision of the jaws, which may be important under certain conditions. It is important that the excision of the jaws may be done only after a proper authorization from the legal controlling authority and only when deemed necessary. However, an absolute requirement that the jaws should be always kept with the body at all times show that the authors do not know why it is sometimes a good practice to take out the jaws and remove them for later supplementary examination. However, it is imperative to return the removed jaws to the body before it is sent to the relatives for burial, especially if on an international context.

The practicing dentist should keep a copy of the AM records for himself for documentation and control if asked about special details. This problem is of course, avoided if a computer program for dental recording is used as most dentists do today. It is also stressed the necessity to register the name, address, e-mail address and telephone number of the dentist. The original records and radiographs should never be given to relatives after a disaster.

Under the methods of identification, following conclusions are recommended <sup>1</sup>. Identification, 2. Identification probable. 3. Identification possible. 4. Identity excluded in case it is necessary to write a report and 5. Insufficient evidenced in case there is no AM or PM material. It is seldom actual to write a report in such cases.

## **MY RECOMMENDATIONS**

It is difficult to orient yourself towards the best practice if you get a forensic odontology case. After my long experience in many years, I may give some recommendations. I know that forensic odontologists want to make professional examinations and reports with a minimum time used. First, I will recommend to follow the practice defined by Interpol as far as it is a good guide, and to use the forms and nomenclature. Any form you use, all fields should be filled in with information. Further, I would recommend to read the IOFOS recommendations for quality assurance and follow them. These recommendations are valid for all the fields of

forensic odontology and under all circumstances. They should be universal. It would be a sign of quality if the forensic odontologist at the end of his report states that the examination and the work have been carried out according to the IOFOS recommendations and that the report was written according to the same recommendations. Perform each step of the procedures according to the best knowledge or to the recommendations from the national societies of forensic odontology. To be able to choose the best practice, it is necessary to read both textbooks and scientific articles.

The fact that there is no systematic education in forensic odontology does not excuse the

odontologist if he does a lousy job or even ends up with wrong conclusions. We work among professionals in forensic medicine and law. They know their job. They also know how to produce a professional report. They will easily see if a forensic odontologist does not perform following a good standard. Lawyers have often impressed me by their knowledge of dentistry. Do not try to trick them!

The quality assurance systems do not cover all the possible circumstances. Even if recommendations are issued, it is important to use one's own brain. It happens that sometimes it might be necessary to improvise in some aspects of the procedures.

## REFERENCES

1. IOFOS' recommendations for quality assurance in forensic odontology: [http://www.iofos.eu/Quality\\_assurance2.html](http://www.iofos.eu/Quality_assurance2.html)
2. Senn DR and Weems RA ed. Manual of Forensic Odontology, Fifth ed. CRC press 2013, 445 pp.
3. Adams C, Carabott R and Evans S ed. Forensic Odontology. An essential guide. First ed. Wiley & son, Oxford 2014. 305 pp.
4. Interpol's guide for DVI and forms: <https://www.interpol.int/INTERPOL-expertise/Forensics/DVI>