An audit of dental prescriptions between clinics and dental laboratories

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RESEARCH

IN BRIEF

- Emphasises the ethical and legal requirements that dentists must provide when writing instructions to a technician.
- Highlights that a high proportion of prescriptions received by technicians are non-compliant.
- Recommends that further undergraduate training in laboratory prescription writing is needed.
- Suggests the whole dental team needs to be educated regarding communication.

Aim To discover the quality of written instructions from dentists to dental technicians and the nature of non-compliant prescriptions. **Method** An audit of laboratory prescription compliance was conducted within an NHS Trust Dental Teaching Hospital to determine the level of communication between dentists and dental technicians. One hundred and fifty prescriptions were audited from dental undergraduates and qualified dentists throughout the different departments. **Results** A total of two-thirds of prescriptions were considered non-compliant and failed to meet relevant ethical and legal guidelines. This problem was seen throughout all departments and at all professional levels. **Conclusion** A breakdown in communication between dentists and technicians through the use of prescriptions is evident even within a close working environment.

INTRODUCTION

It is paramount that dentists and dental technicians are aware and have an understanding of each other's clinical and technical responsibilities and limitiations.[1] The quality of care and the success of the final prosthesis provided to the patient are heavily dependent upon effective communication between the dentist and dental technician.[2]

Communication between dentists and technicians is primarily through the use of laboratory prescriptions. The prescription is usually the entire basis on which the appliance is constructed. Therefore, relevant design information must clearly and effectively be transmitted from the dental surgery to the laboratory. Carefully completed prescriptions are not only able to improve the quality of the final prosthesis, but can also avoid unnecessary delays and remakes, potentially saving time and effort for the dentist and technician, but most importantly the patient.[3]

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Legislation

Since 1998, it has been necessary for all prostheses and restorations manufactured in dental laboratories to comply with the European Union Medical Directive (MDD). The MDD merged with its medicines counterpart in 2003 to become the Medicines and Healthcare products Regulatory Agency (MHRA). The aim of the Agency is to safeguard the public's health. This is achieved by ensuring that medical devices are compliant and are constructed with materials that have been regarded as acceptably safe; and by responding promptly when new concerns come to light.

There is an ethical and legal obligation which places specific requirements on dentists to provide adequate written instructions when a prosthesis is being manufactured, and on the technician to manufacture the prosthesis to this specification.[4] Inadequate communication of design may result in a prosthesis that has been fabricated with little reference to important clinical or biological information.

The European Commission proposed a number of changes to the MDD 93/42/EC with respect to custom-made devices statements. The amendments came in to place on 21 March 2010. Before these amendments the manufacturer (laboratory) of a custom-made device was only required to provide a copy of the statement to the prescriber (dentist). Through the introduction of the amendment directive 2007/47/EC there is now a requirement that the statement should be available to the named patient for whom the device has been manufactured upon request.

The statement must contain the following information:

- The name and address of the manufacturer
- Data allowing identification of the device in question
- A statement that the device is intended for exclusive use by a particular patient, together with the name of the patient
- The name of the medical practitioner or the authorised person who made out the prescription and, where applicable, the name of the clinic concerned
- The specific characteristics of the product as indicated by the prescription
- A statement that the device in question conforms to the essential requirements of custom-made devices and, where applicable, indicating which essential requirements have not been fully met, together with the grounds.[5]

Despite the legal and ethical responsibilities on dentists to prescribe and communicate design information to the technician, a

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number of studies exist which demonstrate a lack of communication and concerns regarding the quality of the information provided by dentists.[6–14] Prescriptions have been called the most often used and abused form of communication between the dentist and the technician.[15]

The reasons for the poor communication found in these studies were usually either financial or educational factors. Studies have found, by comparing samples of written instructions provided under different fee structures, that there was little difference between the qualities of the instructions. Therefore it was suggested that the problems encountered by the dentist in communicating the design of the prosthesis were probably related more to educational issues than financial ones.[8]

A study by Clark[16] suggested that the General Dental Council (GDC) have left it open to dental schools to reduce the time spent on dental technology to a level where competency cannot be achieved. A recent study[17] concluded that the aims of the GDC for *The first five years* have not been met with regards to:

- Effective communication between dentists and dental technicians
- Newly qualified dentists do not have an appropriate understanding of dental technical techniques
- Dental schools do not sufficiently prepare dental undergraduate students to communicate with the dental laboratory.

This view was shared by other authors,[18,19] who stated that the lack of mutual understanding between dentists and dental technicians was due to two main reasons: a lack of integration of dental and dental technology students during education, and the near elimination of dental technology from the dental school curricula to create more time for theory and patient contact. It is imperative that dental students must be aware of all the technical stages to allow sensible and accurate laboratory prescription. The dental curriculum does not include compulsory modules for such prescription writing; therefore the only experience gained by dental undergraduates is through clinical work placements. Dental students are expected to become familiar with laboratory techniques passively rather than by active participation.

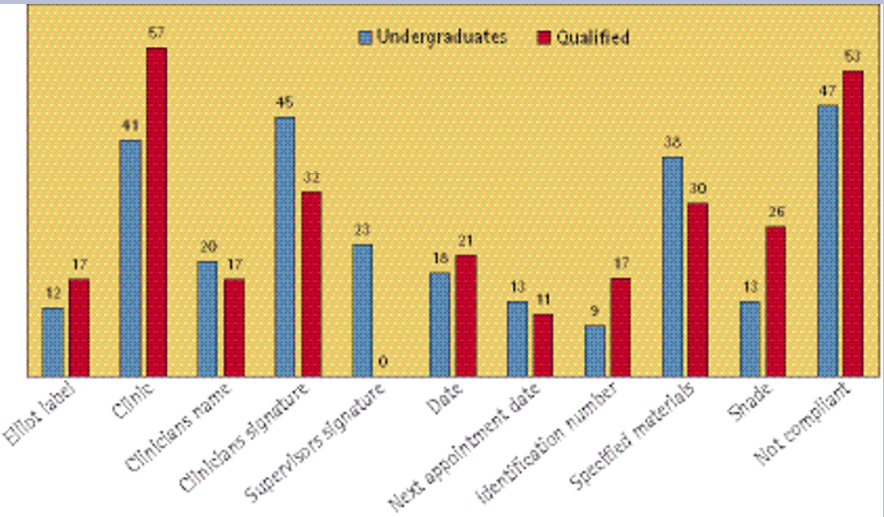

Fig. 1 A graph to show the frequency of missing information in prescriptions from undergraduates and qualified dentists

Table 1 Quality of written instructions provided by different departments

Instruction quality	Department		
	Orthodontics n (%)	Prosthodontics n (%)	Conservation n (%)
Clear	19 (38)	27 (54)	33 (66)
A guide	29 (58)	14 (28)	12 (24)
Poor	2 (4)	9 (18)	2 (4)
None	0 (0)	0 (0)	3 (6)
Illegible	2 (4)	15 (30)	8 (16)

Table 2 Quality of the diagram of the prosthesis design provided by different departments

Diagram quality	Department		
	Orthodontics n (%)	Prosthodontics n (%)	Conservation n (%)
Clear	27 (54)	18 (36)	2 (4)
A guide	6 (12)	8 (16)	3 (6)
Poor	2 (4)	4 (8)	0 (0)
None	15 (30)	20 (40)	45 (90)

The purpose of this study was to investigate the level of communication between dentists (both qualified and undergraduates) and dental technicians in a University Hospital teaching environment, through the analysis of the number of non-compliant prescriptions by the dental laboratory.

An audit was completed and the aim was to:

- Fulfil the laboratory's role and responsibilities according to the new legislation
- Assist in the training and education of the dental team
- Make the best use of resources available.

METHOD

An audit was conducted in an NHS Trust University Dental Hospital. In most UK dental universities, clinical dental undergraduate education is delivered independently from some training programs of other dental care professionals. This

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Trust had the advantage of also teaching dental technology undergraduates, which allowed contact and sometimes an element of integrated learning for clinical and technical students. Interaction between students could potentially improve their future working relationship, by gaining an understanding of what could reasonably be expected from each other's position.

The marking criterion for the audit was that the prescriptions should comply completely (100%) with what was deemed necessary by the MHRA. The investigation aimed to discover the nature of non-compliant prescriptions and information was sought regarding the quality of written instructions and the diagram of the design. Written instructions and the diagrams were classified as:

1. Clear – the instructions are clear
2. A guide – minor decision making has been left to the technician
3. Poor – major decision making has been left to the technician
4. None – no instructions have been communicated.

The sample consisted of 150 prescriptions. Fifty prescriptions were randomly selected from each of the following disciplines: orthodontics, removable prosthodontics, and conservation technology. An equal number of prescriptions from dental undergraduates and qualified dentists were audited; this allowed careful comparison of the standard of written instructions and non-compliant prescriptions between the two professional levels. The standard of written instructions between the departments was also compared to determine whether the standard was suffering in any one particular discipline.

Data was recorded using Microsoft Excel spreadsheet. Descriptive statistics are reported.

RESULTS

A total of 150 prescriptions were audited. Fifty percent (n = 75) were completed by undergraduates and 50% by qualified dentists. Of the total, 67% (n = 100) were considered non-compliant in one form or another. The most commonly missed information was the departmental clinic from which the prescription originated, at 65% (n = 98). The name of the prescribing clinician was not indicated on the prescriptions 25% (n = 37) of the time, while the signature of the clinician was absent in 51% of cases (n = 77). Complete patient information was not present in 19% (n = 29) of cases. The date of prescribing technical work was not indicated on the prescription in 26% (n = 39) of cases while the next appointment date was absent from 16% of prescriptions (n = 24). The type of material required for the construction of the appliance was not specified 45% (n = 68) of the time. Figure 1 shows the frequency of missing information provided by both undergraduates and qualified dentists.

To be 100% compliant and conform to the legal requirement by the MHRA, the audit requested 11 pieces of information to be present on the prescriptions. The highest amount of absent information seen was eight; a qualified orthodontist completed this prescription. Of the prescriptions audited, 18% (n = 27) had over six incidences of non-compliance. This meant that over half of the information required for the audit was not present on the prescriptions. The mode of absent information was four. This implied that over half the information needed on the prescription was present.

The information gathered regarding the quality of the written instructions is shown in Table 1. From the total it was deemed that 53% (n = 79) of instructions were clear and precise. Within the removable prosthodontics and conservation departments the undergraduates' written instructions were slightly clearer than the dentists'. The biggest difference was seen within the removable prosthodontics department where 64% (n = 16) of prescriptions from dental undergraduates were thought of as 'clear' compared to 44% (n = 11) from dentists.

Thirty-six percent (n = 55) of instructions were believed to be a 'guide' with some of the decision-making left to the technician. There was little variance between the standard of instructions between the undergraduates and qualified dentists.

Poor instructions were reported in 9% (n = 13) of cases, leaving major decision making to the technician. No instructions were provided in 2% (n = 3) of prescriptions. The prescriptions with no written instructions were received from the conservation department from dentists.

A total of 17% (n = 25) of prescriptions were considered to be partially illegible.

The quality of diagram of the design was audited in the same manner as the written instructions (Table 2):

- 32% (n = 47) were classed as being clear and precise
- 11% (n = 17) were a guide, with minor decisions left to the technician
- 4% (n = 6) were poor, leaving major responsibility for the design to the technician
- 53% (n = 80) had no diagram of the design.

There was little variance between the undergraduate results and qualified dentists.

DISCUSSION

This audit showed that there was a high level of non-compliant prescriptions being submitted by undergraduates and qualified dentists in a University Hospital teaching environment. Under the new legislation proposed by the MHRA the laboratory has more responsibility in evaluating prescriptions, stating the choice of material used to fabricate an appliance, providing a statement of conformity and finally checking the appliance before dispatch.

The most frequent piece of absent information from the prescriptions was the clinic from which the prescription originated. This could have been due to having an 'in-house' laboratory and it being felt that it was not necessary to provide such information. However, legal requirements by the MHRA make it compulsory and in a teaching environment all requested information should be supplied. Qualified dentists were poorer in providing this information. This could be due to undergraduates being more thorough when completing the prescriptions and also because supervisors checked the completed prescriptions.

The second most common missed information was the clinician's signature. Again this information is required for compliance with legislation proposed by the MHRA. The reasoning behind the undergraduates' results being so poor could be down to having supervisors checking and assuming that the prescriptions would be signed by them. The importance of undergraduates authorising their own work would

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encourage good practice and prevent bad habits developing when graduating. Dentists were also poor in providing an authorised signature; this may be deemed as unprofessional and would indicate the necessity for further education. This could be down to bad habits picked up from being a student. The legal obligation should be highlighted from early on in clinical dental undergraduates' education and more emphasis should be focused on correctly completing the prescriptions.

The type of material required to fabricate the prosthesis was poorly provided. This could be due to inadequate technical knowledge, not being aware of what materials were available and the assumption that the laboratory will use standard materials. Legally, the material has to be specified on the prescription, therefore this poses a very important question of whether it is now the technician's responsibility to provide the information. Realistically, the type of material used, if MDD compliant, will not make a difference to the patient unless there is an allergy, in which case it is the dentist's responsibility to provide the relevant information to the technician.

In this audit, just over half (n = 79) of the written instructions were considered clear and provided sufficient information to construct the appliance. It is important that dentists recognise their ethical and legal responsibilities. Dentists have the knowledge and authority to delegate laboratory procedures based on patients' functional and aesthetical demands. It is therefore the responsibility of the dentist to design the final prosthesis without seeking assistance from the technician. A dental technician would not have access to clinical information regarding the patient. The responsibility of the technician is to fabricate the prosthesis specifically prescribed by the prescription. If these responsibilities are not adhered to the outcome may be an unacceptable prosthesis. Clear and effective communication between dentist and technician is essential for successful fabrication of the final prosthesis. Inappropriate use of the prescription will leave much of the decision making to the technician.

It was found in the audit that the qualified dentists did not provide any or full written instructions, and were contacted for clarification, more frequently than undergraduates. This could be because the cases were more complex and the treatment plan may haveneeded to be discussed before deciding on the design.

Analysis of the results suggests that undergraduates are more accurate at completing what is required on a prescription than dentists. Information is some times repeated but this could be due to a lack of confidence in what to prescribe technically. Duplicated information may also be added by supervisors to clarify what construction stage is needed for the next clinical visit of the patient.

Within the conservation department the diagram for the design was rarely provided. Perhaps this is because the diagram is only required when detail such as staining is requested. A design is not always necessary depending on the stage of treatment, but when it is required and it has not been provided, it may be that the only way to address the issue is for dental technicians to refuse work where a design is absent, causing disruption to the patient. This is also applicable when the design does not have an authorisation signature. In either case, valuable time is needed to contact the prescriber and clarify the missing information, so that the appliance can be constructed in a timely manner and the patient does not become compromised.

Consistently the results show that poor communication of written instructions is evident even in the close working relationship encountered within a hospital environment. The undergraduates and dentists in this study are fortunate as they can go to the laboratory to talk to the technicians about materials and techniques. Such efforts undoubtedly help them to appreciate and understand the difficulties faced by the technician. The technician may also be utilised in the clinic to assist the dentist with technical adjustments and shade taking, etc. This is a luxury that most qualified dentists may not have when starting work in independent practices. To ensure quality of service to patients, undergraduates and qualified dentists should take advantage of the 'in-house' laboratory while it is available to provide for an increase in their knowledge and technical skills.

SUMMARY

It can be concluded that the level of communication between dentists and dental technicians, even within a close working environment, can at times be inadequate. It was evident that a significant proportion of prescriptions were non-compliant and failed to meet the relevant ethical and legal guidelines. This was a problem that existed throughout each department and through different professional levels.

The prescription has to be 100% compliant before commencing the requested appliance so that a statement of conformity can be drawn up to accompany the completed laboratory work to the clinic. Dentists can then provide the patient with their individual conformity statement if requested, or retain it for the lifetime of the appliance. The whole dental team needs to be educated regarding this issue. The dental technician may need to refuse work until all the relevant information has been provided. The importance of correctly completing a prescription needs to be highlighted at the beginning and throughout dental students' education. Further undergraduate training in laboratory prescription writing is recommended.

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