

Trends in referral format and dental notation used in primary care referrals to dental specialists

S. Jadun,^{*1} M. Ashley² and M. N. Pemberton³

Key points

Shows the speed of change of format of referral and the influence of the introduction of an electronic referral management system.

Discusses the influence of format of referral on dental notation used.

Demonstrates the relative frequency of each dental notation in referral letters.

Aim To identify trends over time in the format of communication, and the use of different forms of dental notation in referrals from dentists to dental specialists. **Methods** A total of 400 referrals received in four dental specialities (paediatric dentistry, orthodontics, oral surgery and restorative dentistry) at the University Dental Hospital of Manchester were assessed. The format of referral and the type of dental notation used was assessed. In addition, the results of this study were compared with previously conducted audits regarding the format of the referral. **Results** The Alphanumeric was the most frequent type of dental notation used. The Palmer notation was the next most frequently used in handwritten referrals but rarely used in word processed referrals. The Federation Dentaire International (FDI) system was infrequently used, and the Universal notation was not used in any referral. In comparison with previous audits, there is an increased use of proformas and word processed referrals. Handwritten letters are now rarely used. **Conclusion** Alphanumeric dental notation is the notation of choice in referrals from primary care to secondary care in all the dental specialities assessed. Proformas, when available, and word-processed letters have replaced handwritten conventional letters as the format of choice for referrals.

Introduction

The professional relationship between general dental practitioners (GDPs) and specialist practitioners is a well-established aspect of patient care. Communication from the GDP is received by the specialist, which is then usually followed by a patient consultation.

An informative correspondence letter is then conveyed from the specialist back to the GDP, with a copy of this correspondence often given to the patients themselves. For clinical care to be effective, it is essential that the information provided be clear and accurate and understood by both recipient dentists. This is especially applicable when discussing teeth to be treated.

Various dental notation methods have been introduced in previous years, ranging from the Palmer notation to the more modern Alphanumeric system. A summary of the notations used and examples of each are demonstrated in Table 1.

There has been much debate about the various tooth notation systems currently in use. Notations familiar to most UK dentists would include the Palmer, Alphanumeric and FDI systems. The Palmer system produces a graphical image of the patient's dentition, however, problems are encountered when trying to translate this form of notation on a word processed document.¹ The Federation Dentaire International (FDI) system, introduced in 1970 by the FDI suggested the two

digit system devised by Dr J. Viohl of Berlin.² This was an attempt to improve communication between dental professionals worldwide. Although there is great importance in thinking globally about notation, dental practitioners have raised concerns regarding the use of the two-digit FDI system.³ The first number in the FDI system represents the quadrant in which the tooth lies, and the second number the tooth itself. If a typing error were to occur, this may result in treatment of the wrong tooth, potentially without realisation. The system involves greater thinking and care when translating the digital numbers into meaningful anatomical directions.³

The Universal system is commonly used in the United States. When contrasting the Universal and FDI system, there may be some confusion in the similarity between the numerical forms of identification.

The Alphanumeric system has become more widely used over recent years. It is the preferred notation of choice in some professional journals and has previously been noted to be used in professional correspondence.⁴

¹Dental Core Trainee 2, University Dental Hospital of Manchester, Manchester University NHS Foundation Trust, Manchester, M15 6FH; ²Consultant in Restorative Dentistry and Honorary Senior Lecturer, Division of Dentistry, Faculty of Biology, Medicine and Health, University of Manchester and University Dental Hospital of Manchester, Manchester University NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, M15 6FH; ³Consultant in Oral Medicine and Honorary Professor, Division of Dentistry, Faculty of Biology, Medicine and Health, University of Manchester and University Dental Hospital of Manchester, Manchester University NHS Foundation Trust, Manchester Academic Health Science Centre, Manchester, M15 6FH

*Correspondence to: Sarah Jadun
Email: sarahjadun@yahoo.co.uk

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The University Dental Hospital of Manchester (UDHM) receives a large number of dental referrals from our GDP colleagues each year. Following consultation and at the end of any treatment provided, the consultant will write back to the referring GDP to summarise the treatment provided or advised.

Anecdotally, there appears to be fewer handwritten referral letters than previously. If so, then the change from handwritten letters to word-processed documents may also have elicited a change in notation in order to overcome technological issues. The aim of this study is to assess the current usage of dental notation in referrals from primary care to secondary care, and how the form of communication may influence the notation used. In addition, this study also assesses changes over time in the format of referrals to the restorative dentistry department at a university teaching hospital.

Methods

This study retrospectively assessed referrals from GDPs to the specialities of oral surgery, restorative dentistry, paediatric dentistry and orthodontics at the University Dental Hospital of Manchester. A total of 100 referrals per speciality received between November 2017 and January 2018, were randomly selected and retrospectively assessed for the following:

1. Format of referrals
 - Handwritten letter
 - Proforma- handwritten or word-processed
 - Word processed letter
 - Letter combined of handwritten and word processed aspects
2. Type of dental notation used in each format of referral
3. Frequency of use of different dental notations used to identify each tooth.

The proformas assessed were those developed by, and in long term use by, the Manchester University NHS Foundation Trust (MFT) and more recently those developed by a dental referral management company (FDS). Some exclusion criteria were necessary based on whether a free text section was available on the referral proforma. Proformas containing tooth notation grids (Palmer notation) were not included, as the dentist is guided to use the Palmer notation if such a grid is available as part of the proforma. The specialities not included, due to notation grids, were the FDS proformas in paediatric dentistry and

Table 1 A summary of the various tooth notation systems used followed by an example

Type of notation	Summary	Example
Alphanumeric	'U' or 'L' are used to denote 'upper' or 'lower' arch. 'R' or 'L' to denote 'right' or 'left'. Number 1-8 denote adult teeth, and letters A-E denote deciduous teeth (counting away from the midline).	Upper left first permanent molar is written as UL6
Palmer	This consists of a symbol $\begin{matrix} \downarrow \\ \downarrow \\ \downarrow \\ \downarrow \end{matrix}$ designating in which quadrant the tooth is found and a number or capital letter indicating the position (counting away from the midline).	Upper left first permanent molar is written as L ⁶
FDI	A two digit system, where the first digit indicates the quadrant 1-4 for permanent teeth (counting from the right maxillary quadrant and proceeding clockwise), and 5-8 for deciduous teeth. The second digit indicates the tooth within the quadrant (counting away from the midline).	Upper left first permanent molar is written as 26
Universal	Numbers 1-32 are used for permanent teeth (commencing with the upper right wisdom tooth and proceeding clockwise). Uppercase letters A through T are used for primary teeth	Upper left first permanent molar is written as 16
Long hand	This denotes the full tooth notation	Upper left first permanent molar is stated in full.

Table 2 The frequency of formats used in 100 referrals per speciality, assessed in 2017/2018

	Handwritten referral letter	Word processed referral letter	MFT proforma		FDS proforma		Totals
			Handwritten	Word processed	Handwritten	Word processed	
Paediatric dentistry	3	53	22	22	0	0	100
Orthodontic	0	16	2	1	12	69	100
Oral surgery	5	67	14	14	0	0	100
Restorative dentistry	0	6	10	15	10	59	100
Totals	8	142	48	52	22	128	

Note: FDS proformas in paediatric dentistry and oral surgery were excluded

Table 3 The type and frequency of dental notation used

	Longhand	Palmer	FDI	Universal	Alpha-numeric	Totals
Paediatric dentistry*	16	6	4	0	81	107
Orthodontics**	12	5	3	0	83	103
Oral surgery†	17	14	2	0	77	110
Restorative dentistry‡	6	8	3	0	83	100
Totals	51	33	12	0	324	

*Seven of these referrals had more than one form of dental notation being used.
 **Three of these referrals had more than one form of dental notation being used.
 †Ten of these referrals had more than one form of dental notation being used.
 ‡Only one form of dental notation was used in these referrals.

oral surgery. This eliminated any specific guidance the referrer may have encountered whilst composing the referral. All handwritten and word-processed letters were included in data collection.

For the second part of this study, data derived from previously conducted audits regarding referrals to restorative dentistry were used in order to identify any changes in the trends in the format of referral used. In

2007 and 2012, audits had been conducted to assess the quality of direct referrals into the Restorative Dentistry Department at the University Dental Hospital of Manchester. As a component of these audits, the format of referrals received had been assessed. The results of these previous audits with respect to the format of the referrals were thus compared to the format of referrals received in restorative dentistry in 2017/2018 as already described.

All the data collected were gathered from registered audits.

Results

The frequency of use of different referral formats used in 100 records per speciality assessed in 2017/2018 is given in Table 2.

The type and frequency of dental notation used in 100 referral letters per speciality is given in Table 3. The dental notation used in different formats of referrals was also assessed, as demonstrated in Table 4. When comparing the dental notation used in various referrals, the Alphanumeric system was the most frequent dental notation used in both handwritten and word processed referrals. The Palmer notation was the next most frequently used but was rarely seen in word-processed referrals. The FDI system was infrequently used in both handwritten and word-processed referrals. The Universal notation was not used in any referral.

The results regarding format of referral to restorative dentistry in 2017/2018 compared to those attained in previous studies conducted in 2007 and 2012 are shown in Figure 1. There has been a decrease in the use of handwritten letters. Word processed conventional letters have also declined. Proformas are now the main format of referrals.

Discussion

With the passage of time, the format of referrals is changing. Handwritten referrals are disappearing, with a move to word processed referrals and most recently proformas. Proformas are the referral format of choice in electronic referral management systems and are likely to be increasingly used as these systems become more widespread in use. Over the last few years an electronic referral management system for dental referrals has been introduced into the Greater Manchester region and this has clearly accelerated the move to the use of proformas for referrals.

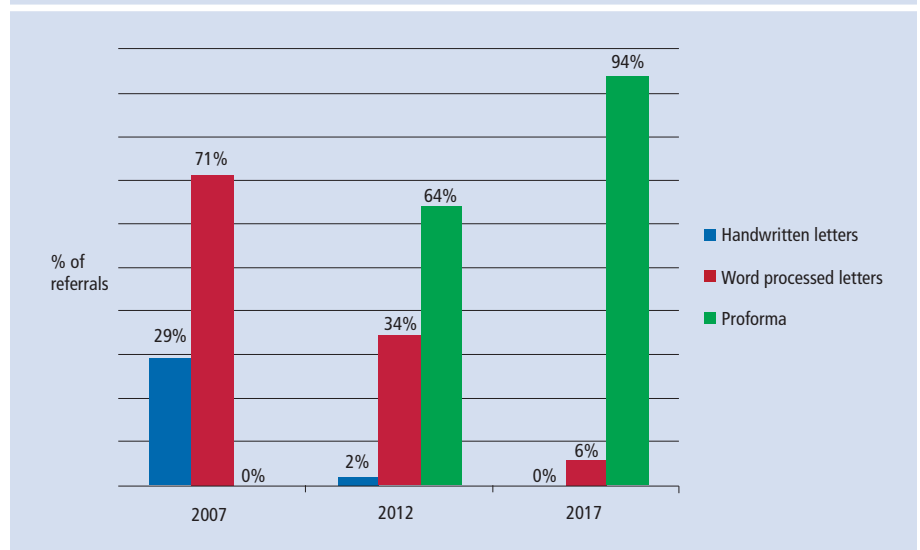
Table 4 The type and frequency of dental notation used in handwritten and word processed letters and proformas

	Handwritten referrals*	Word-processed referrals*	Totals
Longhand	5	46	51
Palmer	30	3	33
FDI	2	10	12
Universal	0	0	0
Alphanumeric	48	276	324
Totals	85	335	

*This includes handwritten letters and proformas

**This includes word-processed letters and proformas

Fig. 1 The frequency of format of referral received by the Restorative Dentistry Department in 2007, 2012 and 2017/2018 (Proformas included both handwritten and word-processed proformas)



The UDHM also receives referrals from across the Northwest of England and sometimes further away. GDPs who practice outside the Manchester area, and do not have easy access to, or familiarity with, the proformas available, may thus use a traditional referral letter. The use of traditional referral letters in this situation is likely to continue, albeit with decreasing frequency.

The results presented in Table 2 regarding frequency of referral formats used, is skewed for paediatric dentistry and oral surgery because of the need to exclude FDS proformas. As such, the frequency of different referral formats used in orthodontics and restorative dentistry are likely to be more representative of the ratios of different formats of referrals received in all specialities. The use of a proforma containing a pre-set notation grid may reduce the risk of error in communication and is

worthy of consideration in the development of future proformas.

The type of referral can be seen to guide the type of tooth notation used. The Palmer notation is a popular method of dental notation in the UK, and it is easy to understand as it is based on a grid of teeth as if facing the patient.⁵ However, the traditional Palmer notation can be seen to cause problems when using a word processor, therefore its use tends to be limited to hand written referrals. A solution proposed by Lewis⁶ was to use the Microsoft Word equation editor function. Another way to generate the over line/underline would be to include it as a part of a bordered table. The visible borders would need to be adjusted in order to recreate the correct form of the notation.³ Both of these methods, however, appear to be infrequently used in practice in the referral letters assessed.

The FDI system has been recommended and promoted by many international health-care organisations, including the International Standards Organisation (ISO).⁷ It remains the most popular dental notation system worldwide.⁸ Its strength lies in the simplicity of having one digit to indicate the quadrant, followed by a second to indicate the tooth within the quadrant.⁹ Conversely, it has been seen as causing confusion with the Universal system, which also uses numbers, especially when considering the quadrant/tooth being discussed.^{10,11} The FDI system has failed to overcome the professional resistance in the UK over many years, as highlighted by Blinkhorn *et al.* who in 1998 reported that only six dental schools in the UK taught the FDI system to their undergraduate students, and only one school used it in clinical practice.¹² All the other schools taught and used the Palmer system. This paper also reported on the dental notation used by GDPs in referrals to the paediatric dentistry department at UDHM. It reported that of the 136 referral letters reviewed, only one referral letter used the FDI system alone, 15 letters used both the FDI and Palmer notation and the remainder only used the Palmer notation. Similar findings were reported from Scotland in 2003, where the dental notation used in referrals from GDPs to restorative dentistry was found to be predominantly the Palmer system, with very few using the FDI system.⁴ This state of affairs is also reinforced by our results, with the FDI form of notation still being rarely used.

The Universal numbering system, having been adopted by the American Dental Association, is primarily utilised in the USA.¹³ Its unfamiliarity in the UK is denoted by its lack of use. It may also lead to confusion when used in conjunction with the FDI system, as both notation systems incorporate the use of numbers.¹⁴

The results presented here show that the Alphanumeric form of dental notation is easily the most widely used in referral

correspondence to all hospital dental specialities. The Palmer notation is more popular than the FDI notation system due to its continued usage in handwritten letters.

The importance of dental notation is most apparent when miscommunication occurs due to misunderstanding about the notation used. This is most likely when the writer and the recipient of a communication are different dentists. This can lead to wrong tooth extraction.¹⁵ With the increased patient safety culture in modern dentistry, it is crucial that such 'never events' are prevented.^{16,17} It is therefore imperative that any communication between colleagues is both clear and accurate. Dental professionals must be able to clearly and reliably identify individual teeth with clarity for their own records and in communication with others. Problems may arise with illegible writing in handwritten referrals, and typographical errors in word-processed referrals. Issues with right/left and upper/lower descriptions may also cause confusion. These multiple potential problems, when combined with a second professional's interpretation of the dental notation used, pose a significant patient safety risk.

The British Orthodontic Society¹⁸ produced guidelines to help ensure effective communication in extraction letters and avoid wrong tooth extractions. It advises that within written communication, orthodontists refer to the teeth to be extracted in two forms of notation, one of which should be words.¹⁹ This guideline accepts that different forms of tooth notation may be used by practitioners, but reinforces safety by denoting that the tooth to be extracted is conveyed in more than one format. This guideline has much to recommend it from a safety perspective.

Conclusion

Over recent years there has been a trend away from the use of handwritten letters in referrals. This change in use from handwritten

to electronic methods of communication has guided the use of particular dental notation types in referrals with the Palmer system now being infrequently used. The Alphanumeric system is currently the most frequently used form of dental notation in referral correspondence to all dental specialities. Regardless of the notation used, dentists must be aware of correct and clear usage to ensure patient safety through prevention of any miscommunication.

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