The use and abuse of abbreviations in orthopaedic literature

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ABSTRACT

INTRODUCTION Abbreviations are commonly used in medical literature. Their use has been associated with medical errors and they can be a source of irritation and misunderstanding. There are strict guidelines for their use. This study analysed the use of abbreviations in orthopaedic literature and compared adherence with guidelines in a general orthopaedic and spinal journal. It also examined orthopaedic professionals' understanding of abbreviations.

SUBJECTS AND METHODS The use of abbreviations in articles over a 3-month period in a general orthopaedic and spinal journal was analysed. The number of abbreviations and adherence with guidelines was recorded. A group of orthopaedic healthcare professionals were tested for their understanding of abbreviations.

RESULTS Almost half of all abbreviations were not properly used and 30% of abbreviations were never defined. Abbreviations were used significantly more often in the spinal journal. Only 40% of abbreviations were correctly defined by the orthopaedic professionals tested.

CONCLUSIONS Guidelines regarding the use of abbreviations are not being adhered to by authors or editors. The poor understanding of abbreviations underlines the importance of minimising their use and defining abbreviations when they are used.

KEYWORDS

Abbreviations – Acronyms – Orthopaedics

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Abbreviations and acronyms are commonly used in medical literature, presentations and medical notes. An abbreviation is a shortened form of a word or phrase used chiefly in writing to represent the complete form, *e.g.* UK for the United Kingdom. An acronym is an abbreviation consisting of the first letters of each word in the name of something, pronounced as a word, *e.g.* AIDS for acquired immuno-deficiency syndrome. For the purposes of this study – where the difference is not of any significance – the term 'abbreviation' is used to mean either an abbreviation or an acronym. Abbreviations are useful because they simplify, facilitate, and accelerate communication. They have become the shorthand of medicine.¹ However, the overuse of abbreviations can be a source of irritation, misunderstanding or medical errors.²

There are guidelines for the use of abbreviations in journal articles. Instructions to authors for the *Journal of Bone and Joint Surgery* (British volume) and *Spine* (Lippincott Williams & Wilkins) state that the use of abbreviations should be kept to a minimum: 'the style should be simple and direct, free from ambiguity and jargon, and with minimal use of abbreviations',³ and authors should 'write out the

full term for each abbreviation at its first use unless it is a standard unit of measure'.⁴ The International Committee of Medical Journal Editors states:⁵ 'Use only standard abbreviations; use of non-standard abbreviations can be confusing to readers. Avoid abbreviations in the title of the manuscript. The spelled-out abbreviation followed by the abbreviation in parenthesis should be used on first mention unless the abbreviation is a standard unit of measurement.'

A previous study of medical and general surgical journals⁶ showed that 43% of articles contained unfamiliar abbreviations. A review of paediatric notes and handover sheets found the use of abbreviations was wide-spread and not well understood.² Some of this misunderstanding may stem from the fact that abbreviations may have multiple meanings.^{7–11} Reading uncommon abbreviations takes our brains longer as we have to decode the abbreviation through its parent words.¹² This can be a particular problem if listening to a conference presentation where the listener has to assimilate information quickly.

There are no published works that look specifically at the use of abbreviations in the orthopaedic literature or that compare different types of orthopaedic literature. The aim

of this study was to determine whether the guidelines regarding the use of abbreviations in orthopaedic literature were being adhered to. We also wanted to compare the use of abbreviations in general orthopaedic and spinal journal articles. The senior author's experience of conference presentations and orthopaedic literature was that abbreviations were overused. We, therefore, analysed how healthcare professionals in local orthopaedic departments interpreted and remembered abbreviations using a questionnaire.

Subjects and Methods

Consecutive articles over a 3-month period (October–December 2006) from a general orthopaedic journal (*Journal of Bone and Joint Surgery* [JBJS], Britain) and a spinal journal (*Spine*, Lippincott Williams & Wilkins) were analysed. Editorials, letters and comment pages were excluded. Diagrams and figures from articles were not included. Abstracts and the articles full text were examined.

The following was recorded: number of individual abbreviations, frequency of repetition of each individual abbreviation, the presence of a definition (including repeats of definition), whether an abbreviation was actually used after initial definition and the overall number of abbreviations. The totals for abstract alone, article alone and combined abstract and article were recorded. The general orthopaedic journal and spinal journal were compared. Statistical analysis was performed using an unpaired *t*-test.

To test understanding of abbreviations, 43 orthopaedic healthcare professionals were given a questionnaire. As part of a presentation, each subject was given a list of 20 abbreviations taken from the articles examined. They were asked to provide as many definitions as they could. The list of definitions was then shown to the subjects. Ten minutes later, the subjects were asked to perform the same task again. They had no prior knowledge that they were to perform the task a second time. The average difference between the two tests was calculated and the results were

Table 1 Examples of undefined abbreviations encountered in study with their definitions

Abbreviation	Definition (presumed)
CT	Computed tomography
MRI	Magnetic resonance imaging
PID	Prolapsed inter-vertebral disc
AIS	Adult idiopathic scoliosis
BMI	Body mass index
OPLL	Ossification posterior longitudinal ligament
COSD	Chronic occupational spine disorder

analysed according to health profession groups – professions allied to medicine (nurses and physiotherapists), foundation year 1 doctors, senior house officers and equivalents, specialist registrars in orthopaedics and equivalents and consultant orthopaedic surgeons.

Results

A total of 171 papers were analysed from the 3-month period October–December 2006 (95 general orthopaedic and 76 spinal). Overall, 30% of abbreviations were never defined (29% general journal, 30% spinal journal). Only 4% of abbreviations were defined more than once (2% general journal, 5% spinal journal) and 12% of abbreviations were defined but not used again (16% general journal, 9% spinal journal).

The spine journal had a significantly higher number of different abbreviations per paper (*Spine* 5.1 vs JBJS 3.4; $P < 0.05$). The spine journal also had a higher number of overall use of abbreviations per paper (*Spine* 49.7 vs JBJS 15.6; $P < 0.001$) and per page (*Spine* 7.6 vs JBJS 2.8; $P < 0.001$). The average per page was derived to control for any difference in

Table 2 Results of abbreviation test for orthopaedic health professionals according to professional group

Group	Mean score (out of 20) before definitions provided	Mean score (out of 20) after definitions provided	Average increase
Professions allied to medicine	5.6	10	4.4
Foundation Year 1 doctors	6.7	10.3	3.7
Senior house officer equivalents	5.6	10.7	5.1
Specialist registrars and equivalents	8.5	14.7	6.2
Consultants and associate specialists	11.2	16.7	5.4

the length of papers although analysis revealed no significant difference in overall article length. On average, the spine journal used each abbreviation 10 times compared to 5 times in the general journal. In summary, the spine journal used more different abbreviations and used them more often.

The most commonly undefined abbreviations encountered were MRI (magnetic resonance imaging) and CT (computed tomography). Although these should be defined they will not cause difficulty to most readers due to the frequency of their use. Examples of other undefined abbreviations encountered in the analysis are found in Table 1.

The results from the abbreviation test are shown in Table 2. Forty-three healthcare professionals completed the task. The average overall score (out of 20) without the definitions being provided was 7.9. This increased to 13.3 after subjects were given the definitions. This represented an average increase of 5.4 (26%). All sub-groups increased their scores. Consultant orthopaedic surgeons had the highest scores in both rounds of the exercise (11.2 increasing to 16.7) but it was the registrars who showed the highest average increase of 6.2 (31%).

Discussion

The aim of this study was to examine how well abbreviations are defined in orthopaedic literature. We have found that nearly one in three abbreviations were not defined on first use with 12% of abbreviations defined and never used again and 4% of abbreviations defined more than once. This means that nearly half of abbreviations were improperly used. There was no difference between the general and spinal journals in these respects. However, in articles from the spinal journal there were significantly more separate abbreviations and those abbreviations were used more often. We also wanted to test orthopaedic healthcare professionals' understanding of abbreviations. On average, 8 out of 20 abbreviations were correctly defined rising to 13 out of 20 after definitions had been provided.

The guidelines regarding the use of abbreviations are clear:³⁻⁵ they should be defined on first use. It is clear that these guidelines are not being adhered to. In our questionnaire, we have shown that abbreviations are not uniformly known and, even after listeners are given definitions, just a short time later they are not all remembered. This may not be so important when reading an article when the text can be scoured for the offending abbreviation. However, we

suggest that, in lectures and presentations, the use of unfamiliar abbreviations detracts from the important messages being conveyed. This is particularly important if abbreviating infrequently used terms. In this situation, the authors suggest that the use of abbreviations is avoided.

Conclusions

Although abbreviations are an invaluable shorthand in our complex medical language, they need to be used appropriately and not abused. At the moment, this is not the case. When preparing manuscripts authors need to think of their readers and limit use of abbreviations in terms of number and familiarity. The real onus lies with editors and editorial committees to help their readers by ensuring that guidelines are being adhered to.

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