

## EDITORIAL

# Publication ethics and scientific misconduct: the role of authors

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There is a well known saying: ‘Publish or be damned’ and these days, the pressure to publish is as great as ever. Reasons vary but centre on factors such as personal profile, career progression (and hence in many cases, potential salary) and, ironically, pressures from grant funders to see that their money has produced something. There may even be elements of an ‘infallibility’ or ‘I know I’m right really’ complex. However, this does not mean that authors can be excused all responsibility for what they publish and how they approach publishing their material.

Nevertheless, it is easy to dismiss this subject as something that only affects other people and other subjects and to assume that there is nothing here that is relevant to the authors of orthodontic articles. Unfortunately, this approach is misguided and represents a head-in-the-sand attitude. It has very recently been stated that international awareness of scientific misconduct is low,<sup>1</sup> although others would argue that the problem is not lack of awareness but tolerance of the problem.<sup>2</sup>

However, while some spectacular frauds have been perpetrated in the name of scientific advancement, it is clear that they relate more to personal advancement or indeed financial gain and it is for such reasons that it behoves everyone to be honest – why condone someone gaining an unfair advantage? But, the fact that some famous cases have occurred in subjects such as physics, stem cell research and pharmacology should not make us feel that they ‘don’t apply to us’; that ‘there are no parallels; everyone I know is a good egg’ or ‘it’s only teeth so let’s forget about it.’ The same standards should and do apply to us whether as clinicians, scientists or both.

A very well known case was that of Jan Hendrik Schön whose work (relating to nanotechnology) purported to make a number of groundbreaking breakthroughs. His work went through the peer review process and was repeatedly published in *Nature* and *Science*. It was only after multiple papers were published in the literature that sharp-eyed researchers at other institutions spotted that there was a peculiar similarity in background ‘noise’ which was inexplicable unless the

same data were being used over and over again. Various retractions have since been published.<sup>3,4</sup> More recently, there was the case of the Korean stem cell researcher, Hwang Woo-Suk, who fabricated his data with regard to cloning human embryonic stem cells.<sup>5</sup>

Problems can also come about in other, ‘big money’ areas (e.g. pharmaceutical research), where controversy can arise if it is not clear that the work was carried out by independent researchers with no financial conflicts. Questions relating to authorship may also arise in such situations especially where ghost authors appear.

However, while these make eye catching stories, there are many other less spectacular pitfalls which may come about simply through inexperience or lack of guidance rather than as the result of some premeditated malpractice. Although premeditated malpractice may come into it as well of course! Some of these pitfalls are worth reviewing since their effects, though subtle in some cases, may nevertheless have relevance beyond simply reflecting (badly) on the integrity of the author or authors.

Let’s look at just a few of the issues.

## What’s wrong with ‘salami slicing’?

*I have a big project and it will be too long to publish as one paper so I will chop it up. What’s the harm? It will also do me the power of good as I will have more publications and my grant funders will see their money has been well spent.*

This may not be a problem, depending on how it is done. It is advisable to let the editor know at the time of submission that the work is from a bigger project. It is also reasonable for the editor to request sight of the larger work. Authors may then be advised what to do: e.g. keep it as it is but reference the larger work, or produce one or two larger papers rather than multiple small ones. The reason is that sometimes, presenting only small, selected parts of a larger project means that interpretation may be biased – if more information was presented, this may alter the entire interpretation of what is presented. In addition, results may actually be misleading. For instance, consider the situation where a clinical trial sample size was based on outcome A. If an

array of secondary outcomes are also investigated but the body of work is ‘salam-ied,’ the initial outcome may no longer be relevant or representative and the trial could well be underpowered to find any difference in the other outcomes. However, this information may be disguised by the ‘salam-ing’ process.

The problem of salami-slicing is related to another issue. That of duplicate or redundant publication.

### What’s wrong with publishing the same thing twice or submitting to more than one journal at a time?

*What’s the harm? I will have more publications and, once more, my grant funders will see their money has been well spent.*

Again it depends on what is being done and how. With regard to Cochrane reviews, where it is important that high quality findings reach as wide an audience as possible, it could be justified to produce a second publication which is published in a relevant specialist journal. Another appropriate example is where an article is translated into another language and published in another journal, but permissions and due acknowledgements are of course required (from the original journal and possibly the original authors depending on the copyright status).

However, this does not cover all eventualities. A 2005 editorial in the journal *Nature Materials* entitled ‘The cost of salami slicing’ sums it up nicely: ‘Peer review is a cornerstone of the scientific method. Although it is by no means perfect, it is the best means we have of ensuring real and steady scientific progress... But despite the fact that most scientists are not paid for their contribution to this process, this does not mean it is free – time spent reviewing is time not spent on teaching or research. Therefore, time spent on papers that make little contribution to new scientific understanding is time wasted.

‘...When authors fail to disclose all relevant work, they deny referees and editors the opportunity of assessing the true extent of its contribution to the broader body of research. Just as serious, failure to properly cite previous work not only misrepresents the field but runs the risk of omitting important pieces of information and potential insight. In the fast world of research, it is often difficult to be completely on top of all the relevant recent publications of other groups. But when authors omit reference to their own work there is no excuse.’<sup>6</sup>

### What’s wrong with plagiarism?

If plagiarism was known as cheating it might be more obvious what is wrong with it. Plagiarism is defined as

‘The action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own’.<sup>7</sup> If one looks at other sub-types of plagiarism, it can read like a series of illnesses. For instance citation plagiarism – willful or negligent failure to appropriately credit other or prior discoverers, so as to give an improper impression of priority. This is also known as, ‘citation amnesia’, the ‘disregard syndrome’ and ‘bibliographic negligence’.<sup>8</sup>

### Failure to seek permission for use of figures

This is a form of plagiarism. If you wish to use someone else’s pictures, graphs or tables, etc., for use in your publication, then contact the original publisher and ask for permission. It is very easy and they usually say yes! You can then provide acknowledgement of where the item came from in your own publication.

### Why worry about declaring interests/ conflicts of interest?

The issues associated with Andrew Wakefield, the MMR (measles, mumps, rubella) vaccine and the *Lancet* are a good example of where a conflict of interest made a difference.

What is a conflict of interest? In 1998, the guidelines from the *Lancet* stated: ‘The conflict of interest test is a simple one. Is there anything...that would embarrass you if it were to emerge after publication and you had not declared it?’<sup>9</sup>

The controversy surrounding Andrew Wakefield and the MMR vaccine holds many lessons for those affected including authors, editors, patients, the public, doctors and the media. The problems arose from the initial publication<sup>10</sup> but more particularly from statements made by Dr Wakefield implying that autism was not only associated with the vaccination of children using the MMR vaccine but that there might be links between the condition and environmental triggers, such as the MMR vaccine.<sup>11</sup> The issue resulted in a decline in UK vaccination levels against measles with widespread concern that more children would contract the illness and perhaps die as a result of not having received the MMR vaccine.

Quoting from the *Lancet*, one of the allegations that related to a conflict of interests was: ‘That Dr Wakefield received £55000 from the Legal Aid Board to conduct this pilot project and that, since there was a substantial overlap of children in both the Legal Aid Board funded pilot project and the *Lancet* paper, this was a financial conflict of interest that should have been declared to the editors and was not... We regret that aspects of funding

for parallel and related work and the existence of ongoing litigation that had been known during clinical evaluation of the children reported in the 1998 *Lancet* paper were not disclosed to editors. We also regret that the overlap between children in the *Lancet* paper and in the Legal Aid Board funded pilot project was not revealed to us. We judge that all this information would have been material to our decision-making about the paper's suitability, credibility, and validity for publication.<sup>9</sup>

In other words, by not disclosing the interest (in this case financial) the validity of the results was undermined as was the integrity of the authors. Many repercussions followed, including the publication of 'Retraction of an interpretation'.<sup>12</sup> Dr Wakefield is currently involved in a hearing with the General Medical Council, who have brought professional misconduct charges against him and two colleagues involved in the *Lancet* paper.<sup>13,14</sup> The charges include failure to disclose financial conflicts of interest. He denies the charges.<sup>14</sup>

It should be noted however that having a financial interest in a product is not necessarily a problem. The problem is a lack of disclosure. Likewise for conflicts of interest.

## Digital image enhancement: what is the harm?

This seems particularly pertinent to orthodontists where many clinical papers are submitted, often showing the achievements of the clinician treating a particularly difficult case. It could be a fine line between showing a case clearly and showing *the clinician and their case to their best advantage* with just a little... 'enhancement.' Since 2002 *The Journal of Cell Biology* has started applying a test which has revealed extensive manipulation of photos. Since then, 25% of all accepted manuscripts have had one or more illustrations that were manipulated in ways that violate the journal's guidelines,<sup>15</sup> and in 1% of the cases authors were found to have engaged in fraud. In some instances it was found that authors would remove bands from a gel – a test for showing what proteins are present in an experiment. Sometimes a row of bands would be duplicated and presented as the controls for a second experiment. Some authors would change the contrast in an image to eliminate traces of a diagnostic stain that showed up in places where there should not be one. Others would take images of cells from different experiments and assemble them as if all were growing on the same plate.<sup>16</sup>

To prohibit such manipulations, the guidelines published by *The Journal of Cell Biology* stated, in effect,

that nothing should be done to any part of an illustration that did not affect all other parts equally.<sup>15</sup> In other words, it is acceptable to adjust the brightness or colour balance of the whole photo, but not to obscure, move or introduce an element.<sup>16</sup>

Work is even being done to develop a package of algorithms designed to spot specific types of image manipulation. When authors aim to remove an object from an image, e.g. a band from a gel, they often hide it with a patch of nearby background. This involves a duplication of material, which may be invisible to the naked eye but can be detected by mathematical analysis.<sup>16</sup>

It is easy to see how that demineralization, that root resorption or that residual space could be 'eliminated' – just with a touch of 'Photoshopping' ('To edit, manipulate, or alter (a photographic image) digitally using computer image-editing software').<sup>7</sup> However, while it maybe possible to introduce automated systems to spot such manipulations, as noted by the editor of *Cell*,<sup>16</sup> these will still only pick up image manipulations – authors can still fall foul of other aspects of publication ethics. Yet, trust is what underpins the whole publishing process: it is unlikely that editors and journals will ever, alone, pick up all such cases. It is thus vital that authors are trained in what is OK and what is not, in order to try and instil in them the right spirit of right and wrong. In addition of course, peer reviewers, editors, readers, publishers and grant funders must also be on board and raise awareness when suspicions are aroused. In addition, rather than journals acting in an isolated fashion as the professions' police, the professions themselves may be able to influence events by contributing their own 'rules of play'. These would then be more widely known (and probably more generally accepted) as the norm. Otherwise, without such awareness, for orthodontics – as we move towards greater use of digital models – it may only be a matter of time before the 'case' is 'finished' using digital fabrication...

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