

Guest-editor's introduction

One difficulty with writing introductions is that they are often not written at the beginning but at the end, after the project has been completed. And because many projects can take years to progress from the idea to reality, by the time they are completed, it may be difficult to recall what events and ideas initiated them.

The idea for this volume was conceived in 1993. Originally, the volume was to be a review of the status, or progress, of BioTechnology in Dental Medicine. The concept evolved from my own experiences trying to develop and market a new diagnostic method. I was not successful, not because the technology did not work, but because of what happened after the technology was developed. I entered a world of patent lawyers and financiers, of regulatory officials and manufacturers, of marketers and focus groups. For me it was like entering a maze and trying to find a way out for the new technology – I never did.

While in the maze, I met a number of colleagues from other academic institutions. They too, had made new discoveries and were attempting to develop these into commercially viable products. While in the maze, we had an opportunity to discuss our experiences. Somehow, all discussions ended with the same question: Why in dentistry do so few of the advances in biotechnology traverse the maze from the research laboratory to the office of the practicing dentist?

As you might expect, each scientist I spoke with had different reasons and perspectives. Some said it was the fault of the university administration: it was unsupportive; some claimed it was the fault of the manufacturers: they have great difficulty in developing effective strategies for marketing new dental biotechnology products. Others said it was the FDA's fault: too many regulations; and others blamed the insurance companies, too interested in the bottom line. And some claimed it was the dentists' fault: dentists were set in their ways and unwilling to learn new methods or procedures. In other words, the scientists blamed everyone but themselves.

But was our perception in fact reality? None of us had had an opportunity to discuss these views with those in other disciplines. What did they think of the process? Clearly, if there was any hope for improving the situation, all those involved in the technology transfer process in dentistry would have to talk to each other. Perhaps if each had their say, problems would be identified and eliminated.

This project was envisioned by Professor Peter F. Niederer, editor of *Technology and Health Care*, as a "symposium-in-print", a place where those involved in the process would have their say. The first step was to develop a list of those involved in the technology transfer process. When this list was developed, its diversity came as something of a surprise. Because, in addition to the academic scientists, the list included: 1) university administrators; 2) patent attorneys and financiers; 3) corporate sponsors and manufacturers; 4) FDA officials; 5) insurance executives; 5) marketers; and of course, 6) the end user, the practicing dentist.

A comment about the selection of contributors from the scientific community – for the most part they are all involved in periodontal research. One of the reasons for this is that some technologies, such as computer based technologies or advances in ceramics, are more successful in transferring their discoveries from the laboratory to the dentists' office. But these do not fall under the heading

biotechnology, that is, they were not technologies based on new biological principles. Therefore, the experiences of these scientists might not be similar to those working on developing diagnostic and therapeutic methods based on biochemistry and molecular biology.

Early in the planning, it was decided to focus on biotechnology to mean the application of new advances in biochemistry and molecular biology to diagnosis and therapy and to restrict this volume to one area – periodontal diagnosis and therapeutics. This decision was perhaps somewhat arbitrary as other areas of dentistry are now using biotechnology, including restorative, problems related to pulpal regeneration, temporomandibular joint disorders, implants, etc. Perhaps these topics can be covered in subsequent issues of this journal.

Having defined the scope of the project, invitations to submit articles were sent out and contributors were asked to address the question of the process of moving discoveries from the academic laboratory to the end-user. I expected . . . , well I do not know exactly what I expected the manuscripts to say. As the manuscripts arrived and I read them, I realized that during the gestation of this first issue, a metamorphosis had taken place; and, at delivery, what emerged was quite different from what I expected. While remaining focused on periodontics, this issue has evolved into a collection of first person accounts about the transfer of technology, a process that has been discussed in relationship to dentistry by others (see Jeffcoat and Clark [1] for a recent review). In contrast to the point of view presented in previous works, that of the present volume is unique and leads to quite a different definition of the technology transfer process. Prior to reading the articles presented here, I would have defined technology transfer quite differently from my definition after reading them. In fact, based on their text, each contributor appears to have a view of the technology transfer process not quite in harmony with the others.

One explanation for the difference in perspective is the number of different disciplines involved in looking at the process. Given the fact that each contributor sees the process of technology transfer from a different angle, the differences in perspective should not be unexpected. To paraphrase the fable of the blind men and the elephant, technology transfer would be the elephant and those who are involved in technology transfer are blind to other's point of view. And because we are exploring the "elephant" without benefit of sight, it should not be surprising that each of us has conjured up a different mental image of the "elephant".

So what have I learned from reading this collection? First, technology transfer, moving a discovery from the laboratory to the end-user, is a complex process. Second, technology transfer relies on a stable working relationship between the various parties. This means the players should remain with the project from beginning to end. And finally, once a discovery moves out of the laboratory, the scientist should leave the project to those with expertise in these other areas. We as scientists should rely on others to guide the product to market. The scientist must let-it-go and believe me, this is not easy.

What conclusions can we draw from the contents of this volume. First, do the contents of this volume prove that the technology transfer process is working well for dentistry? No! What this volume says loud and clear, is that there are problems with the existing process. Whether a discovery makes it all the way from the laboratory to the end-user seems to have little to do with merit and more to do with chance. But if you ask where are the problems, and if you read each contribution with this question in mind, it is clear that each contributor is saying: "I'm not the problem".

Perhaps the problem is establishing communication. But this should come as no surprise. It is often difficult for two individuals to communicate, imagine trying to get the number involved in this process to do so. If the problem is communication, one solution would be to provide a forum for the

different parties to express their opinions and interact. While this volume is an attempt to do just that, what we need is a forum that is more interactive and specifically dedicated to this purpose.

Who should, or could, set up this forum? One possibility would be a federal agency, in this case the National Institute of Dental Research (NIDR). It is not unprecedented for a federal agency to take on the task of coordinating an effort to solve a problem. For example, the Human Genome project was set-up specifically to coordinate the effort of sequencing the human genome. Similarly, the NIDR could set up a Technology Transfer Initiative (TTI) with the express purpose of coordinating and promoting the process of technology transfer within dentistry. The TTI could host formal exchanges such as conferences and workshops and more informal discussions between the participants in the process. These discussions could become forums for open dialogue between groups that would not normally meet without the constraints of contract negotiations between the parties. Hopefully, the establishment of a TTI by the NIDR would be a first step to improving the process. And improving the process is crucial to transferring more 20th century technology to the end-user and ultimately the public. And if the past is any indication, the transfer of technology can only improve the dental profession. If communication is important to the transfer process then it is imperative that we begin.

Acknowledgements

The completion of this project required the cooperation of many and I wish to thank the contributors for being reasonably prompt with meeting deadlines. I especially wish to thank Ms Kristien van Lunen of the Life Sciences Department at Elsevier Science for suggesting this volume be a special issue of *Technology and Health Care*; Professor Peter F. Niederer, editor of this journal, for his advice on the preparation of this volume; IOS Press for continuing with the project; and Dr. Murray Simon for his continued support and cooperation on this project. Dr. Simon was involved in the early stages of the project and has had to endure reading long-winded drafts and even longer-winded telephone calls as the project took form. I cannot thank him enough for his patience and enduring friendship.

References

- [1] M.K. Jeffcoat and W.B. Clark, Research, technology transfer, and dentistry, *J. Dental Education* **59** (1995), 169–184.

Edward F. Rossomando,
Guest-editor
Farmington, CT, USA