Transfer technology in dentistry

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The transfer of technology from the research laboratory to the dental surgery may be a difficult process. Ideas may come from various sources including the researcher in the laboratory to the dentist working on a patient. It is important to get these good ideas put into action so that they can be quickly transferred to the clinical setting.

Dentistry is an area where there are established linkages between individual manufacturers and specific universities, or manufacturers and practitioners but there is no network where these groups come together and critically appraise the state of development of technology transfer. Existing links tend to be organised on a one-to-one relationship where manufacturers will link only to limited members within a research group or university institution. As a result the holistic picture of research and development in the United Kingdom is lost. Technology transfer is thus not as effective as it might be and areas of potential innovation can be missed or not fully exploited. The established dental industries are, in the main, non-UK based but there are possible opportunities for UK based manufacturers, which do not at present have footholds in dental research. However it is difficult for industries not already in the dental market to diversify and become involved. New methods of reaching and involving such groups are required. This is particularly important because non-UK based European and American companies currently dominate the dental market in the UK.

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The Engineering and Physical Sciences Research Council (EPSRC) is keen to facilitate this process from research concept to clinical application and are sponsors of a technology transfer in dentistry network. The aim of the Technology Transfer in Dentistry network is to bring industry, researchers and clinicians together. The network consists of several key researchers in the restorative area from different dental schools around the UK. The following is a list of the aims of the Network and its activities.

AIMS

- Peer review and effective communication concerning dental technologies among:
  - University researchers
  - Industrial manufacturers, and
  - Clinical users
- Achieve effective transfer of knowledge between the three groups and develop new research initiatives that will ultimately benefit the patient.

ACTIVITIES

- Bring together group of interested parties
- Develop knowledge base via workshops
- Identify strengths and weaknesses of present materials and technologies
- Create a resource group for technology transfer in dentistry
- Promote collaboration and synergy of UK companies

The **2003 BDA Conference** is being held at the **Manchester International Convention Centre** between **24th and 26th April 2003.** This paper refers to the half-day session being held on Friday, 25 April 2003.

Contact BDA Events Office for further information:
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For the latest update on the agenda and to download the programme visit: www.bda-events.org.uk

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Professor Ric van Noort will review the technological advances occurring in CAD/CAM ceramic restorations, and with his extensive knowledge of research work into ceramics will bring the listener up to date

The presentations at the BDA conference will look at selected technologies that may appear established but recent innovation has led to a new appraisal of their use in dentistry.

Professor Tim Watson will present the use of air abrasion as a method of minimal cavity preparation. The technology of air abrasion was originally conceived in 1945 and is best described as a pseudo-mechanical, non-rotary method of cutting and removing dental hard tissue. After promising early clinical developments, the advent of the air turbine handpiece and burs resulted in the loss of this early technology to mainstream dentistry. Air abrasion has been reintroduced following advances in adhesive dentistry where there have been changes in cavity design and preparation. Professor Watson will cover technology of air abrasion including its mode of action and will present some of the clinical uses of this technique as well as potential pitfalls.

Initial dental laser applications including surface enamel fusion after Ruby laser irradiation were reported as early as 1965. These early studies used laser radiation of 10.6 mm wavelength and long pulse durations which resulted in thermal damage on enamel, dentine and pulp and led to the eventual decline in the use of these devices. Renewed interest in lasers occurred in the mid-1980s with the introduction of the first laser specifically designed for dental use. Professor Gavin Pearson has been researching into the usefulness of the laser for both cavity preparation and its use on the root surface in periodontology. Understanding how the laser works and its effects are necessary before further clinical use for hard tissue removal can be considered. This lecture will review the present progress and determine whether lasers will become an effective tool for cavity preparation in the future.

Computer-aided design/computer-aided manufacture (CAD/CAM) enables the fabrication of high-quality aesthetic ceramic restorations at the chairside. Clinical trials of restorations manufactured by such a technique have shown a high level of clinical success. This technology is advancing rapidly and many companies are now promoting their own type of CAD/CAM ceramic restorations. Other areas of interest include castable ceramics. Professor Ric van Noort will review the technological advances occurring in this area and with his extensive knowledge of research work into ceramics will bring the listener up to date in this ever-expanding area.

In a similar manner to air abrasion technology ultrasonics was initially used to drill cavities in teeth. However the advent of the high-speed drill relegated the use of ultrasonics to the removal of plaque and calculus from the teeth. In the surgery ultrasonic instrumentation is not only employed for descaling tooth surfaces, but also for root canal preparation and in apical surgery. The probe tips used to perform these procedures are available in a variety of designs to enable easier access to different areas of the mouth. Professor Damien Walmsley will present the technology behind some of the present dental ultrasonic instruments and show ways in which this technology is being advanced.

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Professor Walmsley will also present the technology of magnet retention in the mouth. Magnets have once again become a popular method of attaching removable prostheses to either retained roots or osseointegrated implants. Professor Walmsley has been using magnets for over a decade and he will introduce new and future technological advancements within this field that have made such devices more durable and effective to use.

Professor Trevor Burke, who is no stranger to the introduction of new technologically advanced dental materials into the clinical practice setting, will chair the session.

All the speakers are members of the TT network and it is hoped that many dental industry representatives and general practitioners will come along to listen and add their views to the debate on the new and future potential emerging technologies that are used in dentistry.