European Journal of Orthodontics 31 (2009) 666
doi:10.1093/ejo/cjp110
Advance Access publication 29 October 2009

Biocompatibility of dental materials (2009)

Authors: Gottfried Schmalz and Dorthe Arenholt-Bindslev
Publisher: Springer-Verlag GmbH, Heidelberg, Germany
Price: £135.00; €149.95
ISBN: 978-3-540-77781-6

This comprehensive and highly authoritative book has been written and edited by a professor of operative dentistry and a professor of orthodontics, with individual chapter contributions by other experts from Germany, Scandinavia, and the USA. There are 14 chapters, each written using a similar basic structure and style, demonstrating a strong

overall editorial influence. This can often be lacking in books with individual chapters written by a number of disparate authors. Each chapter is well-written, easy to read, and is strongly evidence-based, supported by comprehensive reference lists. In addition, each chapter contains eye-catching short summary sections entitled 'Key notes' or 'Clinical practical advice' implanted at strategic points within the text, and ends with a chapter summary of the key take-away points entitled 'Conclusions for the dental practitioner'.

The early chapters introduce the reader to the concepts of biocompatibility, toxicity, and allergy associated with dental materials, together with dose dependency, threshold values and placebo/nocebo effects, and the principles of risk and risk management. Biocompatibility and toxicity tests for both odontological and mucosal tissues are clearly described, including cell culture, the use of experimental animals, and diagnostic testing on patients. The final chapter in this initial section helps the reader to understand the complex legal regulations and standards relating to biocompatibility within the European Union with particular reference to the Medical Devices Directive, CE marking of materials, and the European regulation on registration, evaluation and authorization of chemicals legislation. Comparable legislation is also comprehensively described for the USA, Australia, and Japan, which extends the potential readership of the book beyond Europe. The chapter concludes with details of hazard labelling and the ISO standards for toxicity testing.

The middle section of the book contains individual chapters describing the biocompatibility and potential toxicity of commonly used materials, including dental amalgam, composite resins, cements and ceramics, root canal filling materials, dental alloys, polmethylmethacrylate (acrylic) resins, oral hygiene products, and materials for short-term application such as impression materials, periodontal dressings, and suture materials. Each chapter clearly describes the chemistry, setting reactions, and properties of the material followed by its local and systemic toxicity hazards and specific biocompatibility tests. Clear histological sections and clinical photographs support the text, and the photographs in particular may be very useful for the clinician in identifying adverse reactions to materials. These chapters are all well supported by evidence and in view of the contentious public image of some of the materials such as dental amalgam and fluoride; these materials have around 300 references objectively reviewed and listed.

The final chapters of this book describe the risks to clinical and laboratory members of the dental team of occupational exposure to various dental materials. Recommendations are made for environmental barriers such as air extraction and local barrier protection for staff. The environmental problems associated with the disposal of clinical waste are covered and the section on dental amalgam goes so far as to discuss the increasing environmental concerns internationally relating to mercury toxicity from internment and cremation. The book concludes with a description of delayed and immediate allergic responses to dental materials. Local and systemic effects are described and their relation to individual dental materials is reviewed. Of particular importance is the increasing risk of allergic reaction to natural rubber latex found in gloves and rubber dam.

This is an excellent book that will deservedly find a place as a definitive work in the field of dental materials biocompatibility. Much of the information relates to restorative dental practice with limited reference to orthodontics *per se*, despite one of the editors being an orthodontist. However, there is a good deal of translational information to be gleaned in relation to composite resins, acrylic, nickel, and impression materials which, although referred to in limited detail in an orthodontic context, may prove valuable to the specialist reader through selected chapters. In the preface, the editors comment that the guiding theme of the book was to provide 'a scientifically based background that should be helpful for the practicing dentist and form an objective basis for information and discussion with patients presenting with individual needs and concerns'. This has, in my view, been achieved and the book should find a place as a valuable reference guide in dental libraries.

Steve Jones

Copyright of European Journal of Orthodontics is the property of Oxford University Press / UK and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.