

Preface

Research and development in the area of machining and cutting tool development is well established in the advanced manufacturing industries. The theories associated with machining traditional materials such as metals, ceramics, polymers, composites, have been developed over the last century to a fairly high level of sophistication. However, the same cannot be said for the development of tools for the medical industry.

The purpose of this Springer ‘brief’ is to show the embryonic stages of development of highly engineered tools for the medical sector that can equally be applied to all areas of medicine and not just to the development of tools for dentistry. The brief also discusses the merits of applying well-established principles of physical understanding to the problems associated with cutting of biological materials, and is composed of eight chapters that focus on tools, teeth and their environment, the advantage of using coated tools, the synthesis, properties and application of diamond thin films, challenges associated with depositing thin diamond films to flat and curved surfaces, controlling diamond morphology and structure, and the assessment of tool performance using established measures of machinability.

The brief should excite all manner of interested professionals including dentists, orthodontists, surgeons, general practitioners, engineers, physicists, general scientists and students who are actively engaged in studying medicine and biomedical engineering. The authors wish to stimulate the readers’ curiosity in order to enable them to conduct their own research, advance their particular frontier in medicine, and innovate and commercialize current and future knowledge generated in this area of medical engineering by experts in the field.

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Chemical Vapour Deposition of Diamond for Dental
Tools and Burs

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