

Career Paths in Oral Health

Rodrigo J. Mariño
Michael V. Morgan
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Editors

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Preface

Oral health professionals continue to be in great demand as skilled practitioners who provide expertise in the assessment, prevention, diagnosis and treatment of injuries, diseases and conditions, deformities or lesions of the human teeth, mouth, jaw and associated structures. Oral health professionals (OHPs) have a highly diverse range of career opportunities and career paths open to them—never more so than today. These careers include, but are not limited to, clinical oral health practice in both general dentistry and specialties (in private practices, community centres and hospitals), academic work (both teaching and research) and non-traditional careers, for example in community, government, administration, policymaking and government research. OHPs' skills also translate into areas as diverse as dental materials development and manufacturing, clinical trials and outcomes evaluation.

The practice of oral health care includes a wide variety of roles and careers, and many students in the early stages of their studies in oral health may not be aware of the breadth of their future profession and its many specialties. *Career paths in oral health* is a reference guide for anyone considering a career in oral health. The book addresses the growing demand among oral health professions' students and professionals for comprehensive information about the careers available in oral health and the many roles an oral health professional can play. *Career paths in oral health* describes the different pathways to these many careers, the educational requirements and the ideal character strengths and interests. This book provides the reader with an understanding of the different career paths OHPs can take. It is a detailed and descriptive career guide for today's oral health professionals.

Career paths in oral health caters to readers who are seeking an introduction to the oral health professions field, who wish to consider new possibilities for themselves within the field or who wish to acquaint themselves with contemporary issues and debates within the profession, for example on topics such as selection criteria and professional development. This book is also ideal for readers seeking more personal portraits of different careers in oral health, such as undergraduate students choosing a career path and oral health graduates who may feel unsure about their career options.

The chapters' authors have been carefully selected to represent the diverse range of views which exist regarding OHP, as well as for their expertise and authority in their specific topic areas. Authors also cover their topics from an international perspective;

they are from various countries and both academic and non-academic backgrounds. The authors have been selected for their distinction in particular careers and include in their contributions insights gained from personal experience. The chapters are presented using a similar model: starting with a general overview of the career or career path, each chapter outlines entry and educational requirements, including skills and personal attributes. Personality traits needed for success in the career are discussed, as well as a review of the responsibilities and advantages and disadvantages of working in each field.

This book is organised into five parts and thirteen chapters. The writing reflects the broad readership base we want to serve, with the book adopting a scholarly but accessible style which will appeal to undergraduate and postgraduate audiences as well as to broader sections of the community. The chapters are written by leading international scholars and address the following questions:

- Why pursue a career in oral health?
- How would an oral health professional benefit his/her patients/the community by his/her involvement in oral health?
- What education and other background is needed to have a career in oral health?
- What are some of the advantages and disadvantages of the oral health professions?

A strength of each chapter is the authors' personal stories and descriptions of why and how each one took the career path they did. Thus, each chapter includes personal insights from the authors and co-authors as well as invited contributors and highlights lessons gained from personal experience. Some chapters also include recommended further readings.

Part I "Choosing oral health as a career" comprises four chapters which critically examine the history of the professions, their practices and the many legal and other aspects involved. This section also describes the responsibilities of various oral health professions and gives a general overview of the required skills and personality traits.

The second part "Clinical career path in oral health" includes two chapters which describe the main aspects of the practice of dentistry, including its specialties. This section discusses career options and opportunities for general dental practitioners (GDPs) and how GDPs can enrich their professional life by obtaining additional experiences and education. The chapters also present profiles of oral health professionals working in various specialties.

Part III "Non-clinical career paths in oral health" has four chapters which review non-clinical career paths and non-traditional dental careers, career paths in organised dentistry and international organisations and career paths in the dental industry. The goal is to construct a sampling frame that represents oral health professionals in non-clinical specialties.

The fourth part "Academic career paths in oral health" has two chapters. This section describes careers in academic research, including how oral health professionals can benefit from research, even if they do not want to pursue a career

in academic research or in dental education. This includes details of the training paths and opportunities to follow to develop research skills and credentials.

The final part has only one chapter concerning occupational health and retirement. This chapter is a survival guide for oral health professionals and discusses key issues around health and retirement.

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Part I

Choosing Oral Health as a Career



Dentistry in a Historical Perspective and a Likely Future of the Profession

1

Ole Fejerskov, Sergio Uribe, and Rodrigo J. Mariño

Abstract

From the earliest times, humans have shown concern for oral diseases and how to repair their effects. Archaeological findings show signs of dental caries in several ancient cultures, with the earliest evidence of any dental intervention found in a pair of 13,000-year-old teeth in Italy. By the middle of the twentieth century, dentistry had become well established as a technical expertise where the dentist could perform delicate operative procedures in the oral cavity. The focus shifted from the surgical to the restorative, which allowed restoring damaged teeth, with the aim of keeping the teeth functioning in the mouth. While modern oral health care has benefited enormously from advances such as fluoridation, the oral health professions still face significant challenges, such as the major inequalities in oral health, both within and between countries in terms of disease severity and prevalence. Looking to the future, there are key trends which will greatly influence how oral health care is conceptualised and organised, how oral health care personnel are trained and how they will deliver health services to the population. These trends are: the pervasive use of communication and information technologies, world globalisation and migratory movements, the ageing of the world population and climate change.

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1.1 Introduction

At all times and for all people, oral diseases and conditions have been part of life, in the forms of trauma, genetic disorders, caries, periodontal inflammation and tumours. In all ancient cultures, from Mesopotamia, Greece and Rome to China and the Americas, there is evidence that these conditions have been treated with various remedies and instruments indicative of “professionals” operating. We can also find evidence in art and literature, with conditions causing oral pain commonly portrayed.

Today, oral diseases and conditions are among the most prevalent health concerns in humanity. Despite cost-effective methods of prevention having been available for years, these diseases and conditions are often falsely regarded as inevitable and even “natural”. Oral diseases are recognised by the public and government as a major health problem, often resulting in pain and infections of the head and neck region, leading to impaired function. They have a significant negative impact on people’s quality of life. The high prevalence and recurrent nature of dental caries and periodontal disease makes the mouth one of the most expensive parts of the body to treat and in some countries dental treatment costs are claimed to be higher than for cancers and heart disease. There is a marked social gradient and substantial inequalities in oral health—as with health in general—in all populations, irrespective of countries. In recent years, the experience in some parts of the world has clearly demonstrated that control and prevention of the most prevalent oral diseases, (e.g. dental caries and periodontal disease) can result in significant improvements in oral health. However, due to the above-mentioned social inequality, only a fraction of people in most countries have benefited, and among the majority of the world’s population oral health remains poor.

The purpose of this chapter is to reflect on how dentistry has developed so far in most of the world. The chapter will attempt to answer the questions: where have we, the oral health profession, come from and where are we going in the twenty-first century? A recurrent theme is the question of whether we, as a profession, have been able to achieve a significant impact on the prevalence of oral diseases, which remain some of the most prevalent diseases affecting mankind.

There will be a description and review of the history of the oral health professions, because the past strongly influences the way we see the immediate future of these professions. This will touch upon changing oral health concepts and places the current paradigm within the long-term trends of the oral health professions. In order to accomplish this, the chapter is divided into three main sections. The first section is a “helicopter view” of the history of the profession. It summarises historical information on oral health care around the world and sets the background and context for a comparative description of different approaches to oral health care. The second section looks, in this fast changing world, at the future of the profession. The final section includes personal reflections from oral health professionals around the world and their experiences and reflections on the profession. We hope that this approach may lead to a better understanding of oral health and of issues concerning the training of oral health care personnel as

well as giving some directions to the organisation and practice of oral health care in the future.

1.2 History of Dentistry

While it is possible that there was a time when there were no specific “oral health professionals”, as such, at all times and for all people oral diseases and conditions have been a concern and a focus of attention. In fact, dental caries is a disease easily observable in human archaeological excavations (Pezo and Eggers 2012). Therefore, it is not an easy task to summarise the genesis, growth and development of dentistry, without reducing it to a mere exposition of facts and dates. For the purpose of presenting this history as a wide overview of the profession and for clarity’s sake, we have divided the dentistry journey into three stages: pre-historical/historical, pre-professional and professional.

1.2.1 Pre-historic Period

Archaeological findings indicate that some 10,000 years ago, with the advent of agriculture and gradual changes in diet (becoming softer and containing fermentable carbohydrates), dental problems were recognised. For example, in Egypt, the number of people with caries went from less than 1–20 per 100 with the arrival of agriculture (Greene et al. 1967).

However, the first dental lesion was found in a prehistoric reptile named *Labidosaurus hamatus* (lipped lizard), some 250 million years ago (Reisz et al. 2011). Caries is not a modern human disease (Pezo and Eggers 2012). The oldest evidence of dental caries was found in what is today Zambia. The remains of *Homo rhodensis*, a non-human primate, show extensive tooth destruction due to caries at around 650,000–150,000 BC. The remains also show signs of extensive periodontal disease and dental abscesses (Pezo and Eggers 2012). Neanderthals also show high prevalence of enamel hypoplasia, tooth loss and periodontal disease, but no evidence of dental caries (Pezo and Eggers 2012).

From the earliest times, humans have shown concern for oral diseases and how to repair their effects. In the pre-historic era, much of the medical practice was based on myths and was strongly influenced by religion and beliefs. The evidence supporting the choice of treatments was largely anecdotal and based on the experience of these early “practitioners”. As an example, a Sumerian text from 5000 BC describes “tooth worms” as being responsible for toothache caused by dental decay. This is documented in a clay tablet from the Royal Library, which exposes this myth in a poetical manner. Such a belief persisted until the eighteenth century (Forrai 2009).

Archaeological findings of teeth and skull remains show signs of dental caries in several ancient cultures. The oldest evidence of any dental intervention was found in a pair of 13,000-year-old front teeth found in Italy which contain the earliest known use of fillings—made out of bitumen (Oxilia et al. 2017). More surprising is that

there have been people skilled to drill holes in teeth for more than 5000 years, as shown by Bennike and Fredebo (1986) in an ancient Danish skull dated about 3000 BC. Scanning electron microscopic pictures indicate that someone probably using a rotating flint stone had produced a circular hole on the root surface from the buccal side in a molar tooth.

In ancient Egypt, there is also evidence of the practice of dentistry as a medical discipline. The first known reference to a person identified as a dental practitioner is Hesi Re (2500 BC). An inscription on his tomb includes the title “*the greatest of those who deal with teeth, and of physicians*”. Also, in the Ebers papyrus residing in the library of University of Leipzig, Germany, one of the oldest documents of medical knowledge, dated 1550 BC, there are numerous prescriptions for diseases of the mouth and teeth.

On the American continent, the Mayan, Incan and Aztec cultures also had advanced levels of dental procedures. In the ancient Mayan culture in Central America (Sharer 1994), skulls with jade-encrusted teeth have been found from the Middle Preclassical period, around 600 BC. These reflect the earliest indications of cosmetic dentistry and are located in the middle of the buccal surfaces of anterior teeth with the jade placed in circular cavities cut through the enamel.

In Europe, in the Etruscan culture (900–400 BC), examples of “dentures” have been found, and from the time the Roman empire was well established, around 6–4 BC, we know quite a lot about the symptoms and methods of cure for the most common oral conditions, thanks to books by Celsius (1960–1961) and Plinius (1951–1963). A striking feature was the recommendation that as long as pain could be relieved the tooth be kept in a functional state. Pain control might have been achieved by treating caries lesions with opium, saffron, pepper and more “exotic” components (fried worms, Nardus paste, spider eggs, etc). Based on studies of 86 carious teeth from Forum Romanum, dated 50–100 AD, we conclude (Fejerskov et al. 2012) that the teeth had been treated by regular removal of the contents of the carious cavity, prior to “pharmaceutical” treatment. This was possibly done with the many kinds of small spoon-shaped metal instruments available at the time (Milne 1907). These speculations are based on the observation of distinct zones of hypermineralisation deep in the dentin preceding the caries dissolution, indicating some sort of intervention, as this phenomenon is not found in deep slowly progressing lesions with no intervention. Who made these treatments and finally extracted the teeth very elegantly without fracturing the fragile roots, we do not know. Archaeologists suggested that because these teeth were found together with more than 13,000 fragments of ceramics and glass pieces with traces of makeup, medicine and perfume, in a channel leading from a small taberna located at the podium of the Temple of Castor and Pollux, this could represent the first evidence of a beauty salon and dental clinic.

In 1210, the **Guild of Barbers** was established in France (Gelfand 1974). Barbers eventually evolved into two groups: surgeons who were educated and trained to perform complex surgical operations; and lay barbers, or barber-surgeons, who performed more routine hygienic services including shaving, bleeding and tooth extraction.

In the sixteenth century, two classic writers portrayed oral health. Shakespeare was not very generous about ageing and oral health, describing older adults: “second childishness, . . . *sans* teeth, *sans* eyes . . .” (Shakespeare W. *As you like it*. Act 2 Scene 7). Cervantes described how his fictional Knight-errant, Don Quixote, lamented the missing of a few molars:

“Luckless that I am!” said Don Quixote, hearing the sad news his squire gave him; “I had rather they spoiled me of an arm, so it were not the sword-arm; for I tell thee, Sancho, a mouth without teeth is like a mill without a millstone, and a tooth is much more to be prized than a diamond” (Cervantes y Saavedra, *The ingenious Gentleman Don Quixote of La Mancha*. Chapter XVIII).

It is possible to find several other descriptions of dentistry and oral health in the literature of the sixteenth and seventeenth centuries (Martinez 1998). Mortality rates associated with dental diseases was high, for example, in the week of August 15–22, 1665, in London more than one hundred persons died from teeth-related diseases (Onion 2014).

From these few examples of pre- and historic periods of dentistry, it can be concluded that at least 2000 years ago there were hand instruments created for operative dental treatments and tooth extractions and someone took care of relief of dental pain. The three dominant reasons for developing a “dental profession” were evident: (1) Pain and pain relief; (2) Cosmetics and (3) The need for a certain functional replacement of lost teeth. The transmission of knowledge may have been mainly verbal and the approach of the profession was eminently surgical. Painful teeth were removed.

1.2.2 Pre-professional Period

The beginning of the *pre-professional era* dates from the publication of the first dental book in English, “The operator for the teeth” by Charles Allen, in 1685. But it was the publication in 1728 of “Le Chirurgien Dentiste” by Pierre Fauchard, a French surgeon, which is considered the beginning of modern dentistry. Fauchard describes basic oral anatomy and function, signs and symptoms of oral pathology, removal of decayed tooth substance and restoration of teeth, etc. Pierre Fauchard is credited with being the Father of Modern Dentistry. In 1771, an equally important book was published by John Hunter where he describes the scientific basis for dental anatomy in his “The natural history of human teeth”. In England, The Dental Hospital of London was created in 1858 and became the first clinical training site for dentists in Britain. The Royal College of Surgeons granted licenses in dental surgery—and in 1947 the Faculty of Dental Surgery was founded within the Royal College of Surgeons, England.

In Latin American countries, during the time of the Spanish and Portuguese rule, the dental care of the population was provided in very rudimentary form. Mostly untrained “practitioners”, whether foreigners or nationals, practiced as “prácticos”