Temporomandibular Disorders

A problem-based approach

Dr Robin J.M. Gray
BDS, MDS, PhD, MFGDP
Specialist in Oral Surgery
Director of Manchester Dental Specialists
Formerly Senior Lecturer, Co-ordinator of TMD Clinical Teaching and Research Services, Department of Dental Medicine and Surgery, University Dental Hospital of Manchester, Manchester
Formerly Principal of Grays Dental Care, General Dental Practice

Dr M. Ziad Al-Ani
BDS, MSc, PhD, MFDS RCS(Ed), FHEA
University Teacher, Glasgow Dental Hospital and School, Glasgow

DentalUpdate

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Dedication

Our thanks, as always, to our wives Jayne and Manal, not only for their support and encouragement but also for their tolerance over many late nights and long phone calls.

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Preface

This book sets out to establish some new concepts and philosophies in temporomandibular disorder (TMD) learning. It contains a series of everyday situations that will be encountered in practice. The answers are there but it is up to the reader to find them!

Learning is a dynamic process and those who are involved actively will gain more than passive recipients of knowledge. Problem- or enquiry-based learning should provoke thought and arouse readers' curiosity, motivating them to learn and guiding them into creative thinking. Giving readers a real-life clinical scenario will structure their thoughts, increasing the effectiveness of information delivery and lead to a logical conclusion.

The case histories are stand alone, and each should contain sufficient information for the reader to reach the correct diagnosis and formulate a correct treatment plan that is in the patient's best interests.

There will inevitably be some repetition in the text especially in relation to the chapters on anatomy, function, pathology, classification and clinical examination. This is because we did not want the reader to have to constantly cross-refer to earlier chapters when reading the case histories. Although there will be some duplication, the case histories will introduce new facts of specific relevance to that situation. We hope that this will meet students' demands because the earlier chapters which are for information can be applied in the later case studies.

There is a unique link to an online interactive quiz (www.wiley.com/go/gray). This quiz aims not only to test your knowledge of TMD but also to make reading this book more enjoyable, stimulating and productive.

We have provided a further reading list of relevant evidence-based articles which, as far as possible, are either from systematic reviews or randomised controlled trials published in evidence-based dentistry journals. Therefore they provide the most up-to-date information.

The final chapters are practical guides of how to make splints and samples of patient information sheets that can be used as templates. We hope therefore that we have addressed not only WHY but also HOW.

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Chapter 1

About the Book

About temporomandibular disorders: what is a 'TMD'?

The term 'temporomandibular disorders' (TMD) covers a constellation of conditions. There have been many attempts to categorise these conditions but all have shortfalls. Some classify by anatomy, some by aetiology and some by frequency of presentation. We should be aware, however, that there is considerable overlap in any classification system because these are often not clinically appropriate. No one system, therefore, satisfies all the criteria.

Temporomandibular disorders affect the articulatory system, consisting of the temporomandibular joints, mandibular muscles and the occlusion.

Any factor that has an effect on one part of the system is likely to influence other parts of the system, so it is important to avoid tunnel vision when considering possible signs and symptoms of a TMD.

As a dentist in practice you will inevitably encounter patients with symptoms of a TMD, who may present with facial pain, earache, toothache, jaw joint sounds or limited movement.

It is estimated that between 50% and 70% of the population will at some stage in their life exhibit some sign of a TMD. This may be subclinical and the patient might not relate the signs to a jaw problem.

In about 20%, these signs will develop into symptoms, which implies that the patient will take notice of hitherto ignored signs, and about 5% of the population will seek treatment. This will happen if the symptoms become intrusive in day-to-day life. It is important for you, as a dentist, to identify these patients and recognise their particular needs and treatment requirements.

The patient may attend complaining of toothache because their natural assumption would be that a tooth was causing the problem, but your role as a clinician is to diagnose the actual cause of the symptoms.

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A patient presenting with a TMD may have symptoms, in any combination, which might include preauricular or facial pain, restriction or alteration of the range of mandibular movement, muscle pain that is worse with function, localised jaw joint pain, jaw joint sounds such as clicking or crepitation, unexplained tooth sensitivity, tooth or restoration fracture, and chronic daily headache. You must be able to diagnose what is and what is not appropriate for you to treat.

About the book

In modern dental schools, there is a shift from traditional teaching to more interactive methods. In classical didactic textbooks, readers are frequently seen as passive recipients of information, without any engagement in the learning process. Problem-based learning increases the effectiveness of delivering information and makes learning a more memorable experience for the reader.

A green flag denotes a positive pathway and suggests that the reader should follow this train of thought.

A red flag signals caution and suggests that the reader should think hard about this aspect of diagnosis, investigation or treatment.

The 'information' symbol indicates a passage of text that imparts fact(s) that should be remembered.

Assessment of knowledge is by a link to online self-assessment multiple-choice questions, which are marked correct or incorrect, and by short answer questions at the end of the book to which answers are not given because the reader needs to research the topic in the text.

Chapter 2: Clinical aspects of anatomy, function, pathology and classification

This chapter deals with the need for a basic understanding of the normal anatomy, physiology and pathology of the temporomandibular joint and mandibular muscles, which is essential not only for an understanding of the disease processes involved in TMDs but also for an appreciation of treatment objectives.

Chapter 3: Articulatory system examination

This chapter discusses clinical examination and is indispensable! It outlines an easy yet comprehensive examination routine that should be employed for all your patients, not just those with a TMD.

Chapter 4: I've got 'TMJ'

This chapter illustrates a classic history of a common TMD in a patient who thinks that she knows best. This highlights the importance of critical evaluation of the information (baggage) that a patient might bring to the consultation.

Chapter 5: I've got a clicking joint

This represents the most common condition about which you will be asked. Does a click need treatment? This raises your awareness of the need for treatment and the different treatment options for a commonplace complaint.

Chapter 6: I've got a locking joint

Joint locking can be acute or long standing. Intervention is often necessary, but how and when? The various options are discussed, as is their practical relevance. We explore the range of options from 'doing nothing' to 'surgery'.

Chapter 7: I've got a grating joint

Degenerative joint disease in the temporomandibular joint is very different from disease in the hip. Nature has a part to play but we can intervene to make life more tolerable for the person with the condition. Learn about the cyclical nature of this condition and its ramifications.

Chapter 8: You've changed my bite

The possibility of introducing iatrogenic changes to a patient's bite is quite real and can have immediate consequences. Avoidance of the problem is the best approach but to do this you must be aware of the potential pitfalls in restorative care.

Chapter 9: I've got pain in my face

Differential diagnosis is often a complex procedure but must not be avoided. You must avoid tunnel vision and keep an open mind about a patient's complaint no matter how badly explained or difficult to follow. Facial pain is a minefield of potential diagnoses and must be approached logically.

Chapter 10: I've got a dislocated jaw

Although true dislocation is rare, immediate action gives your patient (and you) the best chance of resolving the problem. Learn how to differentiate dislocation from other conditions and how to manage the acute case.

Chapter 11: My teeth are worn

Management of tooth surface loss is a complex treatment but some straightforward rules will help in diagnosis of the cause, monitoring of the situation and its management.

Chapter 12: I've got a headache

Headache is a very complex condition even to diagnose. The relationship of headache to TMD is explored, as is the role of the dentist in treating patients whose primary complaint is headache.

Chapter 13: I've got whiplash

Nowadays litigation, especially in relation to road traffic accidents, is commonplace. TMD can be caused by a 'whiplash-type' injury. Make sure that your examination of such a patient is comprehensive and that you are able to produce the necessary records on demand. Be aware that a TMD can become apparent immediately after an accident as well as becoming evident some time later.

Chapter 14: What's of use to me in practice?

You must be aware of what is available and useful in general practice. There is little point in a costly treatment plan being developed if the patient cannot afford it. Similarly provision of a splint that you know your patient will not wear is pointless. This gives guidelines towards accessing the best treatment for your patient and when to employ it.

Chapter 15: You and the lawyer

Litigation is never too far away! Although you should not practise 'litigation dentistry' because this is not in your patient's best interests, you should be aware of the common pitfalls. Above all else maintain good records and good communication, and do not over-reach your abilities.

Chapter 16: The referral letter

A good referral letter is of great help to the specialist. A poor referral letter is a waste of everyone's time and can, on occasion, be embarrassing for all.

Chapter 17: How to make a splint

This is a 'how-to-do' chapter. It is important for you to know what the technician does from impression taking to delivering the splint back to you ready for insertion and fitting. The patient will often ask about this and appreciate an explanation.

Chapter 18: Patient information

This chapter contains general patient information, in template form, that you might like to use for imparting patient advice when appropriate.

Chapter 19: Glossary of terms

This is more of a dictionary of terms than merely a glossary of terms used in this book. This provides the reader with a 'TMD and occlusion' dictionary.

This chapter identifies the relevant terms from the glossary of prosthodontic terms published regularly in the *Journal of Prosthetic Dentistry*. Additional terms are added from the book *A Clinical Guide to Temporomandibular Disorders*, BDJ Publications, 1997.

Chapter 20: Short answer questions

This chapter includes short answer questions for the reader to practise. The knowledge gained from reading this book will enable the reader to answer these questions effectively.

There is a unique link to an online interactive multiple-choice question (MCQ) site at www.wiley.com/go/gray. This quiz aims to test your knowledge of TMD and to make reading this book more enjoyable, stimulating and productive.

Chapter 2

Clinical Aspects of Anatomy, Function, Pathology and Classification

The joint anatomy, histology, structure, capsule, synovial membrane and fluid, ligaments

The articulatory system comprises the temporomandibular joints (TMJs) and, intra-articular discs, mandibular/jaw muscles and occlusion.

In the simplest terms, the temporomandibular joint is the articulation between the upper and lower jaws. The teeth form the contacts between the upper and lower jaws and the muscles are the motors that move the mandible. This system is unique in that the TMJs are paired; any stimulus that affects one joint or any other single part of the articulatory system can have a 'knock-on effect' in the rest of the system.

It is important to have an understanding of anatomy not only to be able to differentiate between what is physiological and what is pathological, but also to understand the objectives of some treatment options.

The TMJ (Figure 2.1) is a synovial diarthrodial joint, which means that the joint is lubricated by synovial fluid and the joint space is divided into two separate compartments by means of an intra-articular disc. The movements that take place in the compartments are predominantly a sliding movement in the upper joint space between the upper surface of the disc and the inferior surface of the glenoid fossa, and a rotational movement in the lower joint space between the head of the condyle and the undersurface of the intra-articular disc. Unlike the articular surfaces of other synovial joints, where the surfaces are typically lined by hyaline cartilage, the articular surface of the TMJ is covered by a layer of fibrocartilagenous tissue. It was thought that this arrangement reflected a non-load bearing functional role for the TMJ; however, a more likely explanation is that, because the covering layer of the condyle is derived from intramembranous ossification, rather than endochondrol ossification, it

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Figure 2.1 The temporomandibular joint.

therefore lacks the endochondrol template from which hyaline articular cartilage is derived.

Histology

There are four distinct layers or zones described in the articular surface of the condyle and mandibular fossa. These layers are the articular zone, proliferative zone, cartilagenous zone and calcified zone (Figure 2.2):

1. The articular zone is dense fibrous connective tissue and forms the outer functional surface of the condyle head. As a result of this fibrous connective tissue layer, it is suggested that it is less susceptible to the effect of ageing and breakdown over time. In addition, despite a poor blood supply, it has a better ability to repair, good adaptation to sliding movement and the ability to act as a shock absorber when compared with hyaline cartilage.
2. The proliferative zone is mainly cellular and is the area in which undifferentiated germinative mesenchyme cells are found. This layer is responsible for the proliferation of the articular cartilage and the proliferative zone is capable of regenerative activity and differentiation throughout life.
3. The cartilagenous zone contains collagen fibres arranged in a criss-cross pattern of bundles. This offers considerable resistance against compressive and lateral forces but becomes thinner with age.
4. The calcified zone is the deepest zone and is made up of chondrocytes, chondroblasts and osteoblasts. This is an active site for remodelling activity as bone growth proceeds.

The joint capsule

The joint capsule (Figure 2.3) envelops the articular disc and is attached superiorly to the rim of the glenoid fossa and articular eminence and inferiorly to the neck of the condyle. Posteriorly it is attached to the bilaminar zone and anteriorly becomes continuous with the pterygoid muscle attachment. Although it is thin both anteriorly and posteriorly, it is strengthened laterally by the lateral temporomandibular ligament which is not a discrete ligament but a thickened part of the capsule.

Synovial membrane

The glistening inner surface of the capsule comprises the synovial membrane. At birth this membrane covers all internal joint surfaces but is lost from articular surfaces as function commences. The flexibility of the inner surface of the capsule is increased by finger-like projections (villi) of the synovial membrane which disperse the synovial fluid.

The function of the synovial membrane is considered to be:

- regulatory because it controls electrolyte balance and nutrients
- secretory via the interstitial cells
- phagocytic.

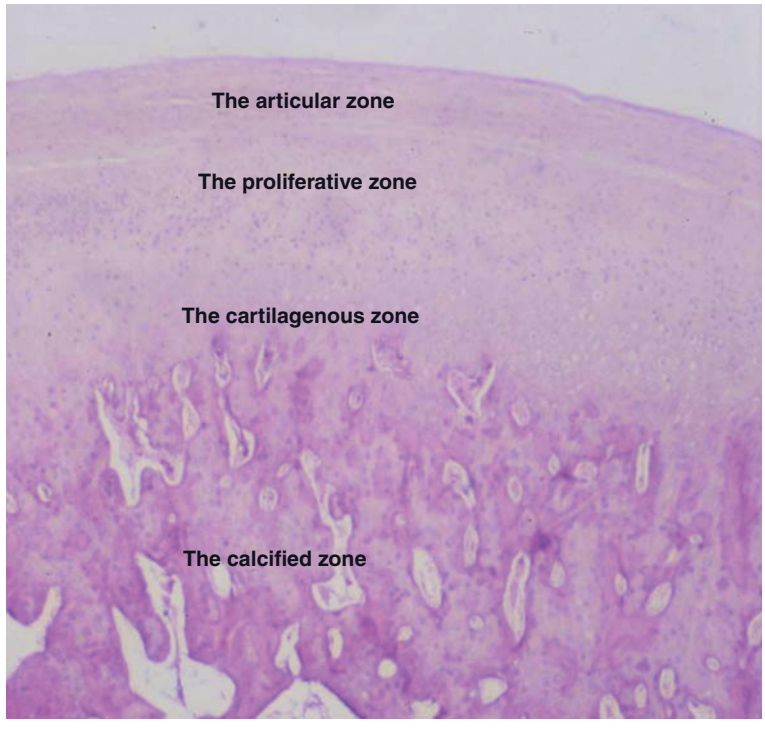

Figure 2.2 The four distinct zones described in the articular surface of the condyle and mandibular fossa.