

British Orthodontic Society
Specialist Advisory Committee for Orthodontics
Orthodontic Specialty Training Syllabus (ST1-3)

Introduction

This document sets out the Syllabus for United Kingdom (UK) specialty training (ST 1-3) in Orthodontics. It has been written on behalf of the General Dental Council (GDC) and is owned jointly by the Specialist Advisory Committee (SAC) for Orthodontics of the surgical Royal Colleges and the British Orthodontic Society (BOS). It is held and maintained by the BOS on the National Orthodontic Programme.

The purpose of this document is to provide the guidance that underpins the principles and processes within UK specialty training in Orthodontics. It is intended to be of use for specialty trainees, trainers, programme providers, the public and other stakeholders. UK Orthodontic specialty training is divided into two discrete phases; ST1-3 and ST4-5:

- ST1-3 training leads to eligibility to sit the UK Surgical Royal Colleges Fellowship in Orthodontics (FOrth) examination and subject to satisfactory completion of all training requirements, eligibility to join the Specialist List in Orthodontics through application to the GDC;
- ST4-5 training currently leads to eligibility to sit the Intercollegiate Specialty Fellowship Examination (ISFE), and subject to satisfactory completion of all training requirements, eligibility for appointment as a UK National Health Service (NHS) Consultant in Orthodontics.

Why is a syllabus needed?

The **Orthodontic Specialty Training Curriculum** refers to the knowledge, skills and competencies that the trainee specialist orthodontist will develop during their period of study and training, and these are detailed in the Purpose Statement (Section A), GDC Standards for Specialist Education (Section B) and the high-level outcomes (Section C: Generic Professional Content and Section D: Specialty-Specific Content) within the curriculum document. The **Orthodontic Specialty Training Syllabus** complements this information by detailing the actual topics that are expected to be covered within the teaching and training programme. The syllabus should be read in conjunction with the **Orthodontic Specialty Training Curriculum**: <https://www.gdc-uk.org/education-cpd/dental-education/quality-assurance/specialty-curricula/orthodontics> and relevant documents relating to the Fellowship in Orthodontics examination, which will be available from the four surgical Royal Colleges.

In addition, the **Dental Gold Guide**, provides a reference for dental specialty training in the UK, whilst the Surgical Royal Colleges **Fellowship in Orthodontics (FOrth)** examination guidance should also be consulted as a key document relating to summative assessment associated with ST1-3 Specialty Training in Orthodontics.

What is included in this syllabus?

When undertaking the current revision and update of the GDC **Orthodontic Specialty Training Curriculum**, a decision was made by the GDC that this curriculum would cover training up to the level of a UK Specialist (ST1-3). This syllabus does not therefore include any information relating to the national curriculum or syllabus for additional training to the level of a Consultant (ST4-5 training). This will be detailed in a separate document.

This document sets out the syllabus in clinical and non-clinical (non-technical training) sections to provide clarity on the expectations of trainees in relation to both domains of training.

Acknowledgements

A number of people have contributed to the development of the **Orthodontic Specialty Training Syllabus** (ST1-3) and at the outset, it should be noted that the SAC for Orthodontics in 2010 under the chairmanship of Professor Nigel Hunt undertook a considerable amount of work in relation to development of the pedagogical material that has been used in developing this current version. The current document has primarily been authored by Professor Martyn Cobourne and Professor Grant McIntyre; with helpful advice from Professor Susan Cunningham, Professor Jayne Harrison, Professor Tony Ireland and Dr Sally Walker; and input from members of the SAC in Orthodontics who are all thanked, with acknowledgement of significant input from Ms Catherine Brierley, Mr Stephen Chadwick, Professor David Felix, Mr Spencer Nute and Ms Helen Tippett.

Principles of ST1-3 training

Training should be structured and whilst complimentary service provision is an important part of a comprehensive NHS training programme, training experience should always be at the forefront. The training programme should ideally have some interaction with a University Dental Hospital, with outreach clinics and training opportunities being provided through a network of district general hospitals, acute hospitals, community dental service clinics and potentially, primary dental care practices.

The purpose of training to the level of a specialist is to enable the dentist to provide high-quality evidence-based orthodontic care for most routine orthodontic problems (further detail on the high-level outcomes is available within the **Orthodontic Specialty Training Curriculum**) and appropriately refer the more challenging multidisciplinary cases to the hospital consultant.

On completion of ST1-3 training, the trainee will have completed a training portfolio on the **Intercollegiate Surgical Curriculum Platform (ISCP)**, undertaken successful progressive and final **Annual Review of Competency Progression (ARCP)** (see **ISCP Action List for ARCP** document) and passed the Fellowship in Orthodontics (FOrth) examination. The individual would then be eligible to apply for entry onto the GDC Specialist List in Orthodontics.

Entry to ST1-3 training and training progression

The **Dental Gold Guide** serves as the generic reference for Dental Specialty Training in the UK and covers the training process, including recruitment, progression, completion and quality management; and the reader should note that this document is updated periodically (the current 4th edition has been available since 1st September 2023: <https://www.copdend.org/postgraduate-training/header-dental-specialty-training/new-edition-dental-gold-guide-2023/>).

Structure of training programmes

The orthodontic specialty training programme should be designed to deliver all educational outcomes within the curriculum, ideally across a network of locations with input from multiple trainers, to provide the trainee with as wide an exposure to training opportunities as possible. Evidence-based orthodontic care should be at the heart of all academic and clinical training, but exposure to different clinical approaches should not be restricted.

During ST1-3 training, all trainees should have access to formal teaching, seminars and tutorials, innovative electronic and multimedia teaching resources, library facilities and concomitant training in research and/or evidence-based practice. **The acquisition of a sound evidence-based knowledge relating to the theoretical and clinical basis of orthodontics is an essential component of training.** The opportunity should be taken for both one-to-one, local group and regional collaborations to deliver the highest quality teaching and training possible. ST1-3 trainees must have a comprehensive training in orthodontic examination of the patient, interpretation of appropriate clinical findings and diagnostic tests, and establishing a definitive diagnosis prior to undertaking structured treatment planning and ultimately, definitive orthodontic treatment. ST1-3 trainees should have their clinical sessions focused on the delivery of evidence-based orthodontic care with close supervision from a number of trainers.

The pastoral care of trainees should not be understated and the opportunity for trainees to link with other dental and medical specialty trainees is an important part of professional and social networking, which should be encouraged by all training programmes. Where necessary, trainees should be encouraged to visit other units, training environments and programmes to broaden and deepen their knowledge, skills and experience in preparation for their future career.

Weekly timetables

In full-time ST1-3 training posts, the trainee should be involved in Direct Clinical Care (DCC) for 7 clinical sessions per week (with 5-6 of these sessions devoted to personal one-to-one treatment, and 1-2 sessions spent participating in a diagnostic clinic) and 3 non-clinical sessions per week. Within this programme, access should be provided to a wide range of diagnostic and therapeutic techniques along with diagnostic and review clinics, interaction with other dental and medical specialties, formal and informal teaching, audit, research, and personal study time. The time devoted to research should be divided between training in research methods and participation in an original research project and/or evidence-based practice.

Where trainees elect to train on a less than full-time (part-time) basis in orthodontics, this should be for no less than 6 sessions per week and should include 4.5 clinical (with 3.5 of these sessions devoted to personal one-to-one treatment, and 1 session spent participating in a diagnostic clinic) and 1.5 non-clinical sessions. Less than full-time training is described in more detail within the **Dental Gold Guide**.

Because of the longitudinal nature of orthodontic case progression, the benefit of undertaking a period of at least 18 months continuous training to deliver the continuity of care required for most orthodontic treatment is significant. However, it is recognised that this model might not be appropriate for some trainees, who may require multiple breaks in their training period. Approved breaks in training, for whatever reason, will necessitate careful assessment of a trainee's competency in relation to the delivery of longitudinal care, and the ARCP panel would be required to assess this on an individual basis as part of the supporting evidence of case progression within the trainees' portfolio.

The timetable below provides details of the indicative training time and sectional distribution based upon full-time training:

Trainee	Training time (years)	Weekly sessions	Total clinical sessions	Non-clinical sessions
Full-time trainee	3	10	7	3
			5-6 personal treatment sessions 1-2 diagnostic clinic*	1 session: formal teaching/personal study/CPD; 2 sessions: research and/or evidence-based practice (Route 1-3)

* some *ad hoc* exposure to other diagnostic clinics to be included (orthodontic MDTs: oral surgery; restorative; orthognathic)

The timetable below provides details of the indicative training time and sectional distribution based upon less than full-time training (60% of full time):

Trainee	Training time (years)	Weekly sessions	Total clinical sessions	Non-clinical sessions
Less than full-time training (60%)	5	6	4.5	1.5
			3.5 personal treatment sessions 1 diagnostic clinic*	0.5 session: formal teaching/personal study/CPD; 1 session: research and/or evidence-based practice (Route 1-3)

* some *ad hoc* exposure to other diagnostic clinics to be included (orthodontic MDTs: oral surgery; restorative; orthognathic)

Facilities

At each training unit there should be the following essential facilities:

- Fully equipped dental surgery accommodation with networked IT infrastructure;
- Access to wide range of instruments, appliances and techniques;
- High-quality one-to-one dental nursing support with continuity for each trainee;
- Appropriate access to laboratory support;
- Access to other members of the dental team, including orthodontic therapists;
- Comprehensive imaging facilities including photography, digital scanning, radiography (and CBCT in at least one training centre);
- Desk-based personal study space with appropriate IT access and network-storage facilities;
- Access to library facilities and academic resources.

Clinical experience and caseload

Clinical training should involve exposure to diagnostic clinics (new patient referral on a weekly basis and selected multidisciplinary), which are predominantly face-to-face, but acknowledging that some virtual clinics may also be beneficial; diagnostic techniques; record collection and treatment planning; delivery of interceptive orthodontic care, and definitive orthodontic treatment through a wide range of fixed and removable appliances, including new and innovative techniques; appropriate review and the provision and supervision of retention phases. Trainees should be exposed to multiple malocclusion types, different methods of managing appliances and a diverse range of consultant trainers.

The primary objective of ST1-3 training is to equip the trainee with the ability to provide a specialist level of care service outside of the hospital and teaching environment and therefore, the case mix and treatment techniques should be selected to meet this need. There should be a strong emphasis on the trainee providing longitudinal continuity of care for their patients.

Caseload

The following guidance is not intended to be prescriptive but to serve as an indication of the case mix that would be expected to provide comprehensive exposure to most specialist-level orthodontic case types. The detail should be maintained by the trainee using the **Orthodontic Logbook Assessment Toolkit (OLAT)** and **SAC Logbook Calculator**, which the individual trainee should update and discuss with their Academic Educational Supervisor (AES) on a regular basis. This will ensure appropriate case progression and by derivation, progress of clinical training at the normal rate.

- A caseload of 100-140 patients across the range of malocclusion groups is desirable for a full-time trainee (or 60% of these for the less than full-time trainee) with a significant proportion of this caseload being treated from start to completion of treatment and into retention (or toward completion for more complex cases, or for those cases started during ST2 or ST3) during the specialty training period. For those trainees who

undertake breaks in training, evidence will need to be provided of experience in the longitudinal management of orthodontic care. In these circumstances, the ARCP panel would assess this supporting evidence on an individual basis;

- Within this caseload, the greater majority should have received treatment involving a primary fixed appliance system – trainees should be able to demonstrate comprehensive understanding and experience in the use of fixed appliances;
- Trainees should also be able to demonstrate comprehensive understanding and experience in the use of removable and fixed functional appliances and methods of growth modification; adjunctive removable and fixed appliance systems (slow and rapid maxillary expansion devices, fixed anchorage devices, such as trans-palatal/lingual arches etc); Temporary Anchorage Devices (TADs); theoretical exposure and some clinical experience in the use of clear aligners as an integral component of comprehensive orthodontic patient care;
- In addition, around 10% of the total caseload should be represented by interdisciplinary cases involving the management of impacted teeth, missing teeth, or requiring adjunctive paediatric, restorative or periodontal care;
- Internal and external transfer cases are inevitable within any clinical service but should represent no more than 30% of a trainee's overall logbook;
- ST1-3 trainees would not be expected to have comprehensive expertise in orthognathic surgical planning, complex orthodontic-restorative cases or cleft care. Formal teaching on the principles of treatment should be provided along with the opportunity to attend a small number of multidisciplinary clinics, case conferences and treatment planning sessions;
- Experience of supervising retention should also be delivered by the programme, including a mix of face-to-face clinics as well as telephone and/or virtual supervision of retention, as appropriate;

There should also be formal reflection on clinical care delivered by the trainee and evaluation of the effects of treatment during the period of training. To provide this evidence, four **Orthodontic Case Presentations (OCP)** should be presented in written format as part of the trainee logbook and formally discussed with an AES/s. The OCP should take place during the ST2 (two cases) and ST3 (two cases) periods of training, respectively (see **OCP-ST2 and OCP-ST3 Documents**). These cases should encompass a range of treatment modalities, including but not limited to interceptive treatment, orthodontic camouflage, growth modification followed by fixed appliance treatment, and multidisciplinary treatment including the management of tooth agenesis or impaction. The AES/s should assess this supporting evidence with the trainee at ST2 and ST3 level, and whilst the OCPs should be regarded as reflective not summative, they should be presented and discussed formally using the relevant **OCP-ST2 and OCP-ST3 Documents**.

Supervision

Close supervision of individual trainees is essential. The structure and roles of the Training Programme Director (TPD), AES and Clinical Supervisor (CS) are detailed within the **Dental Gold Guide**. Within a well-organised orthodontic ST1-3 training programme, the AES should meet with the individual trainee on a monthly basis to discuss case progression, overall clinical and non-clinical training progression and to address any pastoral needs. Whilst these periodic meetings do not need to be logged using the ISCP system, a formal learning agreement meeting should be organised 6 monthly and recorded within the ISCP system. The AES should arrange an appraisal meeting every 6 months in addition to this. These meetings serve a distinct purpose to the ARCP and AES meetings in that they allow a confidential appraisal of trainee progression to be carried out by the

training programme, in order to recognise aspects of excellence within training, address any operational deficiencies and provide early intervention within the training programme when required.

The majority of clinical supervision should be undertaken by named consultants providing continuity of supervisory care, but acknowledging that hospital and practice-based specialists also provide an important contribution. ST4-5 trainees can also make a valuable contribution, but this should not be to the detriment of their own training and should not represent the majority of supervision for an individual ST1-3. Each clinical session should have a named supervisor who is available for most sessions during the training period and where they are to be absent, alternative arrangements for supervision and continuity of patient care are established. AES and CS should be appropriately trained for their specific educational roles and there should be allocated time within their job plans, which should be reviewed as part of their annual appraisal process.

Where a formal University higher degree is being undertaken, research supervisors should ideally be appointed by the University. For trainees who elect to undertake the alternative **Route 2 or Route 3** to satisfy participation in research and/or evidence-based practice – this should be provided with the appropriate level of supervision by HEE/NES/HEIW/NIMDTA. For these trainees, it is essential that a suitable project and supervisor/s are identified early in their training and that comprehensive monitoring of progress is undertaken through the ARCP process (see **Participation in Research Guidance Document**).

Training capacity

The CS should be able to devote adequate time to individual trainees and whilst many experienced trainers can undertake parallel clinical sessions, there should be no more than 8 trainees being supervised by a single trainer on any clinic.

ST1-3 syllabus

The Tables below map the high-level General Professional (Section C) and Specialty-Specific (Section D) outcomes of the **Orthodontic Specialty Training Curriculum** to specific modules within this **Orthodontic Specialty Training Syllabus** and highlight appropriate methods of assessment.

Section C: General Professional Content of the ST1-3 Orthodontic Syllabus

Section C is detailed in the **Orthodontic Specialty Training Curriculum** and is common to all dental specialist trainees (with the exception of Dental Public Health). It is anticipated that the competencies for Section C will be assessed primarily in the workplace through the ARCP process. Please refer to the **Generic Curriculum Passport** document.

Section D: Specialty-Specific Content of the ST1-3 Orthodontic Syllabus

Outcome 5.1

A comprehensive understanding of development and growth of the facial complex, dentition, occlusion, and psychosocial development

Module 5.1.1 Craniofacial developmental biology

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
This module is intended to provide a comprehensive understanding of embryonic development of the head and neck.	Developmental biology of normal and abnormal facial development in the embryo; Developmental basis of common craniofacial malformations.	Apply knowledge of embryonic development of the facial region to the management of patients; Recognise the importance of developmental biology for normal and abnormal development of the facial region.	Lectures & Seminars; Participation in suitable courses and/or meetings; Conventional and web-based e-learning resources; Independent study.	FOrth

Module 5.1.2 Molecular genetics of craniofacial development

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of the cellular and molecular basis of normal and abnormal craniofacial development.</p>	<p>Genetic, molecular and cellular mechanisms of inheritance in man;</p> <p>Gene transcription and translation;</p> <p>Molecular regulation of craniofacial development; tooth development; bone formation and remodelling;</p> <p>Molecular basis of common craniofacial malformations.</p>	<p>Apply knowledge of the cellular and molecular basis of craniofacial biology to the management of patients;</p> <p>Recognise the importance of these processes for normal and abnormal development of the craniofacial region.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning;</p> <p>Independent study.</p>	<p>FOrth</p>

Module 5.1.3 Postnatal growth of the craniofacial region

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of the principles underlying general growth of the body, and growth of the craniofacial region from birth until adulthood.</p>	<p>Mechanisms of general somatic growth, including the adolescent growth spurt;</p> <p>Theoretical basis of growth and remodelling in the craniofacial skeleton;</p> <p>Normal and abnormal patterns of craniofacial growth.</p>	<p>Apply knowledge of craniofacial growth to the management of patients;</p> <p>Recognise the importance of normal and abnormal growth influencing the outcomes of orthodontic treatment.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>OCP</p> <p>FOrth</p>

Module 5.1.4 Normal and abnormal development of the dentition

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Development of the dentition and normal occlusion from birth to adulthood;</p> <p>Effects of genetic and environmental influences on development of the dentition;</p> <p>Early signs of malocclusion.</p>	<p>Normal and abnormal development of the dentition;</p> <p>Stages of dental development and variation from the norm;</p> <p>Factors associated with developmental anomalies within the dentition;</p> <p>Normal and abnormal occlusal development.</p>	<p>Clinical assessment of the dentition in the child and adult;</p> <p>Undertake, analyse, and interpret relevant imaging to identify appropriate development of the dentition;</p> <p>Communicate the developmental process of the dentition to the patient and parent;</p> <p>Discuss the possibilities for interceptive measures to improve or intercept any developing anomalies.</p> <p>Recognise the importance of normal development of the dentition in providing appropriate orthodontic advice and care.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEx</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.1.5 Psychosocial development of the child and young adult

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of the psychological basis of patient development from birth to adulthood.</p>	<p>Normal psychological development from birth to adulthood;</p> <p>Variations in psychological development, including knowledge of common neurodevelopmental conditions that can be seen in patients attending for orthodontic treatment.</p>	<p>Apply knowledge of psychosocial development to the assessment and management of the orthodontic patient;</p> <p>Recognise the importance of variations in psychological profiles when providing appropriate orthodontic advice and care.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.1.6 Epidemiological basis of malocclusion

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Ideal occlusion;</p> <p>Incidence and prevalence of malocclusion;</p> <p>Clinical treatment need and demand for orthodontic treatment;</p> <p>Psychosocial factors in orthodontic care provision.</p>	<p>Incidence and prevalence of malocclusion in different populations;</p> <p>Need and demand for orthodontic treatment in the UK;</p> <p>Use of indices to measure treatment need and outcomes;</p> <p>Ethnic, gender and social influences in orthodontic care provision.</p>	<p>Incorporate patient needs and background in orthodontic treatment planning;</p> <p>Use of the Index of Orthodontic Treatment Need (IOTN); Peer Assessment Rating (PAR) scoring and other occlusal indices;</p> <p>Recognise the importance of psychosocial factors in provision of orthodontic care.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEx</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.1.7 Aetiology of malocclusion

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Malocclusion as a multifactorial condition;</p> <p>Skeletal factors, soft tissue factors and local or dental factors in the aetiology of malocclusion;</p> <p>Pathological factors as a cause of malocclusion.</p>	<p>Genetic influences as a cause of malocclusion;</p> <p>Environmental factors as a cause of malocclusion;</p> <p>Multifactorial contributions to malocclusion.</p>	<p>Analyse and interpret clinical findings with respect to the diagnosis of malocclusion in the child and adult;</p> <p>Recognise the importance of establishing an appropriate treatment plan within the context of the aetiological basis of a malocclusion.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEx</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Outcome 5.2

Possess authoritative knowledge about orthodontic diagnosis and treatment planning

Module 5.2.1 Examination of the orthodontic patient

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide comprehensive understanding of:</p> <p>Clinical assessment: extra-oral and intra-oral examination of the orthodontic patient;</p> <p>Facial and dentofacial aesthetics;</p> <p>Relationship between airway patency, habitual breathing patterns and malocclusion;</p> <p>Identification of patients with more complex medical needs.</p>	<p>Normal relationship of the facial skeletal and soft tissues in frontal and profile view;</p> <p>Intra-oral examination, dentofacial aesthetics, ethnic variations;</p> <p>Variations from population norms;</p> <p>Influence of respiratory activity and nasal breathing on growth and development of the jaws.</p>	<p>Analyse and interpret clinical findings with respect to extra and intra-oral examination of the child and adult orthodontic patient;</p> <p>Recognise the importance of establishing an appropriate treatment plan within the context of the orthodontic examination.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.2.2 Orthodontic diagnostic procedures (including imaging modalities)

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Clinical and radiographic assessments contributing to diagnosis in orthodontics;</p> <p>Manual and automated space analysis;</p> <p>Other special tests;</p> <p>Identification of a problem list following clinical assessment and special investigations.</p>	<p>Clinical diagnosis of malocclusion;</p> <p>Clinical photography of the face and dentition;</p> <p>Intra-oral scanning and digital model analysis;</p> <p>Digital image storage and manipulation;</p> <p>Formal space analysis using orthodontic study models;</p> <p>Appropriate prescription and interpretation of conventional plane film radiography relevant to orthodontic diagnosis;</p> <p>Appropriate prescription and interpretation or ability to act on reported findings of CBCT imaging relevant to orthodontic diagnosis;</p> <p>Other special tests: Basic Periodontal Examination, vitality testing.</p>	<p>Collect, analyse and interpret appropriate records pertinent to accurate diagnosis of the orthodontic patient;</p> <p>Recognise the importance of an accurate diagnosis and the ability to communicate these findings to the patient.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OCP</p> <p>FOrth</p>

Module 5.2.3

Static and functional occlusion, temporomandibular dysfunction and orthodontics

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Static occlusion;</p> <p>Functional occlusion;</p> <p>Anatomy and physiology of the temporomandibular joint (TMJ);</p> <p>Temporomandibular joint dysfunction (TMD);</p> <p>The relationship between orthodontics and TMD.</p>	<p>Static occlusal relationships and classification of malocclusion;</p> <p>Components of a functional occlusion and the concept of mutual protection;</p> <p>Normal TMJ function;</p> <p>Diagnosis & management of TMD (acute and chronic forms);</p> <p>Interaction and management of TMD in orthodontic patients.</p>	<p>Apply knowledge of static and functional occlusal goals to orthodontic treatment provision;</p> <p>Recognise the importance of systematic and thorough examination of the TMJ and diagnosis of TMD as part of orthodontic treatment;</p> <p>Provide suitable advice to orthodontic patients affected by TMD.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.2.4

Cephalometric analysis, analysis of growth and treatment outcomes, growth prediction

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Cephalometric analysis;</p> <p>Cephalometric templates;</p> <p>Superimposition of lateral skull radiographs;</p> <p>Analysis of growth and treatment effects;</p> <p>Growth prediction;</p> <p>Use of digital technology and 3D technologies in cephalometric analysis and growth prediction.</p>	<p>Identification of cephalometric landmarks;</p> <p>Common cephalometric analyses and their interpretation;</p> <p>Cranial base and regional superimposition;</p> <p>Limitations of cephalometric analysis;</p> <p>Methods of growth prediction, including timing of the adolescent growth spurt.</p>	<p>Undertake manual cephalometric analysis and superimposition of lateral skull radiographs and interpret the findings in terms of diagnosis, treatment planning and treatment effects;</p> <p>Recognise the role of cephalometric analysis in orthodontic diagnosis and the evaluation of growth and treatment effects;</p> <p>Recognise the limitations of predicting craniofacial growth.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Practical tuition;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OCP</p> <p>FOrth</p>

Module 5.2.5 Orthodontic treatment planning

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding and experience in:</p> <p>Identification of patient concerns;</p> <p>Identification of treatment aims;</p> <p>Identification of the type of treatment required to achieve those aims.</p>	<p>Patient expectations;</p> <p>Objectives of treatment;</p> <p>How treatment will deliver the objectives;</p> <p>Limitations of treatment.</p>	<p>Explain relevant information to patients relating to each stage of the treatment process;</p> <p>Recognise the main concerns of a patient and their expectations of patient care;</p> <p>Recognise the practicalities of correcting a particular malocclusion for each individual patient;</p> <p>Recognise and discuss all possible treatment options including no treatment.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Outcome 5.3

The ability to deliver expert level orthodontic care

Module 5.3.1 Interceptive management of the developing occlusion

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding and experience of:</p> <p>Interceptive orthodontics;</p> <p>Management of local factors contributing to malocclusion;</p> <p>Management of crossbites;</p> <p>Early modification of skeletal discrepancies.</p>	<p>Features associated with normal and abnormal development of the dentition and facial growth;</p> <p>Consequences of early loss and retention of primary teeth; enforced early loss of permanent teeth;</p> <p>Evidence base relating to early intervention for local problems;</p> <p>Evidence base relating to early modification of crossbites;</p> <p>Evidence base relating to early correction of skeletal discrepancies.</p>	<p>Identification of normal and abnormal development of the dentition and jaws;</p> <p>Recognise the need for early intervention of developing occlusal and skeletal problems within the context of best evidence;</p> <p>Formulate appropriate treatment plans for interceptive management within the context of best evidence.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.2 Orthodontic tooth movement

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding and experience of:</p> <p>Exfoliation of primary teeth and eruption of the permanent dentition;</p> <p>Biology of tooth eruption;</p> <p>Biology of orthodontic tooth movement;</p> <p>Resorption of dental structures.</p>	<p>Process of normal exfoliation of primary teeth and tooth eruption;</p> <p>Disorders of tooth eruption;</p> <p>Histological and molecular basis of tooth eruption and orthodontic tooth movement, response of the periodontium to the application of external force;</p> <p>Normal and pathological resorption of dental structures.</p>	<p>Apply knowledge of clinical, histological and molecular processes to normal exfoliation and eruption of teeth;</p> <p>Recognise the importance of normal exfoliation and eruption during development of the dentition and the need to explain these in terms of treatment options;</p> <p>Recognise the importance of resorption associated with dental structures and the need to explain these in terms of treatment options and in the context of risk of treatment.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching'</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>FOrth</p>

Module 5.3.3 Dentofacial orthopaedics

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding and experience of:</p> <p>Theoretical basis of functional jaw orthopaedics;</p> <p>Timing of orthopaedic treatment;</p> <p>Extra-oral force in the management of skeletal discrepancies (retraction and protraction headgear; functional appliances (see also 5.3.4);</p> <p>Maxillary expansion;</p> <p>Temporary anchorage devices to facilitate dentofacial orthopaedic change.</p>	<p>Indications and contra-indication for the use of dentofacial orthopaedics;</p> <p>Headgear in the context of orthopaedic treatment; safety; directional forces; use of cervical, horizontal, and high pull conventional headgear;</p> <p>Use of headgear with functional appliances (see also 5.3.4);</p> <p>Early management of Class III malocclusion with protraction headgear;</p> <p>Maxillary skeletal expansion;</p> <p>Application of temporary anchorage devices in dentofacial orthopaedics;</p> <p>Evidence base associated with orthopaedic treatment.</p>	<p>Safe application of headgear for use in conjunction with removable, fixed and functional appliances in the management of skeletal discrepancies;</p> <p>Apply the evidence-based principles of treatment timing in dentofacial orthopaedics;</p> <p>Ability to explain the need for orthopaedic treatment.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.4 Fixed and removable functional appliances

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Components and design of removable and fixed functional appliances;</p> <p>Advantages and disadvantages of removable and fixed functional appliances;</p> <p>Mode of action relating to the use of removable and fixed functional appliances;</p> <p>Use of removable and fixed functional appliances in contemporary orthodontic practice.</p>	<p>Indications and contraindications for the use of removable and fixed functional appliances;</p> <p>Design and construction of removable and fixed functional appliances;</p> <p>Mode of action associated with removable and fixed functional appliances;</p> <p>Use of removable and fixed functional appliances for management of malocclusion (including the application of extra-oral force (see also 5.3.3));</p> <p>Evidence base relating to the use of functional appliances.</p>	<p>Ability to design, fit, activate and adjust removable and fixed functional appliances;</p> <p>Ability to manage patients with removable and fixed functional appliances through the treatment process.</p> <p>Recognise the importance of treatment timing with functional appliances.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.5 Orthodontic materials

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Types of materials available for use in orthodontics, their properties and clinical use.</p>	<p>Range of materials available for use in clinical orthodontics and their properties;</p> <p>Biocompatibility and risks of orthodontic materials.</p>	<p>Selection of appropriate materials for each clinical situation;</p> <p>Recognise the potential harms, risks and limitations associated with different orthodontic materials and be able to explain these to the patient;</p> <p>Recognise the impact of orthodontics and the materials used on the environment and the potential impact on environmental sustainability.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.6**Orthodontic biomechanics**

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Application of biomechanical principles to apply forces to teeth;</p> <p>Interaction of fixed and removable orthodontic appliances with the teeth;</p> <p>Friction;</p> <p>Anchorage control;</p> <p>Desirable and undesirable tooth movement.</p>	<p>Tooth responses to orthodontic force; single and two-tooth systems; forces, moments and couples;</p> <p>Mechanics of orthodontic tooth movement;</p> <p>Bracket-archwire interactions;</p> <p>Friction;</p> <p>Tooth translation.</p>	<p>Ability to fabricate first, second and third order bends into an orthodontic archwire;</p> <p>Ability to control anchorage using appropriate biomechanics and adjunctive systems.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.7 Conventional removable appliances

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Components and design of removable appliances;</p> <p>Advantages and disadvantages of removable appliances;</p> <p>Use of removable appliances in contemporary orthodontic practice.</p>	<p>Mode of action associated with removable appliances;</p> <p>Use of removable appliances for interceptive management of malocclusion;</p> <p>Use of removable appliances as an adjunct to fixed appliance treatment.</p>	<p>Ability to design, fit, activate and adjust removable appliances;</p> <p>Ability to manage patients with removable appliances through the treatment process.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.8 Fixed orthodontic appliances

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide comprehensive understanding and experience of labial fixed appliance systems:</p> <p>Theoretical basis;</p> <p>Scope and limitations; indications and contraindications;</p> <p>Placement, bonding, cementation and removal;</p> <p>Anchorage planning and mechanics;</p> <p>Use of archwires, ligatures, elastics and auxiliaries.</p> <p>This module is also intended to provide a theoretical understanding and some clinical experience of lingual fixed appliance systems.</p>	<p>Theoretical basis of different fixed orthodontic appliance systems;</p> <p>Design, manufacture and construction of fixed orthodontic appliances;</p> <p>Bracket prescriptions and local variations;</p> <p>Management of anchorage and mechanics during treatment with fixed orthodontic appliances;</p> <p>Auxiliaries with fixed appliances, including expansion devices and fixed anchorage (see also 5.3.10);</p> <p>Evidence base relating to clinical performance of fixed orthodontic appliances; methods of ligation; archwire materials and sequencing; auxiliaries; space closure.</p>	<p>Selection, fit, management and removal of fixed orthodontic appliance systems appropriate to the treatment of specific malocclusions;</p> <p>Recognise the importance of the evidence base relating to the use of fixed orthodontic appliance systems.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.9 Aligners

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide theoretical exposure and some clinical experience in the use of aligner systems:</p> <p>Aligner systems;</p> <p>Digital appliance design.</p>	<p>Theoretical basis of aligner systems;</p> <p>Aligner materials;</p> <p>Adjuncts to aligner treatment, theory and use of attachments;</p> <p>Treatment planning for aligners;</p> <p>Evidence base relating to aligner tooth movement and treatment outcomes.</p>	<p>Selection, placement of attachments, fit and management of aligner systems appropriate to the treatment of specific malocclusions;</p> <p>Recognise the availability of alternative appliance systems;</p> <p>Recognise the applications and limitations of aligner systems.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical treatment provision.</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.10 Anchorage reinforcement

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of anchorage reinforcement in terms of:</p> <p>Intra-oral anchorage devices;</p> <p>Extra-oral anchorage using headgear (see also 5.33 and 5.34).</p> <p>This module is also intended to provide theoretical exposure and some clinical experience in the use of:</p> <p>Temporary anchorage devices.</p>	<p>Intra-oral anchorage reinforcement with fixed appliances (TPA; Nance arch);</p> <p>Indications for the use of headgear to reinforce anchorage with fixed and removable appliances;</p> <p>Theoretical basis, design, manufacture and construction of temporary anchorage devices;</p> <p>Clinical use of temporary anchorage devices in combination with other orthodontic appliances;</p> <p>Mechanics of temporary anchorage device use for anchorage reinforcement and tooth movement.</p>	<p>Recognise the need to reinforce anchorage in the management of malocclusion;</p> <p>Selection, placement and management of fixed anchorage devices for use with fixed appliances;</p> <p>Selection, placement and management of headgear for use in anchorage reinforcement with fixed and removable appliances;</p> <p>Selection, placement and management of temporary anchorage devices for use in anchorage reinforcement and tooth movement with fixed appliances.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching</p>	<p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.11 Adult orthodontics

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide some theoretical exposure and clinical experience in:</p> <p>Management of the adult orthodontic patient;</p> <p>Comprehensive versus compromise treatment;</p> <p>Appliance therapy;</p> <p>Periodontal considerations;</p> <p>Temporomandibular joint;</p>	<p>Dental health considerations in adult patients, including restorative and periodontal status;</p> <p>General health considerations in adult patients;</p> <p>Orthodontic treatment as an adjunctive therapy and component of adult dental treatment; goals, principles, and different procedures.</p> <p>Evidence base relating to adult orthodontic treatment.</p>	<p>Managing the expectations of adult patients;</p> <p>Recognising the specific problems and limitations of orthodontic treatment for the adult.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.12 Orthodontic emergencies, including dental trauma

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Common problems associated with removable, fixed, functional, aligner and retention appliances and their management;</p> <p>Dental trauma, essential principles of acute management and the relevance of dental trauma to orthodontic treatment.</p>	<p>Common appliance systems and the problems that can be seen in association with them;</p> <p>Acute management of dental trauma; concussion, subluxation, extrusion, luxation, intrusion, avulsion, luxation, crown and crown-root fractures, root fractures, dentoalveolar fracture, soft tissue injury.</p>	<p>Appropriate management of patients who present with problems associated with broken removable, functional, and fixed appliances;</p> <p>Ability to refer acute cases of dental trauma appropriately.</p> <p>Recognise the importance of dental trauma in the management of patients receiving orthodontic treatment.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.13 The iatrogenic effects of orthodontic treatment

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide information on the risks of orthodontic treatment relevant to the assessment and treatment of patients:</p> <p>Root resorption;</p> <p>Effects on the enamel and dentine;</p> <p>Effects on the gingival and periodontal tissues;</p> <p>Effects on the pulp;</p> <p>Adverse effects on dentofacial appearance;</p> <p>Adverse effects on the soft tissues, including headgear and allergic reactions.</p>	<p>Risk factors for iatrogenic damage during orthodontic treatment;</p> <p>Clinical diagnosis of iatrogenic effects;</p> <p>Clinical protocols for minimising and managing iatrogenic damage when identified;</p> <p>Evidence base relating to iatrogenic effects of orthodontic treatment.</p>	<p>Communicating risks of orthodontic treatment to the patient;</p> <p>Managing orthodontic treatment to reduce the risks of iatrogenic damage.</p> <p>Recognising the importance of detailing risk to the orthodontic patient as part of informed consent;</p> <p>Recognising the need for balance in describing risk-benefit to the orthodontic patient.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.3.14 Stability and retention, long-term effects of orthodontic treatment, maturation of the dentition

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide a comprehensive understanding of:</p> <p>Stability of orthodontic tooth movement;</p> <p>Presentation and nature of relapse;</p> <p>Aetiology of relapse;</p> <p>Adjunctive techniques to reduce relapse;</p> <p>Design and use of removable and fixed retention appliances;</p> <p>Contemporary retention regimes within the context of the current evidence base;</p> <p>Long-term maturational change in the untreated dentition.</p>	<p>Association between malocclusion and relapse;</p> <p>Effect of orthodontic treatment on stability;</p> <p>Treatment mechanics to enhance stability;</p> <p>Post-retention changes following active orthodontic treatment;</p> <p>Long-term strategies for maintaining tooth position;</p> <p>Common changes in the untreated occlusion over the long-term;</p> <p>Evidence base relating to orthodontic retention;</p> <p>Common problems with removable and fixed retainers; managing patients with retention problems;</p>	<p>Selection, design, fit and management of both removable and fixed orthodontic retention appliances appropriate for the management of long-term retention following active orthodontic treatment;</p> <p>Recognise the need for post-treatment retention and the importance of the evidence base relating to orthodontic retention;</p> <p>Recognise the importance of post-treatment change;</p> <p>Recognise the importance of retention as part of the consent process.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Outcome 5.4

The delivery of multi-disciplinary care as part of a wider team

Module 5.4.1 Orthodontics and oral surgery

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge and experience of managing dentoalveolar procedures in relation to:</p> <p>Exposure and management of unerupted and impacted teeth;</p> <p>Management of infra-occluded teeth;</p> <p>Management of other failure of eruption;</p> <p>Management of frenal attachments.</p>	<p>Treatment options and evidence base for the management of unerupted and impacted teeth through a combination of minor oral surgery and orthodontics;</p> <p>Treatment options and evidence base for encouraging tooth eruption;</p> <p>Indications and evidence base for frenectomy;</p> <p>Identification and referral of complex cases.</p>	<p>Ability to make decisions on the management and treatment of unerupted and impacted teeth; infra-occluded teeth and teeth affected by other forms of eruption failure;</p> <p>Recognise the treatment options for managing unerupted and impacted teeth including risk-benefit for each option;</p> <p>Recognise the need to provide advice on the need and timing of frenectomy;</p> <p>Appropriate referral of more complex cases.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.4.2 Orthodontics and restorative dentistry

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge and experience of orthodontic treatment as an adjunct to:</p> <p>Restoration of the dentition in cases with mild tooth agenesis or previous extraction;</p> <p>Occlusal rehabilitation including implantology and other restorative interventions;</p> <p>Repositioning periodontally stabilised teeth;</p> <p>Repositioning teeth to facilitate restorative treatment;</p> <p>Dahl concept;</p> <p>Restoration of worn teeth.</p>	<p>Principles of orthodontic space distribution for restoration of teeth with bridges or implants;</p> <p>Timing of adjunctive orthodontic treatment in relation to restorative or periodontal care;</p> <p>Identification and referral of complex cases.</p>	<p>Provide advice to fellow professionals and patients on adjunctive orthodontic treatment;</p> <p>Undertake appropriate adjunctive orthodontic treatment in combined cases;</p> <p>Recognise the importance of an integrated team approach and communication with fellow professionals when considering and planning combined orthodontic and restorative care.</p> <p>Appropriate referral of more complex cases.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p> <p>OCP</p> <p>FOrth</p>

Module 5.4.3 Overview of multidisciplinary management of facial disharmony

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge in:</p> <p>Recognition of facial disproportion;</p> <p>Diagnostic procedures used to identify facial disproportion;</p> <p>Treatment pathway in the orthodontic-surgical management of patients with facial disproportion;</p> <p>Essential pathway in managing patients with cleft lip and or/palate; or other craniofacial syndromes.</p>	<p>Concepts of dentoalveolar compensation for a skeletal discrepancy;</p> <p>Common surgical techniques used to manage disproportions of the jaws;</p> <p>Timing of combined orthodontic-surgical treatment for jaw disproportion;</p> <p>Identification and referral of potential orthognathic cases;</p> <p>Timing of orthodontic care for patients with cleft lip and/or palate.</p>	<p>Ability to identify those cases with facial disproportion that cannot be treated with orthodontics alone;</p> <p>Recognise the essential treatment options for managing patients with facial disproportion and provide risk-benefit advice;</p> <p>Index of Orthognathic Functional Treatment Need;</p> <p>Appropriate referral of potential orthognathic cases.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching.</p>	<p>CEX</p> <p>CbD</p> <p>DOPS</p> <p>OLAT</p>

Outcome 5.5

Research and evidence-based clinical practice

Module 5.5.1 Evidence-based medicine (theoretical basis)

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge in:</p> <p>Theoretical basis of evidence-based medicine;</p> <p>Clinical study design;</p> <p>Searching the literature;</p> <p>Appraisal of the literature;</p> <p>Basic statistical concepts;</p> <p>Systematic review and meta-analysis.</p>	<p>Hierarchy of evidence;</p> <p>PICO format for research questions;</p> <p>Biomedical databases; and search engines;</p> <p>Observational and interventional research;</p> <p>Qualitative research;</p> <p>Patient-reported outcomes;</p> <p>Hypothesis testing and estimation;</p> <p>Systematic review, meta-analysis; forest plots; heterogeneity;</p> <p>Core outcomes;</p> <p>Research ethics.</p>	<p>Ability to interpret the findings of original research and systematic reviews in healthcare;</p> <p>Recognise the benefits and limitations of systematic reviews in orthodontics;</p> <p>Recognise the importance of evidence-based medicine when providing orthodontic care.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study.</p>	<p>ORAS</p> <p>OQIT</p> <p>FOrth</p>

Module 5.5.2

Evidence-based orthodontic practice (the orthodontic literature)

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge in:</p> <p>Evidence-based clinical orthodontic practice based on a sound understanding of the contemporary evidence base</p>	<p>Types of evidence and their intrinsic value to the patient and population within orthodontic care;</p> <p>Understanding of the challenges and potential solutions in producing evidence;</p> <p>Knowledge of the key differences between quantitative and qualitative evidence;</p> <p>Clinical working knowledge of how patients can contribute to the evidence base through research, audit and quality improvement projects;</p> <p>Current best evidence relating to orthodontic management and treatment interventions.</p>	<p>Knowledge and understanding of how to assess the evidence;</p> <p>Ability to integrate best evidence into treatment planning for individual patients;</p> <p>Recognise the importance of evidence-based orthodontic care as a key area of practice.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p> <p>Clinical diagnostic teaching;</p> <p>Clinical treatment provision.</p>	<p>ORAS</p> <p>OQIT</p> <p>FOrth</p>

Module 5.5.3 Research experience

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge and experience in (one or more) of the following:</p> <p>Designing, carrying out and publishing an orthodontic-related research project;</p> <p>Designing, carrying out and publishing an orthodontic related quality improvement project (QIP);</p> <p>Developing and publishing a protocol for an orthodontic-related research project; or</p> <p>Obtaining ethical approval (IRAS) and RD&I approval, including sponsorship, for an orthodontic related research project.</p>	<p>How research can be conducted efficiently and effectively for the longitudinal benefit of patient care in orthodontics;</p> <p>Study design, research regulatory approval process approvals, sponsorship and ethics;</p> <p>Publication and peer review process.</p>	<p>Ability to interpret the existing literature and develop a research question based on currently available evidence;</p> <p>Ability to write a protocol and plan the stages of a research study;</p> <p>Recognise whether ethical approval is required for the research and apply for ethics where required;</p> <p>Ability to undertake the research itself and collect accurate data;</p> <p>Ability to interpret the results, discuss the implications of those results and reach conclusions, including the need for future studies in that area.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p>	<p>ORAS</p> <p>Higher degree</p> <p>FOrth</p>

Outcome 5.6

An understanding of management and organisation of orthodontic services in primary care

Module 5.6.1 Organisation of primary care orthodontics

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge in:</p> <p>Management of personnel;</p> <p>Responsibilities and professionalism for the specialist orthodontic practitioner;</p> <p>Organisation of primary care orthodontic services.</p>	<p>Employment law including equality and diversity;</p> <p>Staff management; personal development; disciplinary procedures;</p> <p>Indemnity;</p> <p>Care Quality Commission;</p> <p>Primary care orthodontic contracts;</p> <p>Managed clinical networks.</p>	<p>Interpersonal skills required to support a team in the delivery of primary care specialist orthodontics;</p> <p>Recognise the importance of good record keeping;</p> <p>Recognise the importance of good staff engagement and support.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Observation of a primary care environment;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p>	<p>Managerial CbD</p> <p>FOrth</p>

Module 5.6.2 Working within the orthodontic team

Objective	Knowledge	Skills & Attitudes	Teaching & Learning Methods	Assessment
<p>This module is intended to provide knowledge in:</p> <p>Roles and responsibilities of members within the orthodontic team</p>	<p>Scope of work for members of the orthodontic team; orthodontic therapist; nurse; technician.</p>	<p>Interpersonal skills required to within a team in the delivery of primary care specialist orthodontics;</p> <p>Recognise the importance of team-building;</p> <p>Recognise the importance of staff engagement and support within the orthodontic team.</p>	<p>Lectures & Seminars;</p> <p>Participation in suitable courses and/or meetings;</p> <p>Conventional and web-based e-learning resources;</p> <p>Independent study;</p>	<p>Managerial CbD</p> <p>FOrth</p>

Appendix

Modular Training Pathways in Orthodontic Subjects

The lists below indicate more subject-specific curriculum content covered by the 3-year training programme leading to the CCST in the Specialty of Orthodontics.

Module 5.1.1 Craniofacial developmental biology

- Embryonic origins of the head and neck;
- Early embryonic organisation of the craniofacial region;
- Embryonic development of the face, palate and pharyngeal region;
- Development of the skull;
- Bone development: intramembranous and endochondral bone formation;
- Tooth development;
- Inherited disorders of craniofacial development;
- Cleft lip and palate;
- Bone disorders.

Module 5.1.2 Molecular genetics of craniofacial development

- Molecular and cellular mechanisms of inheritance;
- Gene transcription and translation;
- Molecular regulation of craniofacial development;
- Hox genes;
- Molecular regulation of tooth development;
- Odontogenic homeobox code
- Molecular basis of tooth agenesis;
- Molecular regulation of bone development;
- Molecular basis of craniofacial disorders.

Module 5.1.3 Postnatal growth of the craniofacial region

- General growth of the body;
- Adolescent growth spurt;
- Craniofacial growth studies;
- Growth of the skull and face;
- Bone remodelling;
- Mechanisms of craniofacial growth;
- Maxillary and mandibular growth rotations;
- Theories of craniofacial growth regulation;
- Abnormalities of facial growth.

Module 5.1.4 Normal and abnormal development of the dentition

- Normal sequence of development of the dentition;
- Primary, mixed and permanent dentitions;
- Establishment of occlusion;
- Mixed dentition analyses;
- Developmental anomalies of the dentition;

- Environmental influences on the developing dentition;
- Maturational changes in the adult dentition.

Module 5.1.5 Psychosocial development of the child and young adult

- Psychological milestones during development of the child and young adult;
- Common psychological conditions (Attention-Deficit/Hyperactivity Disorder (ADHD); Tourette Syndrome; Obsessive-Compulsive Disorder (OCD); Post-traumatic Stress Disorder (PTSD; Anxiety, Depression); Anorexia;
- Psychological aspects of providing orthodontic treatment;
- Body Dysmorphic Disorder (BDD).

Module 5.1.6 Epidemiological basis of malocclusion

- Classification of occlusion and malocclusion;
- Concepts of ideal static and functional occlusion;
- Epidemiology of malocclusion;
- Need and demand for orthodontic treatment;
- Orthodontic indices: IOTN, ICON and PAR.

Module 5.1.7 Aetiology of malocclusion

- Genetic, environmental and multifactorial basis of malocclusion;
- Skeletal and soft tissue factors;
- Local and dental factors;
- Habits;
- Tongue thrust;
- Pathology;
- Equilibrium theory;
- Specific aetiological associations with the main classifications of malocclusion.

Module 5.2.1 Examination of the orthodontic patient

- Medical conditions of relevance to orthodontics;
- Clinical examination of the face in frontal, profile and transverse view;
- Assessment of the oro-facial region in function;
- Facial aesthetic analysis;
- Clinical examination of the oral cavity and dentition;
- Maxillary incisor dentition within the face;
- Dentogingival aesthetics;
- Airway.

Module 5.2.2 Orthodontic diagnostic procedures (including imaging modalities)

- Clinical diagnosis of malocclusion;
- Principles of clinical photography;
- Space analysis;
- Intra-oral scanning and digital model analysis;
- Radiographic investigations in orthodontic assessment;
- Ionising radiation regulations;

- Selection criteria and justification;
- Principles of radiation physics;
- Risks of ionising radiation and dose limitation;
- Level 1 and 2 CBCT core training.

Module 5.2.3 Static and functional occlusion, temporomandibular dysfunction and orthodontics

- Static and functional occlusal relationships;
- Functional occlusion and mutual protection;
- Temporomandibular joint anatomy, physiology and function;
- Temporomandibular dysfunction: clinical examination and management strategies;
- Temporomandibular dysfunction and orthodontic treatment.

Module 5.2.4 Cephalometric analysis, analysis of growth and treatment outcomes, growth prediction

- Uses of cephalometrics;
- Identification of cephalometric landmarks; cephalometric measurements;
- Common cephalometric analyses;
- Cephalometric superimposition: cranial base; regional superimposition of the maxilla and mandible; Björk's methods of structural superimposition;
- Methods of growth prediction and their limitations; template analysis; cervical vertebral maturation.

Module 5.2.5 Orthodontic treatment planning

- Patient expectations of treatment;
- Assimilation of appropriate diagnostic information into a problem list and achievable treatment plan;
- Achieving the facial and occlusal aims of treatment;
- Scope and limitations of orthodontic treatment;
- Timing of treatment;
- Longitudinal delivery of orthodontic care and evaluation of the skeletal, dental and soft tissue effects of treatment.

Module 5.3.1 Interceptive management of the developing occlusion

- Normal and abnormal dental development and facial growth variation;
- Early loss and prolonged retention of primary teeth; ankylosis and infraocclusion;
- Tooth agenesis;
- Supernumerary teeth;
- Local variation in tooth form;
- Eruption defects and tooth impaction;
- Early loss of permanent teeth;
- Crossbites;
- Crowding;
- Skeletal discrepancies;
- Evidence base relating to interceptive management of the developing dentition.

Module 5.3.2 Orthodontic tooth movement

- Physiology of tooth exfoliation and eruption;
- Disorders of tooth eruption;
- Histological and molecular basis of orthodontic tooth movement;
- Factors influencing orthodontic tooth movement.

Module 5.3.3 Dentofacial orthopaedics

- Theoretical basis of functional jaw orthopaedics;
- Primary cartilage, secondary cartilage and sutures as growth centres;
- Bone remodelling;
- Treatment timing: early versus later treatment;
- Maxillary expansion;
- Maxillary restraint and advancement;
- Growth guidance with functional appliances;
- Skeletal anchorage in dentofacial orthopaedics.

Module 5.3.4 Fixed and removable functional appliances

- Biological and clinical effects of functional appliances;
- Evidence base for the use of functional appliances;
- Removable and fixed functional appliance design;
- Treatment timing.

Module 5.3.5 Orthodontic materials

- Range of materials used in clinical orthodontics;
- Composition and physical properties of impression materials, cements, composites, elastomers, metals and metal alloys;
- Orthodontic bonding systems;
- Biocompatibility and risks associated with orthodontic materials

Module 5.3.6 Orthodontic biomechanics

- Fundamental principles of force application;
- Application of orthodontic force: one-couple and two-couple systems;
- Friction;
- Fundamentals of anchorage control;
- Anteroposterior, vertical and transverse tooth movement.

Module 5.3.7 Conventional removable appliances

- Components of removable orthodontic appliances;
- Design and construction of removable appliances;
- Removable appliances for the interceptive management of malocclusion;
- Removable appliances as an adjunct to fixed appliance treatment.

Module 5.3.8 Fixed orthodontic appliances

- Development and evolution of fixed appliance systems;

- Scope and limitations of fixed appliances;
- Indications and contraindications for fixed appliances;
- Bracket design, manufacture and construction;
- Bracket bonding: direct and indirect techniques;
- Using the preadjusted edgewise appliance: bracket prescriptions, bracket variations, stages of treatment, archwire sequencing, anchorage management, finishing;
- Use of auxiliaries with fixed appliances;
- Customised fixed appliances;
- Use of temporary anchorage devices with fixed appliances;
- Evidence base related to the use of fixed appliances;
- Lingual appliances.

Module 5.3.9 Aligners

- Aligner systems;
- Aligner materials: thermoformed and direct printed aligners;
- Theoretical basis of orthodontic tooth movement with aligners;
- Using aligners; digital planning, placing attachments; monitoring treatment progress, evaluating treatment outcome;
- Scope and limitations of aligner treatment;
- Evidence base relating to aligner systems.

Module 5.3.10 Anchorage reinforcement

- Anchorage management in clinical orthodontics;
- Fixed auxiliary appliances for anchorage;
- Headgear: clinical use, force levels, safety;
- Temporary anchorage devices for anchorage reinforcement.

Module 5.3.11 Adult orthodontics

- Special considerations in managing adult orthodontic patients: oral and dental health, general health, absence of growth;
- Managing expectations in adult patients;
- Adjunctive orthodontic treatment in adults;
- Evidence base relating to adult orthodontic treatment.

Module 5.3.12 Orthodontic emergencies, including dental trauma

- Common problems with removable and fixed orthodontic appliances and their management;
- Malocclusion and trauma risk;
- Acute management of dental trauma;
- Orthodontic management of traumatised teeth over the short and long-term.

Module 5.3.13 Iatrogenic effects of orthodontic treatment

- Aetiological basis of iatrogenic damage during orthodontic treatment;
- Risks from appliances and risks from treatment;
- Minimising iatrogenic damage during orthodontic treatment

- Evidence base relating to iatrogenic damage during orthodontic treatment.

Module 5.3.14 Stability and retention, long-term effects of orthodontic treatment, maturation of the dentition

- Nature and presentation of orthodontic relapse;
- Aetiology of orthodontic relapse;
- Association between malocclusion and relapse;
- Association between orthodontic treatment and relapse;
- Post-retention changes following orthodontic treatment;
- Methods of retention in orthodontics;
- Adjuncts to retention;
- Evidence base for orthodontic retention;
- Maturation of the untreated occlusion.

Module 5.4.1 Orthodontics and oral surgery

- Liaison with the oral surgeon;
- Aetiological basis of tooth impactions;
- Diagnosis and management of impacted teeth;
- Interceptive treatment in the management of displaced teeth;
- Open and closed surgical exposure and subsequent orthodontic management of impacted teeth;
- Soft tissue surgery in the mouth, including frenectomy and gingivectomy;
- Surgical interventions to promote retention and stability.

Module 5.4.2 Orthodontics and restorative dentistry

- Liaison with the restorative dentist or GDP;
- Biomechanics of space redistribution;
- When to open and when to close space;
- Orthodontic treatment-timing in relation to restorative care;
- Types of subsequent restoration; longevity and success of bridges versus implant restorations;
- Implications of restorations for orthodontic retention.

Module 5.4.3 Overview of multidisciplinary management of facial disharmony

- Index of Orthognathic Functional Treatment Need (IOFTN);
- Dentoalveolar compensation and the concepts of decompensation in orthodontic management of patients with jaw discrepancies;
- Limits of orthodontic treatment;
- Common surgical approaches in the management of jaw discrepancies;
- Risks and benefits of combined orthodontic and surgical treatment for jaw discrepancies;
- Care pathway for patients undertaking orthodontic-surgical treatment for jaw discrepancies;
- Care pathway for patients born with cleft lip (with or without) cleft palate.

Module 5.5.1 Evidence-based medicine

- Biomedical databases (MEDLINE; Ovid, Cochrane); and search engines (PubMed);
- Observational and interventional studies;
- Quantitative and qualitative clinical research;
- Patient-centred research;
- Hypothesis testing and estimation;
- Bias and confounding;
- Randomised clinical trials;
- Systematic review and meta-analysis;
- Understanding the forest plot; heterogeneity;
- Core outcomes.

Module 5.5.2 Evidence-based orthodontic practice (the literature)

- Historical evidence base in theoretical and clinical orthodontics;
- Current best evidence relating to orthodontic management and treatment interventions.

Module 5.5.3 Research experience

- Research principles including good (research) clinical practice;
- Research ethics;
- Organisation of research and efficient management of research projects;
- Management of patients within clinical research;
- How research evidence translates to clinical practice.

Module 5.6.1 Organisation of primary care orthodontics

- Organisation of primary care orthodontic services in the United Kingdom and differences between the devolved nations;
- The orthodontic contract;
- Managed clinical networks.

Module 5.6.2 Working within the orthodontic team

- Different roles within the orthodontic team;
- The art of delegation;
- Supervision of cases and referrals to other GDC registrant groups;
- Promotion of teamwork and dealing with conflict;
- Responsibilities of the orthodontist in a large team of dental care professionals;
- Scope of practice of the orthodontic therapist.