



سِرِّهِمُ

CONTRIBUTORS

Prepared and updated by Curriculum
Scientific Group

Dr. Adnan Ishgi
Dr. Nadia Alangari
Dr. Ghadeer Basunbul
Dr. Sahar Alhajrasi

Supervision by

Prof. Zubair Amin
Dr. Sami Alshammari

Reviewed and Approved by

Dr. Sami Al Haider

COPYRIGHT STATEMENT

All rights reserved. Copyright © 2018 Saudi Commission for Health Specialties.

This material may not be reproduced, displayed, modified, distributed, or used in any other manner without prior written permission of the Saudi Commission for Health Specialties, Riyadh, Kingdom of Saudi Arabia. Any amendment to this document shall be endorsed by the Specialty Scientific Council and approved by the Central Training Committee. This document shall be considered effective from the date the updated electronic version of this curriculum was published on the commission's website, unless a different implementation date has been mentioned. Correspondence: Saudi Commission for Health Specialties

We would also like to acknowledge that the CanMEDS framework is a copyright of the Royal College of Physicians and Surgeons of Canada, and many of the description's competencies have been acquired from their resources (Please refer to: CanMEDS 2015 physician competency framework; Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).

SAUDI COMMISSION FOR HEALTH SPECIALTIES

P.O. Box: 94656

Postal Code: 11614

Consolidated Communication Center: 920019393

International Contact Call: +966-114179900

E-mail: Curricula@scfhs.org.sa

Website: www.scfhs.org.sa

ISBN: 978-603-8247-38-9

FORWARD

Curriculum development in medical or dental education is a scholarly process that integrates a specific content area with learning theory and methodology to thereafter evaluate its impact⁽¹⁾. Saudi medical and dental consultants are often recruited by the Saudi Commission for Health Specialties (SCFHS) to reform the current curricula across all specialties, and their unique roles in care services and educational facilities make them perfect candidates. However, although consultants are usually content experts, they may not be familiar with the curriculum development process and might face difficulties in accessing the required resources. Therefore, a systematic approach is required for the development of a curriculum in order to justify the effort involved. Hence, the six-step approach to curriculum development established by Kern et al. is now being adopted⁽²⁾ (Figure 1).

Title		Task involved in the step
1	Problem identification	Identification and critical analysis of the healthcare problems that will be addressed in the curriculum. This requires substantial research to analyze what is currently being done by prosthodontic consultants and educators, i.e., the <i>current approach</i> , and what should ideally be done by prosthodontic consultants and educators to address the healthcare problem related to prosthodontic specialty, i.e., the <i>ideal approach</i> .
2	Needs assessment of targeted learners	The general needs assessment is applied to targeted learners.
3	Goals and objectives	Overall goals and aims for the curriculum are written. Specific measurable knowledge, skills, attitudes, and process objectives are written for the curriculum (CanMEDS-based objectives).
4	Educational strategies	A plan is prepared to maximize the impact of the curriculum, including the content and educational methods congruent with the objectives.
5	Implementation	A plan for implementation, including timelines and resources required, is created. A plan for faculty (consultant) development is made to ensure consistency.
6	Assessment and evaluation	Learner and program evaluation plans are created. A plan is devised for disseminating the curriculum.

Figure 1: Six-step approach to curriculum development for medical education

Problem identification

- Shortage in prosthodontic manpower
- High prevalence of missing teeth that require replacement
- Increased aged population and high societal demand for dental care among the elderly
- High demand for dental implants

These points are highlighted in the “context of practice” section; refer to (page 1) for further information.

Needs assessment of targeted learners

After identifying the general healthcare problems (related to prosthodontics) in step 1, it was important to assess the needs of one's targeted group of learners (SCFHS-accredited prosthodontic supervisors, SCFHS residents, and SCFHS-accredited training centers). Analyzing the current situation and formulating ideal approaches are just as essential as the other steps which depend on them, and will lay the foundation for a good rationale, which, in turn, will help us as a curriculum development team to obtain the required support⁽³⁾.

The information required for reforming the prosthodontic program curriculum was obtained by reviewing the available information, collecting new information, and incorporating the opinion of experts (from the prosthodontic scientific council and others).

Available information:

- Local SCFHS guidelines for prosthodontics in clinical practice and the international guidelines published by the American Dental Association (ADA) and American College of Prosthodontics (ACP).
- Literature on prosthodontics published in Saudi Arabia.
- Local and international educational strategies for prosthodontics.
- Reports of professional organizations and governmental agencies (e.g., SCFHS), considering that it is crucial to adapt their accreditation standards when designing a curriculum.
- Public health statistics, being either national statistics obtained from the annual statistical reports, e.g., Ministry of Health (MOH), or international statistics from reports published by the World Health Organization (WHO).

Opinions of consultants and experts

- Formally, through scientific council meetings.
- Informally, through consultations with experts in the dental education field.

Collection of new information

- Survey of SCFHS prosthodontic residents and feedback.
- Observation of tasks performed by prosthodontists.
- Review of critical incidents (including resident stress related to the unexpected or sudden implementation of a new regulation).
- Study of ideal performance cases or role model prosthodontist.

Goals and objectives

Once the needs of targeted learners have been identified, goals and objectives were easily formulated (overall and specific). The CanMEDS-based objectives are implemented in this curriculum and include cognitive (knowledge), affective (behavior), and psychomotor (skills) objectives. Please refer to the “Outcomes and Competencies” section on [\(page 1\)](#).

Educational strategies

Once the goals and objectives were identified, the curriculum content and educational strategies were reviewed and revised to meet the educational objectives. Please refer to the “Teaching and Learning” section on [\(page 1\)](#).

Implementation

There is strong political support from the SCFHS and the prosthodontic scientific council to implement this reformed curriculum. However, some anticipated barriers have been identified and will be addressed in timely manner. The revised curriculum will be introduced to a test audience before its final implementation.

Assessment and evaluation

Multiple formative assessments are designed for residents to ensure their continuous positive progression, and multiple summative assessments are included to provide a decisive grade reflecting the performance of residents.

Evaluation of the curriculum (program-level evaluation) and instructors (individual-level evaluation) are included to provide ongoing feedback to improve the performance of both the curriculum and instructors. Please refer to the “Assessments” section on [\(page 121\)](#).

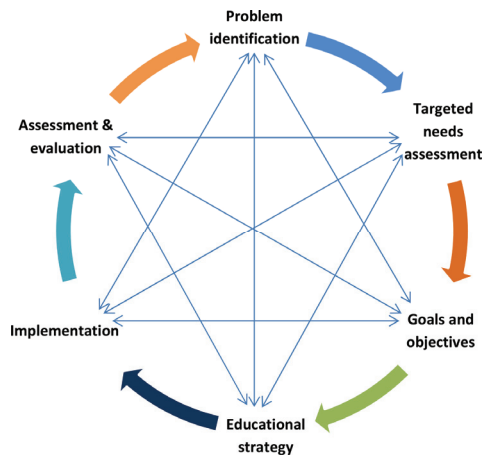


Figure 2: Six-step approach to curriculum development

TABLE OF CONTENTS

CONTRIBUTORS	1
COPYRIGHT STATEMENT	2
FORWARD	3
CHAPTER 1: INTRODUCTION	11
I. Context of practice	11
1. Current challenges	11
2. Prosthodontic residency program in Saudi Arabia	13
II. Goal of curriculum implementation and the responsibilities involved	14
III. What is new in this edition?	15
1. Competency-based vs. time/process-based curricula	15
2. Changing from a 4-year program to a 3-year program	15
3. Exit-level prosthodontic comprehensive clinical case requirements	17
4. Prosthodontic individual clinical requirements (points)	18
5. Supervision guideline	18
6. A new description for the Saudi Board Part I Prosthodontic written examination	19
7. Intended Learning Outcomes (ILOs) strategy for the didactic part	19
IV. Policies and procedures	19
V. Abbreviations used in this curriculum	20
CHAPTER 2: PROGRAM STRUCTURE	22
CHAPTER 2: SUPERVISION GUIDELINE	23
I. Privileges and graded responsibilities	23
II. Supervision level	23
III. Responsibilities	24
CHAPTER 3: OUTCOMES AND COMPETENCIES	25
I. Introduction	25
II. Mission of the program	26
III. Goals of the program	26

IV. Program CanMEDS-based milestones and outcomes	26
1. Dental expert (domain of competence)	28
2. Communicator	34
3. Collaborator	39
4. Leader	42
5. Health Advocate	45
6. Scholar	46
7. Professional	51
V. Clinical competencies and requirements	54
1. Prosthodontic procedures and level of supervision	54
2. Clinical procedural requirements for the prosthodontic program (points)	57
3. Minimum clinical case requirements per resident level (per patient case)	60
CHAPTER 4: TEACHING AND LEARNING	62
I. General principles	62
1. Learning principles relevant to the selected educational methods	62
2. Intended Learning Outcomes (ILOs)	64
II. Didactic component	66
1. Universal topics	66
2. Core specialty topics	71
3.1. Basic courses	71
3.2. Introductory specialty courses	73
3.3. Specialty Literature Review	76
3.4. Book review (Home reading assignments)	129
3. Trainee-selected topics	130
III. Practice-based component	131
1. Pre-clinical laboratory course	131
2. Clinical-based learning	145

CHAPTER 5: RESEARCH PROJECT (RESIDENT DAY)	151
I. Mission	151
II. Objectives	151
III. Mentorship	153
CHAPTER 6: ASSESSMENT	155
I. Assessment formats	156
1. Cognition assessment tools	157
1.1. Annual (promotion) written Multiple Choice Questions/ Single Best Answer examination	157
1.2. Structured Oral Exam (SOE)	157
1.3. Academic Assignments	158
2. Psychomotor assessment tools	163
2.1. Direct Observation of Procedural Skills (DOPS)	163
2.2. Portfolio/Logbook (Assessment system)	166
2.3. Research activity	166
2.4. Objective Structured Clinical Examination (OSCE)	167
3. Affective assessment tools	168
3.1. In-Training Evaluation Report (ITER)	168
3.3. Multi-Source Assessment (360° feedback)	170
3.4. Patient satisfaction assessment (360° feedback)	171
II. Assessment formats integration with Miller's domains and CanMEDS roles	172
III. Formative assessments	174
IV. Summative assessments	175
1. Saudi Board Part I Prosthodontic written examination	175
2. Certification of Training Completion and Final In-Training Evaluation Report	175
3. Final Examinations of Saudi board Certificate	175
3.1. Final Prosthodontic Written Certification Examination	175
3.2. Final Prosthodontic Clinical Certification Examination	176
V. Summary of the formative and summative assessments	176

CHAPTER 7: PROGRAM EVALUATION	179
I. Course Evaluation	182
II. Practical Project/Activity Evaluation	183
III. Overall Basic and Preclinical Course Evaluation	184
IV. End-of-Year Program Evaluation	186
CHAPTER 8: LIST OF REFERENCES	188

1. INTRODUCTION

I. Context of practice

Prosthodontics is the dental specialty that pertains to the diagnosis, treatment planning, rehabilitation, and maintenance of oral function, comfort, appearance, and health of patients with clinical conditions associated with missing or deficient teeth and/or maxillofacial tissues using biocompatible substitutes⁽⁴⁾. Prosthodontists specialize in treating and handling dental and facial problems that involve restoring missing teeth and jaw structures.

1. Current challenges

1.1. Shortage in prosthodontists

Today, there has been an unprecedented burst in the development of prosthodontic modalities and new treatment techniques for replacing missing teeth. However, there is a serious shortage of prosthodontists worldwide. In Chicago, in 2015, a business report generated by the recruiting firm "ZipRecruiter" found out that the most in-demand job was that of a prosthodontist⁽⁵⁾. Both the U.S. Department of Labor and Forbes.com have ranked prosthodontics as one of the Top 10 highest paying jobs in the United States by virtue of their high demand.

According to the American Dental Association (ADA) survey center, there are only 3,372 prosthodontists practicing in the USA, serving more than 235 million individuals (the U.S. population over 18-years-old)⁽⁶⁾. Similarly, there are only 532 prosthodontic specialists and consultants available in Saudi Arabia⁽⁷⁾, serving a population of over 21.6 million individuals over 19-years-old⁽⁸⁾. This is inadequate to meet the needs of Saudi patients. Moreover, consultant prosthodontists constitute less than 1% of all dentists in Saudi Arabia⁽⁷⁾. ()

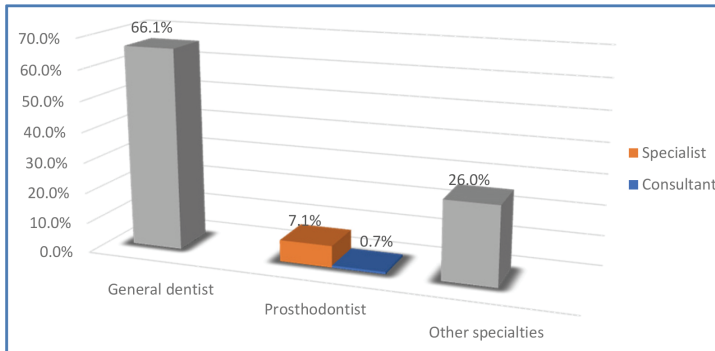


Figure 3: The percentage of licensed dentists in Saudi Arabia

1.2. Prevalence of missing teeth

According to the Centers for Disease Control and Prevention (CDC), more than 120 million Americans are missing one or more teeth, and 35–36 million are missing all of their teeth in one

or both jaws⁽⁹⁾. Additionally, the World Health Organization (WHO) has reported that 26% of individuals over 65-years-old in the US and 46% of their counterparts in Saudi Arabia are edentulous⁽¹⁰⁾. More significantly, in a study conducted in the Eastern Province of Saudi Arabia among a population aged 14–19 years, the prevalence of tooth loss was 40.9%⁽¹¹⁾.

1.3. Increased aged population

According to previously published literature, age is directly related to every indicator of tooth loss^(12, 13). The trend of an aging population is now evident in Saudi Arabia. Recent research has shown that there has been a substantial change in the age structure of the Saudi population due to an increase in life expectancy and a decline in fertility rates.

The average life expectancy in Saudi Arabia has increased dramatically from 45.67 years in 1960 to 74.34 years in 2014⁽¹⁴⁾.

It is predicted that the population of Saudi Arabia will reach approximately 40 million in 2050 and that 25% of the population will be aged 60 years or older. Therefore, there will be at least 10 million people aged 60 years or older in Saudi Arabia by 2050⁽¹⁵⁾. (Figure 3)

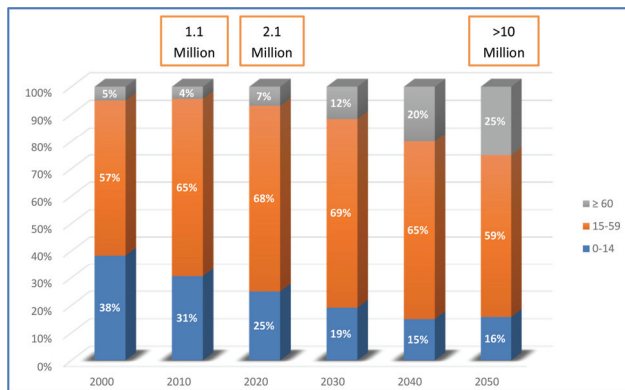


Figure 3: Population aging in Saudi Arabia

1.4. Demand of dental implants

Dental implants are becoming more popular than ever due to their clear advantages over other methods of replacing missing teeth. Dental implants already hold a substantial 18% share of the global dental device market⁽¹⁶⁾ and display one of the highest growth rates among all dental device submarkets. According to Carl Misch, the number of dental implants used increased tenfold from 1983 to 2002 worldwide. In 2005, 550 million U.S. dollars were spent on dental implants worldwide. In 2018, this number increased to more than 9 billion U.S. dollars⁽¹⁷⁾ (Error! Reference source not found.). This demand is likely to continue to increase exponentially, considering that only 2%–3% of the global edentulous population has so far received dental implant treatment⁽¹⁶⁾.

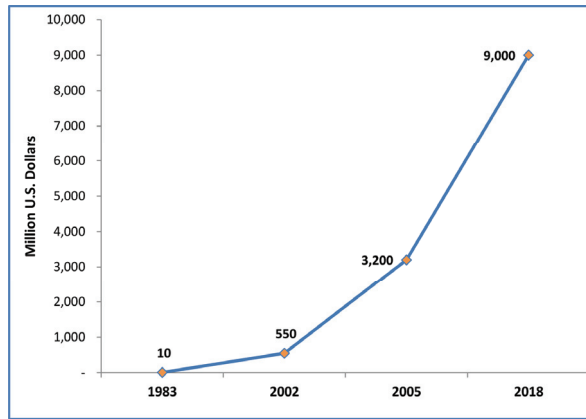


Figure 5: Market value of dental implants

Another reason underlying the increased demand for the replacement of missing teeth with dental implants is that implants have less of a psychological impact on patients than do fixed dental prostheses (bridges) or removable prostheses. Patients treated with an implant-supported prosthesis generally rate their overall psychological health as having improved by 80% compared to their previous state⁽¹⁸⁻²¹⁾.

A study exploring the factors affecting the willingness to pay for dental implants concluded that “despite the cost of treatment, dental implants seem to be an attractive treatment option for the replacement of missing teeth among the majority of surveyed patients in Saudi Arabia”⁽²²⁾.

2. Prosthodontic residency program in Saudi Arabia

- The Saudi Board Prosthodontic training program was founded in 2006. The number of candidates accepted per year since its inception is shown in (Figure 6).

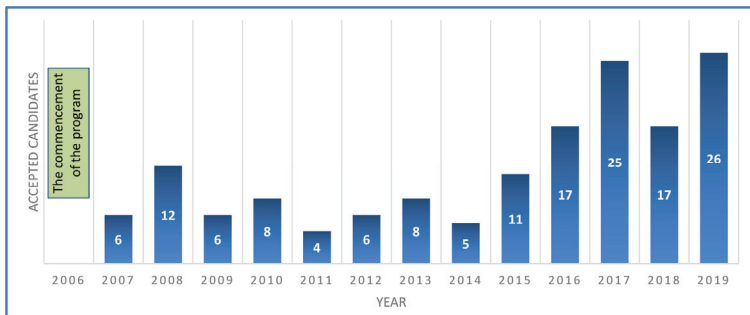


Figure 4: Accepted candidates per year (since 2006)

- To this year (2019), 58 prosthodontic residents have graduated from the program (Figure 7).

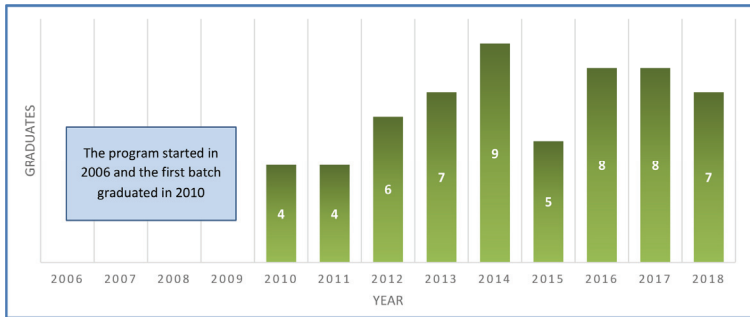


Figure 7: Prosthodontic graduates (since 2010)

- Currently, there are 75 prosthodontic residents distributed across 20 training centers at all residency levels (Figure 8).

Training centers	No. of training centers	Resident level	No. of residents
Central training centers	11	R1	17
Western training centers	5	R2	23
Eastern training centers	2	R3	23
Southern training centers	2	R4	12
TOTAL	20 centers	TOTAL	75 residents

Figure 5: Training centers and registered prosthodontic residents (2019)

II. Goal of curriculum implementation and the responsibilities involved

The goal of this curriculum is to guide residents to become competent in the field of prosthodontics. This goal will require a significant amount of effort and coordination from all stakeholders involved in postgraduate training. As “adult learners,” trainees must demonstrate their full, proactive engagement by:

- a detailed understanding of the learning objectives,
- evidence of self-directed learning,
- an openness to reflective feedback and formative assessment, and
- ensuring their own wellbeing and seeking support when needed.

The program director has a vital role in ensuring the successful implementation of this curriculum.

Training committee members, and particularly the program administrator and chief resident, have a significant impact on the program implementation. Residents should be allowed to share the responsibility in curriculum implementation. The Saudi Commission for Health Specialties (SCFHS) will apply the best models of training governance to achieve the best quality of training. Academic affairs in training centers and a regional supervisory training committee will play a major role in the training supervision and implementation.

The prosthodontic scientific council will be responsible for ensuring that the content of this curriculum is constantly updated to match the best-known standards in postgraduate education in their specialty.

III. What is new in this edition?

1. Competency-based vs. time/process-based curricula

In traditional dental residency programs, the successful completion of a dental curriculum is achieved based on the time spent on rotations, as opposed to the abilities acquired.

The majority of dental residents successfully complete their training programs by meeting the time and process requirements. It is assumed that when these requirements are met, the residents are able to apply what is learned to the actual delivery of patient care, without actually assessing whether that learning is actually applied to healthcare delivery⁽²³⁾.

In this curriculum, we have shifted from a time/process-based framework to an outcome (competency)-based framework. At the end of the program, residents will be eligible to take the final written and clinical examination once they are trusted as a competent prosthodontist, regardless of the residency duration. However, the minimum length of the program is 36 months.

2. Changing from a 4-year program to a 3-year program

The current 3-year prosthodontic curriculum is designed to be similar to the postgraduate programs in North America. This focused approach will allow for better resident turnover, allowing more candidates to be accepted into the program without compromising the quality of the outcome (Figure 9).

Section	4-year program	3-year program
Curriculum		
Curriculum structure	Time/process-based	Outcome (competency)-based
Driving force for process	Supervisors	Residents

Responsibility for content	Scientific council	Scientific council, supervisors, residents, and external experts
Goal of educational encounter	Knowledge acquisition	Knowledge application
Supervision policy	General	Competency-based
Junior residents	R1, R2	R1, R2
Senior residents	R3, R4	R3
Assessment	Mainly summative tools	Summative & formative (page 88)
Evaluation	Not available	Different tools to evaluate the program and supervisors (page 88)
Didactic section		
Pre-clinical course	12 weeks	6 weeks (page 102)
Universal courses	Not available	On-line modules (page 51)
Basic science course	More	Fewer (page 55)
Introductory specialty courses	Few lectures	Lectures and workshops (page 57)
Specialty literature review	About 1000 articles (≈ 20 articles/academic day)	About 500 articles (page 61) (≈ 8 articles/academic day)
	Not filtered (importance!)	≈ 30% of articles for home reading
Lectures/workshops	There are no written Intended Learning Objectives (ILOs)	There are Intended Learning Objectives (ILOs) (page 49)
	Fewer	More
Topic research (resident day)	R1, R2, R3	R1, R2 (page 46)
Residents' presentation content	Not used in exams	ILOs from topic presentation can be used in the promotion exams

Promotion (annual) exam	R1, R2, R3	R1, R2 (page Error! Bookmark not defined.)
Part I written exam	Can be taken in R1 or R2	Can be taken in R1 or R2 (page 138)
Final certification written exam	R4	R3 (page 139)
Clinical section		
Clinical case submission (annual)	Summative (mandatory)	Formative (progress)
Clinical case submission (on exit)	Summative (mandatory)	Summative (mandatory)
Clinical case submission (no.)	9 cases	5 cases (page 46)
Case presentation (academic activity)	One case per year	One case per year
Individual clinical requirements	350 units	350 points (page 45)
Structured oral exam	R1, R2, R3, R4	R1, R2, R3 (page 122)
Final certification clinical exam	R4	R3 (page 131)

Figure 6: Four-year program vs. three-year program

3. Exit-level prosthodontic comprehensive clinical case requirements

At the end of the training program, consultants and supervisors need to decide whether a resident can be entrusted with comprehensive prosthodontic treatments. Residents used to submit their comprehensive prosthodontic cases annually in order to be eligible for the annual promoting exams. Such an approach caused unnecessary stress that affected the performance of the residents, who become biased when selecting clinical cases or choosing the appropriate treatment modalities. This resulted in some training centers complaining of residents being selective in their provision of treatment, most often refraining from providing the general dental services required. Additionally, some comprehensive prosthodontic treatments require dental implant and bone grafting, which can easily take more than a year to complete.

For the above reasons, we provided a different approach for justifying and making better use of supervisor entrustment decisions for residents. This approach will consist of performing and submitting 5 different comprehensive prosthodontic treatments at the end of the training program. CBD forms will be utilized to ensure that the residents completed the treatment competently. (page 1)

Case number	Description
CASE 1	Maxillary and mandibular complete denture treatment ▪ Conventional ▪ Overdentures ▪ Implant-retained/supported overdentures
CASE 2	Fixed/removable prosthodontic treatment (combination) ▪ At least one surveyed crown
CASE 3	Comprehensive fixed prosthodontic treatment ▪ Minimum 18 unites (teeth/pontic) restored/replaced with indirect restoration ▪ With/without implants ▪ With/without removable prosthesis
CASE 4	Comprehensive fixed implant-supported prosthesis treatment ▪ Minimum single arch fixed prosthesis fully supported by implants ▪ No other restrictions or defined units
CASE 5	Elective prosthodontic treatment ▪ CASE 1 (with implant involvement) ▪ CASE 2 ▪ CASE 3 ▪ CASE 4 ▪ Case report; <i>esthetic, maxillofacial prosthesis, concept or digital treatment</i>

4. Prosthodontic individual clinical requirements (points)

To monitor resident progress in the clinic, a minimum number of clinical requirements are required to be submitted annually (e.g., crowns, post and core, veneer, RPD, single dentures, etc.) However, its description is different than the old curriculum. In the old curriculum, the number of units required was set (e.g., 50 units of all-ceramic crowns, 50 units of ceramo-metal crowns, etc.). Additionally, it referred only to the fixed restorations. In the new curriculum, the unit will be re-defined as points termed “clinical requirement points.” Furthermore, it will be less specific, and based on minimum requirements rather than on fixed numbers to be submitted. A DOPS formative assessment tool will be utilized to ensure that the residents received proper feedback ([page 1](#)).

5. Supervision guideline

Prior to this reformed curriculum, there was no clear graded supervision guideline. It was assumed that all residents, regardless of their level, the procedure they are performing, or the competency they are learning, are supervised without further details or description of the term “supervised”. In the revised curriculum, a new supervisory guideline is introduced and integrated into the program competency-based objectives and the type of clinical procedures based on the resident’s level. Please refer to “Supervision guideline” on ([Page 20](#)), “CanMEDS-based program objectives on ([page 24](#)) and “Prosthodontic procedures and level of supervision” on ([page 27](#)).

6. A new description for the Saudi Board Part I Prosthodontic written examination

The Part I written examination will only target R1 and R2 residents. Taking the examination is optional for R1 residents. If they pass it, the promotion examination requirement will be waived, and they are no longer required to take Part I in R2. In contrast, R2 residents are required to take the examination (in case they did not take or pass it in R1) in order to be promoted to R3. Blueprints covering the R1 and R2 curricula are distributed to the residents every year. [\(page 88\)](#)

7. Intended Learning Outcomes (ILOs) strategy for the didactic part

There are multiple information resources in the didactic part, including crash courses, basic courses, a literature review, seminars, workshops, lectures, etc. In the past few years, it was challenging to provide a universal didactic content among all regions in the kingdom. Some instructors or supervisors tend to provide different content than what he/she should provide, subsequently leading to the dissemination of education materials that were mis-aligned with that which was assigned in the curriculum. In the recent final and annual examinations, residents have complained of having questions that were not related to the material covered in their academic year. Therefore, an ILOs strategy was adopted in this curriculum. Every instructor will be provided with pre-determined ILOs that he/she should follow. ILOs will be determined by the scientific council, instructors, speakers, and residents. Continuous feedback from stakeholders will help build an updated bank of ILOs.

IV Policies and procedures

This curriculum represents the means and materials outlining the learning objectives with which trainees and trainers will become familiar in order to achieve the identified educational outcomes. The Saudi Commission for Health Specialties (SCFHS) has a full set of “General Bylaws” and “Executive Policies” (published on the official SCFHS website) that regulate all processes related to training. Regulations that needed to be applied include, but are not limited to, general bylaws of training, assessment, and accreditation as well as executive policies on admission, registration, continuous assessment and promotion, examination, trainees’ representation and support, duty hours, and leaves. Trainees, trainers, and supervisors need to apply this curriculum in compliance with the most updated bylaws and policies which can be accessed online (www.scfhs.org.sa).

V. Abbreviations used in this curriculum

The following acronyms will be found in the book and are listed below alphabetically:

Acronym	Stands for/description
ACGME	Accreditation Council for Graduate Medical Education
ACP	American College of Prosthodontics
ADA	American Dental Association
CAD/CAM	Computer-Aided Design & Computer-Aided Manufacturing
CanMEDS	Canadian Medical Education Directions for Specialists
CBCT	Cone Beam Computed Tomography
CBD	Case-Based Discussion report
CBE	Competency-Based Education
CDC	Centers for Disease Control and prevention
CPC	Cast Post and Core
DIVC	Disseminated intravascular coagulation
DOPS	Direct Observation of Procedural Skills report
FDP	Fixed Dental Prosthesis
FITER	Final In-Training Evaluation Report
HCW	Healthcare Workers
ILO	Intended Learning Objectives
ITER	In-Training Evaluation Report
MCQ	Multiple Choice Question
MOH	Ministry of Health
OPG	Orthopantomogram
OSCE	Objective Structured Clinical Examination

PA	Periapical radiograph
PPA	Presentation Performance Assessment
R1	(First) year of residency
R2	(Second) year of residency
R3	(Third) year of residency
RCPSC	Royal College of Physician and Surgeon of Canada
RPD	Removable partial Denture
RTC	Residency Training Committee
SBA	Single Best Answer
SBPros	Saudi Board of Prosthodontics
SCFHS	Saudi Commission for Health Specialties
SIRS	Systemic Inflammatory Response Syndrome
SOE	Structured Oral examination
TMD	Temporomandibular dysfunction
TMJ	Temporomandibular joint
WHO	World Health Organization

2. PROGRAM STRUCTURE

Residency level	Month	Academic activity				
R1	Oct	Pre-clinical training program: six weeks of basic courses, prosthodontic didactic				
	Nov	courses, and laboratory activities		Clinical requirements (Mandatory for exam setting) • Clinical points (35 points) • CBD report on: CASE 1: Max. and mand. complete denture treatment (SOE) <i>Conventional, Overdentures, Implant-retained/supported overdentures</i> • <i>Two cases' progress (Formative assessment)</i>	Research project (resident day poster)	
	Dec	Literature review + Academic courses (electives)	1 Topic presentation seminar + 1 case presentation seminar			
	Jan					
	Feb					
	Mar					
	Apr					
	May					
	Jun					
	Jul	Promotion (Annual) Written Exam or Part I Prosthodontic Written Exam				
Aug	Annual Structured Oral Exam (SOE) – CASE 1: Max. and mand. complete dentures					
Sep	Clinical rotation / Leave application					
R2	Oct	Literature review + Academic courses (electives)	1 Topic presentation seminar + 1 case presentation seminar	Clinical requirements (Mandatory for exam setting) • Clinical points (140 points) (<i>Cumulative R1 + R2</i>) • CBD report on: CASE 2: Fixed/removable prosthodontic treatment (SOE) with minimum 1 surveyed crown • <i>Two cases' progress (Formative assessment)</i>	Research project (resident day poster)	
	Nov					
	Dec					
	Jan					
	Feb					
	Mar					
	Apr					
	May					
	Jun					
	Jul	Promotion (Annual) Written Exam or Part I Prosthodontic Written Exam				
Aug	Annual Structured Oral Exam (SOE) – Fixed/removable combination case					
Sep	Clinical rotation / Leave application					
R3	Oct	Literature review + Academic courses (electives)	Case presentation seminar + Case-based topic presentation seminar	Clinical requirements (Mandatory for exam setting) • Clinical points (350 points) (<i>Cumulative R1 + R2 + R3</i>) • CBD reports on: CASE 1: Max. and Mand. Complete dentures: <i>Conventional, Overdentures, Implant-retained/supported overdentures</i> CASE 2: Fixed/removable combination case: with minimum 2 crowns (at least one of them surveyed) CASE 3: Comprehensive fixed prosthesis case: <i>with/without implants or removable prosthesis (minimum 18 units) (SOE option)</i> CASE 4: Comprehensive fixed implant-supported prosthesis: <i>Minimum single arch fixed prosthesis fully supported by implants (SOE option)</i> CASE 5: Optional case: <i>either CASE 1 (with implant involvement), CASE 2, CASE 3, CASE 4, or Case report (esthetic, maxillofacial or digital case)</i>		
	Nov					
	Dec					
	Jan					
	Feb					
	Mar					
	Apr	Oral presentation (resident day)				
	May					
	Jun	Clinical rotation / Leave application				
	Jul					
	Aug					
	Sep	Annual Structured Oral Exam (SOE) – CASE 3 or CASE 4				
	Oct	Final Prosthodontic Written Certification Exam	Final Prosthodontic OSCE Certification Exam	Graduation		

For more details on the clinical requirements and points, please refer to (page 1)

2. SUPERVISION GUIDELINE

Integration of the “supervision guideline” will provide all residents with an educational program that is clinically and academically progressive. It will provide an organized educational program which incorporates guidance and supervision of postgraduate residents, facilitating their ethical, professional, and personal development while ensuring safe and appropriate patient care. The privileges of progressive authority and responsibility, conditional independence, and a supervisory role in patient care delegated to each resident will be monitored by the program director and supervisors. The supervised assignments should be sufficient in duration to assess the knowledge, behavior, and skills of each resident and delegate to them the appropriate level of authority and responsibility for patient care.

I. Privileges and graded responsibilities

A description of the level of graded responsibility accorded to each resident by residency year has been developed. This description includes the identification of mechanisms by which prosthodontic supervisors and the program director can make decisions about each resident's progressive involvement and independence in the context of specific patient care activities.

There are some important points:

- The program directors must evaluate each resident's abilities based on specific criteria established in the revised curriculum.
- Supervising prosthodontists will delegate patient care activities to each resident based on the needs of the patient and the abilities demonstrated by the resident.
- Senior residents should act in a supervisory role for junior residents and dental interns with appropriate patients, provided their demonstrated progress in the training program justifies this role.
- There will be circumstances in which all residents, regardless of the level of training, must communicate verbally with the appropriate supervisor. Examples of these situations are as follows:
 - Activation of Code Blue team
 - Consultation for an urgent condition
 - Patient or family dissatisfaction
 - Patient request
 - Transfer of a patient to a higher level of care
- The program directors must ensure that the supervision guideline is distributed to and followed by residents and the supervising prosthodontists.
- Compliance with the supervision guideline will be monitored by the program directors and the Prosthodontic Scientific Council.

II. Supervision level

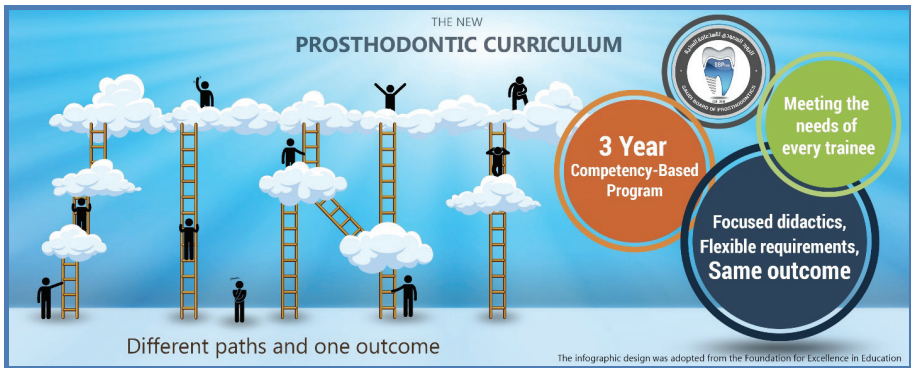
Residents get promoted from one level to another and become less supervised when they become more trustworthy in performing a prosthodontic procedure; please refer to “Prosthodontic procedures and level of supervision” on (page 1). The scale below has been established to translate the entrustment decisions aiming to decrease the level of supervision as resident progresses throughout the program: (*modification of Cate OT's* (24))

- 1. Not allowed to practice the clinical procedure; only Observation (O)**
The resident can observe a clinical procedure without physical intervention. Generally, this applies to R1 residents for some sophisticated dental procedures.
- 2. Allowed to practice the clinical procedure under supervision; Direct Supervision (D)**
The resident can practice a clinical procedure with the physical presence of a prosthodontic supervisor. Generally, this applies to junior residents (R1 and R2).
- 3. Allowed to practice the clinical procedure unsupervised, Indirect Supervision (I)**
The resident can practice a clinical procedure without the physical presence of a prosthodontic supervisor. Generally, this applies to R3 residents & some procedures for R2.
- 4. Allowed to supervise other residents practicing a clinical procedure; Supervising (S)**
The resident can supervise a clinical procedure performed by junior residents or interns. Generally, this applies to senior residents (R3).

III. Responsibilities

- 1. General**
 - All patient care must be supervised by qualified prosthodontic supervisors.
 - Clinical schedules must be available at all clinical services locations such that all healthcare professionals easily can identify the assigned residents and their supervisors.
 - It must be ensured that infection control & safety measures are being followed.
- 2. Supervisors**
 - Daily review of the resident documentation of patients' record.
 - Compliance with training center requirements regarding patient procedure notes.
 - Full accountability under the legislation for any decision to delegate a task to the resident in the patient's best interests.
 - Provision of constructive feedback to residents as appropriate.
- 3. Residents**
 - Each resident is responsible for understanding the process of supervision, the limits of their scope of authority, boundaries, and level of competency, and the circumstances under which they are permitted to act with conditional independence

3. OUTCOMES AND COMPETENCIES



I. Introduction

Training should be guided by well-defined “learning objectives” that are driven by targeted “learning outcomes” of the prosthodontic program to serve specific prosthodontic needs. Learning outcomes are supposed to reflect the professional “competencies” that are aimed to be “entrusted” by residents upon graduation. This will ensure that graduates will meet the expected demands of the healthcare system in relation to the prosthodontic specialty. Competency-based education (CBE) is an “adult-learning” approach that is based on achieving pre-defined, granular, and well-paced learning objectives that are derived from complex professional competencies.

Professional competencies related to healthcare are usually complex and consist of multiple learning domains (knowledge, skills, and attitude). CBE is expected to change the traditional method of postgraduate education. For instance, time of training, though a precious resource, should not be referred to as a proxy for competence (e.g., time of rotation in certain hospital areas is not the primary marker of having achieved competence).

Furthermore, CBE emphasizes the critical role of informed judgment of a learner’s competency progress, which is based on a staged and formative assessment that is based on multiple workplace-based observations. Several CBE models have been developed for postgraduate education in healthcare (e.g., CanMEDS by the Royal College of Physician and Surgeon of Canada (RCPSC), the CBME-Competency model by the Accreditation Council for Graduate Medical Education (ACGME), tomorrow’s doctor in UK and multiple others).

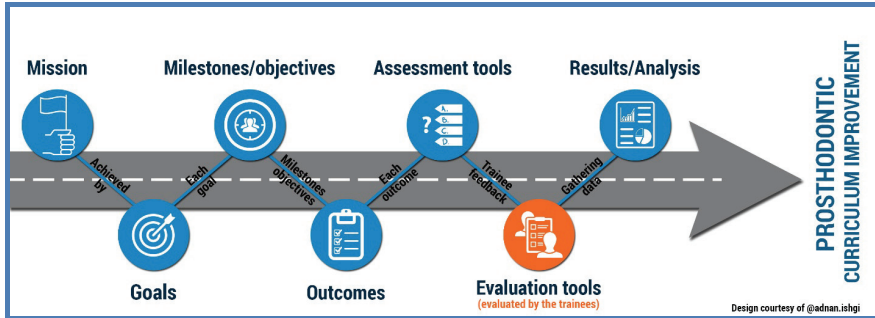


Figure 7: Curriculum development roadmap

II. Mission of the program

The mission of the program is to deliver an outcome (competency)-based curriculum that offers the highest level of clinical teaching and educational experience for the development of future prosthodontists.

III. Goals of the program

At the end of the training program, a successful graduate is expected to be an expert and a competent prosthodontist with a broad-based understanding of the core knowledge, skills, and attitudes necessary for the practice of prosthodontics. The prosthodontic graduate is capable of the following:

- Providing an effective patient-centered care and service to a diverse population in all aspects, including knowledge, skills, and attitude.
- Performing the full range of clinical procedures that are considered an integral part of the prosthodontic specialty.
- Creating and maintaining an ideal environment that promotes the delivery of high healthcare standards in prosthodontics.
- Planning and managing collaborative multidisciplinary oral healthcare issues.
- Embracing lifelong learning, active involvement in the specialty, conducting research, and practicing teaching.
- Addressing ethical issues and issues of gender, age, culture, beliefs, and ethnicity in a professional manner.
- Understanding the oral health needs of our communities and engaging in community service.

IV. Program CanMEDS-based milestones and outcomes

In this section, outcomes and competencies are classified based on the CanMEDS framework and the level of supervision for each residency level. As stated earlier, the curriculum framework in medical and dental education has shifted from a time and process-based framework to a competency-based model. International acceptance of this paradigm shift has been reflected by the release of the CanMEDS framework, which emphasizes not only dental

skills and knowledge but also multiple additional non-dental roles that aim to competently serve society's broader needs. Therefore, in this revised curriculum, we have adopted the CanMEDS framework to establish a core curriculum for the prosthodontic residency training program. The CanMEDS is a competency-based framework and is derived from "Canadian Medical Education Directives for Specialists." The CanMEDS diagram below illustrates the central role of the "dental expert" and shows the interconnectedness of the other roles (Figure 8).

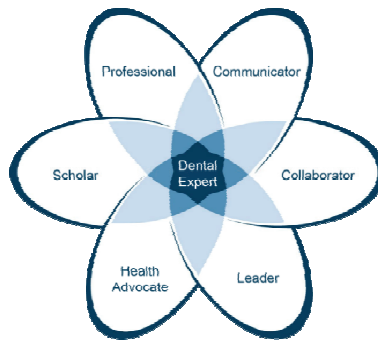


Figure 8: CanMEDS framework

In this curriculum, CanMEDS milestones are integrated to illustrate how a prosthodontist's competence is expected to progress over the course of the residency program until graduation (R1, R2, and R3) (Figure 9). Additionally, the CanMEDS-based objectives are integrated with the "supervision guideline" to provide clear instructions and directions with regard to what supervisors should teach and assess. This will help residents better organize their efforts and successfully learn the intended instructional content based on their residency level.

Domains	Key competencies	Milestones
Dental expert	5	56
Communication	5	32
Collaboration	3	25
Leader	4	22
Health Advocate	2	7
Scholar	4	36
Professional	4	22
Total	27	200

Figure 9: Domains, key competencies, and milestones

1. Dental expert (domain of competence)

As dental experts, prosthodontists integrate all of the CanMEDS roles, applying dental and prosthodontic knowledge, clinical skills, and professional attitudes in their provision of patient-centered care.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency				
1. Practice dentistry within their defined scope of practice and expertise				
Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3
1.1	Demonstrate a commitment to high-quality care of their patients			
1.1.1	Demonstrate compassion for patients	D	D	I
1.1.2	Demonstrate commitment and accountability for patients in their care	D	D	I
1.2.3	Role-model a commitment to high-quality patient care	O	D	I
1.2	Integrate the CanMEDS Intrinsic Roles into their practice of prosthodontics			
1.2.1	Describe the CanMEDS roles and explain how these relate to prosthodontics	D	D	I
1.2.2	Integrate the CanMEDS Intrinsic Roles into their prosthodontics practice	D	D	I
1.2.3	Teach and assess the application of the CanMEDS Competency Framework to prosthodontic practice	O	O	D
1.3	Apply knowledge of the clinical and biomedical sciences relevant to prosthodontics			
1.3.1	Apply knowledge of basic and clinical sciences to identify, diagnose, and treatment-plan common clinical problems	D	D	I
1.3.2	Apply a broad base and depth of knowledge in clinical and basic sciences to manage the variety of prosthodontic cases	D	D	I

1.4	Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner			
1.4.1	Perform a patient assessment and provide an interpretation of the clinical situation to the supervising prosthodontist	D	D	I
1.4.2	Recognize urgent problems that may need the involvement of more experienced colleagues and seek their assistance immediately	D	D	I
1.4.3	Perform appropriately timed clinical assessments with recommendations that are well organized and properly documented	D	D	I
1.4.4	Teach colleagues how to perform consultations	O	O	D

1.5	Carry out professional duties in the face of multiple competing demands			
1.5.1	On the basis of patient-centered priorities, seek assistance to prioritize multiple competing tasks that need to be addressed	D	D	I
1.5.2	Carry out professional duties in the face of multiple, competing demands	D	D	I

1.6	Recognize and respond to the complexity, uncertainty, and ambiguity inherent in prosthodontic practice			
1.6.1	Seek assistance in situations that are complex or new	D	D	D
1.6.2	Recognize and respond to the complexity, uncertainty, and ambiguity inherent in prosthodontic practice	D	D	D

Second key competency 2. Perform a patient-centered clinical assessment and establish a treatment plan				
---	--	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Prioritize issues to be addressed in a patient encounter			
2.1.1	Identify the concerns and goals of the patient for the encounter	D	D	I
2.1.2	Prioritize which issues need to be addressed during future visits or with other dental specialists	D	D	I

2.2	Elicit a history, perform a physical exam, select appropriate investigations, and interpret their results for the purpose of diagnosis and management, disease prevention, and health promotion			
2.2.1	Elicit a history, perform a clinical examination, and develop an initial treatment plan relevant to the patient's need	D	D	I
2.2.2	Conduct a clinical examination and come up with treatment plan in challenging or unusual situations	O	O	D

2.3	Establish care goals in collaboration with patients and their families, which may include treating symptoms, achieving treatment, and improving function			
2.3.1	Initiate discussions with the patient about treatment plans and care goals	D	D	I
2.3.2	Besides the cosmetic issue, address the impact of the patient's oral condition on their ability to eat, speak, function, and pursue a normal life	D	D	I
2.3.3	In a constructive and respectful manner, share concerns with the patient with regard to care goals that are not considered achievable	D	D	I

2.4	Establish a patient-centered treatment plan			
2.4.1	Develop an initial management plan for common prosthodontic cases	D	D	I
2.4.2	Develop and implement treatment plans that consider all of the patient's health problems and context in collaboration with the patient and other dental specialties (when appropriate)	D	D	I
2.4.3	Develop, in collaboration with the patient, a plan to deal with clinical uncertainty (treatment plan is initial and subjected to change)	D	D	D
2.4.4	Establish management plans in patient encounters when there are significant disagreements about what is achievable	O	O	D

Third key competency
3. Plan and perform procedures for the purpose of assessment and/or management

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

3.1	Determine the most appropriate prosthodontic procedures			
3.1.1	Describe the indications, contraindications, risks, and alternatives for a given procedure	D	D	I
3.1.2	Integrate all sources of information to develop a procedural plan that is safe, patient-centered, and considers the risks and benefits of all approaches	D	D	I
3.1.3	Determine the most appropriate prosthodontic procedure for the purpose of assessment and/or management	D	D	I
3.1.4	Develop a novel (new and not done before) procedure while respecting the ethical standards for experimentation	O	O	D

3.2	Obtain and document informed consent, explaining the risks and benefits of, and the rationale for, a proposed procedure			
3.2.1	Describe the ethical principles and legal process of obtaining and documenting informed consent (e.g., teeth clearance)	D	D	I
3.2.2	Obtain informed consent for commonly performed procedures and therapies, under supervision	D	D	I
3.2.3	Use shared decision-making in the consent process, taking risk and uncertainty into consideration	D	D	I

3.3	Prioritize a procedure or therapy, taking into account clinical urgency and available resources			
2.3.1	Recognize and discuss the importance of the triaging and timing of a prosthodontic procedure	D	D	I
2.3.2	Triage a prosthodontic procedure, taking into account clinical urgency, potential for deterioration, and available resources	D	D	I

2.3.3	Triage and schedule procedures in complex situations, demonstrating a collaborative approach when competing for limited resources	D	D	I
--------------	---	---	---	---

3.4	Perform a procedure in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances			
3.4.1	Set up and position the patient for a procedure	I	I	S
3.4.2	Competently perform discipline-specific procedures <i>(Please refer to the procedure list in page 1)</i>	D/I	D/I	I/S
3.4.3	Accurately document procedures	D	D	I
3.4.4	Perform prosthodontic procedures in a skillful and safe manner, adapting to unanticipated findings or changing clinical circumstances	D	D	I
3.4.5	Perform specialized procedures that extend beyond routine practice in the discipline	O	O	D
3.4.6	Teach the procedures of the discipline to others	O	D	I

Fourth key competency

4. Establish plans for ongoing treatment and, when appropriate, timely consultation

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

4.1	Implement a patient-centered care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation			
4.1.1	Describe the importance of follow-ups in patient care	I	I	I
4.1.2	Coordinate investigation, treatment, and follow-up plans when multiple dental specialties and healthcare professionals (e.g., dental laboratory) are involved	D	D	I
4.1.3	Ensure follow-up on cases in the dental laboratory	D	D	I
4.1.4	Ensure follow-up on a response to a prosthodontic procedure	D	D	I

4.1.5	Establish plans for ongoing care, taking into consideration the patient's clinical state, circumstances, preferences, and actions, as well as available resources, best practices, and research evidence	D	D	I
4.1.6	Determine the necessity and appropriate timing of consultation	D	D	I
4.1.7	Develop a novel system of follow-up that is flexible and adaptable to patients, families, and community resources	O	O	D

Fifth key competency

5. Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of healthcare quality and patient safety

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

5.1	Recognize and respond to harm from healthcare delivery, including patient safety incidents			
5.1.1	Define the types of patient safety incidents	I	I	I
5.1.2	Recognize the occurrence of a patient safety incident	D	D	I
5.1.3	Report patient safety incidents to appropriate institutional representatives	D	D	I
5.1.4	Recognize near-misses in real time and appropriately respond to them, preventing them from affecting the patient	D	D	I

5.2	Adopt strategies that promote patient safety and address human and system factors			
5.1.1	Describe the individual factors that can affect human performance, including sleep deprivation and stress	I	I	I
5.1.2	Adopt strategies that promote patient safety and address human and system factors	D	D	I

2. Communicator

As communicators, prosthodontists form relationships with patients and their families that facilitate the gathering and sharing of information essential for effective healthcare.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency				
1. Establish professional therapeutic relationships with patients and their families				
Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3
1.1	Communicate using a patient-centered approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion			
1.1.1	Outline the evidence that effective prosthodontist–patient communication enhances patient and prosthodontist outcomes	I	I	I
1.1.2	Communicate using a patient-centered approach that facilitates patient trust and is characterized by empathy, respect, and compassion	D	D	I
1.2.3	Teach and assess the patient-centered approach to communication	O	O	D
1.2	Optimize the physical environment for patient comfort, dignity, privacy, and safety			
1.2.1	Optimize the physical environment for patient comfort, dignity, privacy, engagement, and safety	D	D	I
1.3	Recognize when the values, biases, or perspectives of patients, dentists, or other healthcare professionals may have an impact on the quality of care, and modify the approach to the patient accordingly			
1.3.1	Recognize and describe how patient and dentist values, biases, and perspectives can affect clinical encounters	D	D	I

1.4	Respond to a patient's non-verbal behaviors to enhance communication			
1.4.1	Use appropriate non-verbal communication to demonstrate attentiveness, interest, and responsiveness to the patient	D	D	I
1.4.2	Respond to patients' non-verbal communication and use appropriate non-verbal behaviors to enhance communication with patients	D	D	I
1.4.3	Demonstrate advanced non-verbal communication skills in difficult cases	O	O	D

1.5	Manage disagreements and emotionally charged conversations			
1.5.1	Describe dentist, patient, and contextual factors that lead to strong emotions	I	I	I
1.5.2	Manage disagreements and emotionally charged conversations	D	D	I

1.6	Adapt to the unique needs and preferences of each patient and to his or her clinical condition and circumstances			
1.5.1	Assess and appropriately address the patient's preferred involvement in decisions about care	D	D	I
1.5.2	Tailor approaches to decision-making to patient capacity and preferences	D	D	I

Second key competency 2. Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families				
--	--	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Use patient-centered interviewing skills to effectively gather relevant basic and psychosocial information			
2.1.1	Conduct a patient-centered interview, gathering all relevant basic and psychosocial information	D	D	I

2.1.2	Intervene when, during the patient interview, a learner or healthcare professional ignores the patient's beliefs, values, preferences, context, or expectations	O	O	D
-------	---	---	---	---

2.2	Provide a clear structure for and manage the flow of an entire patient encounter			
2.2.1	Conduct a focused and efficient patient interview, managing the flow of the encounter while being attentive to the patient's cues and responses	D	D	I
2.2.2	Manage the flow of challenging patient encounters, including those with angry, distressed, or excessively talkative individuals	D	D	I

2.3	Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent			
2.3.1	Describe potential sources of information that may help given patient's care	D	D	I
2.3.2	Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent	D	D	I

Third key competency 3. Share healthcare information and plans with patients and their families				
--	--	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

3.1	Share information and explanations that are clear, accurate, and timely, while checking for patient and family understanding			
3.1.1	Provide information on the diagnosis and prognosis in a clear, compassionate, respectful, and objective manner	D	D	I

3.2	Disclose harmful patient safety incidents to patients and their families accurately and appropriately			
3.2.1	Accurately and appropriately disclose patient safety incidents to the patient	D	D	I

3.2.2	Appropriately apologize for a harmful patient safety incident	D	D	I
3.2.3	Plan and document a follow-up to a harmful patient safety incident	O	O	D

Fourth key competency
4. Engage patients and their families in developing plans that reflect the patient's healthcare needs and goals

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

4.1	Facilitate discussions with patients in a way that is respectful, non-judgmental, and culturally safe			
4.1.1	Communicate with cultural awareness and sensitivity, and facilitate discussions with the patient in a way that is respectful and non-judgmental	I	I	I

4.2	Help patients identify, access, and make use of information and communication technologies to support their care and manage their health			
5.1.1	Describe the various technologies and information sources available to enhance patients' understanding and management of their healthcare	I	I	I
5.1.2	Help the patient identify, access, and make use of information and communication technologies to support care and manage health	D	D	I

4.3	Use communication skills and strategies that help patients and their families make informed decisions regarding their health			
4.3.1	Use communication skills and strategies that help the patient and family make informed decisions (based on scientific facts) regarding their health	D	D	I

Fifth key competency

5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

5.1	Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements			
5.1.2	Document clinical encounters in an accurate, complete, timely, and accessible manner, and in compliance with legal and privacy requirements	D	D	I
5.1.3	Identify and correct vague or ambiguous documentation	O	O	D

5.2	Communicate effectively using a written health record or electronic medical record			
5.2.1	Communicate effectively using a written health record, electronic medical record, or other digital technology	D	D	I

5.2	Share information with patients and others in a manner that respects patient privacy and confidentiality and enhances understanding			
5.2.1	Describe the principles and legal requirements for the privacy and confidentiality of written and electronic communication	D	D	I
5.2.2	Assess patients' preferences with respect to methods of information sharing	D	D	I
5.2.3	Adapt written and electronic communication to the specific discipline and patients' expectations	D	D	I

3. Collaborator

As collaborators, prosthodontists work effectively with other dental specialties and departments to provide safe, high-quality, patient-centered care.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency			
1. Establish and maintain positive relationships with dentists and other colleagues in the healthcare professions to support relationship-centered collaborative care			

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

1.1	Communicate using a patient-centered approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion			
1.1.1	Identify opportunities for collaboration among healthcare professionals along the continuum of care	D	D	I
1.1.2	Respect established rules of their team	D	D	I
1.1.3	Receive and appropriately respond to input from other dental specialties and departments	D	D	I
1.1.4	Establish and maintain healthy relationships with dentists and other colleagues to support patient-centered collaborative care	D	D	I
1.1.5	Analyze interactions among healthcare professionals to provide feedback to optimize the performance of a team for the benefit of patients	O	O	D

1.2	Negotiate overlapping and shared responsibilities with dentists and other colleagues in the healthcare professions in the context of both episodic and ongoing care			
1.2.1	Describe the importance of professional role diversity and integration in high-quality and safe patient care	D	D	I
1.2.2	Describe the roles and scopes of practice of other healthcare professionals related to their discipline	D	D	I
1.2.3	Consult as needed with other dental specialties and departments	D	D	I

1.3	Engage in respectful shared decision-making with dentists and other colleagues in the healthcare professions			
1.3.1	Discuss with the patient any plan for involving other dental specialties and departments	D	D	I
1.3.2	Integrate the patient's perspective and context into the collaborative care plan	D	D	I
1.3.3	Provide timely and necessary written information to colleagues to enable effective relationship-centered care	D	D	I
1.3.4	Engage in respectful shared decision-making with physicians and other colleagues in the healthcare professions	D	D	I
1.3.5	Use referral and consultation as opportunities to improve quality of care and patient safety by sharing expertise	D	D	I
1.3.6	Use technology to enhance collaboration in healthcare	O	O	D

Second key competency

2. Work with dentists and other colleagues in the healthcare professions to promote understanding, manage differences, and resolve conflicts

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Show respect toward collaborators			
2.1.1	Respond to requests and feedback in a respectful and timely manner	D	D	I
2.1.2	Actively listen to and engage in interactions with collaborators	D	D	I
2.1.3	Show respect toward collaborators, and respect the diversity of expertise and perspectives among other dental specialties and departments	D	D	I

2.2	Implement strategies to promote understanding, manage differences, and resolve conflicts in a manner that supports a collaborative culture			
2.2.1	Identify communication barriers among dental specialties & departments	D	D	I

2.2.2	Listen to, understand, and find common ground with collaborators	D	D	I
2.2.3	Communicate clearly and directly to promote understanding, manage differences, and resolve conflicts	D	D	I

Third key competency
3. Hand over the care of a patient to another healthcare professional to facilitate continuity of safe patient care

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

3.1	Determine when care should be transferred to another physician or healthcare professional			
3.1.1	Describe which cases would be required to be transferred	D	D	I
3.1.2	Determine when care should be transferred to another dental specialty or healthcare professional	D	D	I

3.2	Demonstrate safe handover (referral) of care, using both verbal and written communication			
3.2.1	Describe specific information required for a clear and safe handover during transitions in care	D	D	I
3.2.2	If indicated, communicate with the receiving dental specialty or healthcare professionals during transitions in care, clarifying issues after transfer as needed	D	D	I
3.2.3	Analyze gaps in communication between healthcare professionals during transitions in care	D	D	I

4. Leader

As leaders, prosthodontists engage with others to contribute to a vision of a high-quality healthcare system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency				
1. Contribute to the improvement of healthcare delivery in teams, organizations, and systems				

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

1.1	Apply the science of quality improvement to contribute to improving systems of patient care			
1.1.1	Describe quality improvement methodologies	D	D	I
1.1.2	Apply the science of quality improvement to contribute to improving systems of patient care	D	D	D

1.2	Contribute to a culture that promotes patient safety, and analyze safety incidents			
1.2.1	Engage patients and their families in the continuous improvement of patient safety	D	D	I
1.2.2	Analyze harmful patient safety incidents and near misses to enhance systems of care	O	O	D

Second key competency				
2. Engage in the stewardship of healthcare resources				

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Allocate healthcare resources for optimal patient care			
2.1.1	Describe the costs of treatment and dental laboratory procedures relevant to prosthodontics	D	D	I
2.1.2	Consider costs when choosing a prosthodontic treatment plan	O	O	D
2.1.3	Use clinical judgment to minimize wasteful practices and maximize optimal patient care	O	O	D

2.2	Apply evidence and management processes to achieve cost-appropriate care			
2.2.1	Discuss strategies to overcome the personal, patient, and organizational factors that lead to waste of healthcare resources	D	D	I
2.2.2	Apply evidence and guidelines with respect to resource utilization in common clinical scenarios	D	D	I

Third key competency
3. Demonstrate leadership in professional practice

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

3.1	Demonstrate leadership skills to enhance healthcare			
3.1.1	Describe leadership styles as they relate to healthcare	D	D	I
3.1.2	Demonstrate leadership skills by self-awareness, self-reflection, and self-management	D	D	I

3.2	Facilitate change in healthcare to enhance services and outcomes			
3.2.1	Facilitate change in healthcare to enhance services and outcomes	D	D	I
3.2.2	Develop a strategy for implementing change in healthcare with patients, physicians, and other healthcare professionals	O	O	D

Fourth key competency
4. Manage their practice and career

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

4.1	Set priorities and manage time to integrate practice and personal life			
4.1.1	Demonstrate time management skills	D	D	I
4.1.2	Set priorities and manage time to integrate practice and personal life	D	D	I
4.2.3	Mentor others	O	O	D

4.2	Manage career planning, finances, and health human resources in a practice			
4.2.1	Maintain a portfolio (currently named logbook) and reflect professional development	D	D	I
4.2.2	Review opportunities for practice preparation, including choices available for further training	D	D	I
4.2.3	Examine personal interests and seek career mentorship and counselling	D	D	I
4.2.4	Manage career and practice	D	D	I

4.3	Implement processes to ensure personal practice improvement			
4.3.1	Manage a personal schedule using tools and technologies	D	D	I
4.3.2	Improve personal practice by evaluating a problem, setting priorities, executing a plan, and analyzing the results	D	D	I

5. Health Advocate

As health advocates, prosthodontists contribute their expertise and influence as they work with communities or patient populations to improve health. They work with those they serve to determine and understand needs, speak on behalf of others when required, and support the mobilization of resources to effect change.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency	
1. Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment	

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

1.1	Work with patients to address determinants of health that affect them and their access to needed health services or resources			
1.1.1	Analyze patient's needs for health services related to prosthodontics (such as prevalence of missing teeth and measures to prevent them)	D	D	I
1.1.2	Demonstrate an approach to work with patients to advocate for health services or resources	D	D	I

1.2	Work with patients to increase opportunities to adopt healthy behaviors			
1.2.1	Identify resources or agencies that address the health needs of patients	D	D	I
1.2.2	Create health promotion and education resources	O	O	D

1.3	Incorporate disease prevention, health promotion, and health surveillance into interactions with individual patients			
1.2.1	Work with patients to identify opportunities for oral disease prevention, oral health promotion, and oral health protection	D	D	I

Second key competency 2. Respond to the needs of the communities or populations they serve by advocating with them for system-level change in a socially accountable manner			
--	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Work with a community to identify the determinants of health that affect them			
2.1.1	Identify and engage communities or populations facing health inequities	D	D	I

2.2	Contribute to improve health in the community or population they serve			
2.2.1	Partner with others to identify the health needs of a community or population they serve (e.g., provide removable prostheses to patients in elderly homes)	D	D	I

6. Scholar

As scholars, prosthodontists demonstrate a lifelong commitment to excellence in practice through continuous learning and by teaching others, evaluating evidence, and contributing to scholarship.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency 1. Engage in the continuous enhancement of their professional activities through ongoing learning			
---	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

1.1	Develop, implement, monitor, and revise a personal learning plan to enhance professional practice			
1.1.1	Create a learning plan in collaboration with a designated supervisor by identifying learning needs related to their discipline and career goal	D	D	I

1.1.2	Use technology to develop, record, monitor, revise, and report on learning in prosthodontics	D	D	I
1.1.3	Develop, implement, monitor, and revise a personal learning plan to enhance professional practice	D	D	I

1.2	Identify opportunities for learning and improvement by regularly reflecting on and assessing their performance using various internal and external data sources			
1.2.1	Define reflective learning as it relates to prosthodontics	D	D	I
1.2.2	Use exam results and feedback from teachers and peers to enhance self-assessment and improve learning	D	D	I

1.3	Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice			
1.3.1	Contribute to collaborative group learning	D	D	I
1.3.2	Identify the learning needs of a healthcare team	D	D	I
1.3.3	Lead learning activities of a team	O	O	D

Second key competency				
2. Teach students, residents, the public, and other healthcare professionals				

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Recognize the influence of role-modelling and the impact of the formal, informal, and hidden curricula on learners			
2.1.1	Use strategies for deliberate, positive role-modelling	D	D	I

2.2	Promote a safe learning environment			
2.2.1	Ensure a safe learning environment for all members of the team	D	D	I

2.3	Ensure patient safety is maintained when learners are involved			
2.3.1	During teaching, ensure patient safety and identify unsafe clinical situations involving learners (junior residents or dental interns) and manage them appropriately	D	D	I

2.4	Plan and deliver a learning activity (teaching)			
2.4.1	Demonstrate required skills in teaching others, including undergraduate students and peers	O	D	I
2.4.2	Use relevant learning theories to enhance the learning of others	O	D	I

2.5	Provide feedback to enhance learning and performance			
2.5.1	Provide written or verbal feedback to other learners, faculty, and other members of the team	D	D	I
2.5.2	Role-model regular self-assessment and feedback-seeking behavior	O	O	D
2.5.3	Help learners and teachers manage the emotional impact of giving and receiving feedback	O	O	D

2.6	Assess and evaluate learners, teachers, and programs in an educationally appropriate manner			
2.6.1	Assess teachers in an honest, fair, and constructive manner	I	I	I
2.6.2	Evaluate programs in an honest, fair, and constructive manner	I	I	I
2.6.3	Appropriately assess junior learners	D	D	I
2.6.4	Develop a new assessment tool or process	O	O	D

Third key competency
1. Integrate best available evidence into practice

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3
3.1	Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that can address them			
3.1.1	Generate focused questions that address practice uncertainty and knowledge gaps	D	D	I
3.2	Identify, select, and navigate pre-appraised resource			
3.2.1	Select appropriate sources of knowledge as they relate to addressing focused questions	O	O	D
3.2.2	Identify, select, and navigate pre-appraised resources	O	O	D
3.3	Critically evaluate the integrity, reliability, and applicability of health-related research and literature			
2.3.1	Identify appropriate sources that answer a clinical question that you have encountered	D	D	I
3.4	Integrate evidence into decision-making in their practice			
3.4.1	Use evidence, as appropriate, during decision-making	D	D	I
3.4.2	Discuss the barriers to and facilitators of applying evidence into practice	D	D	I
3.4.3	Describe how various sources of information, including studies, expert opinion, and practice audits, contribute to the evidence base of prosthodontic practice	D	D	I
3.4.4	Identify new evidence appropriate to their scope of professional practice through quality-appraised evidence-alerting services	O	O	D

Fourth key competency
4. Contribute to the creation and dissemination of knowledge and practices applicable to health

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

4.1	Demonstrate an understanding of the scientific principles of research and scholarly inquiry and the role of research evidence in healthcare			
4.1.1	Describe the basic scientific principles of research	D	D	I
4.1.2	Contribute to a scholarly investigation or the dissemination of research findings in prosthodontic specialty	D	D	I

4.2	Identify ethical principles for research			
4.2.1	Describe the ethical principles applicable to research and scholarly inquiry	D	D	I
4.2.2	Identify ethical principles for research and incorporate them into obtaining informed consent, considering harm and benefits and vulnerable populations	D	D	I

4.3	Contribute to the work of a research program			
4.3.1	Contribute to the work of a research program	D	D	I
4.3.2	Create and lead research teams	O	O	D

4.4	Summarize and communicate to professional and lay audiences, including patients, the findings of relevant research			
4.2.1	Summarize and communicate to peers the findings of applicable research and scholarship	I	I	I
4.2.2	Formally present research and scholarly inquiry findings, including presentations at meetings, and in print and digital media	O	O	D

7. Professional

As professionals, prosthodontists are committed to the health and well-being of individual patients and society through ethical practice, high personal standards of behavior, accountability to the profession and society, physician-led regulation, and maintenance of personal health.

O: Observation - D: Direct supervision - I: Indirect supervision – S: Supervising others.
Please refer to page 1

First key competency
1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

1.1	Exhibit appropriate professional behaviors and relationships in all aspects of practice			
1.1.1	Exhibit honesty and integrity with patients, peers, dentists, dental laboratory technicians, and other dental department staff	I	I	I
1.1.2	Demonstrate caring and compassion	I	I	I
1.1.3	Recognize and respect boundaries	I	I	I
1.1.4	Demonstrate sensitivity to issues concerning diversity with respect to peers, colleagues, and patients	I	I	I
1.1.5	Consistently maintain confidentiality in the clinical setting, while recognizing the special limitations of confidentiality	I	I	I
1.1.6	Demonstrate punctuality	D	D	I
1.1.7	Complete assigned responsibilities	D	D	I
1.1.8	Manage complex issues while preserving confidentiality	D	D	I
1.1.9	Intervene when behaviors toward colleagues and learners undermine a respectful environment	O	O	D

1.2	Demonstrate a commitment to excellence in all aspects of practice			
1.2.1	Reflect on experiences in the clinical setting to identify personal deficiencies and modify behavior accordingly	D	D	I
1.2.2	Demonstrate a commitment to excellence in all aspects of practice	D	D	I

1.3	Recognize and respond to ethical issues encountered in practice			
1.3.1	Describe principles and theories of core ethical concepts	I	I	I
1.3.2	Manage ethical issues encountered in clinical and academic settings	D	D	I

1.4	Exhibit professional behavior when using technology			
1.4.1	Explain the potential abuses of photographing patients (social media)	D	D	I
1.4.2	Intervene when aware of breaches of professionalism involving technology	D	D	I

Second key competency 2. Demonstrate a commitment to society by recognizing and responding to societal expectations in healthcare				
--	--	--	--	--

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

2.1	Demonstrate accountability to patients, society, and the profession by responding to societal expectations of prosthodontists			
2.1.1	Manage tensions between societal and prosthodontists' expectations	D	D	I
2.1.2	Show a commitment to the promotion of the public good in healthcare	D	D	I

2.2	Demonstrate a commitment to patient safety and quality improvement			
2.2.1	Demonstrate a commitment to patient safety and quality improvement through adherence to institutional policies and procedures	D	D	I

Third key competency
3. Demonstrate a commitment to the profession by adhering to standards and regulation

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

3.1	Fulfill and adhere to the professional and ethical codes, standards of practice, and laws governing practice			
3.1.1	Describe how to respond to, cope with, and constructively learn from a complaint or legal action	D	D	D

3.2	Recognize and respond to unprofessional and unethical behaviors in dentists and other colleagues in the healthcare professions			
3.2.1	Respond to peer-group lapses in professional conduct	D	D	I

Fourth key competency
4. Demonstrate a commitment to dentist health and well-being to foster optimal patient care

Item	Learning Outcomes <i>Residents are able to:</i>	Resident level		
		R1	R2	R3

4.1	Exhibit self-awareness and manage adverse influences on personal well-being and professional performance			
4.1.1	Use strategies to improve self-awareness to enhance performance	D	D	I
4.1.2	Manage the impact of physical and environmental factors on performance	D	D	I

V. Clinical competencies and requirements

1. Prosthodontic procedures and level of supervision

The training resident must perform the following procedures as a prosthodontist under the supervising level listed below. Please refer to the supervising guide in [\(page 20\)](#).

O: Observation – D: Direct supervision – I: Indirect supervision – S: Supervising others.
Please refer to page 1

No	Domain	Prosthodontic procedure	Resident level		
			R1	R2	R3
1	General	Diagnostic photographs	D	I	S
2		Diagnostic radiographs	D	I	S
3		Anesthesia, local, regional block	I	I	I
4		Preliminary impressions	I	I	S
5		Direct restoration	I	I	S
6		Diagnosis	D	I	I
7		Mock work-up	D	I	I
8		Simple treatment plan	D	I	I
9		Vital tooth bleaching	D	I	I
10		Non-vital tooth bleaching	D	I	I
11		Comprehensive treatment plan	D	D	D
12		Prosthodontic treatment under general anesthesia	D	D	D
13		Metal-ceramic crown	D	I	S
14		All-ceramic crown	D	I	S
15		Full metal crown	D	I	S
16		Indirect resin crown	D	I	S
17		Surveyed crown	D	I	S

18	Fixed prosthodontics	Crowns with attachments	D	I	I
19		Richmond crown (including Endocrown)	D	I	S
20		Cast onlay/inlay restorations	D	I	S
21		All-ceramic onlay/inlay	D	I	S
22		Indirect composite inlay/only restorations	D	I	S
23		Prepress porcelain restoration	D	I	I
24		Fixed dental prosthesis (metal-ceramic)	D	I	I
25		Fixed dental prosthesis (All-ceramic)	D	I	I
26		Resin-bonded prosthesis (Maryland bridge)	D	I	I
27		Ceramic veneer	D	I	S
28		Indirect composite veneer	D	I	S
29		Cast post and core	D	I	S
30		Pre-fabricated metal post	D	I	S
31		Pre-fabricated fiber post	D	I	S
32		Amalgam core build-up	D	I	S
33		Composite core build-up	D	I	S
34		Sectioning and removal of crowns and FDP	D	I	S
35		Direct provisional crown or FDP	D	I	S
36		Indirect provisional crown or FDP	D	I	S
37		Conventional complete denture	D	I	I
38		Immediate complete denture	D	I	I
39		Natural tooth-supported overdenture	D	I	I
40		Removable partial denture (bounded saddle)	D	I	I
41		Removable partial denture (distal extension)	D	I	I

42	Removable prosthodontics	Removable partial denture with surveyed crown	D	I	I
43		Removable partial denture with castable attachment	D	I	I
44		Rotational path removable partial denture	D	I	I
45		Transitional removable partial denture (acrylic)	D	I	S
46		Transitional removable partial denture (polyamide)	D	I	S
47		Radiographic/surgical template (guide)	D	I	S
48		Occlusal guards	D	I	S
49		Removable prosthesis reline/rebase	D	I	I
50		Tissue conditioning	D	I	I
51		Repair of removable prosthesis	D	I	I
52	Dental implants	Implant-supported cement-retained crown	D	I	S
53		Implant-supported screw-retained crown	D	I	S
54		Implant-supported cement-retained FDP	D	I	I
55		Implant-supported screw-retained FDP	D	I	I
56		Implant-supported overdenture (stud attachment)	D	I	I
57		Implant-supported overdenture (bar attachment)	D	D	D
58		Screw-retained fixed-detachable implant-supported metal reinforced acrylic complete denture (hybrid denture)	D	D	D
59		Implant-supported comprehensive fixed prosthesis	D	D	D
60	Dental laboratory	Diagnostic cast	D	I	S
61		Base boxing	D	I	S
62		Casts mounting	D	I	S
63		Constructing special impression trays	D	I	S
64		Constructing base plates and occlusion rims	D	I	S

65		Articulator set-up (for different prosthodontic treatments)	D	I	S
66		Diagnostic wax-up replica	D	I	S
67		Teeth set-up	D	I	I
68		Arranging a balanced set-up using anatomical teeth	D	I	S
69		Principles of surveying and design	D	D	I
70		Fabricating surgical templates	D	I	I
71		Laboratory remount and occlusal adjustment	D	I	S
72		Clinical remount and occlusal adjustment	D	I	S
73		Reline and repair of removable prostheses	D	I	I
74	Maxillofacial	TMD management	D	D	D
75		Obturator	D	D	D
76		Cleft palate appliances	D	D	D
77		Radiographic stent (radiotherapy)	D	D	D
78		Surgical guide for implant-supported obturators	D	D	D

2. Clinical procedural requirements for the prosthodontic program (points)

Clinical procedures calculated in points with minimum requirements in order for the resident to be ready for the final examination at the end of the program:

Procedure	Point description	Point count	Minimum (during the program)
Fixed prosthodontics (minimum 300 points on exiting)			
Full coverage indirect restoration			
Full-metal	Per tooth	1	Optional
Metal-ceramic	Per tooth	1	20 crowns
All-ceramic	Per tooth	1	20 crowns

Surveyed crown	Per tooth	2	2 surveyed crowns
Fixed dental prosthesis (FDP)			
FDP retainer/pontic (<i>Metal, metal-ceramic, all-ceramic</i>)	Per tooth/ space	1	20 retainers &/or pontic
Partial coverage indirect restoration			
Veneer and prepless ceramic restoration	Per tooth	1	6 veneers
Inlay and Onlay (including endo-crown)	Per tooth	1	10 inlays &/or onlays
Implant-supported fixed prosthesis			
Implant crown	Per implant	1	20 implant crowns
Implant retainer/pontic	Per implant/ space	1	20 retainers &/or pontic
Abutment for implant crown/retainer	Per implant	1	30 abutments
Post and core			
Cast Post and Core (CPC)	Per post	1	10 CPCs
Pre-fabricated post and core build up	Per post & core build up	1	10 prefabricated posts

Removable prosthodontics (minimum 50 points on exiting)

Complete denture

Conventional complete denture	Per single prosthesis	2	5 prostheses
Immediate complete denture	Per single prosthesis	2	1 prosthesis
Implant-supported/retained overdenture	Per single prosthesis	2	1 prosthesis
Implant abutment supporting the prosthesis	Per implant	1	2 implants
Tooth-supported overdenture	Per single prosthesis	2	Optional

Tooth attachment supporting the prosthesis	Per tooth	1	Optional
Removable partial prosthesis (RPD)			
Free-end saddle or bounded saddle	Per single prosthesis	2	2 prosthesis
RPD attachment	Per attachment	1	Optional
Implant-supported RPD	Per single prosthesis	2	Optional
Implant abutment supporting RPD	Per implant	1	Optional
Transitional removable partial denture	Per prosthesis	0.5	5 prostheses
Other removable prosthesis/appliances			
Acrylic night guard	Per prosthesis	1	5 prostheses
Maxillofacial prosthesis (obturator or extra-oral prosthesis)	Per prosthesis	5	Optional
Incomplete clinical cases (if needed to achieve the annual target) *			
Temporary fixed restoration	Per tooth/pontic	0.25	As required
Temporary fixed restoration + definitive impression	Per tooth/pontic	0.5	As required
Definitive impression for removable prosthesis	Per prosthesis	1	As required

* It is only filled up if the residents did not achieve the annual target. The points will be removed once the case is completed. It can be utilized only at the end of R1 & R2 to fulfil the annual requirements and is not to be calculated toward the end of the program. Refer to the DOPS form (**Figure 21**) in (**page 88**).

3. Minimum clinical case requirements per resident level (per patient case)

Clinical requirement in the whole residency program and the percentage of clinical points for each residency level are as follows:

Completed clinical cases (per patient)		Number of cases
Resident level 1 (One SOE case exam to be promoted)		
i	CASE 1: Maxillary and mandibular complete denture treatment (scenario) (SOE) - Conventional, - Overdentures, or - Implant-retained/supported overdentures	NA
ii	35 clinical points (10%)	NA
iii	<i>Case progress (formative assessment)</i>	2 cases
Resident level 2 (One SOE case exam to be promoted)		
i	CASE 2: Fixed/removable prosthodontic treatment (scenario) (SOE) At least one surveyed crown	NA
ii	150 clinical points (43%)	NA
ii	<i>Case progress (formative assessment)</i>	2+2 cases
Resident level 3 (One SOE case exam to be eligible for final examination)*		
i	CASE 1: Maxillary and mandibular complete denture treatment - Conventional, - Overdentures, or - Implant-retained/supported overdentures	1 case
ii	CASE 2: Fixed/removable prosthodontic treatment At least one surveyed crown	1 case
iii	CASE 3: Comprehensive prosthodontic treatment (SOE option) - Minimum 18 units (teeth/pontic) restored/replaced with indirect restoration - With/without implants - With/without removable prosthesis	1 case

iv	CASE 4: Comprehensive fixed implant-supported prosthesis treatment (SOE option) ▪ Minimum single arch fixed prosthesis fully supported by implants ▪ No other restrictions or defined units	1 case
v	CASE 5: Elective prosthodontic treatment ▪ CASE 1 (with implant involvement) ▪ CASE 2 ▪ CASE 3 ▪ CASE 4 Case report; <i>esthetic, maxillofacial prosthesis, concept, or digital treatment</i>	1 case
vi	350 clinical points (100%)	NA

***Note:** You can submit clinical cases completed in R1, R2, or R3, except for the exam cases

4. TEACHING AND LEARNING

General principles

Teaching and learning are structured such as to incorporate more responsibility for self-directed learning and clinical reasoning. The didactic, laboratory, research, and clinical-based learnings are integrated into the program. Based on the directive of the SCFHS, the following steps are implemented:

- At least 4–6 hours of formal teaching time are reserved each week (referred as academic day). Formal teaching time is planned in advance with an assigned tutor, time slots, and venue.
- The Core Education Program would include the following teaching and learning activities:

1. DIDACTIC COMPONENT (structured-programmatic component) (50%)

- A. Universal topics (5%)
- B. Core specialty topics (40%)
 - *Basic courses in the pre-clinical course* (5%)
 - *Introductory specialty courses in the pre-clinical course* (5%)
 - *Specialty literature review* (20%)
 - *Book review “home reading assignment”* (10%)
- C. Trainee selected topic (5%)

2. PRACTICE-BASED COMPONENT (50%)

- A. Laboratory-based learning in the Pre-clinical course (10%)
- B. Clinical-based learning (practice-based learning) (40%)

1. Learning principles relevant to the selected educational methods

1.1. Principles of adult learning

In 1990, Knowles derived a set of principles of adult learning which are now crucial to designing a course for adults ⁽²⁵⁾. In this curriculum, principles of adult learning were carefully considered and applied. Below are some examples:

- Residents were actively involved in choosing the topics to be presented and discussed according to their needs.
- Residents are motivated to learn in a respectful and motivated environment.
- Residents are self-directed and goal-oriented.
- Residents have prior knowledge and experiences to share and discuss, thereby assisting in the long-term retention of newly acquired knowledge.

1.2. Learning theories

Several learning theories have been practiced in the curriculum:

- Cognitive Learning Theory ⁽²⁶⁾
- Behavioral Learning Theory ⁽²⁷⁾
- Social Learning Theory: role model ⁽²⁸⁾

1.3. Self-determination theory

Students' learning is affected by their motivation⁽²⁹⁾; therefore, both negative and positive aspects of behavioral reinforcement are implemented in our curriculum. Examples:

- **Positive Reinforcement:** Light snacks and meals served in the literature review
- **Negative Reinforcement:** As a recognition of residents submitting complex unique clinical cases or extra clinical cases, some specific clinical-case requirements in the curriculum can be removed if these are not met.

1.4. Experiential learning and learning styles

David Kolb⁽³⁰⁾ believes that learning occurs when a learner reflects on an experience. He described four stages through the process of acquiring experiences (Figure 10):

- Think: Reflective observation
- Adapt: Active experimentation
- Conclude: Abstract conceptualization
- Do: Concrete experience



Figure 10: David Kolb's learning styles model

1.5. Communities of practice

Learning best occurs in a team when the team members support each other. This allows for knowledge and skills to be rapidly disseminated throughout the group.

1.6. Deep/superficial learning

The purpose of learning is to ensure that residents achieve deep learning (an understanding of the subject) rather than superficial learning. The prosthodontics curriculum focuses on patient-centered teaching and active learning rather than passive learning to promote deep learning⁽²⁹⁾.

2. Intended Learning Outcomes (ILOs)

An outcome-based curriculum begins with defining the trainee learning outcomes for the didactic and clinical parts of the residency program. This section will guide the supervisors in doing so and help refine the curriculum over the years. Additionally, it will help trainees better understand the concept of ILOs and make it easier for them to locate the reading resources and be better prepared for the written summative examinations throughout the program (Figure 11).

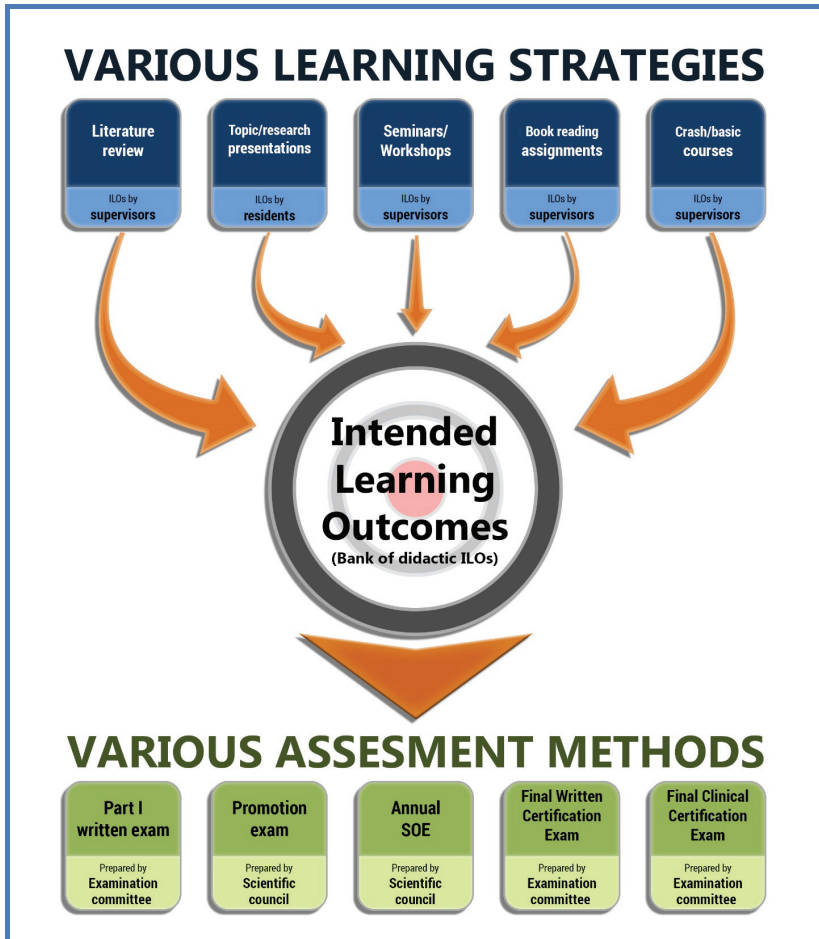


Figure 11: Sources of Intended Learning Outcomes and methods of assessments

Throughout the training program, supervisors and residents will be able to write a learning objective that addresses a specific knowledge, skill, or attitude that could be relevant to the prosthodontic curriculum (**Figure 12**):

Stem (examples)	Add an action verb
After completing the literature review session, residents will be able to...	Use verbs from <i>Bloom's taxonomy</i> list (below)
At the end of the topic presentation, residents will be able to...	
After completing the seminar/workshop, residents will be able to...	Determine the actual process or outcome

EXAMPLE: "At the end of today's *literature review sessions*, residents will be able to *list* the *techniques used to develop a group function occlusal scheme*"

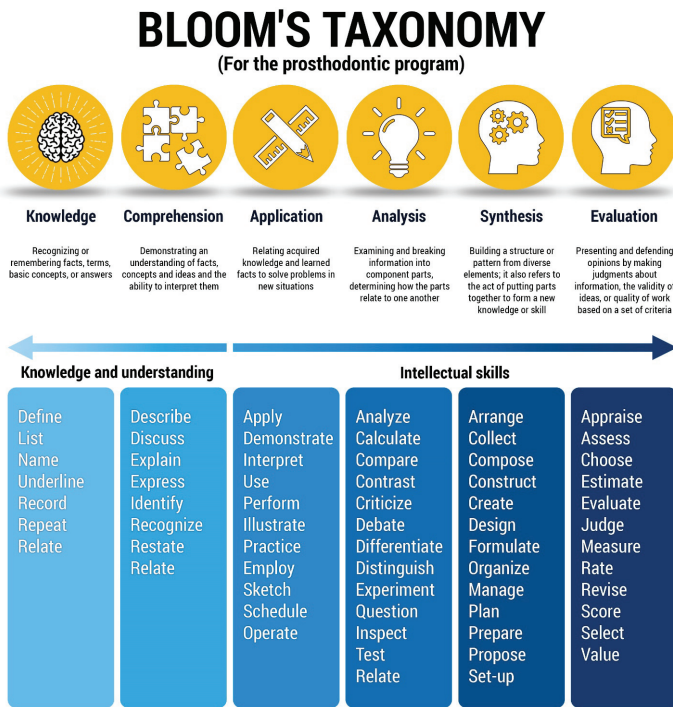


Figure 12: Bloom's taxonomy

II. Didactic component

1. Universal topics

Universal topics are developed centrally by the SCFHS for all specialties and are available as e-learning modules. Their presentation format is more didactic and includes self-assessment at the end of a module. The SCFHS recommends prioritizing the selection of universal courses that have high value, are interdisciplinary and integrated, and require expertise that might be beyond the scope of local clinical training sites.

Rationale

Universal topics are high-value interdisciplinary topics of the utmost importance to the trainee. Topics are delivered centrally to ensure that all trainees receive high-quality teaching and develop essential core knowledge. These topics are common to all specialties.

The topics selected here meet one or more of the following criteria:

- **Impactful:** topics that are common or life-threatening
- **Interdisciplinary:** topics that are difficult to teach under a single discipline
- **Orphan:** topics that are poorly represented in the undergraduate curriculum
- **Practical:** topics that trainees will encounter in hospital practice

Development and delivery method

These topics will be developed and delivered centrally by the SCFHS via an e-learning platform. A set of preliminary learning outcomes for each topic will be developed. These topics will be didactic in nature and focus on the practical aspects of care. The topics will be more content-heavy than the workshops and other face-to-face interactive sessions planned.

The suggested duration of each topic is 1.5 hours.

Assessment

The topics will be delivered in a modular fashion. There will be an on-line formative assessment at the end of each learning unit. After completion of all topics, there will be a combined summative assessment in a context-rich multiple-choice question format. All trainees must attain minimum competency in the summative assessment.

Alternatively, these topics can be assessed in a summative manner along with specialty examination.

- According to the directive of the SCFHS, we have selected 8 of the 36 topics available. In this curriculum, the following subtopics in bold are selected:

Mod	Topic	Subtopic
1	Introduction	1. <u>Safe drug prescribing</u> 2. Hospital-acquired infections 3. Sepsis; SIRS; DIVC 4. <u>Antibiotic stewardship</u> 5. Blood transfusion
2	Cancer	6. Principles of cancer management 7. Side effects of chemotherapy and radiation therapy 8. Oncologic emergencies 9. Cancer prevention 10. Surveillance follow-up of cancer patients
3	Diabetes & Metabolic Disorders	11. <u>Recognition and management of diabetic emergencies</u> 12. Management of diabetic complications 13. Comorbidity of obesity 14. Abnormal ECG
4	Medical & Surgical Emergencies	15. Management of acute chest pain 16. Management of acute breathlessness 17. Management of altered sensorium 18. <u>Management of hypotension and hypertension</u> 19. Management of upper GI bleeding 20. Management of lower GI bleeding
5	Acute Care	21. Pre-operative assessment 22. Post-operative care 23. Acute pain management 24. Chronic pain management 25. Management of fluid in the hospitalized patient 26. Management of electrolyte imbalance

6	Frail Elderly	27. Assessment of frail elderly 28. Mini-mental state examination 29. Prescribing drugs in the elderly 30. <u>Care of elderly</u>
7	Ethics & Healthcare	31. <u>Occupational hazards of HCW</u> 32. Evidence-based approach to smoking cessation 33. <u>Patient advocacy</u> 34. Ethical issues: transplantation/organ harvesting; withdrawal of care 35. <u>Ethical issues: treatment refusal; patient autonomy</u> 36. Role of doctors in death and dying

The objectives and competencies of selected courses are listed below:

Course and outcomes <i>At the end of each learning unit, resident should be able to:</i>	Resident level		
	R1	R2	R3
	CanMEDS role covered		
1. Safe Drug Prescribing - Recognize the importance of safe drug prescribing in healthcare - Describe various adverse reactions, with examples of commonly prescribed drugs that can cause such reactions - Apply principles of drug-drug interactions, drug-disease interactions, and drug-food interactions in common situations - Apply principles of drugs prescribing in special situations, such as renal failure and liver failure - Apply principles of drugs prescribing in the elderly, children, and women who are pregnant or lactating - Promote evidence-based, cost-effective prescribing - Discuss the ethical and legal framework governing safe drug prescribing in KSA	✓		
	- Medical Expert - Leader - Health Advocate - Professional		

2. Antibiotic Stewardship	✓		
• Recognize antibiotic resistance as one of the most pressing public health threats globally • Describe the mechanism of antibiotic resistance • Identify appropriate and inappropriate use of antibiotics • Develop a plan for safe and appropriate antibiotic usage, including correct indication, duration of treatment, type of antibiotic, and discontinuation • Understand and apply the local guidelines for prevention of antibiotic resistance		▪ Medical Expert ▪ Health Advocate	
3. Side effects of chemotherapy and radiation therapy	✓		
• Describe the important side effects (e.g., frequent, life-threatening, or organ threatening) of drugs commonly used in chemotherapy • Explain the principles of monitoring for side effects in a patient undergoing chemotherapy • Describe the pharmacological and non-pharmacological measures available to dampen the side effects of commonly prescribed chemotherapeutic agents • Describe the important (e.g., common or life-threatening) side effects of radiation therapy • Describe the pharmacological and non-pharmacological measures available to dampen the side effects of radiotherapy		▪ Medical Expert	
4. Recognition and management of diabetic emergencies	✓		
• Describe the pathogenesis of common diabetic emergencies, including their complications • Identify risk factors for and patients vulnerable to such emergencies • Recognize a patient presenting with a diabetic emergency • Institute immediate management • Refer the patient to the appropriate next level of care • Counsel patients and families on how to avoid such emergencies		▪ Medical expert ▪ Collaborator ▪ Health Advocate	
5. Management of hypotension and hypertension	✓		
• Triage and categorize patients • Identify patients who need prompt medical or surgical attention • Generate preliminary diagnoses based on history and physical examination • Order and interpret urgent investigations • Provide immediate and appropriate patient management • Refer the patient to the next level of care if necessary		▪ Medical Expert ▪ Collaborator	

6. Care of elderly	✓		
- Describe the factors that need to be considered while planning care for the elderly - Recognize the needs and well-being of caregivers - Identify the local and community care resources available for the elderly - Develop an individualized care plan for an elderly patient with inputs from other healthcare professionals	- Medical Expert - Health Advocate - Communicator - Professional		
7. Occupation Hazards of Healthcare Workers (HCW)	✓		
- Recognize common sources of occupational hazards among healthcare workers and associated risk factors - Describe common occupational hazards in the workplace - Develop familiarity with legal and regulatory frameworks governing occupational hazards among healthcare workers - Develop a proactive attitude to promote safety in the workplace - Protect oneself and colleagues against potential occupational hazards in the workplace	- Medical Expert - Leader - Professional - Collaborator		
8. Patient advocacy	✓		
- Define patient advocacy - Recognize patient advocacy as a core value governing medical practice - Describe the role of patient advocates in patient care - Develop a positive attitude towards patient advocacy - Be a patient advocate in situations of conflict - Be familiar with local and national patient advocacy groups	- Medical Expert - Health Advocate - Communicator		
9. Ethical issues: treatment refusal; patient autonomy	✓		
- Predict situations in which a patient or family is likely to decline a prescribed treatment - Describe the concept of 'rational adult' in the context of patient autonomy and refusal of treatment - Analyze key ethical, moral, and regulatory dilemmas in the refusal of treatment - Recognize the importance of patient autonomy in the decision-making process - Counsel patients and families declining medical treatment in the light of the best interests of the patient	- Medical Expert - Professional - Communicator		

2. Core specialty topics

Rationale and description

The core-specialty courses are intended to provide advanced knowledge in all area of prosthodontics, including fixed prosthodontics, removable partial denture prosthodontics, complete denture prosthodontics, implant prosthodontics, occlusion, esthetic dentistry, digital dentistry, maxillofacial prosthetics, and temporomandibular dysfunction (TMD).

3.1 Basic courses

Rationale and description

A number of brief courses in basic science are offered to residents at the first level of the program. These courses are intended to broaden the resident's knowledge of the various basic science topics relevant to prosthodontics. Each basic science course is delivered to the residents over the course of six weeks at the beginning of the academic year (preclinical program).

Delivery method

- Lectures
- Seminars

Course	Resident level		
	R1	R2	R3
	CanMEDS role covered		
1. Head & Neck Anatomy - List the structures and blood supply of the head and neck - List the cranial nerves and describe their function - Explain the structure of the tongue, oropharynx, teeth, and temporomandibular joint - Describe the masticatory muscles - Explain pathological implications - Explain clinical implications	✓		
	Dental expert		
2. Pharmacology - Discuss agents commonly used to treat oral and systemic diseases - List the indications, contraindications, and potential adverse reactions of medication used	✓		
	- Dental expert - Communicator		

- Elicit medical history from patient to avoid possible allergic reactions - Prescribe medications for patients under their care - Identify potential prescribing errors - Explain to the patient the indication for prescribing the medication and possible potential adverse effects			
3. Oral pathology, medicine, and diagnosis	✓		
- Discuss the oral pathology, etiology, and pathogenesis of oral and para-oral diseases - Recognize and describe deviations from normal and establish a working diagnosis based on the differential diagnosis - Use the appropriate investigations and consultations needed to determine the treatment required, i.e., the need for emergency dental care, medication, referral, and follow-up			Dental expert
4. Dental radiology	✓		
- Explain radiation physics and radiation biology - Discuss radiation hazards and protection - Recognize diagnostic imaging techniques used in oral radiology			Dental expert
5. Introduction to CanMEDS	✓		
- Define CanMEDS - Explain the arguments for using CanMEDS - Describe the elements of the CanMEDS roles to a colleague in your specialty - Practice CanMEDS in your specialty - Discuss the methods used to teach and assess CanMEDS			- Dental expert - Communicator - Collaborator - Leader - Scholar - Health advocate - Professional
6. Comprehensive treatment plan	✓		
- List the types of investigations required in a visit for a clinical diagnosis - Document the sequence of the treatment plan			- Dental expert - Communicator

7. Dental photography	✓		
• Explain the basics of dental photography • List the most appropriate cameras available on the market • Select the most appropriate camera settings for each photograph • Set up a studio in a dental clinic • Produce high-quality photographs	▪ Communicator ▪ Collaborator ▪ Professional		

Assessment and evaluation:

- Part I examination: 5% of part I examination in a multiple-choice question format
- Attendance at the preclinical program
- Residents will evaluate the preclinical program for feedback

3.2. Introductory specialty courses**Rationale and description**

These introductory courses are given in the preclinical program in the beginning of R1 in parallel with the lab procedures they are performing in order to better grasp the taught concepts and techniques.

Delivery methods

- Lectures
- Seminars

Course	Resident level		
	R1	R2	R3
	CanMEDS role covered		

1. Fixed prosthodontics	✓	✓	
• Explain the diagnostic process and treatment planning • Describe the periodontal considerations in fixed prosthodontics (restorability) • List the biomechanical considerations in fixed prosthodontics • Describe provisional restorations • Discuss impression techniques and materials • Describe interocclusal records • Explain laboratory procedures • Discuss cement and cementation • Describe restoration of endodontically treated teeth • Describe esthetics and color • Explain esthetic restorations	▪ Dental expert		

2. Removable partial denture prosthodontics	✓	✓	
• Explain the diagnostic process and treatment planning • Describe the components and classification of removable partial dentures • List the principles of stress control • Describe how to survey a diagnostic cast and the design of the framework • Discuss mouth preparation • Discuss impressions, theories, techniques, and materials • Explain the laboratory procedures for fabrication of the framework • Explain adjustment and try-in of the framework • Explain the altered cast technique • Describe the processing of removable partial dentures • Describe the integration of fixed and removable prosthodontics (e.g., surveyed crowns and attachment-retained removable partial dentures)	▪ Dental expert		
3. Complete denture prosthodontics	✓	✓	
• Explain the diagnostic process and treatment planning • Describe complete denture failures • Discuss the anatomy and physiology of the edentulous mouth • Discuss impressions, theories, techniques, and materials • Discuss jaw relation • Explain try-in of complete dentures • Discuss insertion of complete dentures and post-insertion care • Describe the complete denture occlusion used against natural dentition • Describe the complete denture occlusion used against fixed dental prosthesis • Describe the complete denture occlusion used against a combination of natural dentition and a removable partial denture • Describe immediate dentures • Describe overdentures • Describe the processing of complete dentures • Discuss complete dentures, tissue conditioners & relining, re-base, and repair • Describe clinical and laboratory remounts	▪ Dental expert		
4. Occlusion	✓	✓	
• Discuss concepts of centric relation and centric occlusion • Discuss balanced articulation (completed dentures) • Discuss concepts for conventional FDP (tooth-retained)	▪ Dental expert		

• Anterior disclusion (anterior or canine guidance) • Group function • Discuss concepts for implant-supported artificial occlusion • Implant-supported fixed prosthesis • Implant-supported removable prosthesis (overdentures) • Explain indication of splinting (tooth- and implant-supported prosthesis) • Explain articulator's role in fixed and removable rehabilitation cases			
5. Post and core	✓	✓	
• Establish a guideline to determine the appropriate restoration for endodontically treated teeth • Broaden dental clinicians' knowledge through review of classical and contemporary literature • Demonstrate techniques for fabricating different types of post and core • Cover all learning objectives using interactive and integrative strategies	▪ Dental expert		
6. Maxillofacial prosthesis	✓	✓	
• Define a maxillofacial prosthesis • List the different types of maxillofacial prostheses • Explain the clinical & laboratory steps used to create a maxillofacial prosthesis • Describe the material used in a maxillofacial prosthesis • Explain maintenance of a maxillofacial prosthesis	▪ Dental expert		
7. Temporomandibular disorders (TMD)	✓	✓	
• Discuss the function of the temporomandibular joint • Define disorders of the temporomandibular joint and their causes • List the signs and symptoms of temporomandibular dysfunction • Diagnose temporomandibular dysfunction • Describe the management of temporomandibular dysfunction • Construct occlusal appliances for the treatment of temporomandibular dysfunction	▪ Dental expert		

8. Dental implants	✓	✓	
• Explain the diagnostic process and treatment planning • Discuss the basic anatomy of the maxilla and mandible • Explain radiographic and surgical guides (templates) • Interpret computed tomography scan images • List the types of dental implants • Explain briefly the surgery involved with dental implants • Describe the various prosthetic parts and techniques used for dental implants • Describe implant-supported fixed and removable prostheses	▪ Dental expert		
9. Digital dentistry (CAD/CAM)	✓	✓	
• Explain the diagnostic process and treatment planning • Discuss the CAD/CAM systems and workflow • Explain tooth preparation consideration • List the parameters of CAD/CAM restorations • Describe the scanning process • Describe the extracoronary design and milling • Describe the intracoronary design and milling • Describe the finishing and polishing process	▪ Dental expert		

3.3. Specialty Literature Review

This is a module-based section that was designed and reviewed thoroughly with a team of competent American Board-certified prosthodontists to provide the state of the art and most organized prosthodontic scientific articles. Several factors were considered in selecting these scientific articles in this curriculum:

- Residency level
- Importance of classical prosthodontic articles
- Contextual and practice-related prosthodontic articles
- Integrative dental articles
- Current prosthodontic articles
- American and Canadian Board curricula

Resident level 1				
Module	Topic	Number of scientific articles		
		Assigned	Home reading	Total
101	Fixed prosthodontics (page 62)	22	11	33
102	Removable partial dentures (page 64)	26	16	42
103	Complete denture prosthodontics (67)	37	20	57

104	Occlusion (page 70)	18	3	21
105	Periodontic-prosthodontics (page 71)	20	6	26
106	Implant prosthodontics (page 73)	22	2	22
Total		145	60	203



Resident level 2				
Module	Topic	Number of scientific articles		
		Assigned	Home reading	Total
201	Fixed prosthodontics (page 76)	32	17	49
202	Removable partial dentures (page 78)	28	12	40
203	Complete denture prosthodontics (page 81)	24	15	39
204	Occlusion (page 84)	23	15	38
207	Orthodontic-prosthodontics (page 86)	7	2	9
206	Implant prosthodontics (page 87)	17	5	22
Total		131	66	197



Resident level 3				
Module	Topic	Number of scientific articles		
		Assigned	Home reading	Total
304	Occlusion (page 88)	19	7	26
307	Orthodontic-prosthodontics (page 88)	2	0	2
306	Implant prosthodontics (page 88)	45	18	63
308	Dental esthetics (page 88)	34	15	49
309	TMD (page 88)	14	5	19
310	Maxillofacial prosthodontics (page 88)	11	2	13
Total		125	47	172

Resident level one (R1)

Module 101	Fixed Prosthodontics	(R1)
Principles of tooth preparation		
1. Tooth preparation		
1. Tooth preparations for complete crowns: an art form based on scientific principles Goodacre, C. J., Campagni, W. V., & Aquilino, S. A. (2001). <i>The Journal of prosthetic dentistry</i>, 85(4), 363-376.		
2. Retention/resistance		
2. Fundamentals of extracoronary tooth preparation Part 1: retention and resistance form Giiboe, D. B., & Teteruck, W. R. (1974). <i>Prosthet Dent</i>, 32, 651-656.		
3. Retention and resistance in preparations for extracoronary restorations Part 1: theoretic studies Owen, C. P. (1986). <i>The Journal of prosthetic dentistry</i>, 56(1), 13-16.		
4. Retention and resistance in preparations for extracoronary restorations Part 2: practical and clinical studies Owen, C. P. (1986). <i>The Journal of prosthetic dentistry</i>, 56(2), 148-153.		
3. Resistance form		
5. Evaluation of resistance form for prepared teeth Parker, M. H., Malone, K. H., Trier, A. C., & Striano, T. S. (1991). <i>The Journal of prosthetic dentistry</i>, 66(6), 730-733.		
6. The effectiveness of auxiliary features on a tooth preparation with inadequate resistance form Proussaefs, P., Campagni, W., Bernal, G., Goodacre, C., & Kim, J. (2004). <i>The Journal of prosthetic dentistry</i>, 91(1), 33-41.		
7. Evaluation of resistance form of dislodged crowns and retainer (Home reading) Trier, A. C., Parker, M. H., Cameron, S. M., & Brousseau, J. S. (1998). <i>The Journal of prosthetic dentistry</i>, 80(4), 405-409.		
8. A method for determining adequate resistance form of complete cast crown preparations (Home reading) Weed, R. M., & Baez, R. J. (1984). <i>The Journal of prosthetic dentistry</i>, 52(3), 330-334.		
4. Total occlusal convergence		
9. The effect of preparation taper on the retention of cemented cast crowns under lateral fatigue loading Cameron, S. M., Morris, W. J., Keesee, S. M., Barsky, T. B., & Parker, M. H. (2006). <i>The Journal of prosthetic dentistry</i>, 95(6), 456-461.		

10. The taper of clinical preparations for fixed prosthodontics (**Home reading**)
Nordlander, J., Weir, D., Stoffer, W., & Ochi, S. (1988). *The Journal of prosthetic dentistry*, 60(2), 148-151.
11. Quantitative determination of taper adequate to provide resistance form: concept of limiting taper
Parker, M., Gunderson, R., Gardner, F., & Calverley, M.J. (1988). *The Journal of prosthetic dentistry*, 59(3), 281-288.

Restoration of pulpless teeth

5. Dentin-root complex/foundation restorations

12. Foundation restorations in fixed prosthodontics: current knowledge and future needs
Morgano, S. M., & Brackett, S. E. (1999). *The Journal of prosthetic dentistry*, 82(6), 643-657.

6. Managing endodontically treated teeth

13. Restoration of pulpless teeth: application of traditional principles in present and future contexts
Steven M. Morgano. *The Journal of Prosthetic Dentistry*, Volume 75, Number 4, 1996
14. Post placement and restoration of endodontically treated teeth: a literature review (**Home reading**)
Schwartz, R. S., & Robbins, J. W. (2004). *Journal of endodontics*, 30(5), 289-301.

7. Endodontic post design

15. Factors determining post selection: a literature review (**Home reading**)
Fernandes, A. S., Shetty, S., & Coutinho, I. (2003). *The Journal of prosthetic dentistry*, 90(6), 556-562.
16. Clinically significant factors in dowel design
Sorensen, J. A., & Martinoff, J. T. (1984). *The Journal of Prosthetic Dentistry*, 52(1), 28-35.
17. Retention of endodontic dowels: effects of cement, dowel length, diameter and design
Standlee, J. P., Caputo, A. A., & Hanson, E. C. (1978). *The Journal of prosthetic dentistry*, 39(4), 401-405.

8. Cast post or direct post/core

18. The restoration of endodontically treated, single-rooted teeth with cast or direct posts and cores: a systematic review
Heydecke, G., & Peters, M. C. (2002). *The Journal of prosthetic dentistry*, 87(4), 380-386.

9. Controversy between cast and prefabricated dowel

19. Microleakage and fracture patterns of teeth restored with different posts under dynamic loading
Jung, S. H., Min, K. S., Chang, H. S., Park, S. D., Kwon, S. N., & Bae, J. M. (2007). *The Journal of prosthetic dentistry*, 98(4), 270-276.
20. In vitro evaluation of fracture resistance and failure mode of internally restored endodontically treated maxillary incisors with differing heights of residual dentin (**Home reading**)
Varvara, G., Perinetti, G., Di Iorio, D., Murmura, G., & Caputi, S. (2007). *The Journal of prosthetic dentistry*, 98(5), 365-372.

10. Coronal seal

21. Endodontic failure caused by inadequate restorative procedures: review and treatment recommendations
Heling, I., Gorfli, C., Slutzky, H., Kopolovic, K., Zalkind, M., & Slutzky-Goldberg, I. (2002). *The Journal of prosthetic dentistry*, 87(6), 674-678.

11. Apical seal

22. Post preparation techniques and their effect on the apical seal
Haddix, J. E., Mattison, G. D., Shulman, C. A., & Pink, F. E. (1990). *The Journal of prosthetic dentistry*, 64(5), 515-519.
23. Effect of post preparation on the apical seal (**Home reading**)
Mattison, G. D., Delivanis, P. D., Thacker, R. W., & Hassell, K. J. (1984). *The Journal of prosthetic dentistry*, 51(6), 785-789.
24. The effect of dowel preparation on the apical seal of endodontically treated teeth (**Home reading**)
Neagle, R. L. (1969). *Oral Surgery, Oral Medicine, Oral Pathology*, 28(5), 739-745.
25. The effect of dowel preparation on the apical seal of the common obturation techniques
Camp, L. R., & Todd, M. J. (1983). *The Journal of prosthetic dentistry*, 50(5), 664-666.

12. Amalgam coronal / radicular restoration

26. Fracture resistance of amalgam coronal-radicular restorations
Kane, J. J., Burgess, J. O., & Summitt, J. B. (1990). *The Journal of prosthetic dentistry*, 63(6), 607-613.
27. An amalgam coronal-radicular dowel and core technique for endodontically treated posterior teeth (**Home reading**)
Nayyar, A., Walton, R. E., & Leonard, L. A. (1980). *The Journal of prosthetic dentistry*, 43(5), 511-515.

13. Ferrule effect

28. In vitro fracture resistance of endodontically treated central incisors with varying ferrule heights and configurations (**Home reading**)
Tan, P. L., Aquilino, S. A., Gratton, D. G., Stanford, C. M., Tan, S. C., Johnson, W. T., & Dawson, D. (2005). *The Journal of prosthetic dentistry*, 93(4), 331-336.
29. Ferrule design and fracture resistance endodontically treated teeth
Sorensen, J. A., & Engelman, M. J. (1990). *The Journal of prosthetic dentistry*, 63(5), 529-536.
30. The ferrule effect: a literature review
Stankiewicz, N. R., & Wilson, P. R. (2002). *International endodontic journal*, 35(7), 575-581.

14. Intracoronar reinforcement / coronal coverage

31. Intracoronar reinforcement and coronal coverage: a study of endodontically treated teeth
Sorensen, J. A., & Martinoff, J. T. (1984). *The Journal of prosthetic dentistry*, 51(6), 780-784.
32. Endodontically treated teeth as abutments
Sorensen, J. A., & Martinoff, J. T. (1985). *The Journal of prosthetic dentistry*, 53(5), 631-636.
33. Relationship between crown placement and the survival of endodontically treated teeth (**Home reading**)
Aquilino, S. A., & Caplan, D. J. (2002). *The Journal of prosthetic dentistry*, 87(3), 256-263.

Module 102

Removable Partial Dentures

(R1)

Principles of RPD design**15. Design philosophy**

34. Evolution of removable partial denture design
Becker, C. M., Kaiser, D. A., & Goldfogel, M. H. (1994). *Journal of Prosthodontics*, 3(3), 158-166.
35. Alternate framework designs for removable partial dentures (**Home reading**)
Budtz-Jorgensen, E., & Bochet, G. (1998). *The Journal of prosthetic dentistry*, 80(1), 58-66.
36. Treatment outcomes with mandibular removable partial dentures: a population-based study of satisfaction (**Home reading**)
Frank, R. P., Milgrom, P., Leroux, B. G., & Hawkins, N. R. (1998). *The Journal of prosthetic dentistry*, 80(1), 36-45.
37. Relationship between the standards of removable partial denture construction, clinical acceptability, and patient satisfaction
Frank, R. P., Brudvik, J. S., Leroux, B., Milgrom, P., & Hawkins, N. (2000). *The Journal of prosthetic dentistry*, 83(5), 521-527.

38. Contemporary partial denture design
McCracken, W. L. (1958). *The Journal of Prosthetic Dentistry*, 8(1), 71-84.

16. Mouth preparations, surveying, surveyed crowns

39. Surveying removable partial dentures: the importance of guiding planes and path of insertion for stability
Bezzon, O. L., Mattos, M. G. C., & Ribero, R. F. (1997). *The Journal of prosthetic dentistry*, 78(4), 412-418.
40. Surveyed crowns
Chandler, H. T., Brudvik, J. S., & Fisher, W. T. (1973). *The Journal of prosthetic dentistry*, 30(5), 775-780.
41. Preparation of mouths for fixed and removable partial dentures
Johnston, J. F. (1961). *The Journal of Prosthetic Dentistry*, 11(3), 456-462.
42. A study of four methods recording the path of insertion of removable partial dentures (Home reading)
Wagner, A. G., & Forgue, E. G. (1976). *The Journal of prosthetic dentistry*, 35(3), 267-272.

17. Work authorizations

43. Writing work authorizations for removable partial dentures
Henderson, D. (1966). *The Journal of Prosthetic Dentistry*, 16(4), 696-707.

RPD components and functions

18. Major & minor connectors

44. Major connectors, united it stands
Henderson, D. (1973). *Dental Clinics of North America*, 17(4), 661.
45. Major connectors for mandibular removable partial dentures: design and function
Henderson, D. (1973). *The Journal of prosthetic dentistry*, 30(4 Pt 2), 532.
46. Stiffness of different designs and cross-sections of maxillary and mandibular major connectors of removable partial dentures
Ben-Ur, Z., Mijiritsky, E., Gorfil, C., & Brosh, T. (1999). *The Journal of prosthetic dentistry*, 81(5), 526-532.
47. Subjective reactions to major connector designs for removable partial dentures
Campbell, L. D. (1977). *The Journal of prosthetic dentistry*, 37(5), 507-516.
48. Selection of a major connector for the extension-base removable partial dentures
LaVere, A. M., & Krol, A. J. (1973). *The Journal of prosthetic dentistry*, 30(1), 102-105.
49. Minor connector designs for anterior acrylic resin bases: a preliminary study. *Journal of Prosthetic Dentistry* (Home reading)
Dunny JA, King GE. (1975). *The Journal of prosthetic dentistry*, 1;34(5):496-502

50. The dimensions of mandibular lingual tissues relative to the placement of a lingual bar major connector
Cameron SM, Torres GT, Lefler TB, Parker MH. (2002). *The Journal of Prosthodontics*. 11(2):74-80
51. Clinical comparison of two mandibular major connector designs: the sublingual bar and the lingual plate
Hansen CA, Campbell DJ. (1985). *The Journal of Prosthetic Dentistry*. 1;54(6):805-9
52. The effect of removable partial denture framework design on gingival inflammation: a clinical model (Home reading)
McHenry, K. R., Johansson, O. E., & Christersson, L. A. (1992). *The Journal of prosthetic dentistry*, 68(5), 799-803.
- 19. Bar clasp retainers**
53. Principles and essentials of bar clasp partial denture
Roach, F. E. (1930). *The Journal of the American Dental Association* (1922), 17(1), 124-138.
54. An analysis of mesial rest-I-bar clasp designs (Home reading)
Demer, W. J. (1976). *The Journal of prosthetic dentistry*, 36(3), 243-253.
55. Clasp design for extension-base removable partial denture
Krol, A. J. (1973). *The Journal of prosthetic dentistry*, 29(4), 408-415.
- 20. Wrought wire direct retainers**
56. Construction techniques for wrought-wire retentive clasp arms as related to clasp flexibility
Brudvik, J. S., & Wormley, J. H. (1973). *The Journal of prosthetic dentistry*, 30(5), 769-774.
57. Stress-relaxation testing part III: Influence of wire alloys, gauges, and lengths on clasp behavior (Home reading)
Brudvik, J. S., & Morris, H. F. (1981). *The Journal of prosthetic dentistry*, 46(4), 374-379.
58. A study of the flexibility of wrought wire clasps (Home reading)
Frank, R. P., & Nicholls, J. I. (1981). *The Journal of prosthetic dentistry*, 45(3), 259-267.
59. A comparison of the flexibility of wrought wire and cast circumferential clasps
Richard P. Frank. *The Journal of Prosthetic Dentistry*, Volume 49, Number 4, 1983
Frank, R. P., Brudvik, J. S., & Nicholls, J. I. (1983). *The Journal of prosthetic dentistry*, 49(4), 471-476.
60. Behavior of wrought wire clasps after repeated permanent deformation (Home reading)
Matheson, G. R., Brudvik, J. S., & Nicholls, J. I. (1986). *The Journal of prosthetic dentistry*, 55(2), 226-231.
61. Stress-relaxation testing part II: Comparison of bending profiles, microstructures, micro hardness, and surface characteristics of several wrought wires (Home reading)
Morris, H. F., Asgar, K., Roberts, E. P., & Brudvik, J. S. (1981). *The Journal of prosthetic dentistry*, 46(3), 256-262.
62. Influence of fabrication technique on wrought wire clasp flexibility (Home reading)
Stade, E. H., Stewart, G. P., Morris, H. F., & Pesavento, J. R. (1985). *The Journal of prosthetic dentistry*, 54(4), 538-543.

21. Special considerations for direct retainers
63. Canines as removable partial denture abutments part II: rest and undercut location for retainers McArthur, D. R. (1986). <i>The Journal of prosthetic dentistry</i>, 56(4), 445-450. 64. RPA clasp design for distal extension removable partial dentures Eliason, C. M. (1983). <i>The Journal of prosthetic dentistry</i>, 49(1), 25-27. 65. A new removable partial denture clasp assembly Grasso, J. E. (1980). <i>The Journal of prosthetic dentistry</i>, 43(6), 618-621.
22. Indirect retainer
66. Indirect retention in partial denture design (Home reading) Avant, W. E. (1966). <i>The Journal of prosthetic dentistry</i>, 16(6), 1103-1110. 67. Fulcrum and retention lines in planning removable partial dentures Avant, W. E. (1971). <i>The Journal of prosthetic dentistry</i>, 25(2), 162-166. 68. The efficiency of an indirect retainer (Home reading) Fisher, R. L., & Jaslow, C. (1975). <i>The Journal of prosthetic dentistry</i>, 34(1), 24-30. 69. An investigation of the effectiveness of indirect retainers Frank, R. P., & Nicholls, J. I. (1977). <i>The Journal of prosthetic dentistry</i>, 38(5), 494-506.
23. Rest & rest seats
70. Shear strength of lingual rest seats prepared in bonded composite (Home reading) Toth, R. W., Fiebiger, G. E., Mackert, J. R., & Goldman, B. M. (1986). <i>The Journal of prosthetic dentistry</i>, 56(1), 99-104. 71. Effect of rest design on transmission of forces to abutment teeth Cecconi, B. T. (1974). <i>The Journal of prosthetic dentistry</i>, 32(2), 141-151. 72. Rest seat designs for inclined posterior abutments: a photoelastic comparison Sansom, B. P., Flinton, R. J., Parks, V. J., Pelleu, G. B., & Kingman, A. (1987). <i>The Journal of prosthetic dentistry</i>, 58(1), 57-62. 73. Dentin exposure and decay incidence when removable partial denture rest seats are prepared in tooth structure (Home reading) Jones, R. M., Goodacre, C. J., Brown, D. T., Manoz, C. A., & Rake, P. C. (1992). <i>International Journal of Prosthodontics</i>, 5(3).
24. Review of removable partial denture research
74. Removable partial denture research and its clinical significance (Home reading) Sharry JJ, Cecconi BT (1978). <i>The Journal of prosthetic dentistry</i>, 1;39(2):203-10. 75. Panoramic radiography in the examination of edentulous patients (Home reading) Perrelet LA, Bernhard M, Spirgi M (1977). <i>The Journal of prosthetic dentistry</i>, 1;37(5):494-8

Module 103	Complete denture prosthodontics	(R1)
Introduction and anatomical considerations		
25. Examination and treatment planning		
76. The relationship of oral examination to dental diagnosis House, M. M. (1958). <i>The Journal of Prosthetic Dentistry</i>, 8(2), 208-219. 77. Difficult denture birds Koper, A. (1967). <i>The Journal of prosthetic dentistry</i>, 17(6), 532-539. 78. Human factors in prosthodontic treatment Koper, A. (1973). <i>The Journal of prosthetic dentistry</i>, 30(4 Pt 2), 678-679. 79. The traditional therapeutic paradigm: complete denture therapy Jacob, R. F. (1998). <i>The Journal of prosthetic dentistry</i>, 79(1), 6-13.		
26. Classification and review of complete denture anatomy		
80. Variable denture-limiting structures of the edentulous mouth part II: mandibular border areas Kolb, H. R. (1966). <i>The Journal of prosthetic dentistry</i>, 16(2), 202-212. 81. Current concepts of lingual flange design Levin, B. (1981). <i>The Journal of prosthetic dentistry</i>, 45(3), 242-252. 82. The Coronomaxillary space: literature review and anatomic description Arbree, N. S., Yurkstas, A. A., & Kronman, J. H. (1987). <i>The Journal of prosthetic dentistry</i>, 57(2), 186-190.		
27. Bone physiology		
83. Clinical, cephalometric, and densitometric study of reduction of residual ridges Atwood, D. A., & Coy, W. A. (1971). <i>The Journal of prosthetic dentistry</i>, 26(3), 280-295. 84. The continuing reduction of the residual alveolar ridges in complete denture wearers: a mixed-longitudinal study covering 25 years Tallgren, A. (2003). <i>Journal of Prosthetic Dentistry</i>, 89(5), 427-435. 85. Cephalometric evaluation of the changes in patients wearing complete dentures. a ten-year longitudinal study Tuncay, O. C., Thomson, S., Abadi, B., & Ellinger, C. (1984). <i>The Journal of prosthetic dentistry</i>, 51(2), 169-180. 86. The effect of prosthodontic treatment on alveolar bone loss: a review of the literature (Home reading) Wyatt, C. C. (1998). <i>The Journal of prosthetic dentistry</i>, 80(3), 362-366.		

Principles of complete dentures

28. Denture retention-stability-support

87. A contemporary review of the factors involved in complete denture retention, stability and support Part 1: retention
Jacobson, T. E., & Krol, A. J. (1983). *The Journal of prosthetic dentistry*, 49(1), 5-15.
88. A contemporary review of the factors involved in complete denture retention, stability and support Part 2: stability
Jacobson, T. E., & Krol, A. J. (1983). *The Journal of prosthetic dentistry*, 49(2), 165-172.
89. A contemporary review of the factors involved in complete denture retention, stability and support Part 3: support
Jacobson, T. E., & Krol, A. J. (1983). *The Journal of prosthetic dentistry*, 49(3), 306-313.
90. The Philosophy and goals of impression making (Home reading)
Levin, B. (1984). *Impressions for complete dentures*. Quintessence Publishing Company.

29. Neutral zone concept

91. The neutral zone in complete denture
Beresin, V. E., & Schiesser, F. J. (1976). *The Journal of prosthetic dentistry*, 36(4), 356-367.
92. Flange technique: an anatomic and physiologic approach to increased retention, function, comfort and appearance of dentures (Home reading)
Lott, F., & Levin, B. (1966). *The Journal of prosthetic dentistry*, 16(3), 394-413.
93. The neutral zone and polished surfaces in complete dentures (Home reading)
Schiesser, F. J. (1964). *The Journal of Prosthetic Dentistry*, 14(5), 854-865.

30. Post palatal seal

94. A comparison of the retention of complete denture bases having different types of posterior palatal seal
Avant, W. E. (1973). *The Journal of prosthetic dentistry*, 29(5), 484-493.
95. Reliability of the fovea palatine for determining the posterior border of the maxillary denture (Home reading)
Chen, M. S. (1980). *The Journal of prosthetic dentistry*, 43(2), 133-137.
96. Posterior border seal-its rationale and importance
Hardy, I. R., & Kapur, K. K. (1958). *The Journal of Prosthetic Dentistry*, 8(3), 386-397.
97. A study of posterior palatal seals with varying palatal forms
Nikoukari, H. (1975). *The Journal of prosthetic dentistry*, 34(6), 605-613.
98. Dimensions and displacement patterns of the posterior palatal seal (Home reading)
Silverman, S. I. (1971). *The Journal of prosthetic dentistry*, 25(5), 470-488.

99. Establishing the posterior palatal seal during the final impression procedure: a functional approach
Weintraub, G. S. (1977). *The Journal of the American Dental Association*, 94(3), 505-510.

31. Complete denture impression

100. A historical review of complete denture impression materials (Home reading)
Starcke, E. N. (1975). *The Journal of the American Dental Association*, 91(5), 1037-1041.
101. Advantages of closed mouth muscle action for certain steps of impression taking (Home reading)
Schlosser, R. O. (1931). *The Journal of the American Dental Association* (1922), 18(1), 100-104.
102. Fabrication of complete/partial dentures (different final impression techniques and materials) for treating edentulous patients (Protocol)
Jayaraman, S., Singh, B. P., Ramanathan, B., Pazhaniappan Pillai, M., & Kirubakaran, R. (2016). *The Cochrane Library. Cochrane Database of Systematic Reviews*.
103. Mucostatic impressions (Home reading)
Addison, P. I. (1944). *The Journal of the American Dental Association*, 31(13), 941-946.
104. A critical analysis of mid-century impression technique for full denture (Home reading)
Boucher, C. O. (1951). *The Journal of prosthetic dentistry*, 1(4), 472-491.
105. A critical analysis of the mucostatic principle (Home reading)
Bohannon, H. M. (1954). *The Journal of Prosthetic Dentistry*, 4(2), 232-241.
106. Final impression for complete dentures
Collett, H. A. (1970). *The Journal of prosthetic dentistry*, 23(3), 250-264.
107. Basic principles in impression making
DeVan, M. M. (1952). *The Journal of Prosthetic Dentistry*, 2(1), 26-35.

Jaw relation in complete dentures

32. Jaw relation (constant rest position)

108. The crest position of the mandible and the centric relation
Niswonger, M. E. (1934). *The Journal of the American Dental Association* (1922), 21(9), 1572-1582.
109. Vertical dimension literature review (Home reading)
Swerdlow, H. (1965). *The Journal of prosthetic dentistry*, 15(2), 241-247.
110. The rest position of the mandible and its significant to dental science
Thompson, J. R. (1946). *The Journal of the American Dental Association*, 33(3), 151-180.

33. Jaw relation (variable rest position)

- 111. Cephalometric study of the clinical rest position of the mandible: Part I. The variability of the clinical rest position following the removal of occlusal contacts
Atwood, D. A. (1956). *The Journal of Prosthetic Dentistry*, 6(4), 504-519.
- 112. Cephalometric study of the clinical rest position of the mandible: Part II. The variability in the rate of bone loss following the removal of occlusal contacts (Home reading)
Atwood, D. A. (1957). *The Journal of Prosthetic Dentistry*, 7(4), 544-552.
- 113. Cephalometric study of the clinical rest position of the mandible: Part III. Clinical factors related to variability of the clinical rest position following the removal of occlusal contacts (Home reading)
Atwood, D. A. (1958). *The Journal of Prosthetic Dentistry*, 8(4), 698-708.
- 114. Changes in adult face height due to aging, wear and loss of teeth and prosthetic treatment
Tallgren, A. (1957). *Report ,1. US: Acta Odontol. Scandnavia. 1957* (tDAR id: 125306)

34. Jaw relation (vertical dimension of occlusion)

- 115. A clinical assessment of vertical dimension
Turrell, A. J. W. (1972). *The Journal of prosthetic dentistry*, 28(3), 238-246.
- 116. Determination of occlusal vertical dimension literature review (Home reading)
Fayz, F., & Eslami, A. (1988). *The Journal of prosthetic dentistry*, 59(3), 321-323.
- 117. Relationship of occlusal vertical dimension to the health of masticatory system (Home reading)
Rivera-Morales, W. C., & Mohl, N. D. (1991). *The Journal of prosthetic dentistry*, 65(4), 547-553.
- 118. Can biting force be used as criterion for registering vertical dimension (Home reading)
Boucher, L. J., Zwemer, T. J., & Pflughoeft, F. (1959). *The Journal of Prosthetic Dentistry*, 9(4), 594-599.
- 119. Physiologic vertical dimension and centric relation
Shanahan, T. E. (1956). *The Journal of Prosthetic Dentistry*, 6(6), 741-747.
- 120. Determination of vertical dimension by phonetics.
Silverman, M. M. (1956). *The Journal of Prosthetic Dentistry*, 6(4), 465-471.

35. Jaw relation (recording material)

- 121. Accuracy and dimensional stability of four interocclusal recording materials
Balthazar-Hart, Y., Sandrik, J. L., Malone, W. F. P., Mazur, B., & Hart, T. (1981). *The Journal of prosthetic dentistry*, 45(6), 586-591.
- 122. Clinical evaluation of the accuracy of interocclusal recording material (Home reading)
Fattore, L., Malone, W. F., Sandrik, J. L., Mazur, B., & Hart, T. (1984). *The Journal of prosthetic dentistry*, 51(2), 152-157.
- 123. A study of interocclusal record materials (Home reading)
Mullick, S. C., Stackhouse, J. A., & Vincent, G. R. (1981). *The Journal of prosthetic dentistry*, 46(3), 304-307.

36. Jaw relation (recording technique)**124. Occlusal record (Home reading)**

Trapozzano, V. R. (1955). *The Journal of Prosthetic Dentistry*, 5(3), 325-332.

125. Comparison of jaw relation recording methods

Walker, R. C. (1962). *The Journal of Prosthetic Dentistry*, 12(4), 685-694.

126. Occlusal relationships: The split-cast method for articulator techniques

Lauritzen, A. G., & Wolford, L. W. (1964). *The Journal of prosthetic dentistry*, 14(2), 256-265.

127. Correct vertical dimension and freeway space

Pleasure, M. A. (1951). *The Journal of the American Dental Association*, 43(2), 160-163.

37. Jaw relation (facebow)**128. The face-bow its significance and application**

Brandrup-Wognsen, T. (1953). *The Journal of Prosthetic Dentistry*, 3(5), 618-630.

129. The anterior point of reference

Wilkie, N. D. (1979). *The Journal of prosthetic dentistry*, 41(5), 488-496.

38. Jaw relation (centric relation, CR)**130. Factors influencing centric relation records in edentulous mouth**

Yurkstas, A. A., & Kapur, K. K. (2005). *Journal of Prosthetic Dentistry*, 93(4), 305-310.

131. Physiologic jaw relation and occlusion of complete dentures

Shanahan, T. E. (2004). *The Journal of prosthetic dentistry*, 91(3), 203-205.

132. An evaluation of centric relation records obtained by various techniques

Kapur, K. K., & Yurkstas, A. A. (1957). *The Journal of Prosthetic Dentistry*, 7(6), 770-786.

Module 104

Occlusion

(R1)

Occlusion concepts**39. Hanau' Quint****133. Discussion of "Laws of articulation"**

Boucher, C. O. (1963). *The Journal of Prosthetic Dentistry*, 13(1), 45-48.

134. A reevaluation of Hanau's laws of articulation and the Hanau Quint

Levin, B. (1978). *The Journal of prosthetic dentistry*, 39(3), 254-258.

135. Laws of articulation (Home reading)

Trapozzano, V. R. (1963). *The Journal of Prosthetic Dentistry*, 13(1), 34-44.

Principles of occlusion (dentition and fixed prosthesis)

40. Occlusion principles

136. Dynamic occlusions in natural permanent dentition
Panek, H., Matthews-Brzozowska, T., Nowakowska, D., Panek, B., Bielicki, G., Makacewicz, S., & Mankiewicz, M. (2008). *Quintessence International*, 39(4).
137. Anterior guidance: group function/canine guidance. A literature review
Thornton, L. J. (1990). *The Journal of prosthetic dentistry*, 64(4), 479-482.
138. Application of the functionally generated path technique to restore mandibular molars in bilateral group function occlusion
DuVal, N. B., & Rogers, P. M. (2013). *Journal of Prosthodontics*, 22(3), 226-232.
139. Group function or canine protection
Jemt, T., Lundquist, S., & Hedegard, B. (1982). *The Journal of prosthetic dentistry*, 48(6), 719-724.
140. Occlusion for fixed prosthodontics: a historical perspective of the gnathological influence
Pokorny, P. H., Wiens, J. P., & Litvak, H. (2008). *The Journal of prosthetic dentistry*, 99(4), 299-313.
141. Chewing movements in relation to border movements at the first molar
Gibbs, CH., Lundeen, HC., Mahan, PE., & Fujimoto, J. (1981). *The Journal of prosthetic dentistry*, 46(3), 308-322.
142. Occlusal variations for reconstructing the natural dentition (Home reading)
Schwartz, H. (1986). *The Journal of prosthetic dentistry*, 55(1), 101-105.

41. Concepts of complete denture occlusion

143. Occlusion as related to complete removable prosthodontics
Beck, HO. (1972). *Journal of prosthetic dentistry*. 1972 Mar 1;27(3):246-56.
144. The developments in the occlusal patterns of artificial teeth
Hardy, IR. (1951). *Journal of Prosthetic Dentistry*. 1;1(1):14-28.
145. Factors affecting the masticatory performance of complete denture wearers
Kelly, EK. (1975). *Journal of Prosthetic Dentistry*. 1;33(2):122-36

42. Balanced occlusion

146. Arrangement of anatomic-type artificial teeth into balanced occlusion
Jordan, LG. (1978). *The Journal of prosthetic dentistry*. 39(5):484-94.

43. Lingualized occlusion

147. Lingualized occlusion revisited
Phoenix, RD. (2010). *The Journal of prosthetic dentistry*. 1;104(5):342-6.
148. Lingualized occlusion for removable prosthodontics
Becker CM, Swoope CC, Guckes AD. (1977). *The Journal of prosthetic dentistry*. 1;38(6):601-8

44. Monoplane occlusion

149. A method of developing monoplane occlusions
Brudvik, JS, Wormley, JH. (1968). *The Journal of prosthetic dentistry*. 1;19(6): 573-80.
150. A carborundum stripping technique for the occlusal adjustment of cusplless teeth (Home reading)
Gronas, DG. (1970). *The Journal of Prosthetic Dentistry*. 1;23(2):218-26.
151. The monoplane occlusion for complete dentures
Jones, PM. (1972). *The Journal of the American Dental Association*. 1;85(1):94-100.
152. Balancing ramps in nonanatomic complete denture occlusion
Nimmo, A., Kratochvil, FJ. (1985). *The Journal of Prosthetic Dentistry*. 1;53(3): 431-3

Module 105

Periodontic-prosthodontics

(R1)

Essential periodontics (prosthodontic perspectives)**45. Periodontic diagnosis and prognosis**

153. Development of a classification system for periodontal diseases and conditions
Armitage, G. C. (2000). *Northwest dentistry*, 79(6), 31-35.
154. Prognosis versus actual outcome II. The effectiveness of clinical parameters in developing an accurate prognosis
McGuire, M. K., & Nunn, M. E. (1996). *Journal of Periodontology*, 67(7), 658-665.
155. Prognosis versus actual outcome III. The effectiveness of clinical parameters in accurately predicting tooth survival (Home reading)
McGuire, M. K., & Nunn, M. E. (1996). *Journal of periodontology*, 67(7), 666-674.
156. Furcation morphology relative to periodontal treatment: furcation root surface anatomy
Bower, R. C. (1979). *Journal of periodontology*, 50(7), 366-374.

46. Saliva and CAMBRA

157. The impact of saliva on patient care: literature review
Diaz-Arnold, A. M., & Marek, C. A. (2002). *The Journal of prosthetic dentistry*, 88(3), 337-343.
158. Review of saliva: normal composition, flow, and function (Home reading)
Humphrey, S. P., & Williamson, R. T. (2001). *The Journal of prosthetic dentistry*, 85(2), 162-169.
159. Caries management by risk assessment (CAMBRA) and its effect on the surface roughness of various restorative material (Home reading)
Bolding, L., Masri, R., Arola, D., Driscoll, C., & Romberg, E. (2015). *The Journal of prosthetic dentistry*, 114(4), 543-548.

47. Biological width

- 160.** Dimensions and relations of the dentogingival junction in humans
Gargiulo, A. W., Wentz, F. M., & Orban, B. (1961). *Journal of Periodontology*, 32(3), 261-267.
- 161.** Altering gingival levels: The restorative connection part I: biologic variables
Kois, J. C. (1994). *Journal of Esthetic and Restorative Dentistry*, 6(1), 3-7.
- 162.** Interactions between the gingiva and the margin of restorations
Padbury, A., Eber, R., & Wang, H. L. (2003). *Journal of clinical periodontology*, 30(5), 379-385.

48. Crown lengthening

- 163.** Surgical lengthening of the clinical crown
Brägger, U., Lauchenauer, D., & Lang, N. P. (1992). *Journal of clinical periodontology*, 19(1), 58-63.
- 164.** Restorative and periodontal considerations of short clinical crowns
Davarpanah, M., Jansen, C. E., Vidjak, F., Etienne, D., Kebir, M., & Martinez, H. (1998). *International Journal of Periodontics & Restorative Dentistry*, 18(5).
- 165.** Crown lengthening: the periodontal-restorative connection
Becker, W., Ochsenbein, C., & Becker, B. E. (1998). *Compendium of continuing education in dentistry (Jamesburg, NJ: 1995)*, 19(3), 239-40.
- 166.** Periodontal and dental considerations in clinical crown extension: a rational basis for treatment (Home reading)
Smukler H, Chaibi M. (1997). *Journal of Periodontics & Restorative Dentistry*. 1;17(5).

Periodontal grafts**49. Osseous graft**

- 167.** Bone and bone substitutes (Home reading)
Nasr, H. F., Aichelmann - Reidy, M. E., & Yukna, R. A. (1999). *Periodontology 2000*, 19(1), 74-86.
- 168.** Osseous grafting part I: autografts and allografts for periodontal regeneration- a literature review
AlGhamdi, A. S., Shibly, O., & Ciancio, S. G. (2010). *Journal of the International Academy of Periodontology*, 12(2), 34-38.
- 169.** Osseous grafting part II: xenografts and alloplast for periodontal regeneration- a literature review
AlGhamdi, A. S., Shibly, O., & Ciancio, S. G. (2010). *Journal of the International Academy of Periodontology*, 12(2), 39-44.
- 170.** Surgical techniques for alveolar socket preservation: a systematic review
Vittorini Orgeas, G., Clementini, M., De Risi, V., & de Sanctis, M. (2013). *International Journal of Oral & Maxillofacial Implants*, 28(4).

Periodontal consideration in fixed prosthodontics

50. Periodontal consideration in fixed prosthodontics part I

171. Gingival esthetics
Goodacre, C. J. (1990). *The Journal of prosthetic dentistry*, 64(1), 1-12.
172. Current theories of crown contour, margin placement, and pontic design
Becker, C. M., & Kaldahl, W. B. (1981). *The Journal of prosthetic dentistry*, 45(3), 268-277.

51. Periodontal consideration in fixed prosthodontics part II

173. Gingival enhancement in fixed prosthodontics part I clinical findings
Sorensen, J. A., Doherty, F. M., Newman, M. G., & Flemmig, T. F. (1991). *The Journal of prosthetic dentistry*, 65(1), 100-107.
174. Gingival enhancement in fixed prosthodontics part II biological findings (Home reading)
Flemmig, T. F., Sorensen, J. A., Newman, M. G., & Nachnani, S. (1991). *The Journal of prosthetic dentistry*, 65(3), 365-372.
175. Gingival enhancement in fixed prosthodontics part III anamnestic findings (Home reading)
Sorensen, J. A., & Newman, M. G. (1991). *The Journal of prosthetic dentistry*, 65(4), 500-504.
176. Impression consideration in the maxillary anterior region
Chiche, G. J., Harrison, J. D., & Caudill, R. (1994). *Compendium (Newtown, Pa.)*, 15(3).
177. Periodontal consideration in prosthetic dentistry
Lang, N. P. (1995). *Periodontology 2000*, 9(1), 118-131.
178. Mastering the art of tissue management during provisionalization and biologic final impressions
Shavell, HM. (1988). *The International journal of periodontics & restorative dentistry*. 8(3):24

Module 106

Implant Prosthodontics

(R1)

Introduction

52. History and osseointegration

179. Mechanism of endosseous integration
Davies, J. E. (1998). *International Journal of Prosthodontics*, 11(5).
180. Osseointegration: a reality
Schenk, R. K., & Buser, D. (1998). *Periodontology 2000*, 17(1), 22-35.
181. Osseointegration and its experimental background (Home reading)
Branemark, P. I. (1983). *The Journal of prosthetic dentistry*, 50(3), 399-410.

Clinical guidelines and considerations

53. Implant versus endodontic treatment

182. Clinical decision-making regarding endodontics versus implants
Derhalli, M., & Mounce, R. E. (2011). *Compend Contin Educ Dent*, 32(4), 24-6.
183. Quality of life of endodontically treated versus implant treated patients: a university-based qualitative research study (**Home reading**)
Gatten, D. L., Riedy, C. A., Hong, S. K., Johnson, J. D., & Cohenca, N. (2011). *Journal of endodontics*, 37(7), 903-909.
184. A treatment dilemma of the furcated molar: root resection versus single-tooth implant restoration. A literature review
Kinsel, R. P., Lamb, R. E., & Ho, D. (1998). *International Journal of Oral & Maxillofacial Implants*, 13(3).
185. Outcome of root canal treatment and restoration, implant-supported single crowns, fixed dentures, and extraction without replacement: a systematic review
Torabinejad, M., Anderson, P., Bader, J., Brown, L. J., Chen, L. H., Goodacre, C. J., Kattadiyil, M.T., Kutsenko, D., Lozada, J., Patel, R. & Petersen, F. (2007). *The Journal of prosthetic dentistry*, 98(4), 285-311.
186. For teeth requiring endodontic treatment, what are differences in outcomes of restored endodontically treated teeth compared to implant-supported restorations?
Iqbal, M. K., & Kim, S. (2007). *International Journal of Oral & Maxillofacial Implants*, 22(7).
187. Endodontics or implants? A review of decisive criteria and guidelines for single tooth restorations and full arch reconstructions
Zitzmann, U. Krastl, G. Hecker, H. Walter, C. Weiger, R. (2009). *International endodontic journal*, 42(9), 757-774.

54. Success, survival and failure

188. The long-term efficacy of currently used dental implants: a review and proposed criteria of success
Albrektsson, T., Zarb, G., Worthington, P., & Eriksson, A. R. (1986). *Int J Oral Maxillofac Implants*, 1(1), 11-25.
189. Dental implant failure rates and associated risk factors
Moy, P. Medina, D. Shetty, V. & Aghaloo, T (2005). *International Journal of Oral & Maxillofacial Implants*, 20(4).
190. Implant success, survival, and failure: the international congress of oral implantologists (ICOI) Pisa consensus conference
Misch, C. E., Perel, M. L., Wang, H. L., Summation, G., Galindo-Moreno, P., Trisi, P., ... & Schwartz-Arad, D. (2008). *Implant dentistry*, 17(1), 5-15.
191. Comparative clinical study of three-unit fixed partial prostheses supported by two or three implants
Yi, Y. J., Lee, J. Y., & Kim, Y. K. (2013). *International Journal of Oral & Maxillofacial Implants*, 28(4).

55. Prosthodontics considerations

192. Implant prosthodontics: current perspective and future directions
Taylor T., Agar J., Vagiati T. (2000). *The international Journal of oral & maxillofacial implants*, 15(1), 66-75
193. Clinical complications of osseointegrated implants
Goodacre, C. J., Kan, J. Y., & Rungcharassaeng, K. (1999). *The Journal of prosthetic dentistry*, 81(5), 537-552.
194. Prosthodontics problems and limitation associated with ossiointegration
Taylor, T.D. (1999). *The Journal of prosthetic dentistry*, 79(1), 74-78

56. Clinical guideline for implant dentistry

195. An interdisciplinary approach to treatment planning in implant dentistry
Jivraj, S., Corrado, P., & Chee, W. (2007). *British dental journal*, 202(1), 11-17.
196. Treatment planning of the edentulous maxilla
Jivraj, S., Chee, W., & Corrado, P. (2006). *British dental journal*, 201(5), 261-279.
197. Treatment planning of the edentulous mandible
Chee, W., & Jivraj, S. (2006). *British Dental Journal*, 201(6), 337-347.
198. Transitioning patients from teeth to implants
Jivraj, S., & Chee, W. (2006). *British dental journal*, 201(11), 699-708.
199. Treatment planning of implants in posterior quadrant
Jivraj, S., & Chee, W. (2006). *British dental journal*, 201(1), 13-23.
200. Treatment planning of implants in the aesthetic zone
Jivraj, S., & Chee, W. (2006). *British dental journal*, 201(2), 77-89.
201. Surgical guidelines for dental implant placement
Handelsman, M. (2006). *British dental journal*, 201(3), 139-152.
202. The role of orthodontics in implant dentistry
Rose, T. P., Jivraj, S., & Chee, W. (2006). *British dental journal*, 201(12), 753-764.
203. Immediate implant placement: treatment planning and surgical steps for successful outcomes
Becker, W. (2006). *British dental journal*, 201(4), 199-205.

End of R1

Resident level two (R2)

Module 201	Fixed Prosthodontics	(R2)
Finish lines, restoration margins, and fit		
57. Finish line and margin configuration		
204. Margins of complete crowns: literature review Gardner, F. M. (1982). <i>The Journal of prosthetic dentistry</i>, 48(4), 396-400. 205. Gingival crown margin configuration: a review and discussion. Part I: terminology and widths. Hunter, A. J., & Hunter, A. R. (1990). <i>The Journal of prosthetic dentistry</i>, 64(5), 548-552 206. Analysis of the geometry of finishing lines for full crown restorations Pascoe, D. F. (1978). <i>The Journal of prosthetic dentistry</i>, 40(2), 157-162. 207. Function, placement, and reproduction of bevels for gold castings (Home reading) Rosner, D. (1963). <i>The Journal of Prosthetic Dentistry</i>, 13(6), 1160-1166.		
58. Marginal fit		
208. The effect of various finish line preparation on the marginal seal and occlusal seat of full crown preparations Gavelis JR, Morency JD, Riley ED, Sozio RB. (1981). <i>The Journal of prosthetic dentistry</i>. 2004 Jul;92(1):1-7.		
59. Porcelain margin		
209. In vitro failure load of metal-collar margins compared with porcelain facial margins of metal-ceramic crowns (Home reading) Gardner, F. M., Tillman-McCombsb, K. W., Gaston, M. L., & Runyan, D. A. (1997). <i>The Journal of prosthetic dentistry</i>, 78(1), 1-3. 210. Change in marginal fit as related to margin design, alloy type, and porcelain proximity in porcelain-fused-to-metal restoration Richter-Snapp K, Aquilino SA, Svare CW, Turner KA. (1988). <i>The Journal of prosthetic dentistry</i>; 60(4):435-9. 211. The esthetic metal-ceramic margin: a comparison of techniques Prince, J., & Donovan, T. (1983). <i>The Journal of prosthetic dentistry</i>, 50(2), 185-192. 212. Precision of fit of two margin designs for metal-ceramic crowns Limkangwalmongkol, P., Chiche, G. J., & Blatz, M. B. (2007). <i>Journal of Prosthodontics</i>, 16(4), 233-237.		
60. Margin distortion in metal ceramic restorations		
213. Distortion of ceramometal fixed partial dentures during the firing cycle Bridger, D. V., & Nicholls, J. I. (1981). <i>The Journal of prosthetic dentistry</i>, 45(5), 507-514.		

214. Thermal cycling distortion of metal ceramics Part 1: metal collar width (**Home reading**)
Campbell, S. D., & Pelletier, L. B. (1992). *The Journal of prosthetic dentistry*, 67(5), 603-608.
215. Thermal cycling distortion of metal ceramics Part 2: etiology (**Home reading**)
Campbell, S. D., & Pelletier, L. B. (1992). *The Journal of prosthetic dentistry*, 68(2), 284-289.
216. Preparation design and margin distortion in porcelain-fused-to-metal restoration
Shillingburg, H. T., Hobo, S., & Fisher, D. W. (1973). *The Journal of prosthetic dentistry*, 29(3), 276-284.

61. Improving fit and retention of castings

217. Cement thickness between cast restorations and preparation walls
Fusayama, T., Ide, K., Kurosu, A., & Hosoda, H. (1963). *The Journal of Prosthetic Dentistry*, 13(2), 354-364.
218. Relief of resistance of cement of full cast crowns (**Home reading**)
Fusayama, T., Ide, K., & Hosoda, H. (1964). *The Journal of Prosthetic Dentistry*, 14(1), 95-106.
219. A review of methods & techniques to improve the fit of cast restorations
Schwartz, I. S. (1986). *The Journal of prosthetic dentistry*, 56(3), 279-283.

Biomaterials for FDP

62. Casting alloys

220. Alloys for prosthodontic restoration
Wataha, J. C. (2002). *The Journal of prosthetic dentistry*, 87(4), 351-363.
221. Precious metals in dentistry
Givan, D. A. (2007). *Dental Clinics of North America*, 51(3), 591-601.
222. Base metal alloys used for dental restorations and implants
Roach, M. (2007). *Dental Clinics of North America*, 51(3), 603-627.

63. All-ceramic materials

223. The safety and efficacy of anterior ceramic fixed partial dentures: a review of the literature
Raigrodski, A. J., & Chiche, G. J. (2001). *The journal of prosthetic dentistry*, 86(5), 520-525.
224. Contemporary materials and technologies for all-ceramic fixed partial dentures: a review of the literature
Raigrodski, A. J. (2004). *The Journal of prosthetic dentistry*, 92(6), 557-562.
225. Ceramics for restorative dentistry: critical aspects for fracture and fatigue resistance (**Home reading**)
Thompson, J. Y., Stoner, B. R., & Piascik, J. R. (2007). *Materials Science and Engineering: C*, 27(3), 565-569.

226. Current ceramic materials and systems with clinical recommendations: a systematic review
Conrad, H. J., Seong, W. J., & Pesun, I. J. (2007). *The Journal of prosthetic dentistry*, 98(5), 389-404.
227. Recent advances in materials for all-ceramic restorations
Griggs, J. A. (2007). *Dental Clinics of North America*, 51(3), 713-727.
228. All-ceramic, chair-side computer-aided design/computer-aided machining restorations
Mormann WH, Bindl, A. (2002). *Dent Clin N Am* 46 405–426
229. A new classification system for all-ceramic and ceramic-like restorative materials
Gracis et al. (2015). *The International Journal of Prosthodontics Volume 28, Number 3*
230. Ceramics in dentistry—Part I: classes of materials
McLaren EA. (2009). *inside dentistry insidedentistry.net*
231. Dental ceramics: Part II – recent advances in dental ceramics (Home reading)
Datla, RS, Alla, RK, Alluri, VR, Babu, J. (2015). *American Journal of Materials Engineering and Technology*. 3. 19-26. 10.12691/materials-3-2-1.

Special clinical situations in FDP

64. Cantilevers

232. The cantilever fixed partial denture- a literature review (Home reading)
Himmel, R., Pilo, R., Assif, D., & Aviv, I. (1992). *The Journal of prosthetic dentistry*, 67(4), 484-487.
233. A systematic review of the survival and complication rates of fixed partial dentures (FPDs) after an observation period of at least 5 years IV. Cantilever or extension FPDs
Tan, K., Pjetursson, B. E., Lang, N. P., & Chan, E. S. (2004). *Clinical oral implants research*, 15(6), 654-666.
234. Long-term prognosis of extensive polyunit cantilevered fixed partial denture (Home reading)
Laurell, L., Lundgren, D., Falk, H., & Hugoson, A. (1991). *The Journal of prosthetic dentistry*, 66(4), 545-552.

65. Splinting

235. Effect of splinting on load distribution of extracoronal with distal extension prosthesis in vitro
El Charkawi, H. G., & El Wakad, M. T. (1996). *The Journal of prosthetic dentistry*, 76(3), 315-320.
236. Effect of abutment mobility, site, and angle of impact on retention of fixed partial dentures (Home reading)
Jacobi, R., Shillingburg, H. T., & Duncanson, M. G. (1985). *The Journal of prosthetic dentistry*, 54(2), 178-183.

66. Management of worn dentition

237. Effect of increasing vertical dimension on the masticatory systems in subjects with natural teeth
Carlsson, G. E., & Ingervall, B. (1979). *The Journal of prosthetic dentistry*, 41(3), 284-289.
238. Etiology and diagnosis of tooth wear: a literature review and presentation of selected cases (Home reading)
Hattab, F. N., & Yassin, O. M. (2000). *International Journal of Prosthodontics*, 13(2).
239. Wear evaluation of porcelain opposing gold, composite resin, and enamel
Kadokawa, A., Suzuki, S., & Tanaka, T. (2006). *The Journal of prosthetic dentistry*, 96(4), 258-265.
240. Stress-induced cervical lesions: review of advances in the past 10 years
Lee, W. C., & Eakle, W. S. (1996). *The Journal of prosthetic dentistry*, 75(5), 487-494.
241. Restoration of the extremely worn dentition
Turner, K. A., & Missirlian, D. M. (1984). *The Journal of prosthetic dentistry*, 52(4), 467-474.
242. Analyzing the etiology of an extremely worn dentition
Verrett, R. G. (2001). *Journal of Prosthodontics*, 10(4), 224-233.
243. Factors affecting enamel and ceramic wear: a literature review
Oh, W. S., DeLong, R., & Anusavice, K. J. (2002). *The journal of prosthetic dentistry*, 87(4), 451-459.
244. Conceptual approach to complex rehabilitation of a patient with bulimia nervosa: a case report (Home reading)
Schunke, S., & Schlee, M. (2006). *European Journal of Esthetic Dentistry*, 1(4).
245. Restoring esthetic and anterior guidance in worn anterior teeth: a conservative multidisciplinary approach (Home reading)
Mcintyre, F. (2000). *The Journal of the American Dental Association*, 131(9), 1279-1283.

67. Special topics

246. The prosthodontic concept of crown-to-root ratio: a review of the literature
Grossmann, Y., & Sadan, A. (2005). *The Journal of prosthetic dentistry*, 93(6), 559-562.
247. Limited treatment goals-shortened dental arches
Käyser, A. F. (1994). *Periodontology 2000*, 4(1), 7-14.
248. New paradigms in prosthodontic treatment planning: a literature review (Home reading)
Rich, B., & Goldstein, G. R. (2002). *The Journal of prosthetic dentistry*, 88(2), 208-214.

68. Longitudinal studies

249. Clinical complications in fixed prosthodontics
Goodacre, C. J., Bernal, G., Rungcharassaeng, K., & Kan, J. Y. (2003). *The Journal of prosthetic dentistry*, 90(1), 31-41.

250. Comparison of survival and complication rates of tooth supported fixed dental prostheses (FDPs) and implant supported FDPs and single crowns (SCs) **(Home reading)**
Pjetursson, B. E., Brägger, U., Lang, N. P., & Zwahlen, M. (2007). *Clinical oral implants research*, 18(s3), 97-113.
251. Complications associated with fixed partial dentures with a loose retainer **(Home reading)**
Curtis, D. A., Plesh, O., Sharma, A., & Finzen, F. (2006). *The Journal of prosthetic dentistry*, 96(4), 245-251.
252. Meta-analysis of fixed partial denture survival: prostheses and abutments **(Home reading)**
Scurria, M. S., Bader, J. D., & Shugars, D. A. (1998). *The Journal of prosthetic dentistry*, 79(4), 459-464.

Module 202

Removable Partial Dentures

(R2)

Biomaterials for RPD

69. Clasp flexibility

253. Stress-relaxation testing Part IV: clasp pattern dimensions and their influence on clasp behavior
Morris, H. F., Asgar, K., Brudvik, J. S., Winkler, S., & Roberts, E. P. (1983). *The Journal of prosthetic dentistry*, 50(3), 319-326.
254. Influence of polishing on cast clasp properties **(Home reading)**
Morris, H. F., & Brudvik, J. S. (1986). *The Journal of prosthetic dentistry*, 55(1), 75-77.

70. Attachment RPD

255. The Thompson dowel-rest system modified for chrome-cobalt removable partial denture frameworks **(Home reading)**
Becker, C. M., Campbell, H. C., & Williams, D. L. (1978). *The Journal of prosthetic dentistry*, 39(4), 384-391.
256. A stable base precision attachment removable partial denture (PARPD): theories and principles
Clayton JA. (1980) *Dental Clinics of North America*, 24(1):3-29. PubMed

Clinical implications and techniques for RPD

71. Altered cast impression procedure (ACIP)

257. Clinical outcome of the altered cast impression procedure compared with use of a one-piece cast
Frank, R. P., Brudvik, J. S., & Noonan, C. J. (2004). *The Journal of prosthetic dentistry*, 91(5), 468-476.

258. Influence of impression procedure and occlusal loading on Partial denture movement
Holmes, J. B. (2001). *Journal of Prosthetic Dentistry*, 86(4), 335-341.
259. A comparative study of impression for distal extension removable partial denture
Leupold, R. J. (1966). *The Journal of Prosthetic Dentistry*, 16(4), 708-720.
260. Comparison of vertical movement occurring during loading of distal-extension removable partial denture bases made by three impression techniques
Leupold, R. J., Flinton, R. J., & Pfeifer, D. L. (1992). *The Journal of prosthetic dentistry*, 68(2), 290-293.
261. Vertical displacement of distal-extension ridges by different impression techniques
Vahidi, F. (1978). *The Journal of prosthetic dentistry*, 40(4), 374-377.

72. Clasp forces on teeth & RPD retention

262. Tripping action of Bar Clasp
Stone, E. R. (1936). *The Journal of the American Dental Association* (1922), 23(4), 596-617.

73. Clinical outcomes

263. Periodontal problems associated with use of distal extension removable partial dentures- a matter of construction?
Berg, E. (1985). *Journal of oral rehabilitation*, 12(5), 369-379.
264. Caries, periodontal and prosthetic findings in patient with removable partial dentures: a 10-year longitudinal study (Home reading)
Bergman, B., Hugoson, A., & Olsson, C. O. (1982). *The Journal of Prosthetic Dentistry*, 48(5), 506-514.
265. Clinical evaluation of patients eight to nine years after placement of removable partial denture (Home reading)
Chandler, J. A., & Brudvik, J. S. (1984). *The Journal of prosthetic dentistry*, 51(6), 736-743.
266. A measurement of clasp forces on teeth
Clayton, J. A., & Jaslow, C. (1971). *The Journal of prosthetic dentistry*, 25(1), 21-43.
267. Incidence of various classes of removable partial denture
Curtis, DA, Curtis, TA, Wagnild, GW, & Finzen, FC. (1992). *The Journal of prosthetic dentistry*, 67(5), 664-667.
268. Effect of clasp design upon retention of removable partial dentures
Firtell, D. N. (1968). *The Journal of prosthetic dentistry*, 20(1), 43-52.
269. A randomized clinical trial of two basic removable partial denture designs Part I: comparisons of five-year success rates and periodontal health
Kapur, K. K., Deupree, R., Dent, R. J., & Hasse, A. L. (1994). *The Journal of prosthetic dentistry*, 72(3), 268-282.
270. Measurement (in-vitro) of the amount of force required to dislodge specific clasps from different depths of undercuts
Marei, M. K. (1995). *The Journal of prosthetic dentistry*, 74(3), 258-263.
271. A retrospective study of combined fixed-removable reconstructions with their analysis of failures (Home reading)
Studer, S. P., Mäder, C., Stahel, W., Schärer, P., Prosthodontics, R., & Medicine, F. (1998). *Journal of oral rehabilitation*, 25(7), 513-526.

272. Ten-year evaluation of removable partial dentures: Survival rates based on retreatment, not wearing and replacement
Vermeulen AH, Keltjens HM, van't Hof MA, Kayser AF. (1996). *The Journal of prosthetic dentistry*, 76(3):267-72

74. Surface wear by clasps

273. Abrasion of enamel and composite resin by removable partial denture clasps
Hebel, K. S., Graser, G. N., & Featherstone, J. D. B. (1984). *The Journal of prosthetic dentistry*, 52(3), 389-397.
274. A preliminary study of wear porcelain when subjected to functional movements of retentive clasp arms
Maroso, D. J., Schmidt, J. R., & Blustein, R. (1981). *The Journal of prosthetic dentistry*, 45(1), 14-17.

Stress distribution in RPD designs

75. In-vitro and in-vivo analysis of stress distribution and abutment mobility

275. Movement of three removable partial denture clasp assemblies under occlusal loading
Browning, J. D., Meadors, L. W., & Eick, J. D. (1986). *The Journal of prosthetic dentistry*, 55(1), 69-74.
276. The effect of partial denture clasp design on abutment tooth movement
Cecconi, B. T., Asgar, K., & Dootz, E. (1971). *The Journal of prosthetic dentistry*, 25(1), 44-56.
277. Stereo-photogrammetric analysis of abutment tooth movement in distal-extension removable partial dentures with intracoronal attachments and clasps (Home reading)
Chou, T. M., Eick, J. D., Moore, D. J., & Tira, D. E. (1991). *The Journal of prosthetic dentistry*, 66(3), 343A29-349A30.
278. A photoelastic study of rests on solitary abutments for distal-extension removable partial dentures (Home reading)
Myers, R. E., Pfeifer, D. L., Mitchell, D. L., & Pelleu, G. B. (1986). *The Journal of prosthetic dentistry*, 56(6), 702-707.
279. Effect of two clasp assemblies on arch integrity as modified by base adaptation (Home reading)
Taylor, D. T., Pflughoeft, F. A., & McGivney, G. P. (1982). *The Journal of prosthetic dentistry*, 47(2), 120-125.
280. Evaluation of photoelastic stress patterns produced by various designs of bilateral distal-extension removable partial dentures
Thompson, W. D., Kratochvil, F. J., & Caputo, A. A. (1977). *The Journal of prosthetic dentistry*, 38(3), 261-273.
281. The effects of removable partial dentures on abutment tooth mobility: a clinical study
Goodkind, R. J. (1973). *The Journal of prosthetic dentistry*, 30(2), 139-146.
282. The effect of various clasping systems on the mobility of abutment teeth for distal-extension removable partial dentures
Tebrook, O. C., Rohen, R. M., Fenster, R. K., & Pelleu, G. B. (1979). *The Journal of prosthetic dentistry*, 41(5), 511-516.

Special RPD design and topics

76. Swing-lock removable partial dentures

- 283.** The swing-lock partial denture: an alternative approach to conventional removable partial denture service (**Home reading**)
Antos, E. W., Renner, R. P., & Foerth, D. (1978). *The Journal of prosthetic dentistry*, 40(3), 257-262.

77. Removable partial overdentures

- 284.** Telescope crown retainers for removable partial dentures
Isaacson, G. O. (1969). *The Journal of prosthetic dentistry*, 22(4), 436-448.
- 285.** Crown and sleeve-coping retainers for removable partial prostheses (**Home reading**)
Yalisove, I. L. (1966). *The Journal of prosthetic dentistry*, 16(6), 1069-1085.

78. Rotational path removable partial dentures

- 286.** Removable partial dentures with rotational paths of insertion: Problem analysis
David N. Firtell. *The Journal of Prosthetic Dentistry*, Volume 50, Number 1, 1983
- 287.** Rotational path partial denture design: a 10-year clinical follow up-Part II (**Home reading**)
T.E Jacobson. *The Journal of Prosthetic Dentistry*, Volume 71, Number 3, 1994
- 288.** Dual-path design for removable partial design (**Home reading**)
Gordon E. King. *The Journal of Prosthetic Dentistry*, Volume 39, Number 4, 1978
- 289.** Rotational path removable partial denture Part 1 replacement of posterior teeth
Arthur J. Krol. *International Journal of Prosthodontics*, Volume 1, Number 1, 1988
- 290.** Rotational path removable partial denture Part 2 replacement of anterior teeth
Arthur J. Krol. *International Journal of Prosthodontics*, Volume 1, Number 2, 1988

79. Review of removable partial denture research

- 291.** The dimensions of mandibular lingual tissues relative to the placement of a lingual bar major connector
Cameron, S. M., Torres, G. T., Lefler, T. B., & Parker, M. H. (2002). *Journal of Prosthodontics*, 11(2), 74-80.
- 292.** Clinical comparison of two mandibular major connector design: the sublingual bar and the lingual plate
Hansen, C. A., & Campbell, D. J. (1985). *The Journal of prosthetic dentistry*, 54(6), 805-809.

Biomaterials and its clinical implications

80. Acrylic resin and denture technique

293. Dimensional accuracy of various denture base materials
D.H. Anthony, F.A. Peyton. (1962). *The Journal of Prosthetic Dentistry*, 12(1),67-81.
294. A laboratory study of changes in vertical dimension using a compression molding and pour resin technique (Home reading)
Dukes, B. S., Fields, H., Olson, J. W., & Scheetz, J. P. (1985). *The Journal of prosthetic dentistry*, 53(5), 667-669.
295. Comparison of changes in vertical dimension between compression and injection molded complete dentures (Home reading)
Strohaber, R. A. (1989). *The Journal of prosthetic dentistry*, 62(6), 716-718.
296. Resin denture bases: review of accuracy and methods of polymerization
Takamata, T., & Setcos, J. C. (1989). *International Journal of Prosthodontics*, 2(6).

81. Tissue conditioner material

297. Use of tissue conditioners and resilient liners
Gonzalez, J. B. (1977). *Dental Clinics of North America*, 21(2), 249-259.
298. Mechanical properties of tissue conditioners. Part I: theoretical considerations, behavioral characteristics, and tensile properties (Home reading)
J.A. McCarthy, J.B. Moser, (1978). *The Journal of Prosthetic Dentistry*, 40(1), 89-97
299. Mechanical properties of tissue conditioners. Part II: creep characteristics
J.A. McCarthy, J.B. Moser, (1978). *The Journal of Prosthetic Dentistry*, 40(3), 334-342
300. Clinical implications of resilient denture lining material research. Part II: gelation and flow properties of tissue conditioners
Graham, B. S., Jones, D. W., & Sutow, E. J. (1991). *The Journal of prosthetic dentistry*, 65(3), 413-418.
301. Effect of time lapse between mixing and loading on the flow of tissue conditioning materials (Home reading)
Ward, J. E. (1978). *The Journal of prosthetic dentistry*, 40(5), 499-508.

Special complete denture clinical cases

82. Immediate denture

302. An impression technique for immediate denture
Campagna, S. J. (1968). *The Journal of prosthetic dentistry*, 20(3), 196-203.
303. Minimizing problems in placement of immediate dentures (Home reading)
Demer, W. J. (1972). *The Journal of prosthetic dentistry*, 27(3), 275-284.

304. Immediate complete dentures: an evaluation
Heartwell, C.M., Sailsbury F.W., (1965). *Journal of Prosthetic Dentistry*, 15(4), 615-624.
305. Trimming the cast in the construction of immediate denture (Home reading)
Jerbi, F. C. (1966). *The Journal of prosthetic dentistry*, 16(6), 1047-1053.
306. Immediate dentures service (Home reading)
LaVere, A. M., & Krol, A. J. (1973). *The Journal of prosthetic dentistry*, 29(1), 10-15.
307. The effect of Immediate dentures on maxillomandibular relations
Passamonti, G., Kotrajarus, P., Gheewalla, R. K., Clark, R. E., & Maness, W. L. (1981). *The Journal of prosthetic dentistry*, 45(2), 122-126.

83. Complete overdenture

308. Alveolar bone loss in overdentures: a 5 – year study
Crum, R. J., & Rooney, G. E. (1978). *The Journal of prosthetic dentistry*, 40(6), 610-613.
309. Tooth supported complete dentures: an approach to preventive prosthodontics (Home reading)
Morrow, R. M., Feldmann, E. E., Rudd, K. D., & Trovillion, H. M. (1969). *The Journal of prosthetic dentistry*, 21(5), 513-522.
310. A five-year longitudinal study of patients treated with overdentures
Toolson, L. B., & Smith, D. E. (1983). *The Journal of prosthetic dentistry*, 49(6), 749-756.

84. Combination syndrome

311. The combination syndrome: a literature review
Palmqvist, S., & Carlsson, G. E. (2003). *The Journal of Prosthetic Dentistry*, 90(3), 270-275.
312. The maxillary complete denture opposing the mandibular bilateral distal-extension partial denture: treatment considerations
Saunders, T. R., Gillis, R. E., & Desjardins, R. P. (1979). *The Journal of Prosthetic Dentistry*, 41(2), 124-128.

Esthetics in complete dentures

85. General esthetic

313. Esthetics: a comparison of dentists' and patients' concepts
Brisman, A. S. (1980). *The Journal of the American Dental Association*, 100(3), 345-352.
314. Dental esthetics and the golden proportion
Levin, E. I. (1978). *The Journal of prosthetic dentistry*, 40(3), 244-252.
315. The principles of visual perception and their clinical application to denture esthetics (Home reading)
Lombardi, R. E. (1973). *The Journal of prosthetic dentistry*, 29(4), 358-382.

316. The face form as a guide for the selection of maxillary central incisors
Mavroskoufis, F., & Ritchie, G. M. (1980). *The Journal of prosthetic dentistry*, 43(5), 501-505.
317. Arranging artificial teeth according to anatomic landmarks
Roraff, A. R. (1977). *The Journal of prosthetic dentistry*, 38(2), 120-130.
318. The kinetics of anterior tooth display (Home reading)
Vig, R. G., & Brundo, G. C. (1978). *The Journal of prosthetic dentistry*, 39(5), 502-504.
319. A clinical evaluation of techniques to determine the combined width of the maxillary anterior teeth and the maxillary central incisor
Erber, A. (1982). *The Journal of prosthetic dentistry*, 48(1), 15-22

86. Denture esthetics

320. Introduction to dentogenic restorations
Frush, J. P., & Fisher, R. D. (1955). *The Journal of Prosthetic Dentistry*, 5(5), 586IN1591-590IN2595.
321. How dentogenics interprets the personal factor (Home reading)
Frush, J. P., & Fisher, R. D. (1956). *The Journal of Prosthetic Dentistry*, 6(4), 441IN1-449IN2.
322. How dentogenics interpret the sex factor (Home reading)
Frush, J. P., & Fisher, R. D. (1956). *The Journal of Prosthetic Dentistry*, 6(2), 160-172.
323. The age factor in dentogenics (Home reading)
Frush, J. P., & Fisher, R. D. (1957). *The Journal of Prosthetic Dentistry*, 7(1), 5-13.
324. The dynesthetic interpretation of the dentogenic concept
John P. Frush. *The Journal of Prosthetic Dentistry*, Volume 8, Number 4, 1958

Clinical situations and considerations

87. Speech

325. Functional contouring of the palatal vault for improving speech with complete dentures (Home reading)
Goyal, B. K., & Greenstein, P. (1982). *The Journal of prosthetic dentistry*, 48(6), 640-646.
326. An approach to prosthodontics through speech science part IV. physiology of speech (Home reading)
Martone, A. L., & Black, J. W. (1962). *The Journal of Prosthetic Dentistry*, 12(3), 409-419.
327. Utilizing speech to simplify a personalized denture service
Pound, E. (2006). *Journal of Prosthetic Dentistry*, 95(1), 1-9.
328. Phonetic considerations in denture prosthesis
Rothman, R. (1961). *The Journal of Prosthetic Dentistry*, 11(2), 214-223.

88. Gagging

- 329.** The gagging problem in prosthodontics treatment. Part I: description and causes
Conny, D. J., & Tedesco, L. A. (1983). *The Journal of prosthetic dentistry*, 49(5), 601-606.
- 330.** The gagging problem in prosthodontics treatment. Part II: patient management
Conny, D. J., & Tedesco, L. A. (1983). *The Journal of prosthetic dentistry*, 49(6), 757-761.

89. Troubleshooting

- 331.** Post-insertion denture problems
Morstad, A. T., & Petersen, A. D. (1968). *The Journal of Prosthetic Dentistry*, 19(2), 126-132.

Module 204

Occlusion

(R2)

Principles and technique of occlusal guidance**90. Articulator I**

- 332.** Limitation of semi-adjustable articulators. Part I: straight line articulators without setting for immediate side shift
Wachtel, H. C., & Curtis, D. A. (1987). *The Journal of prosthetic dentistry*, 58(4), 438-442.
- 333.** Limitation of semi-adjustable articulators. Part II: straight line articulators with provision for immediate side shift
Curtis, D. A., & Wachtel, H. C. (1987). *The Journal of prosthetic dentistry*, 58(5), 569-573.
- 334.** The significance of articulator capabilities part I. Adjustable vs. semi-adjustable articulators **(Home reading)**
Bellanti, N. D. (1973). *The Journal of prosthetic dentistry*, 29(3), 269-275.
- 335.** The significance of articulator capabilities part II. The prevalence of immediate side shift
Bellanti N.D., Martin K.R. (1979). *The Journal of prosthetic dentistry*, 42(3), 255-6.
- 336.** Articulator selection for restorative dentistry
Hobo, S., Shillingburg, H. T., & Whitsett, L. D. (1976). *The Journal of prosthetic dentistry*, 36(1), 35-43.
- 337.** Evolution of occlusion and occlusal instrument
Becker, C. M., & Kaiser, D. A. (1993). *Journal of Prosthodontics*, 2(1), 33-43.
- 338.** Classification of articulators **(Home reading)**
Rihani, A. (1980). *The Journal of prosthetic dentistry*, 43(3), 344-347.
- 339.** Evaluation of basic articulators and their concepts, part I. Basic concepts **(Home reading)**
Weinberg, L. A. (1963). *The Journal of prosthetic dentistry*, 13(4), 622-644.

340. Evaluation of basic articulators and their concepts, part II. Arbitrary, positional, semi-adjustable articulators.
Weinberg, L. A. (1963). *The Journal of Prosthetic Dentistry*, 13(4), 645-663.
341. Evaluation of basic articulators and their concepts, part III. Fully adjustable articulators
Weinberg, L. A. (1963). *The Journal of Prosthetic Dentistry*, 13(5), 873-888.
342. Evaluation of basic articulators and their concepts, part IV Fully adjustable articulators (Home reading)
Weinberg, L. A. (1963). *The Journal of Prosthetic Dentistry*, 13(6), 1038-1054.

91. Articulator II

343. Influence of tooth contact on the path of condylar movements (Home reading)
Alsawaf, M. M., & Garlapo, D. A. (1992). *The Journal of prosthetic dentistry*, 67(3), 394-400.
344. Condylar determinants of occlusal patterns: Part I. Statistical report on condylar path variations
Aull, A. E. (1965). *The Journal of prosthetic dentistry*, 15(5), 826-846.
345. Condylar movement patterns engraved in plastic block (Home reading)
Lundeen, H. C., & Wirth, C. G. (1973). *The Journal of prosthetic dentistry*, 30(6), 866-875.

92. Articulator III

346. Comparison of condylar control settings using three methods: a bench study
Pelletier, L. B., & Campbell, S. D. (1991). *The Journal of prosthetic dentistry*, 66(2), 193-200.
347. Effect of changes in articulator settings on generated occlusal tracings. Part I: condylar inclination and progressive side shift setting
Price, R. B., Kolling, J. N., & Clayton, J. A. (1991). *The Journal of prosthetic dentistry*, 65(2), 237-243.
348. Effect of changes in articulator settings on generated occlusal tracings. Part II: immediate side shift, intercondylar distance, and rear and top wall setting
Price, R. B., Kolling, J. N., & Clayton, J. A. (1991). *The Journal of prosthetic dentistry*, 65(3), 377-382.

93. Face bow

349. Variation in location of arbitrary and true hinge axis points
Lauritzen, A. G., & Bodner, G. H. (1961). *The Journal of Prosthetic Dentistry*, 11(2), 224-229.
350. A study of the arbitrary center and the kinematic center of rotation for face-bow mountings
Schallhorn, R. G. (1957). *The Journal of Prosthetic Dentistry*, 7(2), 162-169.
351. Arbitrary mandibular hinge axis locations (Home reading)
Simpson et al, *The Journal of Prosthetic Dentistry*, Volume 51, Number 6, 1984
Simpson, J., Hesby, R., Pfeifer, D., & Pelleu, G. (1984). *The Journal of prosthetic dentistry*, 51(6), 819-822.

352. Accuracy of an earpiece face-bow (Home reading)
Palik, J. F., Nelson, D. R., & White, J. T. (1985). *The Journal of prosthetic dentistry*, 53(6), 800-804.
353. The accuracy of an ear face-bow
Teteruck, W. R., & Lundeen, H. C. (1966). *The Journal of prosthetic dentistry*, 16(6), 1039-1046.

94. Graphic recording / CADIAX

354. An in vitro evaluation of the reliability and validity of an electronic pantograph by testing with five different articulators
Chang, W. S., Romberg, E., Driscoll, C. F., & Tabacco, M. J. (2004). *The Journal of prosthetic dentistry*, 92(1), 83-89.

95. Centric relation (CR)

355. The condylar position in sickness and in health (Home reading)
Celenza FV. (1985). *Int J Periodontics Restorative Dent*.5(2):38-51.
356. A classification system for occlusions that relates maximal intercuspation to the position and condition of the temporomandibular joints
Dawson PE. (1996). *J Prosthet Dent*. 75(1):60-6
357. Reproducibility of mandibular centricity in three dimensions (Home reading)
Hobo and Iwata (1985). *The Journal of prosthetic dentistry*, 53 (5), 649-654.
358. Centric-relation recording techniques-a comparative investigation
Kantor ME, Silverman SI, Garfinkel L. (1973). *J Prosthet Dent*. 30(4 Pt 2):604-6.
359. Accuracy of recording horizontal condylar inclination and Bennett angle with the Cadiax compact
Celar AG, Tamaki K. (2002). *J Oral Rehabil*. 29(11):1076-81.
360. Comparison of recordings obtained with computerized axiography and mechanical pantography at 2 time intervals (Home reading)
Petrie CS, Woolsey GD, Williams K. (2003). *J Prosthodont*. 12(2):102-10.
361. Comparative tests of arbitrary and kinematic transverse horizontal axis recordings of mandibular movements. (Home reading)
Bernhardt O, Küppers N, Rosin M, Meyer G. (2003). *J Prosthet Dent*. 89(2):175-9.
362. A comparison of the equalization of pressure by means of the central bearing point and wax check bites. (Home reading)
Trapozzano VR. (1949). *J Am Dent Assoc*. 38(5):586-91
363. Overview of articulation materials and methods for the prosthodontic patient (Home reading)
Dixon DL. (2000). *J Prosthet Dent*. 83(2):235-47
364. Centric relation records-historical review
Myers ML. (1982). *J Prosthet Dent*. 47(2):141-5

96. Mandibular transverse hinge access

365. The transverse hinge axis: real or imaginary (Home reading)
Weinberg, L. A. (1959). *The Journal of Prosthetic Dentistry*, 9(5), 775-787.

366. Location of the terminal hinge axis and its effect on the second molar cusp position
Gordon, S. R., Stoffer, W. M., & Connor, S. A. (1984). *The Journal of prosthetic dentistry*, 52(1), 99-105.
367. An evaluation of the face-bow mounting
Weinberg, L. A. (1961). *The Journal of Prosthetic Dentistry*, 11(1), 32-42.
97. Posterior determinant of occlusion
368. An evaluation of the mandibular border movements: their character and significance
Lundeen, H. C., Shryock, E. F., & Gibbs, C. H. (1978). *The Journal of prosthetic dentistry*, 40(4), 442-452.
369. Condylar determinants in a patient population: electronic pantograph assessment
Payne, J. A. (1997). *Journal of oral rehabilitation*, 24(2), 157-163.

Module 207

Orthodontic-prosthodontics

(R2)

Advanced topics

98. Miscellaneous

370. Enhancing restorative, periodontal, and esthetic outcomes through orthodontic extrusion
Fakhry, A. (2007). *European Journal of Esthetic Dentistry*, 2(3).
371. Esthetic correction of anterior dental malalignment: conventional versus instant (restorative) orthodontics
Spear, F. M. (2004). *Journal of Esthetic and Restorative Dentistry*, 16(3), 149-162.

99. Cephalometric analysis

372. An analysis of the relationship between mandibular alveolar bone loss and a low Frankfort-mandibular plane angle (Home reading)
Unger, J. W., Ellinger, C. W., & Gunsolley, J. C. (1991). *The Journal of prosthetic dentistry*, 66(4), 513-516.
373. A cephalometric technique for prosthodontics diagnosis and treatment planning
Chaconas, S. J., & Gonidis, D. (1986). *The Journal of prosthetic dentistry*, 56(5), 567-574.
374. Cephalometrically predicted occlusal plane: implications in removable prosthodontic
Karkazis, H. C., & Polyzois, G. L. (1991). *The Journal of prosthetic dentistry*, 65(2), 258-264.
375. Significance of the Frankfort-mandibular plane angle to prosthodontics
DiPietro GJ, Moergeli JR. (1976). *J Prosthet Dent*. 36(6):624-35
376. Racial norms: esthetic and prosthodontic implications
Johnson PF. (1992). *J Prosthet Dent*. 67(4):502-8.
377. Physiographic cinematography studies of a prosthodontic patient: an initial report (Home reading)
Alexander, LM. (1964). *The Journal of Prosthetic Dentistry*, Volume 14, Issue 6
378. Clinical, cephalometric, and densitometric study of reduction of residual ridges
Atwood DA, Coy WA. (1971). *J Prosthet Dent*. 26(3):280-95

Module 206	Implant Prosthodontics	(R2)
Introduction		
100. Implant design, component, and systems		
379. A 5- year follow- up comparative analysis of the efficacy of various osseointegrated dental implant systems: a systematic review of randomized controlled clinical trails Esposito, M., Grusovin, M. G., Coulthard, P., Thomsen, P., & Worthington, H. V. (2005). <i>International Journal of Oral & Maxillofacial Implants</i>, 20(4). 380. Systematic assessment of clinical outcomes in bone-level and tissue-level endosseous dental implants Vouros, I. D., Kalpidis, C. D., Horvath, A., Petrie, A., & Donos, N. (2012). <i>International Journal of Oral & Maxillofacial Implants</i>, 27(6).		
101. Implant diameter and size		
381. Effect of implant size and shape on implant success rates: a literature review Lee, J. H., Frias, V., Lee, K. W., & Wright, R. F. (2005). <i>The Journal of prosthetic dentistry</i>, 94(4), 377-381. 382. Influence of implant length and diameter on stress distribution: a finite element analysis (Home reading) Himmlova, L., Dostálová, T. J., Kácvovský, A., & Konvičková, S. (2004). <i>The Journal of prosthetic dentistry</i>, 91(1), 20-25. 383. Influence of diameter and length of implant on early dental implant failure Olate, S., Lyrio, M. C. N., de Moraes, M., Mazzonetto, R., & Moreira, R. W. F. (2010). <i>Journal of Oral and Maxillofacial Surgery</i>, 68(2), 414-419. 384. The influence of implant diameter and length on stress distribution of osseointegrated implants related to crestal bone geometry: a three-dimensional finite element analysis Baggi, L., Cappelloni, I., Di Girolamo, M., Maceri, F., & Vairo, G. (2008). <i>The Journal of prosthetic dentistry</i>, 100(6), 422-431.		
102. Screw- vs. cement-retained implant-prosthesis		
385. Marginal discrepancy of screw retained and cemented metal-ceramic crowns on implant abutments Keith, S. E., Miller, B. H., Woody, R. D., & Higginbottom, F. L. (1999). <i>International Journal of Oral and Maxillofacial Implants</i>, 14(3), 369-378. 386. Complications associated with excess cement around crowns on osseointegrated implants: a clinical report Pauletto et al, <i>The international Journal of oral & maxillofacial implants</i>, Volume 14, Number 6, 1999 387. Long term outcome of cemented versus screw-retained implant-supported partial restorations (Home reading) Nissan et al, <i>The international Journal of oral & maxillofacial implants</i>, Volume 26, Number 5, 2011		

103. Implant treatment planning I

- 388.** Consensus conference panel report: crown-height space guidelines for implant dentistry-Part 1
Misch, C. E., Goodacre, C. J., Finley, J. M., Misch, C. M., Marinbach, M., Dabrowsky, T., ... & Cronin Jr, R. J. (2005). *Implant dentistry*, 14(4), 312-321.
- 389.** Consensus conference panel report: crown-height space guidelines for implant dentistry-Part 2 (**Home reading**)
Misch, C. E., Goodacre, C. J., Finley, J. M., Misch, C. M., Marinbach, M., Dabrowsky, T., ... & Cronin Jr, R. J. (2006). *Implant dentistry*, 15(2), 113-121.
- 390.** Evidence-based criteria for differential treatment planning of implant restorations for the mandibular edentulous patient
Sadowsky, S. J., & Hansen, P. W. (2014). *Journal of Prosthodontics*, 23(2), 104-111.
- 391.** Evidence - based criteria for differential treatment planning of implant restorations for the maxillary edentulous patient
Sadowsky, S. J., Fitzpatrick, B., & Curtis, D. A. (2015). *Journal of Prosthodontics*, 24(6), 433-446.
- 392.** Effect of implant-supported or retained dentures on masticatory performance: a systematic review (**Home reading**)
Fueki, K., Kimoto, K., Ogawa, T., & Garrett, N. R. (2007). *The Journal of prosthetic dentistry*, 98(6), 470-477.
- 393.** A meta-analysis of implants in partial edentulism
Lindh, T., Gunne, J., Tillberg, A., & Molin, M. (1998). *Clinical oral implants research*, 9(2), 80-90.
- 394.** Factors that affect individual tooth prognosis and choices in contemporary treatment planning (**Home reading**)
Mordohai, N., Reshad, M., Jivraj, S., & Chee, W. (2007). *British Dental Journal*, 202(2), 63-72.

104. Implant treatment planning II

- 395.** Classification and management of restorative space in edentulous implant overdenture patients
Ahuja, S., & Cagna, D. R. (2011). *The Journal of prosthetic dentistry*, 105(5), 332-337.
- 396.** Treatment of maxillary jaws with dental implants: guidelines for treatment
Drago, C., & Carpentieri, J. (2011). *Journal of Prosthodontics*, 20(5), 336-347.
- 397.** Standard of care for the edentulous mandible: a systematic review
Fitzpatrick, B. (2006). *The Journal of prosthetic dentistry*, 95(1), 71-78.
- 398.** Implant-retained maxillary overdentures
Eckert, S.E., & Carr, A. B. (2004). *Dental Clinics*, 48(3), 585-601.

105. Implant position and crestal bone remodeling

399. Apical-coronal implant position: recent surgical proposals. Technical note
Davarpanah, M., Martinez, H., & Tecucianu, J. F. (2000). *International Journal of Oral & Maxillofacial Implants*, 15(6).
400. Initial implant position determines the magnitude of crestal bone remodeling
Hartman, G. A., & Cochran, D. L. (2004). *Journal of periodontology*, 75(4), 572-577.

End of R2

Resident level three (R3)**Module 304****Occlusion****(R3)****Implant occlusion****106 Principles of implant occlusion**

401. Occlusion in implant dentistry. A review of the literature of prosthetic determinants and current concepts
Gross, M. D. (2008). *Australian dental journal*, 53(s1).
402. Occlusal considerations in implant therapy: clinical guidelines with biomechanical rationale
Kim, Y., Oh, T. J., Misch, C. E., & Wang, H. L. (2005). *Clinical oral implants research*, 16(1), 26-35.
403. Guidelines for occlusion strategy in implant-borne prostheses. A review **(Home reading)**
Rilo, B., Silva, J. L., Mora, M. J., & Santana, U. (2008). *International dental journal*, 58(3), 139-145.
404. Implant occlusion: biomechanical considerations for implant-supported prostheses
Chen, Y. Y., Kuan, C. L., & Wang, Y. B. (2008). *The Journal of dental science*, 3(2), 65-74.
405. Dental occlusion: modern concepts and their application in implant prosthodontics
Carlsson, G. E. (2009). *Odontology*, 97(1), 8-17.
406. Dental implants in patients with bruxing habits
Lobbezoo, F., Brouwers, J. E. I. G., Cune, M. S., & Naeije, M. (2006). *Journal of oral rehabilitation*, 33(2), 152-159.

407. Occlusal stability in implant prosthodontics-clinical factors to consider before implant placement (**Home reading**)
Design, P. (2001). Journal of Canadian Dental Association, 67(9), 522-6.
408. The influence of functional forces on the biomechanics of implant-supported prostheses-a review (**Home reading**)
Şahin, S., Çehreli, M. C., & Yalçın, E. (2002). Journal of dentistry, 30(7), 271-282.
409. A Positive correlation between occlusal trauma and peri-implant bone loss: literature support (**Home reading**)
Misch, C. E., Suzuki, J. B., Misch-Dietsh, F. M., & Bidez, M. W. (2005). Implant dentistry, 14(2), 108-116.
410. Evidence-based considerations for removable prosthodontic and dental implant occlusion: a literature review (**Home reading**)
Taylor, T. D., Wiens, J., & Carr, A. (2005). The Journal of prosthetic dentistry, 94(6), 555-560.
411. Rationale for choices of occlusal schemes for complete dentures supported by implants
Nikolopoulou, F., & Ktena-Agapitou, P. (2006). Journal of Oral Implantology, 32(4), 200-203.

Occlusion scheme

107. Anterior guidance

412. Anterior guidance-The key to successful occlusal Treatment
Broderson, S. P. (1978). The Journal of prosthetic dentistry, 39(4), 396-400.
413. Group function or canine protection
Jemt, T., Lundquist, S., & Hedegard, B. (1982). The Journal of prosthetic dentistry, 48(6), 719-724.
414. Influence of group function & canine guidance on electromyographic activity of elevator muscles
Manns, A., Chan, C., & Miralles, R. (1987). The Journal of prosthetic dentistry, 57(4), 494-501.
415. Anterior guidance: Its effect on electromyographic activity of the temporal & masseter muscles
Williamson, E. H., & Lundquist, D. O. (1983). The Journal of Prosthetic Dentistry, 49(6), 816-823.

108. Anterior guidance vs. posterior determinants

416. Effect of canine guidance on the working condylar path
Hobo, S., & Takayama, H. (1989). International Journal of Prosthodontics, 2(1).
417. Reevaluation of Hanau's laws of articulation and the Hanau Quint (**Home reading**)
Levin, B. (1978). The Journal of prosthetic dentistry, 39(3), 254-258.
418. Evaluation of the relationship between anterior and posterior functionally disclusive angles. Part II: study of a population
Pelletier, L. B., & Campbell, S. D. (1990). The Journal of prosthetic dentistry, 63(5), 536-540.

109. Functionally generated path technique

- 419.** The generated path technique in reconstruction dentistry. Part I: complete dentures (Home reading)
Meyer, F. S. (1959). *The Journal of Prosthetic Dentistry*, 9(3), 354-366.
- 420.** The generated path technique in reconstruction dentistry. Part II: fixed partial denture
Meyer, F. S. (1959). *The Journal of prosthetic dentistry*, 9(3), 432-440.

110. Eccentric recordings

- 421.** A comparison of lateral interocclusal records to pantographic tracings
Curtis, D. A. (1989). *The Journal of prosthetic dentistry*, 62(1), 23-27.
- 422.** Comparison of condylar control settings using three methods: a bench study
Pelletier, L. B., & Campbell, S. D. (1991). *The Journal of prosthetic dentistry*, 66(2), 193-200.
- 423.** Comparison of articulator settings obtained by using an electronic pantograph and lateral interocclusal recordings
Price, R. B., & Bannerman, R. A. (1988). *The Journal of prosthetic dentistry*, 60(2), 159-164.

111. Occlusal measurement devices

- 424.** Reliability, validity, and utility of various occlusal measurement methods and techniques
Baba, K., Tsukiyama, Y., & Clark, G. T. (2000). *The Journal of prosthetic dentistry*, 83(1), 83-89.
- 425.** Computer-aided evaluation of occlusal load in complete dentures
Boening, K. W., & Walter, M. H. (1992). *The Journal of prosthetic dentistry*, 67(3), 339-344.
- 426.** New method for analyzing complete denture occlusion using the center of force concept: a clinical report
Olivieri, F., Kang, K. H., Hirayama, H., & Maness, W. L. (1998). *Journal of Prosthetic Dentistry*, 80(5), 519-523.

Module 307

Orthodontic-prosthodontics

(R3)

Miscellaneous**112. Miscellaneous**

- 427.** Enhancing restorative, periodontal, and esthetic outcomes through orthodontic extrusion
Fakhry A. (2007). *Eur J Esthet Dent*. 2(3):312-20
- 428.** The esthetic correction of anterior dental mal-alignment conventional vs. instant (restorative) orthodontics
pear FM. (2004). *J Calif Dent Assoc*. 32(2):133-41

Module 306	Implant prosthodontics	(R3)
Biomaterials		
113. Implant surface		
429. On implant surfaces: a review of current knowledge and opinions Wennerberg, A., & Albrektsson, T. (2010). <i>International Journal of Oral & Maxillofacial Implants</i>, 25(1).		
Clinical perspectives		
114. Implants in growing patients		
430. Adult growth, aging and the single-tooth implant Oesterle, L. J., & Cronin Jr, R. J. (2000). <i>International Journal of Oral & Maxillofacial Implants</i>, 15(2). 431. Implants in adolescent: a literature review and case report Westwood, R. M., & Duncan, J. M. (1996). <i>International Journal of Oral & Maxillofacial Implants</i>, 11(6). 432. Mandibular implants and the growing patient (Home reading) Cronin Jr, R. J., Oesterle, L. J., & Ranly, D. M. (1994). <i>International Journal of Oral & Maxillofacial Implants</i>, 9(1). 433. Maxillary implants and the growing patient (Home reading) Oesterle, L. J., Cronin, R. J., & Ranly, D. M. (1994). <i>Implant Dentistry</i>, 3(2), 115.		
115. Implant impression		
434. Effects of implant system, impression technique, and impression material on accuracy of the working cast Wegner, K., Weskott, K., Zengineli, M., Rehmann, P., & Woestmann, B. (2013). <i>International Journal of Oral & Maxillofacial Implants</i>, 28(4). 435. Effects of implant angulation, impression material and variation in arch curvature width on implant transfer model accuracy (Home reading) Akalin, Z. F., Ozkan, Y. K., & Ekerim, A. (2013). <i>International Journal of Oral & Maxillofacial Implants</i>, 28(1). 436. A novel open tray impression technique for fabrication of a provisional prosthesis on immediate load implants in a completely edentulous arch Kaneko, T., Yamagishi, K., Horie, N., & Shimoyama, T. (2013). <i>International Journal of Oral & Maxillofacial Implants</i>, 28(2).		

116. Implant mucosa interface

- 437.** Biological width around one and two-piece titanium implants
(A histometric evaluation of unloaded non-submerged and submerged implant in the canine mandible)
Hermann, J., Cochran, D., Buser, D., Schenk, R., Schoolfield, J. (2001). *Clinical oral implants research*, 12(6), 559-571.
- 438.** The interface between the mucosa and the implant
Lindhe, J., & Berglundh, T. (1998). *Periodontology 2000*, 17(1), 47-54.
- 439.** The effect of material characteristics of surface topography and of implant components and connections on soft tissue integration; a literature review (Home reading)
Rompen, E., Domken, O., Degidi, M., Farias Pontes, A. E., & Piattelli, A. (2006). *Clinical oral implants research*, 17(S2), 55-67.
- 440.** The soft tissue response to osseointegrated dental implants
Weber, H. P., & Cochran, D. L. (1998). *The Journal of prosthetic dentistry*, 79(1), 79-89.
- 441.** Wear at the titanium zirconia implant abutment interface: a pilot study (Home reading)
Klotz, M. W., Taylor, T. D., & Goldberg, A. J. (2011). *The International journal of oral & maxillofacial implants*, 26(5), 970-975.

117. Biomechanics

- 442.** Distal cantilevers and implant dentistry
Romanos, G. E., Gupta, B., & Eckert, S. E. (2012). *International Journal of Oral & Maxillofacial Implants*, 27(5).
- 443.** Magnitude and distribution of occlusal forces on oral implants supporting fixed prosthesis: an in vivo study (Home reading)
Duyck, J., Oosterwyck, H., Sloten, J., Cooman, M., Puers, R., & Naert, I. (2000). *Clinical oral implants research*, 11(5), 465-475.
- 444.** Evaluation of strain at the terminal abutment site of a fixed mandibular implant prosthesis during cantilever loading
Rodriguez, A. M., Aquilino, S. A., Lund, P. S., Ryther, J. S., & Southard, T. E. (1994). *Implant Dentistry*, 3(1), 56.
- 445.** Cantilever and implant biomechanics: a review of the literature- Part I
Rodriguez, A. M., Aquilino, S. A., & Lund, P. S. (1994). *Journal of Prosthodontics*, 3(1), 41-46.
- 446.** Cantilever and implant biomechanics: a review of the literature- Part 2
Rodriguez, A. M., Aquilino, S. A., & Lund, P. S. (1994). *Journal of Prosthodontics*, 3(2), 114-118.
- 447.** Therapeutic biomechanics concepts and clinical procedures to reduce implant loading part I: therapeutic differential loading
Weinberg, L. A. (2001). *Journal of Oral Implantology*, 27(6), 293-301.
- 448.** Therapeutic biomechanics concepts and clinical procedures to reduce implant loading part II: therapeutic differential loading (Home reading)
Weinberg, L. A. (2001). *Journal of Oral Implantology*, 27(6), 302-310.

449. Occlusal loading in implant dentistry
Isidor, F., (1999). *Proceedings of the 3rd European Workshop on Periodontology – Implant Dentistry*, 358–375. Berlin: Quintessence Books
450. Load factor control for implants in the posterior partially edentulous segment
Rangert, B. R., Sullivan, R. M., & Jemt, T. M. (1997). *International Journal of Oral & Maxillofacial Implants*, 12(3).
451. Tilting of posterior mandibular and maxillary implants for improved prosthesis support (Home reading)
Krekmanov, L., Kahn, M., Rangert, B., & Lindström, H. (2000). *International Journal of Oral & Maxillofacial Implants*, 15(3).

118. Passive fit

452. Accuracy of implant impression techniques
Assif, D., Marshak, B., & Schmidt, A. (1996). *International Journal of Oral & Maxillofacial Implants*, 11(2).
453. Accuracy of two impression techniques with angulated implants
Conrad, H. J., Pesun, I. J., DeLong, R., & Hodges, J. S. (2007). *The Journal of prosthetic dentistry*, 97(6), 349-356.
454. The accuracy of three implant impression techniques: a three-dimensional analysis
Phillips, K., et. al. (1994). *The International Journal of Oral Maxillofacial Implants*. 9(5), 533-540.
455. Fit of implant frameworks fabricated by different techniques
Riedy, S. J., Lang, B. R., & Lang, B. E. (1997). *The Journal of prosthetic dentistry*, 78(6), 596-604.
456. Strategies to achieve fit in implant prosthodontics: a review of the literature (Home reading)
Wee, A. G., Aquilino, S. A., & Schneider, R. L. (1999). *International Journal of Prosthodontics*, 12(2).

119. Complications

457. Clinical complications with implants and implant prostheses
Goodacre, C. J., Bernal, G., Rungcharassaeng, K., & Kan, J. Y. (2003). *The Journal of prosthetic dentistry*, 90(2), 121-132.
458. Implant surgery complications: etiology and treatment (Home reading)
Misch, K., & Wang, H. L. (2008). *Implant dentistry*, 17(2), 159-168.
459. In vivo measurements of precision of fit involving implant-supported prosthesis in the edentulous jaw (Home reading)
Jemt, T. (1996). *International Journal of Oral & Maxillofacial Implants*, 11(2).
460. Prosthesis misfit and marginal bone loss in edentulous implant patients
Jemt, T., & Book, K. (1996). *International Journal of Oral & Maxillofacial Implants*, 11(5).
461. Clinical methods for evaluating implant framework fit
Kan, JY, Rungcharassaeng, K, Bohsali, K. Goodacre, CJ. (1999). *The Journal of prosthetic dentistry*, 81(1), 7-13.

120. Immediate loading and placement

- 462.** Clinical and esthetic outcomes of implants placed in post-extraction sites
Chen, S. T., & Buser, D. (2009). *International journal of oral & maxillofacial implants*, 24.
- 463.** Consensus statements and recommended clinical procedures regarding loading protocols
Weber H., Morton D., Gallucci G., Rocuzzo M., Cordaro L., Grutter L. (2009). *The International Journal of Oral Maxillofacial Implants*, 24 Suppl:180-3.
- 464.** Immediate restoration and loading of dental implants: clinical considerations and protocols
Morton, D., Jaffin, R., & Weber, H. P. (2004). *International Journal of Oral & Maxillofacial Implants*, 19(7).

121. Mini implants

- 465.** "Mini implants": Do we have data?
Estafanous, E. et. al. (2011). *The international journal for oral & maxillofacial implants*, 26

122. Short and zygomatic implants

- 466.** Fixed restorative options for the edentulous maxilla
Leopardi A, (2008). *Functional Esthetics & Restorative Dentistry*.2(3), 44-56.
- 467.** Zygoma fixture in the management of advanced atrophy of the maxilla: technique and long-term results
Brånemark, P. I., Gröndahl, K., Öhrnell, L. O., Nilsson, P., Petruson, B., Svensson, B., ... & Nannmark, U. (2004). *Scandinavian journal of plastic and reconstructive surgery and hand surgery*, 38(2), 70-85.

123. Tooth intrusion connected to implant

- 468.** Intrusion of teeth in the combination implant to natural tooth fixed partial denture: a review of the theories
Pesun, I. J. (1997). *Journal of Prosthodontics*, 6(4), 268-277.
- 469.** Freestanding and tooth-implant connected prostheses in the treatment of partially edentulous patients. Part I: an up to 15 years of clinical evaluation **(Home reading)**
Naert, I., Duyck, J., Hosny, M., Van Steenberghe, D. (2001). *Clinical oral implants research*, 12(3), 237-244.
- 470.** Freestanding and tooth implant connected prostheses in the treatment of partially edentulous patients. Part II: An up to 15 years of radiographic evaluation
Naert, I., Duyck, J., Hosny, M., Quirynen, M., Van Steenberghe, D. (2001). *Clinical oral implants research*, 12(3):245-251
- 471.** Tooth implant supported fixed prostheses: a retrospective multicenter study
Lindh, T., Dahlgren, S., Gunnarsson, K., Josefsson, T., Nilson, H., Wilhelmsson, P., & Gunne, J. (2001). *International Journal of Prosthodontics*, 14(4).

124. Implant-supported overdentures

- 472.** Long term effect of overdenture bar design on peri implant tissues
Lehmann, KM. et. al. (2013). *The International journal of oral & maxillofacial implants*, 28(4), 1126-1131.
- 473.** Early loaded one stage implants retaining mandibular overdentures by two different mechanisms: 5-year results
Akça, K., et. al. (2013). *International Journal of Oral & Maxillofacial Implants*, 28(3).
- 474.** Clinical performance and peri implant parameter of 132 implants supporting locator retained overdentures: a case series of 33 patients (**Home reading**)
Troeltzsch, M., Troeltzsch, V., Brodine, A. H., Frankenberger, R., Messlinger, K., & Troeltzsch, M. (2013). *International Journal of Oral & Maxillofacial Implants*, 28(4).
- 475.** Retention characteristics of different attachment systems of mandibular overdentures retained by two or three implants
Uludag, B., & Polat, S. (2012). *International Journal of Oral & Maxillofacial Implants*, 27(6).

125. All-on-four

- 476.** Correction of misfit in a maxillary immediate metal resin implant fixed complete prosthesis placed with flapless surgery on four implants
Yilmaz, B., Suarez, C., & McGlumphy, E. (2011). *International Journal of Oral & Maxillofacial Implants*, 26(5).
- 477.** All-on-4 concept implantation for mandibular rehabilitation of an edentulous patient with Parkinson disease: a clinical report
Liu, F. C., Su, W. C., You, C. H., & Wu, A. Y. J. (2015). *The Journal of prosthetic dentistry*, 114(6), 745-750.

126. Bisphosphonates and antibiotic prophylaxis

- 478.** Does antibiotic prophylaxis at implant placement decrease early implant failures? A Cochrane systematic review
Esposito, M., Grusovin, M. G., Loli, V., Coulthard, P., & Worthington, H. V. (2010). *European journal of oral implantology*, 3(2).
- 479.** What impact do systemically administrated bisphosphonates have on oral implant therapy? A systematic review
Madrid, C., & Sanz, M. (2009). *Clinical oral implants research*, 20(s4), 87-95.

127. Peri-implant soft tissue and papilla

- 480.** Tissue alterations at implant supported single tooth replacements: a 1-year prospective clinical study
Cardaropoli, G., Lekholm, U., & Wennström, J. L. (2006). *Clinical Oral Implants Research*, 17(2), 165-171.
- 481.** Clinical and radiographic evaluation of the papilla level adjacent to single tooth dental implant. A retrospective study in the maxillary anterior region (**Home reading**)
Choquet, V., Hermans, M., Adriaenssens, P., Daelemans, P., Tarnow, D. P., & Malevez, C. (2001). *Journal of periodontology*, 72(10), 1364-1371.

482. A systematic review of marginal soft tissue at implants subjected to immediate loading or immediate restoration
Glauser, R., Zembic, A., & Hämmerle, C. H. (2006). *Clinical oral implants research*, 17(S2), 82-92.
483. Correlation of papilla to crestal bone levels around single tooth implants in immediate or delayed crown protocols
Ryser, M., Block, M., & Mercante, D., (2005). *Journal of oral and maxillofacial surgery*, 63(8), 1184-1195.
484. Gingival recession around dental implants: a 1-year longitudinal prospective study (Home reading)
Small, P. N., & Tarnow, D. P. (2000). *International Journal of Oral & Maxillofacial Implants*, 15(4).
485. Vertical distance from the crest of bone to the height of interproximal dental papilla between adjacent implants
Tarnow, D., et. al. (2003). *Journal of periodontology*, 74(12), 1785-1788.
486. Peri-implant papilla reconstruction: realities and limitations (Home reading)
Pradeep, A. R., & Karthikeyan, B. V. (2006). *Journal of periodontology*, 77(3), 534-544.
487. The effect of inter-implant distance on the height of inter-implant bone crest
Tarnow, D., Cho, S. C., & Wallace, S. S. (2000). *Journal of periodontology*, 71(4), 546-549.

128 Implant maintenance

488. Implant maintenance
Humphrey, S. (2006). *Implant maintenance. Dental Clinics*, 50(3), 463-478.
489. Statements from the Estepona Consensus Meeting on Peri-implantitis, February 2–4, 2012 (Home reading)
Albrektsson, T., Buser, D., Chen, S. T., Cochran, D., DeBruyn, H., Jemt, T., ... & Taylor, T. D. (2012). *Clinical implant dentistry and related research*, 14(6), 781-782.

129 Miscellaneous

490. Publication bias in five dental implant journals: an observation from 2005 to 2009 (Home reading)
Chia-Chun Yuan, J., Shyamsunder, N., Adelino Ricardo Barão, V., Lee, D. J., & Sukotjo, C. (2011). *International Journal of Oral & Maxillofacial Implants*, 26(5).
491. Fracture resistance of crowns cemented on titanium and zirconia implant abutments: a comparison of monolithic versus manually veneered all ceramic systems
Martínez-Rus, F., Ferreiroa, A., Bartolomé, J. F., & Pradies, G. (2012). *International Journal of Oral & Maxillofacial Implants*, 27(6).

Module 308	Dental Esthetics	(R3)
Clinical perspectives		
130 Treatment planning		
492. A multidisciplinary approach to esthetic dentistry Spear, F. M., & Kokich, V. G. (2007). <i>Dental Clinics of North America</i>, 51(2), 487-505. 493. Prosthodontics: Achieving quality esthetic dentistry and integrated comprehensive care (Home reading) Malament, K. A. (2000). <i>The Journal of the American Dental Association</i>, 131(12), 1742-1749. 494. An interdisciplinary approach for improved esthetic results in the anterior maxilla Claman, L., Alfaro, M. A., & Mercado, A. (2003). <i>The Journal of prosthetic dentistry</i>, 89(1), 1-5. 495. Clinically based diagnostic wax-up for optimal esthetics: the diagnostic mock-up. (Home reading) Simon, H., & Magne, P. (2008). <i>Journal of the California Dental Association</i>, 36(5), 355-362. 496. Esthetics alumina and zirconia rehabilitation: a team approach to treatment planning and material selection. Hegenbarth, E. A., & Holst, S. (2007). <i>European Journal of Esthetic Dentistry</i>, 2(4). 497. The metal-free approach to restorative treatment planning. (Home reading) Cortellini, D., Valenti, M., & Canale, A. (2006). <i>European Journal of Esthetic Dentistry</i>, 1(3). 498. The science of communicating the art of esthetic dentistry. Part II: Diagnostic provisional restorations Derbabian, K. et. al. (2000). <i>Journal of Esthetic and Restorative Dentistry</i>, 12(5), 238-247.		
131 Laminate veneers		
499. Porcelain laminate veneers: reasons for 25 years of success Calamia, J. R., & Calamia, C. S. (2007). <i>Dental clinics of north America</i>, 51(2), 399-417. 500. Porcelain laminate veneers: minimal tooth preparation by design Gürel, G. (2007). <i>Dental Clinics of North America</i>, 51(2), 419-431. 501. A clinical longitudinal study 323 porcelain laminate veneers. Period of study from 3 - 11 years Granell-Ruiz, M., Fons-Font, A., Labaig-Rueda, C., & Martínez-González, A. (2010). <i>population</i>, 3, 12. 502. Clinical evaluation of 546 tetracycline-stained teeth treated with porcelain laminate veneers (Home reading) Chen, J. H., Shi, C. X., Wang, M., Zhao, S. J., & Wang, H. (2005). <i>Journal of dentistry</i>, 33(1), 3-8.		

- 503.** Porcelain veneers: a review of the literature (**Home reading**)
Peumans, M., Van Meerbeek, B., Lambrechts, P., & Vanherle, G. (2000). *Journal of dentistry*, 28(3), 163-177.

132 Cements and adhesives

- 504.** New Developments in Dental Adhesion (**Home reading**)
Perdigao, J. (2007). *Dental Clinics of North America*, 51(2), 333-357.
- 505.** Cements for Use in Esthetic Dentistry
Pegoraro, T. A., da Silva, N. R., & Carvalho, R. M. (2007). *Dental Clinics of North America*, 51(2), 453-471.

133 Perspectives of anterior dental esthetics

- 506.** Anterior dental aesthetics: facial perspective
Ahmad, I. (2005). *British dental journal*, 199(1), 15-21.
- 507.** Anterior dental aesthetics: dentofacial perspective
Ahmad, I. (2005). *British dental journal*, 199(2), 81-88.
- 508.** Anterior dental aesthetics: dental perspective
Ahmad, I. (2005). *British dental journal*, 199(3), 135-141.
- 509.** Anterior dental aesthetics: gingival perspective
Ahmad, I. (2005). *British dental journal*, 199(4), 195-202.

Esthetic biomaterial

134 Biomechanical properties

- 510.** Fracture load and mode of failure of ceramic veneers with different preparations
Castelnuovo, J., Tjan, A. H., Phillips, K., Nicholls, J. I., Kois, J. C., of Washington, U., & of Dentistry, S. (2000). *The Journal of prosthetic dentistry*, 83(2), 171-180.
- 511.** Fracture resistance and deflection of pulpless anterior teeth restored with composite or porcelain veneers (**Home reading**)
D'arcangelo, C., De Angelis, F., Vadini, M., D'amarzio, M., & Caputi, S. (2010). *Journal of Endodontics*, 36(1), 153-156.
- 512.** Unstable cracking (chipping) of veneering porcelain on all-ceramic dental crowns and fixed partial dentures
Swain, M. V. (2009). *Acta Biomaterialia*, 5(5), 1668-1677.

135 Shade and color

- 513.** Clinical steps to predictable color management in aesthetic restorative dentistry
Chu, S. J. (2007). *Dental Clinics of North America*, 51(2), 473-485.
- 514.** Relative translucency of six all-ceramic systems. Part I: core materials
Heffernan, M. J., Aquilino, S. A., Diaz-Arnold, A. M., Haselton, D. R., Stanford, C. M., & Vargas, M. A. (2002). *The Journal of prosthetic dentistry*, 88(1), 4-9.

515. Relative translucency of six all-ceramic systems. Part II: core and veneer materials (Home reading)
Heffernan, M. J., Aquilino, S. A., Diaz-Arnold, A. M., Haselton, D. R., Stanford, C. M., & Vargas, M. A. (2002). *The journal of prosthetic dentistry*, 88(1), 10-15.
516. Spectrophotometric evaluation of the optical influence of different metal alloys and porcelains in the metal-ceramic complex
Kourtis, S. G., Tripodakis, A. P., & Doukoudakis, A. A. (2004). *The journal of prosthetic Dentistry*, 92(5), 477-485.
517. Color matching in dentistry. Part I. The three-dimensional nature of color
Sproull, R. C. (2001). *Journal of Prosthetic Dentistry*, 86(5), 453-457.
518. Color matching in dentistry. Part II. Practical applications of the organization of color
Sproull, R. C. (2001). *Journal of Prosthetic Dentistry*, 86(5), 458-464.
519. Color matching in dentistry. Part III. Color control
Sproull, R. C. (1974). *The Journal of prosthetic dentistry*, 31(2), 146-154.
520. The effect of ceramic thickness and number of firings on the color of ceramic systems: An in vitro study
Uludag, B., Usumez, A., Sahin, V., Eser, K., & Ercoban, E. (2007). *The Journal of prosthetic dentistry*, 97(1), 25-31.
521. Tooth Colour: a Review of the Literature (Home reading)
Joiner, A. (2004). *Journal of dentistry*, 32, 3-12.

Restorative perspectives

136 Adhesive restorations and composite

522. Aesthetic anterior composite restoration: a guide to direct placement
LeSage, B. P. (2007). *Dental Clinics of North America*, 51(2), 359-378.
523. Clinical approach to anterior adhesive restorations using resin composite veneers. (Home reading)
Mangani, F. et. al. (2007). *European Journal of Esthetic Dentistry*, 2(2).
524. Full-mouth adhesive rehabilitation of a severely eroded dentition: the three-step technique. Part 1.
Vailati, F., & Belser, U. C. (2008). *European Journal of Esthetic Dentistry*, 3(1).

137 Tooth bleaching

525. Vital tooth whitening
Kihn, P. W. (2007). *Dental Clinics of North America*, 51(2), 319-331.
526. Nonvital bleaching: general considerations and report of two failure cases.
Dietschi, D. (2006). *European Journal of Esthetic Dentistry*, 1(1).

Implant Esthetics

138 Soft tissue and restorative esthetics

527. Advanced concepts in implant dentistry: Creating the "aesthetic site foundation"
Elian, N., Ehrlich, B., Jalbout, Z. N., Classi, A. J., Cho, S. C., Kamer, A. R., ... & Tarnow, D. P. (2007). *Dental Clinics of North America*, 51(2), 547-563.
528. A review of the functional and esthetic requirements for dental implants
Leblebicioglu, B., Rawal, S., & Mariotti, A. (2007). *The Journal of the American Dental Association*, 138(3), 321-329.
529. Clinical outcomes of implant abutments in the anterior region: a systematic review (Home reading)
Bidra, A. S., & Rungruanganunt, P. (2013). *Journal of Esthetic and Restorative Dentistry*, 25(3), 159-176.
530. Prosthetic management of implants in the esthetic zone. (Home reading)
Higginbottom, F., Belser, U., Jones, J. D., & Keith, S. E. (2004). *International Journal of Oral & Maxillofacial Implants*, 19(7).
531. Implants in the esthetic zone
Al-Sabbagh, M. (2006). *Dental Clinics*, 50(3), 391-407.
532. Esthetic outcomes of immediate implant placements
Evans, C. D., & Chen, S. T. (2008). *Clinical Oral Implants Research*, 19(1), 73-80.
533. Prosthetic treatment of maxillary lateral incisor agenesis with osseointegrated implants: a 24–39-month prospective clinical study (Home reading)
Zarone, F., Sorrentino, R., Vaccaro, F., & Russo, S. (2006). *Clinical oral implants research*, 17(1), 94-101.
534. Provisional restorations for optimizing esthetics in anterior maxillary implants: a case report
Kourtis, S., Psarri, C., Andritsakis, P., & Doukoudakis, A. (2007). *Journal of Esthetic and Restorative Dentistry*, 19(1), 6-17.
535. Retrospective evaluation of mandibular incisor replacement with narrow neck implants (Home reading)
Cordaro, L., Torsello, F., Mirisola Di Torresanto, V., & Rossini, C. (2006). *Clinical oral implants research*, 17(6), 730-735.
536. Soft tissue conditioning by immediate restoration of immediately placed implants in full arch rehabilitation: the double provisional technique
Cordaro, L., & Torsello, F. (2006). *European Journal of Esthetic Dentistry*, 1(3).
537. Implant loading protocols for the partially edentulous esthetic zone
Grütter, L., & Belser, U. C. (2009). *International Journal of Oral & Maxillofacial Implants*, 24.
538. Optimizing esthetics for implant restorations in the anterior maxilla: anatomic and surgical considerations
Buser, D., Martin, W., & Belser, U. C. (2004). *International Journal of Oral & Maxillofacial Implants*, 19(7).
539. Outcome analysis of implant restorations located in the anterior maxilla: a review of the recent literature (Home reading)
Belser, U. C., Schmid, B., Higginbottom, F., & Buser, D. (2004). *International Journal of Oral & Maxillofacial Implants*, 19(7).

- 540.** Consensus statement and recommended clinical procedures regarding esthetics in implant dentistry
Belser, U., Buser, D., & Higginbottom, F. (2004). *Int J Oral Maxillofac Implants*, 19(Suppl), 73-74.

Module 309

Temporomandibular joint

(R3)

Temporomandibular joint disorder

139 Diagnostic techniques TMD

- 541.** A review of temporomandibular disorder diagnostic techniques
Baba, K., Tsukiyama, Y., Yamazaki, M., & Clark, G. T. (2001). *The Journal of prosthetic dentistry*, 86(2), 184-194.
- 542.** The influence of mandibular movements on joint sounds in patients with temporomandibular disorders
Leader, J. K., Boston, J. R., Rudy, T. E., Greco, C. M., & Zaki, H. S. (1999). *The Journal of prosthetic dentistry*, 81(2), 186-195.
- 543.** Devices for the diagnosis and treatment of temporomandibular disorders. Part I: introduction, scientific evidence, and jaw tracking
Mohl, N. D., McCall, W. D., Lund, J. P., & Plesh, O. (1990). *The Journal of prosthetic dentistry*, 63(2), 198-201.
- 544.** Devices for the diagnosis and treatment of temporomandibular disorders. Part II: electromyography and sonography
Mohl, N. D., Lund, J. P., Widmer, C. G., & McCall, W. D. (1990). *The Journal of prosthetic dentistry*, 63(3), 332-336.
- 545.** Devices for the diagnosis and treatment of temporomandibular disorders. Part III: thermography, ultrasound, electrical stimulation, and electromyographic biofeedback
Mohl, N. D., Ohrbach, R. K., Crow, H. C., & Gross, A. J. (1990). *The Journal of prosthetic dentistry*, 63(4), 472-477.

140 Graphic recording for TMD patients

- 546.** Patterns of mandibular movements in subjects with craniomandibular disorders
Nielsen, I. L., Marcel, T., Chun, D., & Miller, A. J. (1990). *The Journal of prosthetic dentistry*, 63(2), 202-217.
- 547.** Temporomandibular joint axiography and MRI findings: a comparative study
Parlett, K., Paesani, D., Tallents, R. H., & Hatala, M. A. (1993). *The Journal of prosthetic dentistry*, 70(6), 521-531.

141 Prevalence of TMD associated with occlusal variables

- 548.** Sixty-eight years of experimental occlusal interference studies: What have we learned?
Clark, G. T., Tsukiyama, Y., Baba, K., & Watanabe, T. (1999). *The Journal of prosthetic dentistry*, 82(6), 704-713.

549. No association between incisal tooth wear and temporomandibular disorders
John, M. T., Frank, H., Lobbezoo, F., Drangsholt, M., & Dette, K. E. (2002). *The Journal of prosthetic dentistry*, 87(2), 197-203.
550. Prevalence of dental occlusal variables and intraarticular temporomandibular disorders: molar relationship, lateral guidance, and nonworking side contacts
Kahn, J., Tallents, R. H., Katzberg, R. W., Ross, M. E., & Murphy, W. C. (1999). *The Journal of prosthetic dentistry*, 82(4), 410-415.
551. The association between wear facets, bruxism, and severity of facial pain in patients with temporomandibular disorders
Pergamalian, A., Rudy, T. E., Zaki, H. S., & Greco, C. M. (2003). *The Journal of prosthetic dentistry*, 90(2), 194-200.
552. Quantification and validation of predictive values of occlusal variables in temporomandibular disorders using a multifactorial analysis
Pullinger, A. G., & Seligman, D. A. (2000). *The Journal of prosthetic dentistry*, 83(1), 66-75.
553. Orofacial pain and occlusion: Is there a link? An overview of current concepts and the clinical implications
Racich, M. J. (2005). *The Journal of prosthetic dentistry*, 93(2), 189-196.
554. Prevalence of missing posterior teeth and intraarticular temporomandibular disorders (Home reading)
Tallents, R. H., Macher, D. J., Kyrkanides, S., Katzberg, R. W., & Moss, M. E. (2002). *The Journal of prosthetic dentistry*, 87(1), 45-50.
555. An evidence-based assessment of occlusal adjustment as a treatment for temporomandibular disorders
Tsukiyama, Y., Baba, K., & Clark, G. T. (2001). *The Journal of prosthetic dentistry*, 86(1), 57-66.

142 Management of TMD patients

556. Position paper regarding diagnosis, management, and treatment of temporomandibular disorders (Home reading)
Dawson, P. E. (1999). *The Journal of prosthetic dentistry*, 81(2), 174-178.
557. Management of temporomandibular disorders: concepts and controversies (Home reading)
McNeill, C. (1997). *The Journal of prosthetic dentistry*, 77(5), 510-522.
558. Prosthetic rehabilitation in patients with temporomandibular disorders (Home reading)
Türp, J. C., & Strub, J. R. (1996). *The Journal of prosthetic dentistry*, 76(4), 418-423.

143 Occlusal splints

559. A common-sense approach to splint therapy (Home reading)
Dylina, T. J. (2001). *The Journal of prosthetic dentistry*, 86(5), 539-545.

Module 310	Maxillofacial	(R3)
------------	---------------	------

Maxillofacial prosthesis

144 Classification

560. Basic principles of obturator design for partially edentulous patients. Part I: Classification
Aramany, M. A. (2001). *Journal of Prosthetic Dentistry*, 86(6), 559-561.
561. Basic principles of obturator design for partially edentulous patients. Part II: Design principles
Aramany, M. A. (1978). *The Journal of prosthetic dentistry*, 40(6), 656-662.

145 Overview

562. Prosthodontic principles in the framework design of maxillary obturator prostheses
Parr, G. R. Tharp, G. E., & Rahn, A. O. (2005). *The Journal of prosthetic dentistry*, 93(5), 405-411.
563. Function of obturator prosthesis after maxillectomy and prosthetic obturator rehabilitation
Chen, C. et. al. (2016). *Brazilian journal of otorhinolaryngology*, 82(2), 177-183.
564. Facial Prosthesis (Home reading)
Dostalova, T. et. al. (2011). In *Implant Dentistry-A Rapidly Evolving Practice. InTech*.
565. Prosthodontic rehabilitation of acquired maxillofacial defects
Mantri, S., & Khan, Z. (2012). In *Head and Neck Cancer. InTech*.
566. Obturator prostheses for hemimaxillectomy patients
Keyf, F. (2001). *Journal of oral rehabilitation*, 28(9), 821-829.
567. Common oral complications of head and neck cancer radiation therapy: mucositis, infections, saliva change, fibrosis, sensory dysfunctions, caries, periodontal disease & osteoradionecrosis
Sroussi H.Y. et. al. (2017). *Cancer Med.* 6(12):2918-2931.
568. Facial prosthesis
Dostalova, Tatjana et. el. (2011). 10.5772/18332
569. Function of obturator prosthesis after maxillectomy and prosthetic obturator rehabilitation
Chen C, Ren W, Gao L, Cheng Z, Zhang L, Li S, Zhi PK. (2016). *Braz J Otorhinolaryngol.* 82(2):177-83.
570. Influence of dental treatment in place on quality of life in oral cancer patients undergoing chemoradiotherapy
Nunez-Aguilar J, et.al.(2018). *Med Oral Patol Oral Cir Bucal.* 1;23(4)
571. Prosthodontic rehabilitation of acquired maxillofacial defects
Mantri, Sneha & Khan, Zafrulla. (2012). 10.5772/31562
572. A systematic review of trismus induced by cancer therapies in head and neck cancer patients (Home reading)
Bensadoun RJ, et. al. (2010). (MASCC)/(ISOO). *Support Care Cancer.* 18(8):1033-8

3.4. Book review (Home reading assignments)

General prosthodontic information and procedures are obtained from the following classical prosthodontic books. Residents are responsible for reading the assigned materials in the books in a timely fashion, as directed by the supervisors, in order to discuss it on the weekly academic day.

Fixed prosthodontics
Rosenstiel SF, Land MF. Contemporary Fixed Prosthodontics-E-Book: Elsevier Health Sciences; 2016
Shillingburg HT, Jacobi R, Brackett SE. Fundamentals of Tooth Preparations for Cast Metal and Porcelain Restorations. Hanover Park, IL, USA: Quintessence Publishing Co Inc; 1997
Removable partial denture prosthodontics
Phoenix R, Cagna D, DeFreest C, Stewart K. Stewart's clinical removable partial prosthodontics. 2008
McCracken's Removal Partial Prosthodontics. 13th ed. Amsterdam, The Netherlands: Elsevier; 2015
Complete denture prosthodontics
Zarb GA, Hobkirk J, Eckert S, Jacob R. Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-Supported Prostheses. 2013
Dental biomaterials
Anusavice KJ, Shen C, Rawls HR. Phillips' science of dental materials. Elsevier Health Sciences; 2012
Occlusion
Wiens J. Fundamentals of Occlusion: American College of Prosthodontics; 2015.
Dawson PE. Functional Occlusion: From TMJ to Smile Design. 7th ed. Amsterdam, The Netherlands: Elsevier; 2006
Okeson J. Management of Temporomandibular Disorder and Occlusion. 7th ed. Amsterdam, The Netherlands: Elsevier; 2012
Implant prosthodontics
Misch CE. Contemporary implant dentistry. St-Louis: Mosby Elsevier; 2008.

Esthetic dentistry

Fradeani M. Esthetic Rehabilitation in Fixed Prosthodontics. Hanover Park, IL, USA: Quintessence Publishing Co Inc; 2008

Maxillofacial prosthesis

Beumer J, Curtis TA, Marunick M, editors. Maxillofacial Rehabilitation: Prosthodontic and Surgical Considerations. St. Louis, MO, USA: Ishiyaku EuroAmerica Inc; 1996

3. Trainee-selected topics**Rationale and description**

Elective courses can help residents develop skills they seek, such as surgically placing dental implants. Additionally, elective courses can help residents increase their knowledge of a specialized area within the field of prosthodontics or in the education process, such as maxillofacial prostheses or communication skills. Though these topics are selected by the residents themselves, they have to be planned and approved by the SCFHS regional committee.

Delivery methods

- Lectures
- Seminars
- Workshops
- Practice-based learning

Topics

Examples of some of the topics include, but are not limited to:

- Dental implant courses
- Dental esthetic courses
- Digital CAD/CAM technology courses
- Maxillofacial prosthesis courses
- Digital complete denture courses
- Digital smile design courses
- Veneer courses
- Prosthodontic review course
- Computed Tomography Scan (CT and Cone-beam-CT scan) courses
- Managing medically compromised and special needs patients
- Communication skills
- Leadership skills
- Research writing
- Ethical issues in human research
- Filler and Botox courses
- Dental laboratory courses

Assessment

- Portfolio/logbook
(Assessment system)
- Formative feedback

III. Practice-based component**1. Pre-clinical laboratory course****Rationale and description**

This is a preparatory course that is intended to introduce first-year (R1) residents to the basic components and aspects of prosthodontics. They will be exposed to an intensive series of didactic (cognitive) courses and laboratory (psychomotor) sessions to be undertaken in a 6-week period.

Delivery methods

- Interactive lectures
- Hands-on (practice-based learning)
- Demonstration
- Case presentation seminar

Course objectives

On completion of the pre-clinical course, residents will be able to:

- Recognize the integration of biomedical sciences in the practice of the specialty
- Identify the concepts and techniques applicable to fixed and removable prosthodontics
- Demonstrate an understanding of the TMJ, and occlusion in natural dentition and prosthesis
- Demonstrate competence in performing basic clinical and laboratory procedures related to prosthodontics
- Recognize the current developments in implant dentistry and CAD/CAM systems
- Identify dental materials used in the course & their characteristics, manipulation & limitations
- Understand the administrative, communication and collaboration skills needed to carry out the laboratory procedures described in the course
- Demonstrate the appropriate attitude required in performing certain tasks

Content:

Domain	Number of sessions		
	Didactic	Practical	Total
Orientation	2	0	2
Basic medical science (page 1)	4	0	4
Complete denture course (page 1)	4	6	10
Removable partial denture course (page 1)	4	4	8
Fixed prosthodontic course (page 1)	8	12	20

Occlusion (page 1)	3	1	4
CAD/CAM (page 1)	1	2	3
Dental photography (page 56)	1	0	1
Implant dentistry (page 1)	2	2	4
Maxillofacial prosthesis (page 1)	2	2	4
Total	31	29	60

1. Complete denture course

Day	AM session	PM session
Day 1	- Anatomy of the edentulous patient - Materials used in complete denture fabrication	- Pouring primary impressions - Construction of custom trays
Day 2	Preliminary and final impressions for complete dentures	- Boxing and pouring of final impressions - Construction of Record base & occlusion wax rim
Day 3	- Jaw relations records - Complete denture occlusion	- Mounting master casts - Setting anterior teeth
Day 4	- Trial denture try-in and posterior palatal seal - Denture processing and delivery	- Setting posterior teeth - Waxing up dentures
Day 5	Flasking, packing, and processing of dentures	Finishing

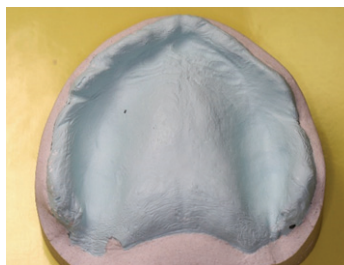
Green color: Didactic session / Blue color: Practical session

Item	Learning Outcomes Residents are able to:
1.1	Pouring primary impressions and constructing primary casts
1.1.1	Inspect the impression for defects (void and tear)
1.1.2	Use powder & liquid ratio and vacuum mixing
1.1.3	Pour the impression without trapping air bubbles

1.1.4	Separate the cast from the impression without damaging the cast
1.1.5	Trim the cast properly
1.1.6	Polish the cast using sandpapers

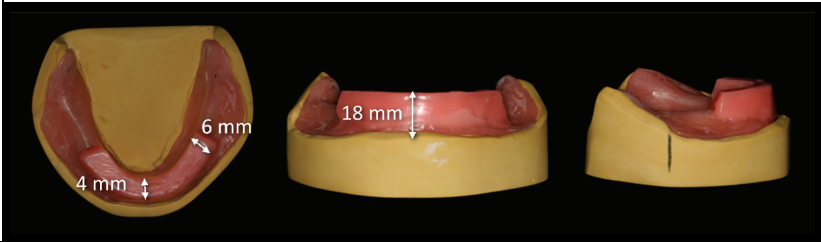
1.2	Constructing custom trays
1.2.1	Block-out undercuts on casts
1.2.2	Identify and mark border and location of tissue stops
1.2.3	Produce right thickness of wax spacer (if indicated)
1.2.4	Mix the acrylic resin to dough consistency/ use light activate acrylic resin
1.2.5	Cure the acrylic resin using pressure pot (if chemical cure)
1.2.6	Apply separating medium and adapt the acrylic resin to cast
1.2.7	Position and shape tray handle/finger rests
1.2.8	Remove custom tray from cast without damaging the tray or cast
1.2.9	Trim the tray and round the borders
1.2.10	Produce proper thickness 1.5 mm all around and tray adaptation
1.2.11	Produce proper shape and size of handle (10 mm in height, 8 mm in width and 4 mm in thickness)

1.3	Boxing and pouring of final impressions
1.3.1	Mix plaster and pumice 1:1 ratio
1.3.2	Form a base where the impression will be placed
1.3.3	Use the stone grinder to form a 3mm base edge
1.3.4	Use different grits of sandpaper for fine finishing
1.3.5	Wrap the base with boxing wax
1.3.6	Seal it with sticky wax
1.3.7	Mix the stone using a vacuum mixer
1.3.8	Pour stone on the impression
1.3.9	Use vibrator during pouring
1.3.10	Break the base after stone setting



1.4	Construction of record base
1.4.1	Block-out undercuts on casts
1.4.2	Mix the acrylic resin to dough consistency / use light activate acrylic resin
1.4.3	Apply separating medium and Adapt the acrylic resin to cast
1.4.4	Cure the acrylic resin using pressure pot (if chemical cure)
1.4.5	Remove custom tray from cast without damaging tray or cast
1.4.6	Trim the tray and round the borders
1.4.7	Produce proper thickness 1.5 mm all around and tray adaptation

1.5	Construction of occlusion wax rims
1.5.1	Use proper pink wax to for the wax rims
1.5.2	Fold the wax rim until you get the proper thickness
1.5.3	Use sticky wax to stick the pink wax to the record base
1.5.4	Use large spatula and wax knife for forming the wax rims
1.5.5	Use the appropriate measurements for upper wax rim

1.5.6 Use the appropriate measurements for lower wax rim**1.6** **Mounting casts on articulators****1.6.1** Use proper articulator and set it correctly**1.6.2** Center the maxillary cast and position the occlusal plane at the correct height and orientation**1.6.3** Mount the upper cast and contour stone**1.6.4** Attach lower cast to the lower member and contour stone**1.6.5** Preserve original occlusal relationship and pin-contact on the incisal-guide table**1.6.6** Mix plaster and use it for mounting**1.7** **Setting up teeth****1.7.1** Select teeth (shade, mold and size)**1.7.2** Set the upper anterior teeth**1.7.3** Set the lower anterior teeth**1.7.4** Correct horizontal & vertical overlap**1.7.5** Set the posterior teeth**1.7.6** Adjust the occlusion**1.7.7** Produce wax festooning**1.7.8** Clean and smooth the wax**1.8** **Wax-up denture****1.8.1** Use proper wax instruments to for the soft tissue around the acrylic teeth**1.8.2** Polish the finished wax-up**1.8.3** Remove any excess wax on acrylic teeth

1.9	Flasking, packing, and processing of dentures
1.9.1	Separate the cast from model
1.9.2	Cover the cast base by tin foil to preserve the grove intact
1.9.3	Select Proper flask
1.9.4	Clean and smooth then apply petroleum jelly
1.9.5	Mix plaster in the first part of flask and block out the undercut
1.9.6	Apply separator on all areas except teeth
1.9.7	Apply die stone on teeth
1.9.8	Mix plaster for pouring the second part with vibration
1.9.9	Eliminate wax
1.9.10	Apply separator on all areas except teeth
	
1.9.11	Mix acrylic resin tor dough stage and packing into flask
1.9.12	Cure the denture (long or short curing)
1.9.13	Deflask

1.6	Finishing the dentures
1.6.1	Remount casts on the articulator
1.6.2	Check the occlusion (incisal pin contact)
1.6.3	Remove the dentures from the casts

1.6.4	Use the carbide burs for finishing the dentures
1.6.5	Round all the borders and smooth it
1.6.6	Polish the dentures using lathe polishing unit

2. Removable partial denture course

Day	AM session	PM session
Day 1	- Partial tooth loss and classification of partially edentulous arches - The principles of surveying	- Pouring primary impressions - Construction of custom trays
Day 2	- Rest seats and mouth preparations for RPD - Major and minor connectors	- Surveying - RPD design and mouth preparation
Day 3	- Direct and indirect retainers - Biomechanics of removable partial dentures	- Final impressions - Refractory casts
Day 4	- Impression materials and procedures for RPDs - Occlusal relationships of RPDs	- Altered cast technique - Wax-up for RPD

Green color: Didactic session / Blue color: Practical session

Item	Learning Outcomes Residents are able to:
2.1	Surveying and block-out of the cast
2.1.1	Understand the surveyor unit and their tools and draw the design
2.1.2	Orient the cast and tilt using analyzing rod
2.1.3	Determine the guiding planes
2.1.4	Determine the undesirable and desirable undercuts on abutment
2.1.5	Block-out the undercuts by wax
2.1.6	Remove the excess wax
2.1.7	Relieve the edentulous areas
2.1.8	Prepare cast for duplication

2.2	RPD design, mouth preparation and final impression
2.2.1	Design RPD framework
2.2.2	Select the appropriate burs
2.2.3	Perform various mouth preparation
2.2.4	Take final impression
2.3	Wax-up the framework and sprue
2.3.1	Transfer the design on the refractory cast
2.3.2	Design direct retainer (type of clasp), and occlusal rests
2.3.3	Adapt the major connector on cast and seal it
2.3.4	Design indirect retainers (shape and design)
2.3.5	Produce internal finish line and tissue support areas
2.3.6	Produce external finish line and mechanical retention
2.3.7	Attach sprue wax gauge (4mm) to the wax pattern
2.3.8	Solder the sprue wax together by wax and attached and seal it to funnel plastic
2.3.9	Seal the cast on the rubber base of the ring
2.3.10	Secure the ring on the rubber base
2.3.11	Mix the investment material according the manufacturing instruction with vacuum mixer
2.4	Burn-out and casting
2.4.1	Place the ring in the burn out furnace
2.4.2	Rise the temperature gradually to get proper thermal expansion
2.4.3	Melt the alloy according the manufacturing instruction
2.4.4	Cast the ring (when alloy reach the melting range)
2.5	Divesting, finishing and polishing the metal framework
2.5.1	Use the proper way to divesting the metal framework
2.5.2	Produce metal framework intact without any miscasting or deformity
2.5.3	Clean the metal framework by sandblasting size (250 micron)
2.5.4	Cut out sprue, remove any nodules or extra metal
2.5.5	Grind the metal and fit the framework on the master cast without damaging the cast

2.5.6	Use rubber for the external and clasps surface
2.5.7	Use high luster polish with the lathe polishing unit
2.6	Altered cast technique
2.6.1	Take a second final impression for the edentulous area using the metal framework
2.6.2	Cut the master cast at the edentulous area
2.6.3	Place the final impression (taken by the metal framework) on the master cast
2.6.4	Pour die stone on the impression (edentulous area)
2.7	Wax-up for RPD
2.7.1	Set up teeth
2.7.2	Wax-up of the gingiva using pink wax

3. Fixed prosthodontic course

Day	AM session	PM session
Day 1	• Treatment planning • Occlusal concepts in fixed prosthodontics • Articulators	• Mounting diagnostic casts • Diagnostic wax-up
Day 2	• Principles of tooth prep • Preparation for full metal/metal ceramic/all-ceramic and partial veneer crowns	• Tooth preparation for full metal/metal ceramic crowns
Day 3	• Preparation for veneers/inlays and onlays • Final impressions and tissue management	• Tooth preparation for all-ceramic crowns
Day 4	• Provisional restorations • Pontic design and connectors of FDPs	• Preparation for veneers/inlays and onlays
Day 5	• Restoration of endodontically treated teeth	• Final impression making and pouring • Provisional restorations/direct technique
Day 6	• Preparation of working casts • Wax-up	• Fabrication of provisional restorations/Indirect direct technique

Day 7	• Framework design and selection of metal for metal ceramic restorations • Investing and casting	• Cast post and core
Day 8	• Porcelain application for metal ceramic restorations • All-ceramic restorations	• Die preparation (maxillary incisor/premolar/molar) • Wax-up full contour
Day 9	• Wax-up full contour and cut back for metal ceramic crown • Investing and casting	• Porcelain application and characterization for metal ceramic crown
Day 10	• Heat pressing all-ceramic crown	• Porcelain laminate veneers: try-in & cementation

Green color: Didactic session / Blue color: Practical session

Item	Learning Outcomes <i>Residents are able to:</i>
3.1	Tooth preparation for full metal/metal ceramic crowns/all-ceramic crowns
3.1.1	Use typodont
3.1.2	Select teeth for crown preparation
3.1.3	Perform occlusal reduction
3.1.4	Perform axial reduction
3.1.5	Check the convergence angle
3.1.6	Prepare proximal grooves
3.1.7	Design and prepare the appropriate finish line
3.1.8	Remove any sharp edges + finishing
3.2	Tooth preparation for veneers/onlays/inlays
1.1.1	Use typodont
1.1.2	Select teeth for partial crown preparation
1.1.3	Perform the appropriate reduction
1.1.4	Designing and prepare the appropriate finish line
1.1.5	Remove any sharp edges + finishing

3.3	Final impression and provisional restorations/direct technique
1.3.1	Retract the gingiva
1.3.2	Take final impression
1.3.3	Fabricate putty key (index)
1.3.4	Fabricate provisional restoration with different techniques
3.4	Cast post and core
1.4.1	Prepare the canal to receive post
1.4.2	Use of GC resin to make post pattern
1.4.3	Prepare the core
3.5	Die preparation
3.5.1	Inspect the impression (without any deformity or tearing on the margin)
3.5.2	Pour the impression by hard die stone and vibration
3.5.3	Trim the cast and prepare for pindexing
3.5.4	Drill the cast base for pin holes and glue the pins
3.5.5	Apply separator medium and pour the stone over the pins
3.5.6	Cut the dies without any damaging of the margins and adjacent teeth
3.5.7	Ditch the dies
3.5.8	Prepare the cast for wax up
3.6	Wax-up full contour
3.6.1	Apply die spacer
3.6.2	Apply die lubricant
3.6.3	Insert die in dipping wax
3.6.4	Perform full contour wax-up (axial, occlusal morphology, margin finishing and emergence profile)
3.6.5	Cutback the wax for porcelain
3.6.6	Maintain strength of wax in connector

3.6.7	Make a 3 mm collar on the lingual surface
3.6.8	Extend the collar to mid proximal for porcelain support (butt joint)
3.6.9	Smooth the wax and re-margin
3.7	Spruing and investing the ring
3.7.1	Sprue at the point of the greatest bulk of the pattern
3.7.2	Connect the sprue with pattern in a flared shape
3.7.3	Attach sprue at about 45 degrees
3.7.4	Produce length of sprue about 10 mm
3.7.5	Produce runner bar attached with sprue for bridge
3.7.6	Attach sprue wax patterns into the rubber former (part of the investment metal ring)
3.7.7	Place ring liner short of the ends of the ring by 3 mm
3.7.8	Spry the pattern with wax agent to reduce surface tension
3.7.9	Mix the proper investment materials with vacuum mixer
3.7.10	Fill the wax surface with investment materials
3.7.11	Fill the ring with investment material
3.7.12	Place in water to obtain hygroscopic expansion (if indicated)
3.8	Burn-out and casting the ring
3.8.1	Place invested ring in room temperature furnace
3.8.2	Rise the temperature gradually
3.8.3	Cast the ring with proper melting the alloy
3.8.4	Divest the ring and clean by sandblaster
3.8.5	Remove nodules inside metal framework
3.8.6	Fit the metal on the die without any damage of the die
3.8.7	Cut out sprue
3.8.8	Grind coping surface to desired thickness with care of margin
3.8.9	Clean metal for porcelain build-up

3.9	Divesting, finishing and polishing the metal framework
3.9.1	Select shade
3.9.2	Apply oxidation
3.9.3	Apply opaque
3.9.4	Apply dentin and cut-back build-up
3.9.5	Carve the dentin back to allow placement of enamel
3.9.6	Produce anatomy and counterering the crown
3.9.7	Stain and glaze
3.9.8	Polish the metal roller and sandblast the inner surface

3.10	Heat pressing all-ceramic crown
3.10.1	Use the injection machine
3.10.2	Use the proper ingot
3.10.3	Perform heat pressing

3.11	Porcelain laminate veneers: Try in & cementation
3.11.1	Use the trial cement
3.11.2	Use proper isolation
3.11.3	Prepare the tooth to receive the veneer
3.11.4	Prepare the veneer for cementation
3.11.5	Do proper light-cure cementation procedure
3.11.6	Remove excess cement

4. Occlusion

Day	AM session	PM session
Day 1	• TMJ anatomy and mandibular movements • Centric relations and tooth contact	• Facebow transfer • Centric relation and protrusive records • Programming the articulator
Day 2	• Occlusal analysis • Occlusal splints	• Occlusal splint fabrication

Green color: Didactic session / Blue color: Practical session

5. Digital dentistry (CAD/CAM)

Day	AM session	PM session
Day 1	• CAD CAM systems and workflow • Tooth preparation considerations • Parameters of CAD CAM restorations	• Scanning using intraoral scanner • Extra-coronal Restoration Design and milling
Day 2	• Intra-coronal restoration design and milling • Finishing and polishing	

Green color: Didactic session / Blue color: Practical session

6. Implant dentistry

Day	AM session	PM session
Day 1	• Osteointegration • Principles of implant dentistry & treatment planning	• Single implant impression • Multiple implant impression
Day 2	• Implant prosthetic components • Implant impression techniques • Screw retained Vs cemented	• Overdentures and Locators

Green color: Didactic session / Blue color: Practical session

7. Maxillofacial prosthesis

Day	AM session	PM session
Day 1	• Introduction to maxillofacial prosthesis • Rehabilitation of maxillary and mandibular defects	• Maxillary obturators
Day 2	• Rehabilitation of facial defects	• Facial prosthesis

Green color: Didactic session / Blue color: Practical session

8. Dental photography

Day	AM session	PM session
Day 1	• Lecture on the principles of dental photography • Hands-on practice	

Green color: Didactic session / Blue color: Practical session

2. Clinical-based learning

Rationale and description

In the context of providing comprehensive prosthetic dental care, the program includes advanced clinical training in removable prosthodontics, fixed prosthodontics, dental implants, esthetic and digital dentistry, and maxillofacial prosthodontics. For each of these disciplines, there will be a sufficient number and variety of cases to ensure the adequate training of the resident. The resident is expected to increase his/her own knowledge and ability in the management of a wide range of prosthetic difficulties while at the same time fully understanding the role of the specialist in treating a variety of complex conditions.

Using a formally structured and documented program, residents will provide comprehensive prosthetic care (as opposed to episodic, emergency, specialist referral, or one-time care) for a significant number of patients who present with complex restorative treatment.

The program will be structured such as to allow the resident to exercise independent judgment beyond that which is expected in the pre-doctoral curriculum. Residents will be assigned patients who present with increasingly difficult problems and will be given increasingly greater clinical responsibility as they progress in their advanced training.

Delivery methods

- Work-based learning
- Case presentation seminar

Work-based learning objectives (general)

By the end of this clinical-based learning, the resident should be able to:

- Demonstrate a commitment to high-quality patient care
- Integrate the intrinsic roles of CanMEDS into the practice of prosthodontics
- Apply knowledge of the clinical and biomedical sciences relevant to prosthodontics
- Communicate using a patient-centered approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion
- Optimize the physical environment for patient comfort, dignity, privacy, and safety
- Use patient-centered interviewing skills to gather relevant basic and psychosocial information effectively
- Elicit a medical, dental, and family history using a patient-centered approach
- Perform an extraoral and intraoral examination
- Select appropriate investigations e.g., radiographs, photographs, and computed tomography scans
- Interpret the results of history-taking, assessment, and investigation for the purpose of diagnosis and management, disease prevention, and health promotion
- Establish and implement a patient-centered care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation
- Determine the most appropriate prosthodontic procedures
- Engage patients and their families in developing plans that reflect the patient's healthcare needs and goals
- Obtain and document informed consent, explaining the risks and benefits of a proposed procedure as well as the rationale
- Work with patients to identify opportunities for the prevention of oral disease and promotion and protection of oral health

- Engage in respectful, shared decision-making with other dental specialists and colleagues in the healthcare professions
- Perform prosthodontic procedures in a skilled and safe manner
- Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements
- Display appropriate professional behaviors and relationships in all aspects of practice

Case presentation seminar objectives

By the end of the case presentation seminars, the resident should be able to:

- Develop audience-centered presentations
- Deliver well-rehearsed presentations with relevant content, meeting the objectives of the seminar course
- Adopt an integrative thematic presentation (using a multidisciplinary approach)
- Present clinical prosthodontic cases following the guidelines and recommendations of the SCFHS, Prosthodontic Scientific Council, and American College of Prosthodontics
- Deliver a presentation within the given timeframe
- Record and present data accurately and objectively
- Use various visual aids for the presentation of data and the improvement thereof
- Use effective verbal and non-verbal communication techniques
- Engage the audience in the presentation to stimulate active learning and group discussion
- Reduce the stress associated with public presentations
- Gain feedback from the audience and accept constructive criticism with a positive attitude
- Self-reflect after each presentation

Competencies and specific objectives covered and assessed for the work-based learning

Item	Learning Outcomes <i>Residents are able to:</i>	CanMEDS role covered
1	Competency-proficiency for obtaining information and order investigation	
1.1	Perform history and information gathering	Dental expert - Communicator
1.2	Perform extra and intra oral examination	Dental expert
1.3	Order radiographic investigation (e.g., OPG, CBCT, PA, etc.)	Dental expert - Collaborator
1.4	Order laboratory investigation (e.g., mounted casts, wax-up, etc.)	Dental expert - Collaborator
1.5	Communicate with the auxiliary staff (assistants, x-ray tech., etc.)	Collaborator
1.6	Communicate with the laboratory technologist (written)	Collaborator
1.7	Demonstrate high ethical standards and a positive attitude	Professionalism - leader - Communicator - Collaborator

2	Competency-proficiency for occlusal devices	
2.1	Achieve appropriate diagnosis (e.g., Bruxism)	Dental expert
2.2	Formulate treatment planning	Dental expert - Collaborator
2.3	Take impression	Dental expert
2.4	Obtain interocclusal record	Dental expert
2.5	Deliver final prosthesis	Dental expert
2.6	Follow-up adjustments	Dental expert - Communicator

3	Competency-proficiency for complete dentures	
3.1	Demonstrate positive attitude with geriatric patients	Dental expert
3.2	Achieve appropriate diagnosis (e.g., ACP edentulous classification)	Dental expert
3.3	Formulate treatment planning for complete edentulism	Dental expert - Collaborator
3.4	Produce custom tray, border mold, final impression	Dental expert
3.5	Produce record base	Dental expert
3.6	Produce posterior palatal seal	Dental expert
3.7	Obtain vertical dimension, centric relation record	Dental expert
3.8	Perform facebow transfer, casts articulation	Dental expert
3.9	Arrange anterior teeth / arrange all teeth	Dental expert
3.10	Perform try-in, occlusal plane, esthetics, phonetics & CR record	Dental expert
3.11	Obtain protrusive record	Dental expert
3.12	Produce balanced occlusion	Dental expert
3.13	Finalize waxing	Dental expert
3.14	Prescribe dental laboratory order	Dental expert - Collaborator
3.15	Laboratory/clinical remount	Dental expert
3.16	Adjust occlusion	Dental expert

3.17	Deliver final prosthesis	Dental expert
3.18	Follow-up adjustments	Dental expert - Communicator

4	Competency-proficiency for removable partial dentures	
4.1	Achieve appropriate diagnosis (e.g., partial edentulism classification)	Dental expert
4.2	Formulate treatment planning for partial edentulism	Dental expert - Collaborator
4.3	Produce diagnostic casts	Dental expert
4.4	Perform survey and design	Dental expert
4.5	Perform mouth preparation final impression	Dental expert
4.6	Perform master cast survey and design	Dental expert
4.7	Try-in framework and perform adjustments	Dental expert
4.8	Obtain altered cast impression	Dental expert
4.9	Obtain interocclusal record	Dental expert
4.10	Arrange teeth	Dental expert
4.11	Prescribe dental laboratory order	Dental expert - Collaborator
4.12	Adjust occlusion	Dental expert
4.13	Adjust tissue surface, peripheral extension	Dental expert
4.14	Polish final prosthesis	Dental expert
4.15	Deliver final prosthesis	Dental expert
4.16	Follow-up adjustments	Dental expert - Communicator

5	Competency-proficiency for fixed prosthodontics	
5.1	Achieve appropriate diagnosis	Dental expert
5.2	Formulate treatment planning utilizing fixed prosthesis	Dental expert - Collaborator
5.3	Produce diagnostic waxing	Dental expert
5.4	Perform initial preparation and temporization	Dental expert

5.5	Perform final impression	Dental expert
5.6	Try-in individual castings/framework, pick-up impression	Dental expert
5.7	Obtain occlusal record	Dental expert
5.8	Select tooth shade	Dental expert
5.10	Prescribe dental laboratory order	Dental expert - Collaborator
5.11	Mount the casts	Dental expert
5.12	Try-in bisques and adjustment	Dental expert
5.13	Deliver final prosthesis	Dental expert
5.14	Follow-up adjustments	Dental expert - Communicator

6	Competency-proficiency for post and cores	
6.1	Achieve appropriate diagnosis	Dental expert
6.2	Formulate treatment planning and decide on restorability	Dental expert - Collaborator
6.3	Prepare the canal to receive the post	Dental expert
6.4	Obtain impression or direct pattern (e.g., GC pattern)	Dental expert
6.5	Prescribe dental laboratory order	Dental expert - Collaborator
6.6	Build up core restoration	
6.7	Cement final post after adjustments	Dental expert

7	Competency-proficiency for implant prosthesis	
7.1	Formulate treatment planning (pre-surgical)	Dental expert - Collaborator
7.2	Formulate final treatment planning (post-implant uncovering)	Dental expert
7.3	Make provisional restoration	Dental expert
7.4	Perform final impression	Dental expert
7.5	Mount the casts (cross mounting)	Dental expert

7.6	Prescribe dental laboratory order	Dental expert - Collaborator
7.7	Try-in framework, pick-up impression, occlusal record	Dental expert
7.8	Select tooth shade	Dental expert
7.9	Obtain occlusal record	Dental expert
7.10	Select tooth shade	Dental expert
7.11	Try-in bisques and adjustment	Dental expert
7.12	Deliver final prosthesis	Dental expert
7.13	Follow-up adjustments	Dental expert - Communicator

5. RESEARCH PROJECT (RESIDENT DAY)

Residents are required to complete a research topic as an integral part of the prosthodontic training program. Each resident can select a mentor and a topic in the first year of the training. The research topic should be either directly or indirectly related to the prosthodontic field. Residents are asked to present their research topic to the SCFHS regional committee and their respective prosthodontic supervisors at the weekly scientific activity meeting and at the residents' day in April of every academic year.

Residents are encouraged to publish their research project and present it at national and international events.

I. Mission

The mission is to prepare prosthodontists to provide the highest quality of oral healthcare to the community and to advance knowledge and its application through research according to national and international standards.

II. Objectives

▪ General objectives

This research course is designed to provide residents with the knowledge and skills necessary to conduct a high caliber research project following a methodology based on ethics and scientific evidence.

▪ Specific objectives

1. Dental Expert	
1.1	Integrate the CanMEDS Intrinsic roles into their research project
1.2	Critically review the scientific literature of the research project
1.3	Understand the basic principles of research design, methodology and biostatistics
1.4	Demonstrate in-depth knowledge of the research project

2. Communicator	
2.1	Demonstrate communication skills in presenting the research project in the form of a PowerPoint presentation or a poster
2.2	Demonstrate skills in defending and arguing the research project
2.3	Demonstrate appropriate communication skills when the research deals with human subjects

3. Collaborator

3.1	Collaborate with the research team
3.2	Identify, consult and collaborate with appropriate experts to conduct the research

4. Scholar

4.1	Develop contextual research questions
4.2	Design a research project to answer these questions
4.3	Review the scientific literature relevant to the research project
4.4	Use the appropriate material and methods to conduct the research project
4.5	Assess and analyze the results and recommend further research and investigations

5. Health Advocate

5.1	Contribute to improving the oral health of patients and communities by conducting scientific research
5.2	Recognize the implications and consequences of a variety of common prosthodontic-related oral health problems that can be prevented by patient education

6. Leader

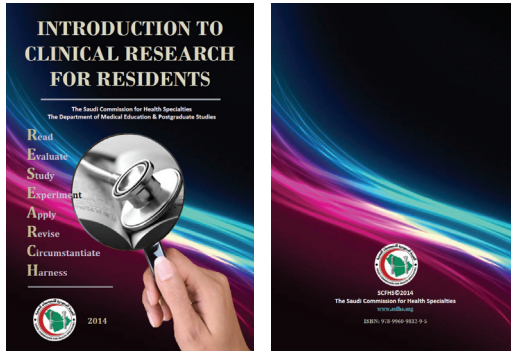
6.1	Select a mentor and a research project
6.2	Independently design the research and use available resources
6.3	Demonstrate effective time management in conducting and submitting the research project
6.4	Demonstrate leadership qualities in leading a research project

7. Professional

7.1	Maintain high ethical and professional standards when conducting a research project, avoiding unacceptable practices such as plagiarism
7.2	Publish accurate research results
7.3	Disclose any potential personal or financial conflict of interest

7.4	Use the appropriate material and methods to conduct a research project
7.5	Assess and analyze the results and recommend further research and investigations

Additionally, the residents are encouraged to read and understand the new SCFHS publication entitled **Introduction to Clinical Research for Residents** available at <http://www.scfhs.org.sa/>.



III. Mentorship

A *mentor* is an assigned prosthodontic supervisor responsible for the professional development of residents under his/her responsibility. Mentoring is the process by which a mentor provides support to the resident. A *mentee* is the resident under the supervision of the mentor.

Goals:

- Guide residents towards personal and professional development through continuous monitoring of research and academic progress
- Early identification of struggling residents as well as high achievers
- Early detection of residents who are at risk of emotional and psychological disturbances
- Provide career guidance

Roles of the Mentor

- Manage residents' stress and burnout, and provide guidance, plans and solutions
- Nurtures a long-term professional relationship with the assigned residents
- Provides an "academic home" for the residents so that they can feel comfortable sharing their experiences, expressing their concerns, and clarifying issues in a non-threatening environment
- Keeps sensitive information about the residents in confidence
- Makes appropriate and early referrals to the program director or appropriate healthcare professional if he/she determines a problem that would require expertise or resources that is beyond his/her capacity. Example: Serious academic problems, progressive deterioration of academic performance, potential mental or psychological issues, personal problems interfering with academic duties, professional misconduct, etc.

- However, mentors are not expected to provide extra tutorials, lectures, or clinical sessions, provide counselling for serious mental and psychological problems, be involved in residents' personal matters, or provide financial or other material supports.

Roles of the Resident

- Submits resume at the start of the relationship
- Provides mentor with medium- (1-3 years) and longer-term (3-7 years) goal
- Takes primary responsibility in maintaining the relationship
- Schedules monthly meeting with mentor in a timely manner; does not request an ad-hoc meeting except in the case of an emergency
- Recognize self-learning as an essential element of residency training
- Report any major events to the mentor in a timely manner

Tasks during the meeting

- Discuss overall clinical experience of the residents with attention to any concerns raised
- Review logbook or portfolio with the residents to determine whether the resident is on target in meeting the training goals
- Revisit earlier concerns or unresolved issues, if any
- Explore any non-academic factors seriously interfering with training
- Document excerpts of the interaction in the logbook

6. ASSESSMENT

Assessment is a complex process of evaluation of holistic educational achievement. The term can be used interchangeably with evaluation. However, for the purpose of this report, **assessment** will be used exclusively to describe the process consisting of evaluating a student's performance and educational achievements. In contrast, **Evaluation** is used with respect to the training program; please refer to the "Program evaluation" section at (page 1). We follow this convention throughout this curriculum.

Assessment is the accreditation of a characteristic or value of an individual. It is generally preceded by a measurement, followed by a grade, and ends with a decision. The measurement tool has to be reliable and valid. Upon the process of assessment, both criterion-referenced system (measurement of students' performance based on predetermined standards) and norm-referenced system (measurement of students' performance in relation to each other) are considered depends on the assessment tool.

The process of assessment has several advantages and functions (Figure 13). Among these are summative, formative, and quality assurance components as follows:

- **Summative assessment:** aims at assessing the resident's performance and summarizing it into a widely accepted format, e.g., a grade or a mark, and can be done by the end of the year or after finishing an educational block.
- **Formative assessment:** is more related to the resident's educational process, and consists of a process of continuous feedback to guide, motivate, indicate areas that need improvement, hence promoting the desired learning outcome.
- **Quality assurance purpose:** aims at indirectly evaluating the educational process by measuring whether the particular educational program has achieved its goals by assessing students' performance in acquiring pre-specified educational objectives.

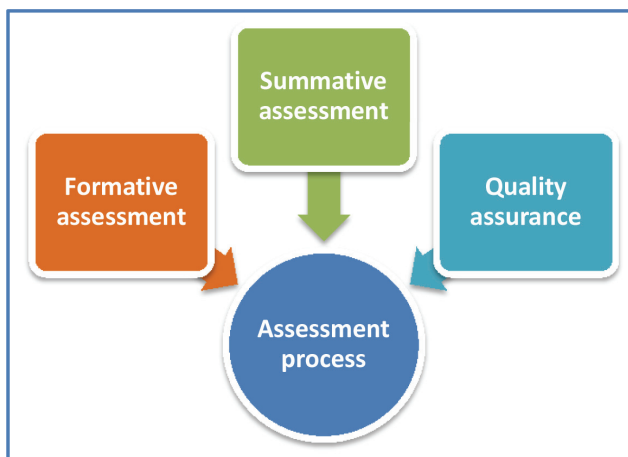


Figure 13: Complex assessment system

According to Miller's pyramid of medical competency⁽³¹⁾, these areas of competencies are inter-related and inter-dependent. These areas can be looked at under two major domains, cognition (knows, and knows how) and behavior (shows how, and does) (Figure 14). A recent extended version of Miller's pyramid adding meta-skills, or intra- and interpersonal skills, has also been introduced.

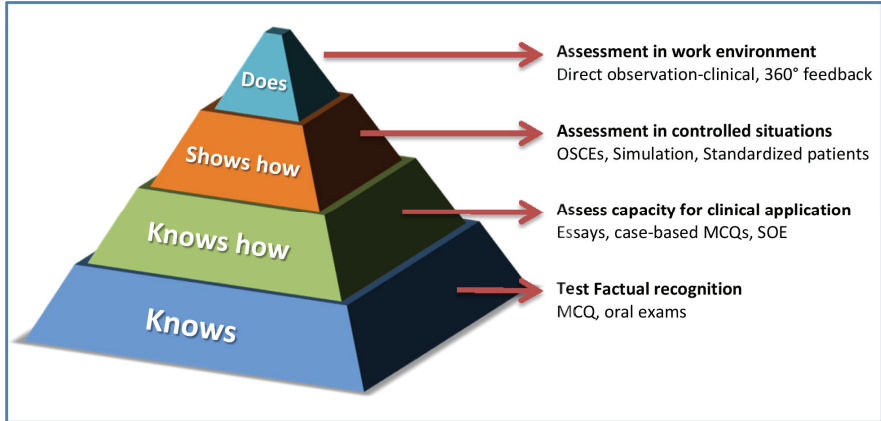


Figure 14: Miller's pyramid of medical competency

Based on the above, it is obvious that the assessment process is complex and involves substantial of effort to achieve its desired goals and objectives. Generally, the available assessment methods have different potential for evaluating the competencies stated in Miller's pyramid, with variable reliability and validity scores, and variable accuracy with regard to the respective competency to be measured.

To overcome this problem, Van der Vleuten has suggested using a cocktail of methods or a holistic program to cover the whole range of medical competencies, such that possible weaknesses of one method will be compensated for by others. The assessment program (a system rather than a method) should be built to be comprehensive and holistic in order to cover all domains mentioned in Miller's pyramid⁽³²⁾.

The assessment program in this prosthodontic curriculum is a mixture of complementary instruments targeted to higher cognitive abilities, is capable of assessing intrapersonal and interpersonal skills and emphasizing formative assessment, and is designed to achieve the objectives of the curriculum.

I. Assessment formats

There is no single assessment modality that can address all the required domains of competency suggested by Miller's pyramid or its modified version. Therefore, to obtain an accurate assessment, different modalities are required. During the assessment, certain elements of competency must be considered, including the following:

- **Cognition:** Knowledge of content
 - **Psychomotor:** Skills (procedures, physical examinations, and communication)
 - **Affective:** Attitude and behavior
- Below is a list of assessment tools used currently in the prosthodontic training program.

1. Cognition assessment tools

1.1. Annual (promotion) written Multiple Choice Questions (MCQ)/Single Best Answer (SBA) examination

A multiple-choice questions tool is an appropriate method for assessing the understanding of basic and clinical prosthodontics and tests the “knows” and “know-hows” in Miller’s pyramid. Multiple-choice questions are widely used in medical and dental training programs⁽³³⁾ because they are a cost-efficient testing format with high reliability and validity. Additionally, they can objectively test a large amount of curriculum content and a large number of residents in a short period of time. In this program, the MCQ format is used in Promotion (Annual) examinations. Additionally, it is used in Saudi Board Part I and the final prosthodontic written examination. Please refer to “Summative assessments” on [\(page 1\)](#).

Promotion (annual) examinations:

This written exam shall cover applied basic science knowledge related to prosthodontics. This exam is designed by the Prosthodontic Scientific Council. Passing the exam/exams is essential for any candidate to proceed to the next level of training. However, this exam will be waived in R1 or R2 if the candidate passed the Saudi Board Part I written prosthodontic examination.

Example:

A 65-year-old male patient came to the clinic complaining of discomfort with his dentures. On examination, patient has upper and lower complete dentures with 2 mm midline shift, he has a 4-mm freeway space, and it is observed that the posterior teeth are set edge to edge in centric occlusion without horizontal overjet.

What is the most likely discomfort the patient is complaining about?

- Gagging
- Difficulty in swallowing
- Cheek biting
- Speech aberrations

1.2. Structured Oral Exam (SOE)

The Structured Oral Exam is an advanced and more structured form of typical oral exams, and is an assessment conducted by a panel of prosthodontic examiners. Unlike in MCQ, clinical reasoning, professional thinking, self-confidence, and self-assurance can be assessed. In this curriculum, the SOE tool is designed with preset questions and standard answers.

At the end of each residency year (R1, R2, and R3), each resident will present his/her own case in which he/she will be given pre-set questions distributed to the examiners along with answers with references in order to standardize the method of questioning and standardize the level of examiners. The grades are assigned according to a blueprint governing exam content.

- Resident level 1 (R1) Scenario case of maxillary and mandibular complete denture treatment

- Resident level 2 (R2) Scenario case of fixed/removable prosthodontic treatment
- Resident level 3 (R3) will be able to choose between presenting 2 comprehensive fixed prosthesis cases that he/she completed:
 - a. Comprehensive fixed prosthodontic treatment
 - b. Comprehensive fixed implant-supported prosthesis treatment

Narrative criteria example:

R1	R2	R3
Maxillary and mandibular complete denture treatment	Fixed/removable prosthodontic treatment	A choice between 2 comprehensive fixed prosthesis treatment
Anatomical landmarks, denture retention, denture stability, denture support Impression techniques and materials, posterior palatal seal Jaw relation, esthetics and phonetics, VDO guidelines, Facebow techniques and CR record	Kennedy classifications, major and minor connectors, direct and indirect retainers, Intracoronar and extracoronar attachments, Kratochvil I bar, Krol RPI Survey and designs, mouth preparation, fitting frameworks, impression techniques, altered cast technique,	a. Comprehensive prosthodontic treatment <i>(With/without implants or removable prosthesis with minimum 18 fixed units (teeth/pontic))</i> OR b. Comprehensive fixed implant-supported prosthesis treatment <i>(Minimum single arch fixed prosthesis fully supported by implants)</i>

Example of questions on a clinical case:

- List clinical findings (problem list)
- What is the etiology of the worn dentition?
- What will you find when you observe the facial appearance of a patient with a severely worn dentition?

1.3. Academic Assignments

The following academic and clinical assignments are mandatory for annual promotion and graduation:

- Case-Based Discussion (CBD)
- Presentation Performance Assessment
- Literature review attendance/quizzes

1.3.1 Case-Based Discussion (CBD)

The purpose of a Case-Based Discussion (CBD) encounter is to evaluate the level of professional judgement exercised in clinical cases by the trainee. CBD is designed to:

- guide the trainee's learning through structured feedback
- help improve clinical decision making, clinical knowledge and patient management
- provide the trainee with an opportunity to discuss their approach to the case and identify strategies to improve their practice
- be a teaching opportunity enabling the evaluator to share their professional knowledge and experience

Overview

CBD encounter involves a comprehensive review of clinical cases between a trainee and an evaluator. All the cases that will be submitted at the end of the academic year should have a completed CBD. The trainee is given feedback from an evaluator across a range of areas relating to clinical knowledge, clinical decision making and patient management. A CBD encounter for each case takes approximately 20–30 minutes (**Figure 15**).

Resident (or instructor) responsibilities include:

- Choose the case(s) for discussion
- Use the CBD form to rate the trainee
- Provide constructive feedback and discuss improvement strategies
- Provide an overall judgment on the trainee's clinical decision-making skills
- Submit the completed CBDs to the regional committee at the end of the academic year

Timing and number of CBD forms		
R1	2 CBDs	Any submitted cases: Finished or in progress
R2	2 CBDs	Any submitted cases: Finished or in progress
R3	5 CBDs	CASE 1: Maxillary and mandibular complete denture treatment CASE 2: Fixed/removable prosthodontic treatment CASE 3: Comprehensive prosthodontic treatment CASE 4: Comprehensive fixed implant-supported prosthesis treatment CASE 5: Elective prosthodontic treatment

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program



المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

CASE-BASED DISCUSSION (CBD) For completed and submitted clinical cases

Trainee's Name: _____ Training level: _____

Training center: _____ City: _____

Patient name or initials: _____ Medical record: _____

Case Type ☐ Uncomplicated ☐ Intermediate ☐ Complex

Describe Case / Prosthesis _____

Procedure	Unsatisfactory			Satisfactory			Superior		
	1	2	3	4	5	6	7	8	9
Medical record documentation									
Clinical assessment									
Investigation and referrals									
Treatment									
Follow-up and future planning									
Professionalism									
Clinical judgment									
Leadership/Managerial skills									
Overall performance									

Outcome of overall resident assessment ☐ Clinically outstanding ☐ Clinically acceptable

Remarks:

Supervisor Signature: _____ Date: _____

Case-Based Discussion (CBD) (F02) | Prosthodontic Training Program-SCFHS



Figure 15: Case-Based Discussion (CBD)

1.3.2. Presentation Performance Assessment

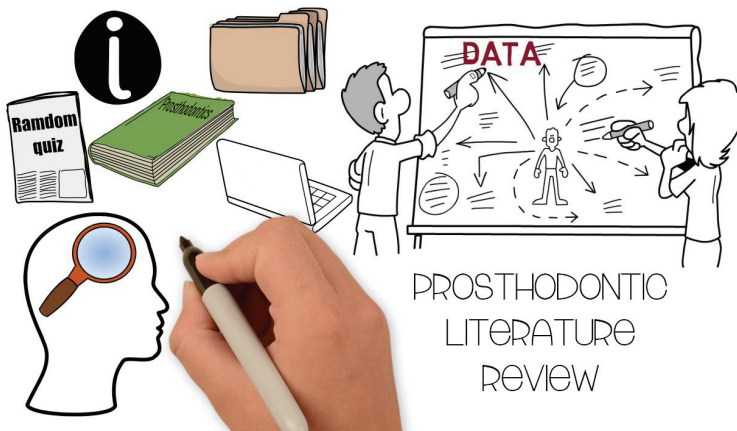
Residents are required to deliver multiple oral and poster presentations throughout their residency. The patient performance assessment could be used as a “summative assessment” and be used to assess residents’ performance in presentations, clinical cases, prosthodontic topics, and research projects (**Figure 20: Direct Observation of Procedural Skills (DOPS) For Prosthodontic Procedures (front page)**).

Additionally, residents from level two and above will participate in the annual prosthodontic resident day as oral speakers or poster presenters and will be assessed with the same assessment form. Generally, senior residents present oral presentations, while junior residents present posters.

Additionally, this assessment tool could be used as a “formative assessment” in which residents have the opportunity to assess each other when they are presenting a clinical case or a prosthodontic topic. This form is designed to enhance teaching and assessment skills and develop scholar, collaborator and professional roles. This assessment will provide an opportunity to the program director or the supervisors to reflect with their residents. All information will be kept confidential.

1.3.3. Literature review attendance/mini-quizzes

A specialty-literature review is essential for all residents to be a competent prosthodontist and enhance their scholar skills. Therefore, attendance and random quizzes are tools used to reinforce its implementation. Residents who fail to fulfill this requirement can ultimately be deprived from setting to the final exam. Random MCQ mini-quizzes could be applied during literature review session without prior notice to ensure that residents have prepared and read the assigned scientific articles.



Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program



المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

Presentation Performance Assessment

Presenter Name: _____ Res. level: _____ Date: _____

Please, fill in the appropriate evaluation mark using the grading reference below:

Unsatisfactory	Below Average	Average	Above Average	Outstanding
1	2	3	4	5

No.	Criteria	Grade
1	Introduction of self, case and topic objectives	
2	Capturing the attention of the audience	
3	Providing proper documentation	
4	Organization and preparation	
5	Exhibiting understanding of the presented materials	
6	Explaining important points	
7	Eye contact with the audience	
8	Oral presentation skills	
9	Quality of the slides and documentation	
10	Response to questions and criticism	
Overall evaluation		

One or two strengths of the presentation	One or two weaknesses of the presentation
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Instructor name _____ Signature: _____

NOTE: Only instructors are required to write their names and sign (Summative assessment), residents can evaluate anonymously (without writing name and signing) (Formative assessment)



Figure 19: Presentation Performance Assessment Form

2. Psychomotor assessment tools

2.1. Direct Observation of Procedural Skills (DOPS)

This is a workplace-based assessment (WBA) and a structured checklist for assessing competence in performing diagnostic and interventional procedures. It facilitates feedback in order to develop behaviors and performance related to operative, decision making, communication, and teamwork skills. It is slightly modified to fulfill the assessment criteria essential to effectively evaluate the prosthodontic procedure and clinical encounter outcomes. It is a competency-based assessment that is customized to evaluate multiple clinical encounters for single or multiple prosthodontic procedures (**Error! Reference source not found.** and Figure 16).

Competency-based grading and description are as follows:

Score	Key	Description
1	Completed with substantial assistance	- Resident completed the case/procedure after substantial assistance from the prosthodontic supervisor. - The supervisor involved physically in treating the patient. Example: The supervisor completed the crown preparation.
2	Completed with minimal assistance	- Resident completed the case/procedure after minimal assistance from the prosthodontic supervisor. - The supervisor gave directives in treating the patient. Example: The supervisor suggested to the resident to modify or adjust the preparation finish-line.
3	Completed independently (Competent)	- Resident completed the case/procedure without assistance from the prosthodontic supervisor. - However, the procedure was done with inadequacy in other non-dental soft skills or performed at marginally accepted quality. Example: The resident exceeded the appropriate time to finish the procedure or had shortcomings in communicating with the patient.
4	Completed independently, efficiently & effective (Proficient)	- Resident completed the case/procedure without assistance from the prosthodontic supervisor. - The procedure was done proficiently covering all aspects of clinical encounters. Example: The resident completed the procedure and clinical encounter proficiently with high quality and within the expected time.

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program



المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS) For Prosthodontic Procedures (DENTAL COMPETENCY-BASED ASSESSMENT)

Trainee's Name: _____ Training level: _____
Training center: _____ City: _____
Patient name or initials: _____ Medical record: _____
Case Type ☐ Uncomplicated ☐ Intermediate ☐ Complex

Describe Procedure / Prosthesis _____

Resident's assessment scale:

1 = Completed with substantial assistance

3 = Completed independently (Competent)

2 = Completed with minimal assistance

4 = Completed independently, efficiently & effective (Proficient)

Procedure	Date	Resident Performance	Supervisor Name	Supervisor Signature	Comments
Elicit history and information from patient					
Clinical and radiographical examination					
Good understanding of the theoretical background					
Laboratory Prescription and mounted-casts evaluation					
Diagnosis and treatment planning					
Communication with patient (consent), colleagues & staff					
Aware of risks of cross infection (Aseptic technique)					
Case preparation and temporization					
Definitive impressions					
Jaw relation					
Delivery of the prosthesis					
Post procedural instructions and maintenance					
Coped well with unexpected problems					
Record keeping					
Professionalism					
Overall performance					

Outcome of overall resident assessment ☐ Clinically outstanding ☐ Clinically acceptable

Supervisor Signature: _____ Date: _____

Direct Observation of Procedural Skills (DOPS) (F01) | Prosthodontic Training Program-SCFHS



Figure 20: Direct Observation of Procedural Skills (DOPS) For Prosthodontic Procedures (front page)

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program



المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

CLINICAL POINTS

Code	Type of procedure	Assigned points	No. of Units	Total points	Supervisor	
					Name	Signature
Fixed prosthesis requirements						
101	Full-metal crown	1 point				
102	Metal-ceramic crown	1 point				
103	All-ceramic crown	1 point				
104	Surveyed crown	2 points				
111	Full-metal FDP retainer/pontic	1 point				
112	Metal-ceramic FDP retainer/pontic	1 point				
113	All-ceramic FDP retainer/pontic	1 point				
121	Veneer or prepress ceramic restoration	1 point				
122	Only or inlay (including Endocrown)	1 point				
131	Implant crown	1 point				
132	Implant retainer/pontic	1 point				
133	Abutment for implant crown/retainer	1 point				
151	Cast post and core (CPC)	1 point				
152	Prefabricated post and core build-up	1 point				
Removable prosthesis requirements						
201	Conventional complete denture	2 points				
202	Immediate complete denture	2 points				
203	Implant-supported/retained overdenture	2 points				
204	Implant abutment supporting the overdenture	1 point				
205	Tooth-supported overdenture	2 points				
206	Tooth attachment supporting the overdenture	1 point				
251	Free-end saddle or bounded saddle RPD	2 points				
252	RPD attachment (semi-precision) (per attachment)	2 points				
253	Implant-supported RPD	2 points				
254	Implant abutment supporting the RPD	1 point				
255	Transitional RPD	0.5 point				
Other prostheses/appliances						
301	Acrylic night guard	1 point				
501	Maxillofacial prosthesis (obturator or extraoral prosthesis)	5 points				
Uncompleted clinical points (if needed to achieve the annual target)*						
901	Temporary fixed restoration	0.25 point				
902	Temporary fixed restoration + definitive impression	0.5 point				
951	Definitive impression for removable prosthesis	1 point				
Completed clinical points for this patient						
Uncompleted clinical points for this patient*						
Total clinical points for this patient						
TOTAL CLINICAL POINTS FOR THE WHOLE ACADEMIC YEAR						
FILLED OUT ONCE PER ACADEMIC YEAR, & BASED ON OTHER SIGNED DOPS FORMS THROUGHOUT THE TRAINING YEAR. THIS SECTION CAN ONLY BE SIGNED BY THE PROGRAM DIRECTOR						

* It is only filled up if the residents didn't achieve the annual target. The points will be removed once the case is completed. It can only be utilized at the end of R1 & R2 to fulfill the annual requirements, and not to be calculated toward the end of the program.

Direct Observation of Procedural Skills (DOPS) (F01) | Prosthodontic Training Program-SCFHS



**Figure 16: Direct Observation of Procedural Skills (DOPS)
For Prosthodontic Procedures (back page)**

2.2. Portfolio/Logbook (Assessment system)

This is a systematic and organized collection of a candidate's work that demonstrates to others the direct evidence of a candidate's efforts, achievements, and progress over a period of time⁽³⁴⁾. Currently, and until the execution of the new web-based portfolio software "Assessment system" by SCFHS, each resident maintains a logbook which is considered a part of the portfolio. The portfolio is an integral component of the training program that will be monitored by an assigned prosthodontic supervisors (*Refer to the **mentorship** section below*) and developed in alignment with the learning process. The following aspects are taken into consideration^(33, 35) (**Figure 17**):



Figure 17: Portfolio component

2.3. Research activity

Research is one of the SCFHS requirements. Residents are required to present their research at the Annual resident day their research activities. For more details, please refer to Chapter 5 "Research" on ([page 1](#)).



2.4. Objective Structured Clinical Examination (OSCE)

This is designed to test knowledge, clinical skill, and behavior competencies. It is a hands-on, real-world approach to clinical education and assessment. In this curriculum, the OSCE tool is used in the final clinical examination, testing the “shows how” in Miller’s pyramid.

OSCE stations will fall into the following types:

- Clinical stations involving interaction between the resident & a real or simulated patient.
- Practical stations involving performance of technical procedures (e.g., Setting-up articulator).
- Static stations do not involve any physical interaction, but the task may be very varied.

The followings can be assessed:

- Communication
- History taking
- Physical examination
- Investigations, including laboratory, radiographic, and other data interpretation
- Diagnosis and treatment
- Technical and procedural skills

The blueprint design will guide the selection of tasks to be performed (Figure 18).

Domains	Dimension of care				Station no.
	Health promotion and illness prevention	Dental materials	Fixed dental prosthesis (including implants)	Removable denture	
	2±1	1±1	3±1	3±1	
Patient care 4±1 stations	1	1	1	1	4
Patient safety and procedural skills 2±1 station(s)			1	1	2
Communication and interpersonal skills 1±1 station(s)	1				1
Professional behaviors 2±1 station(s)			1	1	2
Total stations	2	1	3	3	9

Figure 18: Final clinical examination OSCE blueprint

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program



المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

IN-TRAINING EVALUATION REPORT (ITER)

Training center: _____ City: _____
Trainee's Name: _____ Resident level: _____
Rotation date: _____ SCFHS No.: _____

Procedure	Meeting expectations*					Score
	Rarely	Inconsistently	Generally	Exceeds	N/A	
MEDICAL EXPERT						Score
a. Apply knowledge of the clinical and basic sciences						
b. Elicit a history, perform a clinical exam, select appropriate investigations, and interpret their results competently						
c. Recognize and respond to patient safety incidents						
d. Provide appropriate clinical decisions						
e. Deliver appropriate emergency management						
f. Perform a procedure in a skillful and safe manner						
COMMUNICATOR						Score
a. Communicate using a patient-centered approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion						
b. Provide accurate documentation						
c. Provide a clear structure of communication						
d. Disclose harmful patient safety incidents to patients and their families accurately and appropriately						
COLLABORATOR						Score
a. Establish and maintain positive relationships with colleagues						
b. Interact with other specialists during joint consultation						
c. Handle conflicts professionally						
LEADER						Score
a. Participate in administrative activities						
b. Allocate health care resources for optimal patient care						
c. Manage time and set priorities						
HEALTH ADVOCATE						Score
a. Incorporate disease prevention and health promotion						
SCHOLAR						Score
a. Participate in appropriate medical education or research activities						
b. Implement an ongoing plan for self-education						
c. Participate in teaching activities						
d. Plan and deliver a learning activity						
e. Improve the electronic logbook/portfolio						
PROFESSIONAL						Score
a. Recognize and respond to ethical issues encountered						
b. Understand medical and legal obligations						
c. Exhibit punctual attitude						
d. Accept constructive criticism						
TOTAL out of 100%						
Comments						
Residency training committee approval (if applicable)						Date
Program director name and signature						Date
Trainee name and signature						Date

*Rarely ≤30%, Inconsistently >30–60%, Generally >60–90%, Exceeds >90%

Continuous Evaluation Report (CER) (F06) | Prosthodontic Training Program-SCFHS



Figure 19: In-Training Evaluation Report (ITER)

3.3. Multi-Source Assessment (360° feedback)

This is a supplemental (optional) formative assessment form that is designed to cover professional, communicator, and collaborator roles. Dental staff including supervising consultants, dental assistants, dental lab technologists, and dental radiological technologists can use it (Figure 20).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

Multi-Source Assessment (360° Feedback)

Presenter Name: _____ Res. level: _____ Date: _____

Please, fill in the appropriate evaluation mark using the grading reference below:

Unsatisfactory	Below Average	Average	Above Average	Outstanding
1	2	3	4	5

No.	Criteria	Grade
1	Treats co-workers with respect and provides information when necessary at any time. <i>(Attitude and professionalism)</i>	
2	Attends and leaves on time, and finishes the scheduled clinical procedure on the expected time duration. <i>(Proper time management and attendance)</i>	
3	Provides and requests proper consultations when needed, and provides understandable verbal and written feedbacks <i>(Collaboration)</i>	
4	Documents (written or electronic) complete and proper medical/dental records and case referrals, and they are readable, and done on time for each encounter <i>(Professionalism and collaboration)</i>	
5	Documents (written or electronic) proper consent form before procedure, and manages patients in case of adverse events <i>(Communication and professionalism)</i>	
6	Overall resident confidence in handling patients, colleagues, allied healthcare staff, and clinic. <i>(Professionalism)</i>	
Overall evaluation		

Comments

Done by: _____ Initials: _____

Multi-Source Assessment Form (F03)| Prosthodontic Training Program-SCFHS



Figure 20: Multi Source Assessment Form

3.4. Patient satisfaction assessment (360° feedback)

This is another supplemental (optional) formative assessment which dental patients can use to assess their resident doctors. They can assess residents' health advocacy, communication, and professionalism. The patient will fill out the form after the clinical encounter and submit it to a third party (e.g., front-desk staff). Later, the program director can collect them and reflect with his/her residents. All information will be kept confidential (Figure 21).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

استبيان عن رضا المرضى

اسم الطبيب _____ التاريخ _____

عزيزي زائر/زائرة قسم الأسنان

نود التعرف على شعورك بما يتعلق بالخدمات المقدمة من قبل أطبائنا المقيمين. سوف تستخدم اجاباتك لتحسين جودة هذه الخدمات. ليس المطلوب ذكر اسمك في هذا الاستبيان. وسوف يتم الاحتفاظ بكافة الأجوبة في سرية تامة و دون التعريف بصاحبها لاستخدامها لأغراض التعليم و التقييم فقط.

نشكرك على مشاركتك في هذا الاستبيان

لقد قممت بزيارة هذا الطبيب (ضع علامة ✓ على أحد الأجوبة)

للمرة الأولى ☐ 2-4 مرات ☐ 5 مرات أو أكثر ☐

أرجو وضع علامة ✓ على ما تراه مناسباً حسب رأيك عن أداء الطبيب المقيم في القياس المدرج أدناه:

اعراض تماماً (1)	اعراض (2)	متعاد (3)	او افق (4)	او افق تماماً (5)
تواصل الطبيب				
				1 قدم الطبيب نفسه بطريقة لائقة وشرح لي واجباته تعاهي
				2 استمع الطبيب لمشكلكي الأساسية ويسأل عن تاريخي المرضي
				3 استعمل كل الوسائل المتاحة لشرح حالتي المرضية وطريقة العلاج
				4 شاركتي الرأي لاختيار أفضل خطة علاج تتناسب مع حالتي المرضية
				5 تأكد من فهمي لتعليمات ما بعد العلاج
مهنية الطبيب				
				1 هذا الطبيب مهذب ومحترم في تعامله معي
				2 يهتم خصوصي أثناء المجازة و إجراء الكشف
التقييم الشامل للطبيب				
				1 خدمة الرعاية التي قدمها الطبيب بشكل عام كانت ممتازة

مقترحات لتحسين الأداء: _____

نشكركم على هذا الاستبيان

أرجو وضع النموذج بعد إكماله في الصندوق المخصص لذلك أو تسليمه لأحد موظفي الاستقبال

Patient Satisfaction Survey Form (F05) | Prosthodontic Training Program-SCFHS



Figure 21: Patient Satisfaction Survey Form

II. Assessment formats integration with Miller's domains and CanMEDS roles

1. Assessment formats vs. Miller's domains

No	Assessment tool	Format	type	Residency level	Miller's domain
Cognitive assessment tools					
1	Multiple Choice Question (MCQ)	Part I exam (Written)	Summative	R1 or R2	Knows Knows how
		Annual exam (Written)	Summative	R1 or R2	
		Final exam (Written)	Summative	R3	
2	Structured Oral Examination (SOE)	Annual exam (Clinical)	Summative	R1, R2, R3	
3	Academic Assignments				
	• Case-Based Discussion (CBD)	Annual submission	Summative	R1, R2, R3	Does
	• Presentation Performance Assessment (PPA)	Continuous	Mix	R1, R2, R3	Knows how
	• Literature review attendance/quiz	Continuous	Summative	R1, R2, R3	Knows
Psychomotor assessment tools					
4	Direct Observation of Procedural Skill (DOPS)	Continuous	Formative	R1, R2, R3	Does
5	Portfolio / logbook Assessment system	Continuous	Mix	R1, R2, R3	Does
6	Research activity	Continuous	Summative	R1 or R2	Does
7	Objective Structured Clinical Exam (OSCE)	Final exam (Clinical)	Summative	R3	Shows how
Affective assessment tools					
8	In-Training Evaluation Report (ITER)	Continuous	Summative	R1, R2, R3	Does

9	Multi Source Assessment (360° feedback)	Continuous	Formative	R1, R2, R3	Does
10	Patient Satisfaction Survey (360° feedback)	Continuous	Formative	R1, R2, R3	Does

2. Assessment formats vs. CanMEDS roles

Assessment	Dental Expert	Communicator	Collaborator	Professional	Leader	Scholar	Health Advocate
Cognitive assessment tools							
MCQ	+++	+	++	+	+	++	++
SOE	+++	+	+	+	-	-	+
CBD	+++	+++	+++	+++	+++	+++	+++
Presentation Performance Assessment*	++	-	+++	+++	+++	++	-
Psychomotor assessment tools							
DOPS	+++	+++	+++	+++	+++	+++	+++
Portfolio/Log book Assessment system	++	++	+	+++	++	+++	+++
Research activity	+++	-	++	+++	-	+++	-
OSCE	+++	+++	+++	+	-	-	++
Affective assessment tools							
Continuous Evaluation Report	+++	+++	+++	+++	+++	+++	+++
Multi Source Assessment	++	+++	+++	+++	+++	++	+++
Patient Satisfaction Survey	++	+++	+++	+++	+++	++	+++

* Estimated assessment effect, the rest are adopted from the **CanMEDS Assessment Tools Handbook**⁽³⁶⁾

III. Formative assessments

The general objective of the annual promotion assessment is to assess whether the trainee has satisfactorily acquired the theoretical knowledge and clinical competences that he/she should have acquired during the relevant year⁽³⁴⁾. (Figure 22)

The annual promotion assessment is a holistic program implemented throughout the academic year to cover the CanMEDS framework domains via a set of formative assessment tools that include the following **continuous assessment components**:

- In-Tainting Evaluation Report (ITER), containing a list of CanMEDS criteria for evaluation
- Competency-proficiency clinical assessment
- Multisource assessment (360° feedback)
- Patient satisfaction survey (360° feedback)
- Clinical case presentation seminar
- Presentation performance assessment (completed by a peer)
- Feedback during academic activities
- Monthly feedback during department meetings
- End-of-year written examination (local)
- Oral examination
- Case-Based Discussion (CBD)
- Research requirement
- Portfolio or Logbook
- Direct Observation of Procedural Skills (DOPS)

The trainee and trainers are advised to communicate directly with their program directors to apply the most updated “formative assessment” tools as the list mentioned in this document might be subjected to periodic changes. Please refer to the “Assessment formats” section on (page 1).

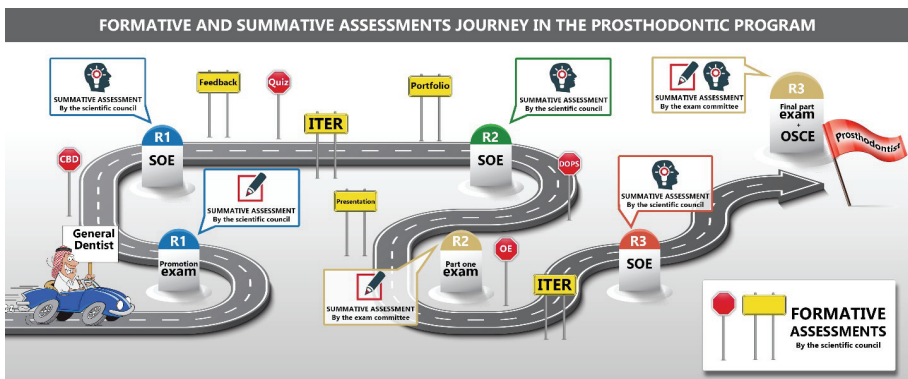


Figure 22: Formative and summative assessments in the program

IV. Summative assessments

The summative assessment is the component of the assessment that primarily aims to make informed decisions on trainees' competency. In comparison with the formative one, a summative assessment does not aim to provide constructive feedback. Based on SCFHS regulations, a summative assessment includes Saudi Board Part I Prosthodontic written examination, Certification of Training Completion, and final written/clinical examination.

1. Saudi Board Part I Prosthodontic written examination

This written exam shall cover applied basic science knowledge related to prosthodontics. Passing the exam is a prerequisite for any candidate to proceed to a more senior level of training⁽³⁴⁾.

The part I written examination will only target R1 and R2 residents. The exam is optional for R1 residents. If they pass it, the promotion exam in R1 will be waived and they will no longer be required to take part I in R2. In contrast, R2 residents are required to take the exam (in case they didn't take it or pass it in R1) in order to be promoted to R3. An exam blueprint will be distributed to the residents covering the full R1 and R2 curricula.

2. Certification of Training Completion and Final In-Training Evaluation Report

A Final In-Training Evaluation Report will be completed by the resident training program director for each resident at the end of the final year in residency. This is a summative evaluation that confirms that the resident has acquired the full range of competencies (knowledge, skills, and attitudes) required for a specialist and is ready to sit the Saudi certification examinations.

The Final In-Training Evaluation Report is not a composite of the regular in-training evaluations; rather, it is a testimony of the evaluation of competencies at the end of a residency education program⁽³⁴⁾.

In order to be eligible for final specialty examinations, each trainee is required to obtain a "Certification of Training-Completion." Based on the training bylaws and executive policy, trainees will be granted a "Certification of Training-Completion" once the following criteria are met:

- a. Successful completion of 5 required comprehensive prosthodontic cases
- b. Completion of the required clinical points as outlined
- c. Clearance from SCFHS training affairs, that ensures compliance with tuitions payment and completion of universal topics

A "Certification of Training-Completion" will be issued and approved by the local supervisory committee or its equivalent according to SCFHS policies.

3. Final Examinations of Saudi board Certificate

3.1. Final Prosthodontic Written Certification Examination

A written exam will be carried out to determine the quantity and quality of specialty knowledge base ranked as competent, such that the individual can be used as a referral source for prosthodontics⁽³⁴⁾.

For more details, please visit the SCFHS webpage: <http://www.scfhs.org>

3.2. Final Prosthodontic Clinical Certification Examination

This is an OSCE clinical exam that ensures that the candidate has the necessary clinical competencies in prosthodontics including, but not limited to, history taking, physical examination, documentation, procedural skills, communication skills, bioethics, diagnosis, management, investigation, and data interpretation ⁽³⁴⁾.

For more details, please visit the SCFHS webpage: <http://www.scfhs.org>

Promotion decision mechanism

Residents are evaluated according to the following mechanism:

< 50 %	50 % to 59.4 %	60 % - 69.4 %	≥70 %
Clear Fail	Borderline Fail	Borderline Pass	Clear Pass

- Resident should obtain **“Borderline Pass”** in all criteria to be promoted
- Resident will not be promoted if he/she obtains **“Clear Fail”** in any of the criteria
- As an exception to the above, the training program director can recommend the resident to be promoted on the following conditions:
 - If resident obtains **“Borderline Fail”** in 1 criterion, he/she should compensate for it by obtaining a **“Clear Pass”** in another criterion in order to be promoted to the next level
 - If resident obtains **“Borderline Fail”** in 2 criteria (not on the same element; skills, knowledge or attitude), he/she should compensate for it by getting a **“Clear Pass”** in another 2 criteria in order to be promoted to the next level (and so on)
 - If resident obtains **“Borderline Fail”** in 3 criteria (not on the same element; skills, knowledge or attitude), he/she should compensate for it by obtaining a **“Clear Pass”** in another 3 criteria in order to be promoted to the next level (and so on)
 - Resident will only be promoted after approval of the scientific council

V. Summary of the formative and summative assessments

Details		Type	R1	R2	R3
Knowledge المعرفة					
Academic assignment مهام أكاديمية محددة	Preclinical course	Formative	✓	-	-
	Literature review	Formative	✓	✓	✓
	Case/Topic presentation	Formative	✓	✓	✓

	Case-Based Discussion (CBD)	Formative	✓	✓	✓
End-of-Year Written Exam (YET-local) اختبار نهاية السنة الكتابي		Formative/summative	✓*	✓*	-
Structured Oral Exam (SOE) الاختبار الشفهي المنظم		Formative/summative	✓	✓	✓
Skills المهارات					
Direct Observation of procedural skills (DOPS)		Formative	✓	✓	✓
Portfolio/Logbook كتيب الحالات		Formative	✓	✓	✓
Research activity (Resident day presentation) النشاط البحثي		Formative	✓	✓	✓
Attitude السلوك					
In-Training Evaluation Report (ITER)	Continuous Evaluation (تقييم مستمر كل 3 أشهر) Formative forms to help in filling the ITER: • Multi Source Feedback • Patient Satisfaction Survey	Formative	✓	✓	✓
Summative assessments will be evaluated according to the following criteria					
< 50 %	50 % to 59.4 %	60 % - 69.4 %	≥70 %		
Clear Fail	Borderline Fail	Borderline Pass	Clear Pass		
- Resident should obtain “Borderline Pass” in all criteria to be promoted - Resident will not be promoted if he/she gets “Clear Fail” in any of the criteria - If resident gets “Borderline Fail” in one criterion, he/she should compensate it by getting a “Clear Pass” in another criterion in order to be promoted to the next level - If resident gets “Borderline Fail” in two criteria, he/she should compensate it by getting a “Clear Pass” in another two criteria in order to be promoted to the next level (and so on)					

Part I Written Exam اختبار الجزء الأول الكتابي	Summative	✓*	✓*	-
Final Written Certification Exam الاختبار الكتابي النهائي	Summative	-	-	✓
Final Clinical Certification Exam الاختبار السريري النهائي	Summative	-	-	✓

* The "Saudi Board Part I examination" can be taken in R1 and the "End-of-Year Written Exam (YET-local)" will be waived. In case R1 residents did not pass it, they should complete the YET-local exam in order to be promoted to R2; the Part I examination then can be retaken by the end of R2.

7. PROGRAM EVALUATION

Evaluation of the prosthodontic program is an integral part of this dynamic curriculum. The program needs to be reviewed periodically in order to maintain ongoing improvement and to determine whether its goals and objectives have been achieved. The following chart shows the general blueprint of the curriculum evaluation system:

Evaluation issue	Evaluation plan
1. Prosthodontic education is the goal of the curriculum	
Is the cognitive, psychomotor, and affective content of the curriculum appropriate for prosthodontics?	Annual residents' evaluation surveys (page 1)
Is it impacting the residents as planned and producing competent prosthodontists?	Graduated resident's opinion
2. The educational program and evaluations are competency-based	
Does the curriculum content and assessment adequately include the use of knowledge, skills, and behavior competencies? (e.g., communication, scholar, professional)	Periodic residents' evaluation for didactic and skill course (pages 1 and Error! Bookmark not defined.)
	Assess the competency-based objectives every 3–5 years for updates and modifications
3. Integration of basic and clinical science contents.	
Does basic and clinical sciences promote learning and serve as basis for successful clinical practice?	Preclinical and annual residents' evaluation surveys. (page Error! Bookmark not defined. and 1)
	Annual clinical case review by assigned committee from the scientific council
4. Self-directed learning	
Does the curriculum promote independent study?	Residents' evaluation surveys
	Three-month periodic review of the residents' performance

5. Appropriate varieties of clinical cases

Is the clinical setting adequate to meet the clinical curriculum requirements?	Periodic residents' evaluation for skill courses (page Error! Bookmark not defined.)
Are the residents exposed to different clinical cases of master prosthodontics?	- Annual clinical case review by assigned committee from the scientific council - Three-month periodic review of the residents' performance

6. Discovering new knowledge

Does the curriculum motivate residents to discover new information related to prosthodontics?	Annual residents' evaluation surveys (page 1)
	Research report
	Resident day contest

The evaluation results can be used to maintain and garner support for the curriculum, to assess students' achievement, to satisfy external requirements, to document the accomplishments of the curriculum developers, and to serve as the basis for presentations and publications. There are several evaluation programs under consideration. In this curriculum, we are using a mix of **Goal-based evaluation** as described by Ralph Tyler⁽³⁷⁾ and **Goal-free evaluation** as described by Michael Scriven⁽³⁸⁾.

▪ Goal-based evaluation

Goal-based assessment is one of the oldest and most frequently used evaluation systems. Occasionally, it is called a goal-attainment model or objectives-centered model. It uses a systematic methodology according to several different steps in order to determine whether the curriculum plan has achieved its goals. To use this model, we constructed a survey with pre-determined questions that reflect the objectives of the curriculum.

Example:

- (On a scale of 5) how would you rate the environment of the overall program for residents?
- (On a scale of 5) how would you rate the presence of supervisors during clinical sessions?

▪ Goal-free evaluation

A goal-free evaluation is conducted without particular knowledge or reference to stated or predetermined goals and objectives. Unlike goal-based evaluation, goal-free evaluation observes and measures actual processes and outcomes. Therefore, unexpected outcomes, whether positive or negative, can help us improve the curriculum. Examples of unexpected outcomes include the presence of a competitive environment that motivates residents, boosts their role as lecturer or encourages a positive attitude, results in work overload, results in the presence of weak students, or incurs a language barrier.

Example:

1. *What aspects of the prosthodontic program were positive to you?*
2. *What aspects of the prosthodontic program were negative to you?*

Four different evaluation forms are constructed:

- I. Course evaluation
- II. Practical project/activity evaluation
- III. Overall basic and preclinical course evaluation
- IV. End-of-year program evaluation.

I. Course Evaluation

This evaluation can be used for any theoretical course given at any residency level (Figure 23).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

Course Evaluation

Prosthodontic Residency Program

Course name: _____ Resident level: _____

Instructor name: _____ Date of course: _____

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate.

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

1	Organization and teacher skills	Grade	Comments
1.1	Quality of planning and preparation in general		
1.2	Clarity of the educational objectives		
1.3	Course relevance to prosthodontic specialty		
1.4	Quality of delivery consistency in general		
1.5	Quality of delivery method (slides, photos, etc.)		
1.5	Ability to motivate residents to participate (stimulation)		
1.6	Ability to relate course information to clinical application		
1.7	Effectiveness of feedback (e.g. clear, specific, timely, constructive)		
1.8	Difficulty of the course		
1.9	Role model (e.g. knowledgeable, competent, professional)		
1.10	Overall experience		

2	Outcome	Grade	Comments
2.1	Knowledge learned in this course		
2.2	Communication skills learned this course		
2.3	Self-directed learning in this course		
2.4	Change toward professional attitude and behavior		

3	Course duration	Too long	About right	Too short
3.1	Appropriate length of the course	7	6	5
				4
				3
				2
				1

Please provide other positive or negative comments about this academic year, which may help in modifying it for the next year. Also give any comments / suggestions for topics that need to be covered or discussed in more detail for this residency level:

Note: To ensure confidentiality, don't write your name

1 | Course evaluation form (F07) | Prosthodontic Training Program-SCFHS



Figure 23: Course Evaluation (for theoretical courses)

II. Practical Project/Activity Evaluation Course Evaluation

This evaluation can be used for practical project or activity (Figure 29).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

Practical Project/Activity Evaluation Prosthodontic Residency Program

Practical project: _____ Resident level _____
Instructor name: _____ Date of project: _____

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate.

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

1	Organization and instructor skills	Grade	Comments
1.1	Quality of planning and preparation in general		
1.2	Clarity of the educational objectives		
1.3	Quality of the resident guide booklet		
1.4	Quality of delivery method (slides, hand-on, etc.)		
1.5	Quality of the practical activities in general		
1.6	Instructors cooperation with residents		
1.7	Multidisciplinary collaborative environment among residents		
1.8	Ability to relate to clinical application		
1.9	Effectiveness of feedback (e.g. clear, specific, timely, constructive)		
1.10	Overall experience		

2	Laboratory set-up (or clinic set-up)	Grade	Comments
2.1	Accessibility to dental laboratory (or clinic)		
2.2	Space availability for residents		
2.3	Presence of supervisors in the lab (or clinic)		

3	Outcome	Grade	Comments
3.1	Knowledge and practical skills learned in this course		
3.2	Communication skills learned this course		
3.3	Self-directed learning in this course		
3.4	Change toward professional attitude and behavior		

4	Course duration	Too long	About right	Too short
4.1	Appropriate length of the course	7 6	5 4 3	2 1

Please provide other positive or negative comments about this academic year, which may help in modifying it for the next year.
Also give any comments / suggestions for topics that need to be covered or discussed in more detail for this residency level:

Note: To ensure confidentiality, don't write your name

1 | Practical project/activity evaluation form (F08) | Prosthodontic Training Program-SCFHS



Figure 29: Practical Project/Activity Evaluation

III. Overall Basic and Preclinical Course Evaluation

This evaluation consists of 2 pages targeting only R1 and will be distributed at the end of the basic and preclinical courses (Figure 24 and Figure 25).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

Overall Basic and Preclinical Course Evaluation

Prosthodontic Residency Program

Date: _____

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate.

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

ORGANIZATION AND OUTCOME									
1	Basic course organization (Theoretical part)					Grade	Comments		
1.1	Quality of planning in general								
1.2	Clarity of the educational objectives								
1.3	Quality of the resident guide booklet								
1.4	Course relevance to prosthodontic specialty								
1.5	Accessibility to teachers								
1.6	Cooperation with residents								
1.7	Organization and management								
1.8	Overall experience								
2	Laboratory organization						Comments		
2.1	Accessibility to dental laboratory								
2.2	Available space for residents								
2.3	Presence of supervisors in the lab								
2.4	Quality of the lab activities in general								
2.5	Multidisciplinary collaborative environment								
2.6	Constructive feedback by teachers								
3	Outcome						Comments		
3.1	Knowledge learned in this course								
3.2	Laboratory skills learned this course								
3.3	Communication skills learned this course								
3.4	Self-directed learning								
3.5	Change toward professional attitude and behavior								
4	Assessment						Comments		
4.1	Format of the assessment								
4.2	Assessment feedback by teachers								
4.3	Fairness								
5	Appropriate length for the course		Too long		About right			Too short	
5.1	Basic course		7	6	5	4	3	2	1
5.2	Laboratory courses and activities		7	6	5	4	3	2	1

Note: To ensure confidentiality, don't write your name

1 | Overall basic and preclinical course evaluation form (F09) | Prosthodontic Training Program-SCFHS



Figure 24: Page 1/2 for the Basic and Preclinical Course Evaluation

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

TEACHING AND LEARNING

6	Basic courses	Preparation	Amount learned	Stimulation
6.1	Head and neck anatomy	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.2	Pharmacology	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.3	Oral pathology, medicine and diagnosis	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.4	Dental radiology	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.5	Introduction to CanMEDS	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.6	Comprehensive treatment planning	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
6.7	Clinical photography	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

7	Introductory specialty courses	Preparation	Amount learned	Stimulation
7.1	Fixed prosthodontics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.2	Complete denture prosthodontics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.3	Removable partial denture prosthodontics	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.4	Dental implants	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.5	Occlusion	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.6	Post and core	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.7	Temporomandibular disorders	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
7.8	Maxillofacial prosthesis	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

8	Laboratory activities	Preparation	Amount learned	Stimulation
8.1	Complete denture laboratory work	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.2	Removable partial denture laboratory work	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.3	Diagnostic wax-up replica	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.4	Tooth Preparation and shade selection	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.5	Provisional restoration	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.6	Post and core fabrication	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.7	Maxillofacial prosthesis laboratory work	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
8.8	Fixed dental prosthesis Laboratory with CAD/CAM	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5

Please provide other positive or negative comments about this academic year, which may help in modifying it for the next year. Also give any comments / suggestions for topics that need to be covered or discussed in more detail for this residency level:

Note: To ensure confidentiality, don't write your name



Figure 25: Page 2/2 for the Basic and Preclinical Course Evaluation

IV End-of-Year Program Evaluation

This consists of 2 pages that will be distributed after the end-of-year written exams to all residents across all residency levels (Figure 26 and Figure 27).

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

SAUDI BOARD-PROSTHODONTIC FORMS

End-of-Year Program Evaluation For Prosthodontic program

Residency level: _____ Date: _____

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

No.	Items to be evaluated	Grade	Comments
1	Academic year organization		
1.1	Quality of planning the academic year in general		
1.2	Quality of delivery consistency in general		
1.3	Accessibility to program director		
1.4	Accessibility to supervisor		
1.5	Cooperation with the residents		
1.6	Ability to motivate residents		
1.7	Quality of the resident guide booklet		
1.8	Clarity of the educational objectives		
1.9	Organization and management		
2	Teaching and learning		
2.1	Basic scientific courses		
2.2	Pre-clinical training program and courses		
2.3	Complete denture topics		
2.4	Removable partial denture topics		
2.5	Fixed Prosthodontic topics		
2.6	Dental implant topics		
2.7	Occlusion topics		
2.8	Temporomandibular disorder topics		
2.9	Dental esthetic topics		
2.10	Case / Topic presentation		
2.11	Literature review		
2.12	Academic courses		
2.13	Research project		
2.14	Overall experience		

Note: To ensure confidentiality, don't write your name

1 | End-of-year program evaluation form (F10) | Prosthodontic Training Program-SCFHS



Figure 26: Page 1/2 for the end of year program evaluation

Kingdom of Saudi Arabia
Saudi Commission for Health Specialties
Prosthodontic Training Program




المملكة العربية السعودية
الهيئة السعودية للتخصصات الصحية
برنامج الاستعاضة السنية

SAUDI BOARD-PROSTHODONTIC FORMS

Please rate each of the following sections on the 5-point scale, or with N/A. Comment when appropriate

Poor	Fair	Good	Very Good	Excellent
1	2	3	4	5

No.	Items to be evaluated	Grade	Comments
3	Clinical and laboratory activities		
3.1	Multidisciplinary collaborative environment		
3.2	Available clinics		
3.3	Presence of supervisors in the clinic		
3.4	Balance between program clinical requirements and training center demands		
3.5	Flow of patients		
3.6	Quality of the clinical activities in general		
3.7	Constructive feedback by supervisors		
3.8	Accessibility to dental laboratory		
3.9	Quality of dental laboratory work		
4	Outcome		
4.1	Knowledge learned this year		
4.2	Clinical skills learned this year		
4.3	Laboratory skills learned this year		
4.4	Communication skills learned this year		
4.5	Change toward professional attitude and behavior		
4.6	Self-directed learning		
4.7	Clinical reasoning		
5	Assessment		
5.1	Relevance to the learning material		
5.2	Format of the exam (MCQ, OSCE, Essay, etc.)		
5.3	Difficulty of the exam		

Please provide other positive or negative comments about this academic year, which may help in modifying it for the next year. Also give any comments / suggestions for topics that need to be covered or discussed in more detail for this residency level:

Note: To ensure confidentiality, don't write your name

2 | End-of-year program evaluation form (F10) | Prosthodontic Training Program-SCFHS



Figure 27: Page 2/2 for the end of year program evaluation

8. LIST OF REFERENCES

1. Thomas PA, Kern DE. Internet Resources for Curriculum Development in Medical Education: An Annotated Bibliography. *Journal of General Internal Medicine*. 2004; 19(5 Pt 2):599-605.
2. Kern DE. Curriculum development for medical education: a six-step approach: JHU Press; 1998.
3. Moore DE, Pennington FC. Practice - based learning and improvement. *Journal of Continuing Education in the Health Professions*. 2003;23(S1).
4. Keith J. Ferro, Steven M. Morgano, Carl F. Driscoll, Martin A. Freilich, Albert D. Guckes, Kent L. Knoernschild, et al. The Glossary of Prosthodontic Terms: Ninth Edition. The Journal of prosthetic dentistry. 2017;117(5s):e1-e105.
5. Barth C. Prosthodontist Is #1 "In Demand" Job in Chicago, per ZipRecruiter. What Is a Prosthodontist? press releases by American College of Prosthodontists. 2015.
6. Bureau TUSC. United States population quick facts Suitland, Md: U.S. Department of Commerce; 2016 [Available from: <https://www.census.gov/quickfacts/table/PST045216/00>].
7. AlBaker A, AlRuthia Y. The reality of licensed dentists in the Saudi market: Specialties and geographical distribution. Alpha and Beta. 2016.
8. Statistics GAO. Demographic scan, 2016. In: Statistics GAO, editor. Saudi Arabia 2016.
9. CDC. Public health and aging: retention of natural teeth among older adults--United States, 2002. *MMWR Morbidity and mortality weekly report*. 2003;52(50):1226-9.
10. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century--the approach of the WHO Global Oral Health Programme. *Community Dentistry and oral epidemiology*. 2003;31(s1):3-24.
11. Atieh MA. Tooth loss among Saudi adolescents: social and behavioural risk factors. *International dental journal*. 2008;58(2):103-8.
12. Marcus SE, Drury TF, Brown LJ, Zion GR. Tooth retention and tooth loss in the permanent dentition of adults: United States, 1988-1991. *Journal of dental research*. 1996;75 Spec No:684-95.
13. Meskin LH, Brown LJ. Prevalence and patterns of tooth loss in U.S. employed adult and senior populations, 1985-86. *Journal of dental education*. 1988;52(12):686-91.
14. Average Life Expectancy [Internet]. The World Bank. 2014. Available from: https://www.google.com.sa/publicdata/explore?ds=d5bncppjof8f9_&ctype=l&strail=false&bcs=d&nselm=h&met_y=sp_dyn_le00_in&scale_y=lin&ind_y=false&rdim=region&idim=country:SAU&fidim=region&tstart=-302929200000&tend=1401138000000&hl=en&dl=en&ind=false
15. Abusaaq HI. Population aging in Saudi Arabia. Saudi Arabian Monetary Agency. 2015: 1-18.
16. Report. Global Dental Implants Market (2010 -2015). Markets and Markets Research; 2010 July 2010. Report No.: MD 1225.
17. Misch CE. Contemporary implant dentistry. 3rd edition ed: Elsevier Health Sciences; 2007. 22 p.
18. Blomberg S, Lindquist L. Psychological reactions to edentulousness and treatment with jawbone - anchored bridges. *Acta Psychiatrica Scandinavica*. 1983;68(4):251-62.
19. Albrektsson T, Blomberg S, Brånemark A, Carlsson GE. Edentulousness—an oral handicap. Patient reactions to treatment with iawbone - anchored prostheses. *Journal of Oral Rehabilitation*. 1987;14(6):503-11.

20. Raghoobar GM, Meijer HJ, Stegenga B, Hof MA, Oort RP, Vissink A. Effectiveness of three treatment modalities for the edentulous mandible. *Clinical oral implants research*. 2000;11(3):195-201.
21. Mahmoud A-O, Ahed A-W. Satisfaction with dental implants: a literature review. *Implant dentistry*. 2005;14(4):399-408.
22. Al Garni B, Pani SC, AlMaaz A, Al Qeshtaini E, Abu-Haimed H, Al Sharif K. Factors affecting the willingness to pay for implants: A study of patients in Riyadh, Saudi Arabia. *Dental Research Journal*. 2012;9(6):719-24.
23. Iobst WF, Sherbino J, Cate OT, Richardson DL, Dath D, Swing SR, et al. Competency-based medical education in postgraduate medical education. *Med Teach*. 2010;32(8):651-6.
24. Cate OT. A primer on entrustable professional activities. *Korean journal of medical education*. 2018;30(1):1-10.
25. Knowles M. *The adult learner: a neglected species*. 1973.
26. Tennyson RD, Rasch M. Linking cognitive learning theory to instructional prescriptions. *Instructional Science*. 1988;17(4):369-85.
27. Harasim L. *Learning theory and online technologies*: Taylor & Francis; 2017.
28. Kenny NP, Mann KV, MacLeod H. Role modeling in physicians' professional formation: reconsidering an essential but untapped educational strategy. *Academic Medicine*. 2003;78(12):1203-10.
29. Ramani S, Leinster S. AMEE Guide no. 34: Teaching in the clinical environment. *Med Teach*. 2008;30(4):347-64.
30. Kolb DA. *Experiential learning: Experience as the source of learning and development*: FT press; 2014.
31. Miller GE. The assessment of clinical skills/competence/performance. *Academic medicine*. 1990;65(9):S63-7.
32. Van Der Vleuten CP, Schuwirth L, Driessen E, Govaerts M, Heeneman S. Twelve tips for programmatic assessment. *Medical teacher*. 2015;37(7):641-6.
33. Gerhard-Szep S, Güntsch A, Pospiech P, Söhnel A, Scheutzel P, Wassmann T, et al. Assessment formats in dental medicine: An overview. *GMS journal for medical education*. 2016;33(4).
34. SCFHS. *General Exam Rules and Regulations*. Saudi Arabia: Saudi Commission for Health Specialties; 2015.
35. SCFHS. *Proposal for Post-Graduate Curriculum*. Saudi Commission for Health Specialties; 2015.
36. Bandiera G, Sherbino J, Frank J. *The CanMEDS assessment tools handbook. An introductory guide to assessment methods for the CanMEDS competencies*. Ottawa (ON): Royal College of Physicians and Surgeons of Canada. 2006.
37. Tyler RW. *Basic principles of curriculum and instruction*: University of Chicago press; 2013.
38. Scriven MS. *The methodology of evaluation (Perspectives of Curriculum Evaluation, and AERA monograph Series on Curriculum Evaluation, No. 1)*. Chicago: Rand McNally. 1967.
39. Frank JR, Snell L, Sherbino J, editors. *CanMEDS 2015 Physician Competency Framework*. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).