

# CHAPTER 5: THE PROSTHODONTIC PLAN

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In response to the research question:

In what ways are the intentions of the prosthodontics programme within the hybrid – PBL curriculum being realised, or not?

data from documents such as:

1. notes from departmental meetings and the Teaching and Learning Committee of the SOHS
2. programme / course documents including lecture notes
3. programme / course documents that were issued to students
4. the DLP cases that were to be discussed

were used to draw up the instructional system. These were used to establish if the teaching had shifted to adopt the intentions of the innovation pertaining to the prosthodontic programme.

## THE PROSTHODONTIC COURSE

The curriculum under consideration was formally identified as:

OHSC 501 2007: Component 1: Fixed & Removable Prosthodontics and formed part of the Bachelor of Dental Surgery. It was scheduled to run a full academic year from January until November 2007 (Appendix 5).

## **Aims of the Prosthodontic Programme**

As reflected in its name, the course comprised both removable and fixed denture therapy, where the latter dealt with management of dental disease via the provision of fixed dentures in the form of cast restorations such as crowns, bridges and implants. The removable prosthodontic component dealt with the provision of removable dentures either as complete or partial dentures, for the management of tooth loss. The overall aims of the course may be summarised under the different components as follows:

### **Removable Prosthodontics - Complete Dentures**

1. To appreciate the changes in the form and function of the mouth and jaws, brought about by the total loss of teeth and the possible social and behavioural consequences of tooth loss.
2. To be able to critically evaluate the influence of complete dentures on the remaining soft tissues and the underlying bony structures.
3. To help in understanding the scope and limitations of complete dentures together with the bio-compatibility and physical properties of the materials used in their construction.
4. To understand the socio – economic consequences of tooth loss and replacement and the role of a complete dentures service for communities served and in relation to a national oral health policy within a national health service.

### **Removable Partial Dentures**

1. To gain an understanding of the changes in the form and function of the mouth and jaws brought about by the loss of some teeth and the possible social and behavioural consequences of partial tooth loss.

2. To be able to critically evaluate the influence of partial dentures on the remaining teeth and soft tissues.
3. To understand the scope and limitations of partial dentures together with the bio – compatibility and physical properties of the materials used in their construction.
4. To understand the socio – economic consequences of partial tooth loss and replacement and the role of a comprehensive denture service within a national health system.
5. To know the biological and functional principles to be followed in designing appropriate removable partial dentures.

During the discussion of the first DLP case, it was evident that students did demonstrate some degree of understanding of the above outcomes when they discussed the impact of the socio-economic consequences of dental intervention (Appendix 3), especially in relating this to the type of management strategies that they proposed for the case. Factors that were considered during the students' deliberation of the case brought out a number of factors including the relevance of age, social status, biological influences on denture design, amongst the issues discussed.

### **Fixed Prosthodontics**

1. To understand the development of the masticatory system and the natural dentition from a bio - functional perspective.
2. To understand the consequences of alterations of the form of the external contours and surfaces of teeth on the stomatognathic system.
3. To be able to evaluate the need for fixed prosthodontic intervention and the long term consequences of the technologies used.

4. To be able to evaluate the alternative procedures available for the replacement of missing teeth and to assess the viability of a fixed, as opposed to removable, prosthodontic solution.

The discussions that were had by the students, when they first encountered the DLP cases, demonstrated that students had some understanding of the issues that were pertinent to the management of the cases (Appendix 3). Most of the outcomes for both the removable and fixed prosthodontics programme were touched upon, albeit not to an increased level of discussion. The discussions tended to be on the superficial level.

The prosthodontic course was structured such that there were pre - clinical / techniques courses given to the students prior to the students being introduced to the clinical aspects of dental care delivery on patients, in order to prepare the students for the clinical practice of whatever component of prosthodontics the patients who attend for dental treatment at the Dental Hospital may require. Students acquired procedural skills in the skills development laboratory (Techniques Laboratory) before starting clinical treatment of patients.

The pre – clinical technical courses ran in the second and fourth year of study with the removable prosthodontics techniques aspect being delivered in the second year and the fixed prosthodontics techniques aspect delivered in second term of the fourth year. The pre – clinical courses focused on the technical aspects of the procedures that are used in removable and fixed prosthodontics. For instance, with removable prosthodontics, the techniques course equipped the students with the cognitive and technical skills required for the provisioning of complete dentures. Students were taught how to fabricate different classes / types of complete dentures; how to set up the teeth using anatomical tooth forms for the different classes / types of jaw relationships; how to do the final waxing up of trial dentures, their flasking, packing, curing, deflasking, remounting and finishing. They were also taught how to repair simple common

denture faults such as a mid – line fracture, replacement of a missing tooth and the addition of a flange to a denture.

The cognitive skills emphasised included understanding the form of the dental arch and the edentulous ridge arch form; the skeletal relationships and incisal relationships according to Angle's classification; the use of simple average value articulators and the recognition of common faults in the technical aspects of complete denture construction and their correction.

With respect to removable partial dentures, there was no dedicated pre – clinical techniques course due to the infra – structural limitations of the laboratory space. Instead all the teaching was delivered via actual patient treatment and tutorials which emphasised the theory required and hence gave the students the requisite cognitive knowledge.

The fixed prosthodontics pre – clinical techniques course focused on teaching the students the actual technical skills required in preparing teeth for the various restorations informing fixed prosthodontics and how to use the required relevant tools and diagnostic aids during the provisioning and / or fabrication of such restorations. Students were taught how to use a more complex articulator requiring a face bow- transfer, custom incisal guide table, and the recording of various inter – occlusal records to enable the programming of such articulators. These were utilised during the occlusion course to facilitate the understanding of how the stomatognathic system works in relation to dental therapy. In addition they were taught to make the appropriate provisional restorations which are needed as part of the procedure.

The pre-clinical programme is meant to equip the students with the necessary psychomotor, as well as cognitive skill sets, to enable them to undertake clinical patient management. Emphasis on the required diagnostic skill set is done during the provision of dental care to patients where more contextualised clinical training happens. However, diagnostic methodologies were taught

in the didactic part of the programme as well, during tutorials, integrated learning sessions (case based PBLs) and in the PBL programme.

Integration of the pre-clinical and clinical curriculum is paramount to the success of the undergraduate dental student. In the fixed prosthodontics techniques course basic prosthodontic principles were taught to enable the student to accomplish various clinical procedures necessary in fixed prosthodontic. Emphasis was placed on treatment planning and management of the prosthodontic patient.

The pre – clinical course consisted of tutorial and laboratory / techniques sessions sequenced to provide maximum integration between understanding the principles of diagnosis and management of the prosthodontic patient with the technical skills required to perform fixed prosthodontic procedures. The tutorials also introduced and reinforced the fundamental principles associated with the related laboratory exercises. At the introduction of each new procedure, a demonstration / tutorial was given to outline the specific exercises that needed to be performed during that and subsequent sessions.

OHSC 501 Removable and Fixed Prosthodontics presumes a conceptual understanding of prosthodontics as competencies and the various skills sets relating to previous years of study are reviewed and greater depths of understanding pursued. It builds upon the conceptual foundations laid in the pre – clinical, clinical and didactic parts of the course from the first year of study. It also assumes that students have acquired certain knowledge in the medical and basic sciences which will be built on during the course such as in anatomy, physiology, pathology, pharmacology, oral biology, physics, chemistry and biology. The prosthodontics programme focuses on creating opportunities for students to develop certain competencies throughout their training. Therefore the emphasis is not on achieving various ‘objectives’.

Students are expected to develop different skill - sets pertaining to:

1. Cognitive
2. Psychomotor
3. Technical
4. Clinical
5. Diagnostic and
6. Interpersonal skills.

These inform how students are expected to view patient management – as an holistic and comprehensive approach – and not only focusing on the individual treatment procedures that they are required to master in order to obtain the requisite skills before moving on to the different levels of clinical competence.

The interpersonal skills that have to be developed focus on the ability of the student to motivate the patient to the degree of behaviour modification required for the establishment, and maintenance of the level of oral health required for the successful longevity and wearing of the dentures or restorations provided, be they removable or fixed prosthodontics. Additionally, students are encouraged to develop a realistic perception of their own limitations and potential in carrying out clinical procedures and arriving at appropriate diagnoses. As prosthodontic treatment involves working with other personnel in the dental team, emphasis is also placed on students developing recognition of the importance of working and communicating effectively with other members of the dental team.

Within the Department of Prosthodontics, all this is facilitated via the utilisation of varied teaching and learning strategies such as:

1. The traditional lecture
2. Interactive tutorials
3. Clinical sessions

4. PBL lessons and
5. The multidisciplinary teaching platform of integrated learning PBL sessions as well as alignment of the assessment philosophies to encapture the principle of continuous assessment.

As stated in the previous chapter, classroom observation only involved the PBL lessons and none of the other teaching and learning opportunities. During these observations, intentions of the prosthodontic plan were looked for to check if these were actually occurred and realised. Through these, realisation of the PBL process was looked for and matched against what was planned and what actually transpired. Below is a discussion on the PBL process as it was planned for the School, and to which the small groups observed would have followed.

## **Principles of PBL Instructional Methods and Techniques and Description of their Intended Learning Processes**

With respect to the teaching strategies employed in the prosthodontic department, Faculty in the discipline were expected to teach according to the principles informing the curriculum innovation. A lot of emphasis was therefore made by the department, through regular departmental workshops and meetings, to instill and clarify any issues explaining PBL philosophy and contemporary pedagogy to enable Faculty to utilise the latter teaching methods even when teaching within the core discipline.

Problem – based learning is designed to address three critical educational objectives:

- the acquisition of deeply understood knowledge that is integrated from a wide variety of disciplines and required to analyse and solve patient problems
- the development of effective clinical problem solving, self - directed learning and team and interpersonal skills



- the development of curiosity and the desire to continue learning (Behar-Horenstein, Mitchell and Dolan, 2005).

These principles are reflected in the educational philosophy which was adopted for the institution's curriculum innovation and which the prosthodontic department supported. These included striving for academic excellence in order to graduate competent dental professionals; creating a humanistic educational environment which was cognisant of the broad public health issues; inculcate a values system that embodies integrity, fairness and cooperation as well as having Faculty who integrate and facilitate effective and active learning in order to produce graduates who possess and demonstrate knowledge and skills in cognitive, psychomotor and affective domains. Additionally, the assessment policies were to offer both formative and summative assessments and provide continuous, timely and constructive feedback. Assessments were also to be structured in a way that they assessed increasing levels of complexity with emphasis in the senior year towards clinically applied integrated and comprehensive problems. Problem – based learning is grounded in the literature of cognitive psychology particularly through its emphasis on learning in context, activation of prior learning and elaboration of learning (Schmidt, 1983).

The actual problem – based learning DLP cases that were observed had objectives that were in line with general aims of the programme. With regard to case A, the DLP was designed to allow students to consider treatment alternatives using an actual patient who had been treated by Faculty in the Dental Hospital clinics and case B was planned so that it could start broadening the students concepts governing patient treatment and assist them on how their approach to patient management to suit different kinds of patients with special needs. The case was also structured such that knowledge gained from discussions during the lessons would form a basis for detailed studies in different core components / subjects (Appendix 6).

Critical thinking and reasoning skills are imperative in the area of treatment planning, as required in one of the DLP cases observed (Case A). Here, context - based information must

be horizontally integrated and multidisciplinary based information needs to be vertically integrated in order to design strategies for comprehensive patient care (i.e. treatment / management plans). Traditional curricula, where students typically receive information in a non – interactive teacher – driven lecture format and where clinical teaching is typically organised in a discipline based structure, makes the development of such skills particularly challenging in dental students. Seemingly, problem - based learning curricula has been shown to enhance development of such skills (Schmidt, 1983; Walton, Clark and Glick, 1996; Greenwood, Mullins, Townsend, Wetherell and Winning, 1999).

Students are expected to attend consecutive sessions and meet about 3 or 4 times, depending on the length of the DLP. During these sessions subject – matter and skills are integrated around a central theme. Most of the themes or cases are multidisciplinary in nature. At the start of each DLP, students are offered a specially prepared paper case, which provides them with information about scheduled activities or when they are expected to meet in order to discuss the case and come up with relevant requirements informing the particular DLP. This includes attendance with the faculty as a facilitator of the DLP and group process. Included in the DLP is an explanation on the way the process is to run, what the learning objectives are, a vignette of the case to be discussed with a list of references and other learning resources to facilitate the learning process. The main educational vehicle is the tutorial group, which consists of about ten to twelve students. In their tutorial group, students meet each other for two hours once a week. During this time, students discuss theoretical problems designed by faculty. Some of the cases are sourced from real patients treated by post graduate students and faculty in the school. Since the problem offered is the starting point of the students' learning process, they are expected to analyse the problem initially based on their prior knowledge from the preceding years of study and other sources. During this phase, students then hypothesise about possible underlying principles, mechanisms and processes that may explain the phenomena described in the problem. They may also be expected to attempt to come up with procedures that could be used to assist in addressing or solving the problem at hand (Schmidt, 1983; Rohlin, Petersson and Svensater, 1998); Seymour and Walsh, 2001). It is through this process that it is expected that a degree of knowledge integration occurs. Additionally cognitive elaboration of the knowledge is expected. As students may run into challenges during this phase, the facilitator is then expected to assist

the students either as content expert or process facilitator (Bochner, Badoniva, Howell and Karimbux, 2002). Trained staff / Faculty therefore assume the role of facilitators and are guardians of the group process rather than content specialists. However with the specific small group lesson observed during the study, the staff members served the dual role of process facilitators as well as content specialists.

The prosthodontics programme is thus structured on the basis of early introduction to clinical dentistry and is based on the fundamental philosophies of horizontal and vertical integration; outcomes based education; continuous assessment; student centred approach and problem based learning, with a mixture of the tradition concepts such as teacher centred lecture based. Furthermore, the curriculum is based on three main domains of human biology, health sciences and clinical dentistry which are interplayed appropriately throughout the training whereby in the early years the emphasis is more on the first two which gradually decrease later on; whereas the clinical dentistry component does the opposite, starting as a small component and increasing with each successive year. This is meant to ensure vertical continuity as the two components are meant to align with and support clinical dentistry. The assessment philosophy is meant to provide timely constructive feedback especially in assessing both clinical work and theoretical knowledge informing the clinical aspects.

In summary, the instructional system is the teaching plan (curriculum) that aimed to help students learn in a manner reflected in the broad aims and objectives of the institution's curriculum and needs to be read with the description of the lessons (Appendix 3). What was looked for in the prosthodontic plan included how students and staff used the PBL principles to facilitate their clinical reasoning skills and demonstrate evidence of integration of prosthodontics knowledge in addressing the cases that they discussed during the small group lessons. The findings are reported in the next chapter.