

## CONDENSED COURSES MODEL FOR DENTAL UNDERGRADUATES DURING COVID – 19 PANDEMIC

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### ABSTRACT

*Global pandemic situation of coronavirus demands modification in the existing mode of teaching within dental institutes. A blended combination of online teaching along with well-planned condensed courses for dental undergraduate students can be helpful during COVID-19 era of social distancing. The aim of such proposals is to assist dental institutes in finding practical solutions for teaching manual skills. Biphasic course program is presented for 75 students per final year. Student centered, self-directed and problem solving learning approaches are presented for maximum involvement of students. Focused teaching in small groups on core skills and work-based assessment are incorporated. Deficiencies identified from feedback and program evaluation can be accommodated in second phase. Such feasible proposal planned according to the existing facilities of accredited institutes may be helpful in refining competencies of dental graduates during multiple stages of coronavirus pandemic.*

**Key words:** Condensed dental course, Undergraduates, Clinical skills, COVID-19 Pandemic.

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### INTRODUCTION

Curriculum is the basis of an educational program that mandates constant revision according to the needs of society.<sup>1</sup> Dynamism of curriculum effects the cognitive, affective, interpersonal and physical skills. The internal and external change during a specific situation may lead to altered effects of a preplanned curriculum. Adoption of change of curriculum or its contents in a particular situation is known as a, “situational model”.<sup>2</sup>

The pandemic of coronavirus COVID-19 started in December 2019 and gradually engulfed the world.<sup>3</sup> During the initial era, lockdown was imposed worldwide to control the infection transmission, which led to economic crisis at individual as well as country levels. This pandemic affected all aspects of life on planet including the educational standards in health profession. Health professional institutions shifted to the electronic modes of learning on commercial or customized institutional electronic platforms with synchronous or asynchronous modes of teaching.<sup>4</sup> However, in multiple areas around the globe, diverse perspectives about online education are reported by the dental students.<sup>5,6</sup> Dental procedures

were restricted to emergencies only. Temporary changes were made in the dental curricula to accommodate the dynamic COVID – 19 situation as well as to satisfy the accreditation standards of Commission on Dental Accreditation. (CODA)<sup>7</sup> Absence of practical training was considered as one of the significant factors effecting the quality of dental education.<sup>8</sup> However, it can be foreseen, that on line learning modes will be a smarter way of health professional education in future.<sup>9</sup>

Dental education demands hands on skill for effective learning.<sup>10</sup> Multiple virtual reality based teaching systems and tele-dentistry can facilitate effective student monitoring, engagement and objective assessments, without the exposure to live patient. These utilize haptic technology to produce kinesthetic communication to the operator.<sup>11</sup> car-I However, the availability of these soft wares within developing countries as well as the absence of real patient clinical scenarios can preclude the use of these within most dental institutes.

Other institutes utilized predesignated time for clinical teaching as advanced post graduate case discussions for undergraduate students, formation of study clubs for virtual case presentations<sup>12</sup> or continued with routine didactic teaching with delayed clinical sessions to be resumed at the time of possible control of disease.

The development of multiple vaccines against COVID -19 partly allowed world wide businesses to resume.<sup>13</sup> Phasic reopening of educational institutes was planned. Health screenings, protocols for adequate ven-

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tilation, maintenance of social distancing, mandatory use of PPE, reduced aerosol generation protocols with improved evacuation measures, inclusion of simulation exercise for clinical training and reducing the number of employees to half, were implemented to decrease the chances of infection transmission. Educational institutes were reopened in the “new normal” environment.<sup>7</sup>

Many dental schools have introduced additional simulation sessions for final year students to compensate for the loss experienced during lock down.<sup>7</sup> Living in a developing country like Pakistan, it is the need of day to modify our curriculum or its components to improve the training of graduating professionals during this pandemic. All aerosol generating procedures require designated manikin rooms, level 3 surgical masks with PPE and high evacuation systems in addition to routine COVID SOPs. Other procedures can be continued with routine COVID- 19 PPE, double masks and social distancing.

Considering the present situation of corona virus with country, there is a need to look for possible solutions which are not only acceptable to local accreditation councils but also beneficial to our budding professionals. This article suggests a few recommendations that can be specified for subjects of Prosthodontics (Tables 2, 3) as well as Operative dentistry (Endodontics and Conservative Dentistry – Table 4) as per given facilities of our local dental institutes. These can be further modified for application in other domains of dentistry. The proposed course map is given as figure 1.

## METHODOLOGY

The proposed design of condensed course is a phasic program. Initial phase (Table 1) can involve condensed skill based courses, to be completed within first 15 weeks of academic year for 75 students in all clinical subjects, followed by another round of similar time period to be spent as clinical rotations for comprehensive treatment planning and performing individual clinical procedures. Program evaluation of Phase I can be utilized and addressed in phase II of this model.

### *Proposed design of condensed course in Prosthodontics (example) during the COVID-19 pandemic*

Phase 2: - To be completed within second round of 15 weeks for clinical rotations.

This phase can involve clinical exposure of final year students and can address all the shortcomings identified during phase I. Students will be asked to perform individual clinical procedures on those patients screened for COVID-19 or having a proof of COVID vaccine.

It will make the curriculum more comprehensive

for practical learning. Program evaluation can continue during this phase for its future implementation to become at par with international standards.

## DISCUSSION

The pandemic of corona virus has urged the world to modify its practices in all aspects of life. The curricula of health professional education are thus no exception. The situational curriculum in the “new normal” can address the mandatory issue of practical training. If we continue to hang on to the conventional curriculum, our professionals can soon become extinct in profession.<sup>2</sup> A thorough assessment of global situation in the past one and a half year, a deep understanding of the existing facilities within accredited institutes of the country as well as an estimation of the possible scenario in near future can drive us to establish an appropriate plan. However, one of the biggest hurdles in implementation of such innovations is, the acceptance to change of the traditional patterns of teaching and learning.<sup>14</sup> Other possible factors can include lack of motivation, lack of resources and lack of expertise.

An approach towards a blended learning program may be fruitful and self-sufficient to deal with such global emergencies.<sup>15</sup> Multiple studies in diverse domains of dentistry favor the use of blended learning even before the spread of COVID – 19. (14) However, its individual contribution in each subject may vary as per the curricular requirements. It is not possible to completely virtualize clinical content, there fore such condensed courses with careful division of faculty and students might be one of the possible solutions.

The phasic division of condensed course model

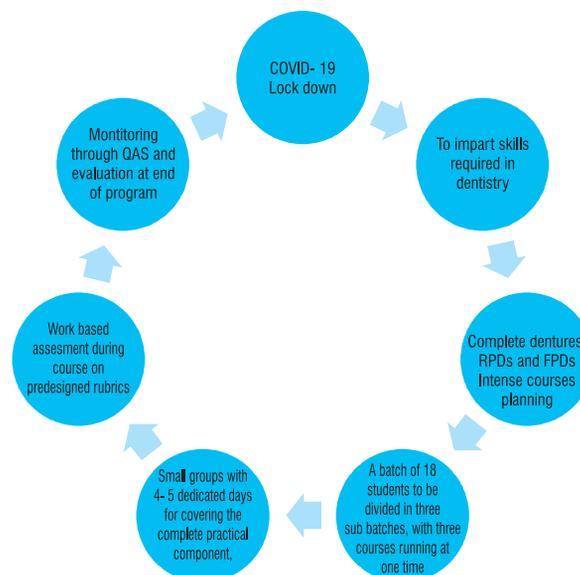


Fig 1: Proposed course map for a condensed course model for dental undergraduates during COVID – 19 Pandemic.

TABLE 1: PHASE 1- TO BE COMPLETED WITHIN FIRST 15 WEEKS FOR A BATCH OF 75 STUDENTS.

<b>Statement of intent</b>	The participant is able to perform the basic clinical procedures required for fabrication of fixed and removable prosthesis.
<b>Content</b>	The course will cover the laboratory steps and clinical steps required for construction of complete dentures, removable partial denture and fixed dental prosthesis.
<b>Learning and teaching strategies</b>	Student centered teaching approach with self-directed learning.
<b>Duration</b>	3 weeks for total intense course program
<b>Group formation</b>	<ul style="list-style-type: none"> <li>• A batch of 15 students allocated in one clinical department can be divided into three subgroups of 5 each.</li> <li>• Every subgroup will complete an intense course of 5 days each of complete dentures (CD-1 – Table 2), removable partial dentures (RPD-1- Table 2) and fixed dental prosthesis (FDP-1 Table 3 ).</li> <li>• Intense courses for operative dentistry (endodontics and conservative dentistry) are given in Table 4.</li> </ul>
<b>Assessment</b>	One or two pre planned work based assessment on day 3/5, during each course. It can be done on predesigned rubrics. Rubrics can be e mailed to students prior to the start of course, for effective learning.
<b>Program evaluation</b>	Program evaluation can be done during and at conclusion of phase 1 module, to identify the shortcomings and record the response from participants for future improvement.
<b>Collaboration of stake holders</b>	<p>Courses can be announced at the start of academic year.</p> <p>Health professional education department empowered by institutional administration can coordinate all courses for each department.</p> <p>The teaching and video material for all three courses can be emailed to students before the start of course in their respective departments.</p> <p><b>Venues:</b></p> <p>Removable prosthodontics courses can be conducted in prosthodontics laboratory on predesignated stations and adequate IT Support, with multimedia projected computer system and digital cameras for display of videos.</p> <p>Fixed Prosthodontics courses can be conducted in manikin Laboratory having adequate IT Support, with multimedia projected computer system and digital cameras for display of videos.</p> <p><b>Time duration:</b></p> <p>4-5 hours per day for 5 days in one week for one course.</p> <p>Break up of each course is given in table 1 and 2.</p> <p><b>Human resource support</b></p> <p>One senior and three junior facilitators per course can be allocated.</p> <p>Two students will be allocated to each junior facilitator.</p> <p>Three assistants per session can provide assistance in every session.</p>

tends to adopt a systematic approach of transition from simple to complex stage. The use of haptic technology in developing country may not be a common practice in near future, owing to its increased cost and availability. Combination of e learning with concise face to

face session can bridge the gap of practical training. Inclusion of self-directed learning through video resources is considered more attractive to students than conventional learning from text books.<sup>16</sup>

TABLE 2: PROPOSED ACTIVITIES DURING REMOVABLE PROSTHODONTICS COURSES

	CD-1		RPD-1	
	10:00 – 12:00	12:00 – 14:00	10:00 – 12:00	12:00 – 14:00
Day 1	Impression material manipulation on models	Custom tray fabrication	Impression material manipulation	Surveying
Day 2	Base plate formation with rims	Video/	Clasp making	Wax up and demonstration of all jaw relation records and articulation
Day 3	Articulation	Anterior set up of teeth (Work based assessment)	Articulation	Set up of teeth (Work based assessment)
Day 4	Posterior set up, trial video display	Flasking, packing and curing	Trial (demonstration or video display)	Flasking, packing and curing
Day 5	Finishing polishing,	Remount adjustment	Finishing polishing	Program evaluation

TABLE 3: PROPOSED ACTIVITIES DURING FIXED PROSTHODONTICS COURSE

	FPD – 1	
	10:00 – 12:00	12:00 – 14:00
Day 1	Matrix formation	Gross Anterior PFM crown preparation
Day 2	Finishing Anterior PFM crown preparation	Gross Posterior PFM crown preparation
Day 3	Finishing Posterior PFM crown preparation	Temporary crown fabrication (Work based assessment)
Day 4	Impression making (video tutorial)	Finishing of temporary crown and jaw relation record videos
Day 5	Cementation	Program evaluation

TABLE 4: PROPOSED ACTIVITIES DURING OPERATIVE DENTISTRY COURSES

	Non surgical root canal treatment		CONSERVATIVE DENTISTRY	
	10:00 – 12:00	12:00 – 14:00	10:00 – 12:00	12:00 – 14:00
Day 1	Diagnosis and treatment planning	Diagnosis and treatment planning	Class 2 Amalgam cavity preparation	Class 2 Amalgam restoration
Day 2	Access cavity preparation anterior teeth	Access cavity preparation posterior teeth	Class 2 composite cavity preparation	Class 2 composite cavity restoration
Day 3	Chemo-mechanical debridement	Chemo-mechanical debridement	Class 3 & 4 composite cavity preparation and restoration	Class 3 & 4 composite cavity preparation and restoration
Day 4	Obturation techniques	Obturation techniques	Class 5 cavity preparation and restoration	Class 5 cavity preparation and restoration
Day 5	Restoration of endodontically treated teeth with foundation restoration.	Restoration of endodontically treated teeth with preformed posts.	Direct composite veneer preparation and placement	Direct composite veneer preparation and placement

The second phase of clinical rotations can accommodate patient encounter, practicing pre planned individual clinical procedures, case discussions and comprehensive treatment planning on actual cases. Pre session distribution of study material and pre session planning of focused cases and relevant clinical procedures may avoid wastage of time and resources. It also has a remarkable effect on the mindfulness of study participants.<sup>17</sup> Practical aspects of clinical topics taught at a later stage in didactic teaching can be understood well during second phase of clinical rotations. Such horizontal integration of didactic and practical aspects may improve its effectiveness.<sup>18</sup> This phase can also provide opportunity for providing any improvements required in first phase.

Flexibility within such plans may allow amendment after program evaluation.<sup>1</sup> The academic institutions adopting and improvising such advancements might prove as leaders in health professional education in future.

## CONCLUSION

The effects of coronavirus pandemic on dental education calls for devising a change in curriculum, with the aim to improve the teaching methods used for learning manual skills. Inculcation of problem-based learning within clinical rotations may help in refining competencies of dental students.

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**CONTRIBUTIONS BY AUTHORS**  
Both authors contributed significantly