IMPROVISING MEDICAL TEACHING DURING PANDEMIC THROUGH THE PLATFORM OF PUBLISHING TO CONVEY SPECIFIC CASE BASED LEARNING TO UNDERGRADUATE DENTAL STUDENTS – PART 1 (PSYCHOSOCIAL LEARNING)

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ABSTRACT

The surge of covid 19 pandemic has affected everyone in almost all parts of life. Medical/dental education is no exception. Teaching as well as student learning has been compromised with norms like social distancing, personal protective wear and lockdowns. Reduced school times, absence of group discussions and clinical demonstrations have prompted teachers to convey course information in different ways. The fear of contracting coronavirus and then infecting respective families adds to the always stressed medical students and staff. Prior to covid 19, studies have shown students to be less attentive which leads to their poor retention of case based information taught in the clinical sessions. During the pandemic, theory classes could be managed through online portals, but clinical learning in patients cannot be compensated by such means. With a contextual background of such factors, this two part case series is an attempt to fulfill the void in teaching that has occurred during a pandemic. 87 students (47 female, 40 male) who were enrolled for the course (Clinical Fixed Prosthodontics) (SDS 543 and SDS 544) for academic year December 2020 – June 2021 were asked to submit their clinical cases on a template along with the grades obtained. Cases of fixed partial denture in Kennedy class 3 partial edentulous situation were selected on the basis of complexity in history, clinical examination, diagnosis and prosthesis design. All cases were analysed under two main heading (psychosocial learning, applied basic sciences). In this the first part of the article, multiple selected cases are presented in a four tier series. Major or minor learning skills that students lacked have been highlighted and discussed. Since many students were not able to see each others cases, the authors predict that publishing the cases will achieve two objectives. Firstly, all students will be able to see each others work and what they were taught and secondly, students are expected to take critical evaluation of authors seriously and use this platform as a means to improve those deficiencies.

Keywords: medical education, student stress, distant learning, fixed partial denture, dental porcelain
I. INTRODUCTION

While everyone is witnessing the immediate consequences of covid 19 on the global population in terms of mortality, very less attention has been given to the long term consequences of the pandemic which includes student education. Since the beginning of the pandemic, most countries had to implement early unprecedented precautions strictly to limit the spread of SARS-CoV-2. Countries like the Kingdom of Saudi Arabia (KSA), have shown resolute dedication to fight the pandemic. They took strict measures that included stopping of flights, suspending religious tourism (Umrah/Haj pilgrims), banning/restricting social and governmental gatherings (includes various summits and conferences) and even restricting people to pray daily five times at their homes rather than at mosques [1], [2]. Shifting of all schools (including medical/dental) and universities to remote learning and virtual classrooms was perhaps one of the early responses that was observed globally [3]. While remote learning may be able to instill learning outcomes in some subjects, it may be difficult or even impossible to instill the same in other subjects. A medical/dental school is responsible to build educational foundations for lifelong professional career among both undergraduate and postgraduate students [4]. The clinical learning environment is not only central to student learning but it also contributes essentially to the students’ perception of his achievement, success and satisfaction during medical training [5]. The clinical learning environment is unique in medical/dental schools since it is the place where the theoretical parts of the curriculum are integrated with the practical part [6]. At this juncture, it is also worthy to note that many healthcare workers have been reported to have lost their lives in the covid 19 pandemic, and most of those who are working in hospitals are experiencing burnout and stress [7]. Stress is perhaps one of the essential ingredients of medical education. Stress associated with medical students has been associated with many factors like the abrupt transition from student to doctor [8], suffer from burnout [9], living conditions [10] and teaching curriculum [11]. Not only dental schools have been found to be highly stressful, but dental students have also been observed to have higher levels of stress than medical students [12]. This has been attributed to the mandatory and compulsory development of hand skills and dexterity, among dentists besides excessive teaching curriculum (dental students need to study most of the medical subjects) and clinical work [13], [14]. The effect of stress among medical students has also been studied and studies have identified that stressful students do have low morale, dissatisfaction and low attendance in medical school [15]. While authors have highlighted students' needs in term of their own oral treatment, there are few studies that show an association between academic stress levels and students current health. [16]

Importance of clinically based learning and the need for a new approach: Burnout and stress among medical/dental students have been observed to impact their mental health during their training [17] which has been associated as the possible reason for their absenteeism, low morale and dissatisfaction [18]. The risk of catching the disease at school, through patient treatment and/or their batchmates (during training) and the apprehension of infecting their families are two additional stressors that have been an undesired consequence of the current pandemic. At the beginning of the pandemic, many authors have stated the challenging nature of organizing and studying practical medical education [7], [19]. Students no longer can have group clinical discussions because of the chances of violating social distancing rules. College administrations have followed their respective government policies and therefore students are directed to be in the clinics only when they have their respective patients present alongside their respective supervisors. Such steps have affected clinical teaching, since a clinical instructor/supervisor cannot demonstrate a particular clinical step to all his students studying under him in a group. Subject and course coordinators have also found it very difficult to standardize uniform teaching to all students amid the new rules of maintaining social distancing during clinical sessions. Subjects like the science of dental materials (SDM), which forms the core subject in undergraduate dental curriculums especially for subjects like Prosthodontics and restorative dentistry, are difficult to understand unless its effective integration into clinical practice is not done by the clinical teachers [20]. Also, it is the personal experience of the authors that students who are taking different courses at one time, are overloaded with requirements/examinations/assessments and they really cannot differentiate between what to retain and what not to retain (clinically significant and insignificant information). The authors also strongly favour that students should be educated about their strengths and weaknesses after each course so that they get a chance to hone their skills.

With this background, the authors feel that it would not only be innovative but also viable to use publishing as a platform to communicate course learning outcomes to its students. This case series does not differ from conventional case series, if one considers the teachers’ experience (as patients) with similar issue who have assessed a particular problem (disease) that has been identified from single or multiple sources (students) and is unique. The series also fulfills other criteria like retrospective look, common measure and each case separately described/lumped together. The objectives of the case series are as follows: (1) to integrate basic sciences
(psychosocial and applied sciences) into clinical science through case completion (2) to reach and educate other students in the group/batch/class who did not have the chance to see or participate in clinical discussions of their batchmates (colleagues) (3) to highlight the strength and weaknesses of the course, students, teachers and administration (4) to sensitize students to constructive criticism about their work (5) to stimulate students to put their own efforts to seek knowledge rather than depend on others to provide information to them. For convenience and compliance the study will be discussed in two parts, the first one being, psychosocial in nature and the second one as application of basic sciences in treating complex cases.

II. METHODOLOGY:

This case series is an accumulation of clinical cases done by undergraduate students during their clinical course of clinical fixed Prosthodontics during the academic year 2020-21 at the fifth year level of their undergraduate program. All clinical cases were performed under the direct and personal supervision of highly qualified and experienced staff in a reputed and recognized academic institute. All patients presented were thoroughly informed and consent was obtained from them. A total of 87 students (47 female, 40 male) was enrolled for the course (Clinical Fixed Prosthodontics) (SDS 543 and SDS 544) for academic year December 2020 – June 2021. The students were required to complete a three unit anterior or posterior fixed partial denture including the preprosthetic mouth preparation (patient specific) along with a case of a post and core/crown restoration. At the end of the semester the students were asked to submit their completed cases on a prestandardized power point template that included all the steps of clinical treatment. Verification of the cases was done through cross checking from students log book and patient's entry in R4 (Carestream, Software). Cases selected for this article were based on verification of records, special cases (based on non conventional designs, techniques, procedures), case completion (case history recording, radiographs and photographs) and supervisor's decision. Supervisors' decision was based on their clinical floor experience with students and only those cases/steps were included where students needed to pay special attention. Cases which fell within the norms of the regular course curriculum and requirement were not included in this series.

Case presentations:

Series 1 (Significance of developing professional relation with a patient): An elderly male patient in his late sixties, was scheduled for treatment in SDS (Substitutive Dental Sciences) course 543/544 by undergraduate dental students. Patient had a medical history of diabetes and hypertension that was under control. Clinical examination revealed that the left maxillary lateral incisor was periodontally compromised and would have not been able to sustain the responsibility of supporting a bridge that involved maxillary canine. The patients treatment plan included oral prophylaxis, immediate interim partial denture in relation to missing central (after extracting left lateral incisor) followed by the fabrication of a fixed partial denture. Other prosthetic options presented to the patient, but not consented included the implant supported individual crowns in relation to #21 and 22. Immediate removable partial denture was fabricated before the tooth could be extracted, and on the day of prosthesis insertion the lateral incisor was extracted (Fig 1A) and the partial denture was inserted (Fig 1B). Fixed partial denture treatment was continued using routine clinical and laboratory procedures with main difficulty coming while fabrication of the temporary crown in relation to maxillary left canine (Fig 1C). Final prosthesis in the form of a four unit, porcelain fused to metal restoration was fabricated and cemented in place (Fig 1D). While the patient was very happy with the esthetic outcome of the fixed partial denture, the patient became very aggressive at the stage of final cementation and started demanding that the prosthetic teeth were high and that he was not able to close the posterior teeth. The patient was actually bringing the mandible forward, which was making his posteriors to drop out of the occlusion. Patients behaviour, though was not appropriate, was directly a result of the non professional relation established by the student with him.
Fig 1: (A) Maxillary lateral incisor extracted (B) Interim partial denture inserted (C) Temporary crown in relation to maxillary left canine on the day of tooth preparation (D) Final fixed partial denture cemented in place

Series 2 (The need of essential mouth preparation):

In this series, different cases are presented that range from previously done endodontic treatment, post core treatment or laying down of foundation restorations. Patients presented with existing prefabricated posts being short (Fig 2 A, C), faulty (Fig 2 B) or even fall short in diameter (Fig 2D). In all such cases, one needs to remove the existing post and retreat the tooth. After removing the existing post, one needs to estimate the current depth by using an instrument and taking a radiograph (Fig 2 E). This is followed by negotiating the obturating material within the canal using a Gates Glidden drill and removing the required filling (Fig 2 F). The final length of the canal has to be more than two third of the length of the root or it should cross the center of rotation of the root.

Fig 2: (A) Short prefabricate screw post (B) Faulty prefabricated post (C) Fractured core (D) Short posterior post (E) Negotiating gutta percha filling (F) Removing appropriate amount of gutta percha filling (G) Prepared post space that is ideal with 5 mm of apical gutta percha filling present

Series 3 (correct foundation restorations): (a) Multiple cases in both semesters demanded the need of proper foundation restorations on the natural teeth. This ranged from complex post core preparations to simple composite core restorations. An unusual case of a maxillary canine was restored with a cast post core rather than a simple restoration or a prefabricated post. The most important factor that was in favour of a custom made cast post was patients occlusion and his age (Fig 3 A, B). A distal portion of the canine was destroyed by caries and as per occlusal examination was the mainstay for carrying horizontal forces during eccentric movements. Another complex case involved the use of multiple cast post core in a young male patient (Fig 3 C). The patient was started in the first semester and completed in the second semester after all, concerned teeth went for crown lengthening procedure that involved removal of alveolar bone. Provision of a ferrule was only possible after crown lengthening (Fig 3 C). Students need to understand the importance of proper fit of the custom made cast post core which is
evident from the margins of the cast post core when placed in the prepared tooth (Fig 3 D, E). Any tooth that is having a faulty post core placed within the tooth (Fig 3 F) should not be treated unless the entire post is removed.

Fig 3: (A) Cast post core for canine (B) Canine after preparation (C) Multiple post core after crown lengthening (D) Cast post core showing inadequate fit (E) Cast post properly fitted after corrections (F) Improper post placement that resulted in failure of treatment (previous treatment done outside)

(b) Many female patients who are allotted to the students have an old composite restoration of the abutment tooth. Most students have been observed to take the old restoration as it is which in turn has led to many problems for the patients in the past. Old composite restorations must be duly removed from abutment teeth and a new fresh, composite restoration must be placed as a foundation restoration before starting the fabrication of the crown for all abutments. A dual cure resin core is ideal for core build up (Fig 4 A, B, C).

Fig 4: (A) Posterior molar teeth with new composite core restoration and old restoration. Note the discoloration at margins of old restoration (B) One of the foundation restoration is the glass ionomer type 2 while another was composite (C) An excellent core foundation replacing an old carious composite restoration

Series 4 (Psychosocial aspects of the transition from preclinical to clinical courses)

During the course, constant observation of the supervisors was that most students were not able to make an ideal preparation in terms of the amount of tooth structure removal. One of the neglected clinical steps at the same time has also been observed to be the preparation of depth orientation grooves which should be fairly approved by the concerned supervisor. Students must also understand that this method is the only method that is clinically viable since other methods cannot fulfill the objectives of verifying the entire three dimensional preparation. A proper depth orientation groove depends on the selected retainer and the depth and inclination varies for each surface as well as each incline (Fig 5 A). For knowing the tooth preparation will be adequate, the depth orientation groove placement should be considered as compulsory. All dimensions of the grooves should be made less initially (15 to 20 percent) to allow final finishing of preparation. Another general and serious lacunae in learning outcome was
the strength of the temporary restorations given after tooth preparation. Most students must understand that thin temporary restorations are directly proportional to the amount of tooth preparation done on the patient. An excellent example of strength and esthetics achieved for a temporary fixed partial denture is presented (Fig 5 B). Because the tooth preparation of the first premolar and the molar tooth are essentially correct, the temporary made out of a composite restorative material fulfills the objectives of the temporary restoration. Adequate tooth preparation also enhances other clinical procedures like verifying common lines for path of insertion (Fig 6 A), gingival retraction (Fig 6 B), duplicating margins within the final impression Fig 6 (C, D).

Fig 5: (A) Proper depth of depth orientation grooves (B) Temporary restoration made out of composite material that does not lack strength

Fig 6: (A) Ideal amount of tooth removed during preparation (B) Gingival retraction cords placed (C) Margins in the impression (D) Molar area of the impression

III. DISCUSSION

A series of cases have been described whose basis is mainly psychosocial in nature. All students must understand that psychology is an important and essential ingredient of prosthetic dentistry. This applies to not only to the psychological factors that are associated with particular treatments (like cleft lip and palate) but also how to develop professional rather than friendly relations with patients. In the first case, the behaviour of the patient was not appropriate at the time of prosthesis cementation because over his previous appointments he had started thinking that the doctor who is treating him is like a friend despite having such a huge age gap. Every time when the patient
would come to the clinic, the relation between the dentist and the patient would get less professional and more friendly. Such behaviour gives patients a chance to become more dominant and he starts taking things treatment less seriously [21]. During clinical courses, the dental students need to be aware of his personal responses towards his patients [22]. Potentially harmful responses have been studied, identified and even corrected. It has also been stated that proper personal responses of the patients should be each student own objective of which he/she needs to be fully aware of [23]. It is the responsibility of clinical instructors to review such inebriate students' responses to their patients and point out the harm that can be perfected through improvement of personal attitude [23]. During the course of the last appointment, the concerned patient was overly aggressive in his demands, although he was not allowing himself to actually understand what most of the doctors were asking him to do. It is worthwhile to let students know that the highest form and the most common form of aggressive behaviour in medical treatment is not related to any violence, but it's the patients talking negatively about the doctor to their friends and their relatives [24, 25]. While this may be a single case, there was a mutual consensus among the clinical instructors that female students were more often involved in demonstrating professional and disciplined behaviour with their patients. The female students were more often displaying their personal emotions in front of their patients which at times were intense. While it is also important for every doctor to develop a sense of confidence among his patients, it should not come at the cost of impairing his own treatment. A good doctor patient relation is that of mutual respect that does not show any signs of damaging each others social reputation [26].

Many patients present with previous dental treatments that may range from a simple restoration to a complex post core foundation restoration. All treatments must be based on the principle of ethics which include justice and beneficence to the patient [27]. While fulfilling a course requirement is essential, students must remember that no fixed partial denture treatment will be durable if the underlying foundation restoration is not sound. One of the most complex procedures is to remove the previous post core and redo it again [28]. An undergraduate student must remember the various principles of post core restoration in which one of the important aspect is the length of the post. A series of cases have been reported during this academic year. One of the significant factor that determines the clinical success of a cast post core is its design which includes the radicular and the coronal portion [29]. Restorative options start with a pit and fissure sealant and end at full crown. Likewise, while restoring a tooth with a post core, students need to understand and learn, which type of post core is indicated for which clinical situation. The most significant clinical criteria to decide between a prefabricated or a cast post core is the amount of remaining natural tooth structure coronally [30]. With decrease in the amount of natural tooth structure, the chances of custom cast post core increase [31]. An exception can be when the relation between the amount of natural tooth remaining and the induction of a cast post core, which is mainly applicable in posterior teeth. A prefabricated post accomplishes most of the objectives of a cast post core in posterior teeth, provided the number of post cores placed is more than one. Clinical presentation of the lost tooth structure has been found to be misleading, therefore radiographs assist and influence the final treatment option choice in such cases [32]. The next most determining factor in deciding the use of cast post core is the type of existing occlusion. In most cases of mutually protected occlusion, the canine has to bear the brunt of lateral forces during eccentric mandibular movements. Since, the patients age was less, a long term treatment plan was devised in which it was feasible to have a custom made cast post core fabricated and cemented within the canine.

A doctor patient relationship is actually a representation of a fiduciary (involving trust) relationship in which the doctor agrees to respect patients' rights (autonomy, confidentiality, informed consent, non abandonment) [33]. One of the chief aspect of this relationship is conscious attempts to provide the highest standards of care [34]. While a student may have the compulsion of completing course requirements on their head, it should not be completed at the expense of compromised standards. When a student is examining intra oral condition of the abutment, he is supposed to judge the existing condition of the restoration. Most composite restorations have an inherent disadvantage of polymerization shrinkage [35]. When a patient presents with a composite restoration that is old, it is compulsory to judge whether old restoration will by any chance, stop the already started microleakage process after placement of the crown. This is unlikely, therefore all old composite restorations need to be removed and a new composite restoration need to be given. Students must also make sure that the patient does not leave the clinic without having a temporary crown over a newly build foundation restoration (composite). All composites are prone to thermal shrinkage and expansion depending upon the temperature of the food. Both expansion and shrinkage result in initiation of microleakage, [36] which, if commences cannot be reverted back. An alternate to this is the application of a bonding agent over the newly laid core build up. Placing a crown restoration over a deteriorated foundation restoration does not qualify in maintaining standards or care.
Fear is a primitive and a natural human emotion that involves humans irrespective of their age or preparedness. One of the common and unexplored fear among health care workers is the fear of bringing harm to their patients (intentional, unintentional) [37,38]. Students who have been taught an irreversible dental procedure like tooth preparation in preclinical practices (on typodont/extracted teeth), are bound to have an inherent fear of bringing harm to patients when they treat them during clinical settings. The fear of over preparation of the tooth can persist among individuals despite being told that the preparation is underprepared. In fixed Prosthodontics, underprepared tooth is considered to be more dangerous to the health of the abutment tooth than overpreparation. While it is mandatory for students to take steps to decrease the rates of committing errors, it is also important that fear in huge proportion can hamper their ability to learn the proper procedure at the proper time. While it is also true that such fear fades away with clinical practice, the course learning outcome in such case may be delayed but never eliminated. Both course administrators and students must understand this variable and take measures to eliminate/minimize them accordingly.

IV. CONCLUSION

Within the limitations of this case series, it can be concluded that learning is a dynamic phenomenon that keeps on changing with every new individual who enters into the system. Stress among medical/dental students is real and needs digging deeper. Times have changed, distractions to the students are more as compared to yesteryears, teaching needs to be improved, especially clinical teaching which has taken a back seat due to covid 19 pandemic. It is expected that a message sent through publishing platform will be considered seriously by the students, after all it is all about them. Most dental treatments have a psychosocial aspect which is associated with both sides of the coin. Students need to put more efforts to instill clinical skills in the absence of group discussions and case presentations.

Acknowledgement

The authors would like to acknowledge the efforts of the students and the staff of the other departments who played a major role in completion of all cases during the two semesters. We would also like to sincerely thank all the intern students of college of dentistry, who left no stone unturned to help in performing mouth preparation of the cases.


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