"The Standard of Care and Evidence Based Dentistry" – Ethics and Needs of Patient in Present Era: A Brief Case Report towards Setting the "Standards of Dental Care" in Dental Malpractice

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Abstract: A case report is used to clarify the *"standard of care in dentistry"*, following evidence based dentistry treatment approach. The patient suffering from pain in the upper teeth, and unpleasant smile received four stages of treatment, , resolving his chief complaints, and enhancing his teeth appearance. The treatment plan was developed using radiography and mounting models on semi-adjustable articulator. The completed treatment was successful, with the patient continuing to do well 1.5 year after completion of treatment.
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Keywords: Standard of care; evidence based dentistry; malpractice; complete oral rehabilitation

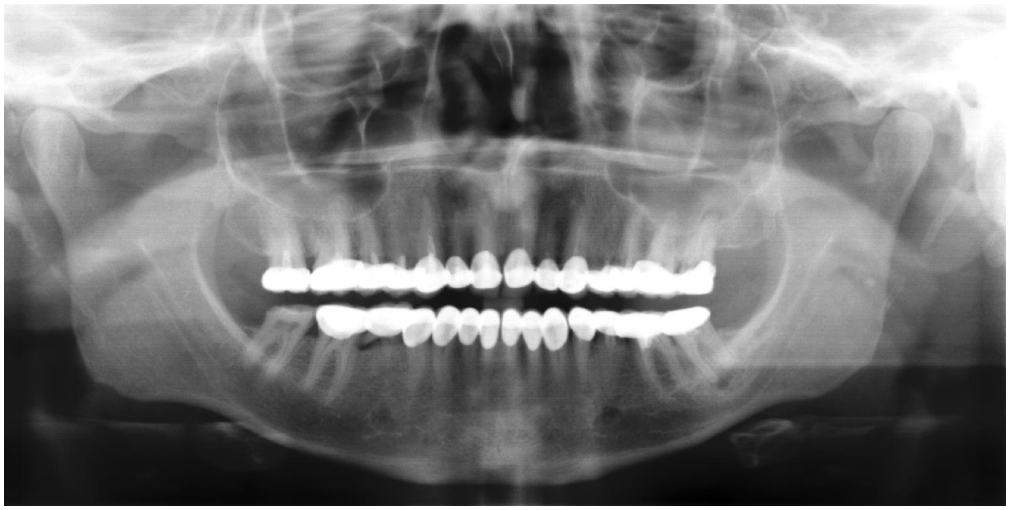

Figure 1. Preoperative Orthopantomogram x-ray clarifies the patient status.

Introduction

Dental malpractice has become very serious matter recently as the number of claims is on the rise in many countries[1]. Statistics indicate that most of the dental practitioners, specialist or general practitioner will be involved in the litigation process during some point in his career[2]. *"Adhering to a standard of ethical conduct means you try to provide the most conservative procedure possible that is in the patient's best interest"*[3].

Emergence of new materials and technologi- cal evolution, and development of procedures, along with legal issues, will all have a profound effect on what is considered to be the *"standard of care in dentistry"*[4]. The term *"standard of care"* is a legal term defined as "*that care which a reasonable and prudent practitioner would do under the same or similar circumstances*"[5]. The meaning of standard of care is actually found in the definition of negligence which consists of four elements, namely, that the duty of care was owed by the dentist to the patient, that the dentist violated the applicable standard of care, that the plaintiff suffered a compensable injury, and that the injury was caused in fact and proximately caused by sub-standard conduct [6].

Although the definition of *"standard of care"* has not changed, the method in which clinicians practice has changed and, therefore, the level of care has evolved with the development of new diagnostic tools, biomaterials, treatment modalities, and the advent of new court rulings[7]. The factors that influence *"standard of care"* include the diagnosis, the patient, advancing technologies and materials, and delivery methods for care[8].

To truly properly care for your patients, all dentists are ethically and even legally bound to follow some combination of all of the moral compasses. *"Ethics and the needs of the patient*

should always be the priority of the clinician , do no harm' is the ethical and legal obligation of treating any patient"[9] . As Harald O. Heymann, professor and graduate program director of operative dentistry at the University of North Carolina School of Dentistry, says: *"While esthetic or cosmetic dentistry is elective by nature, by the same token patients come to us because they respect us as professionals and, as such, we should guide them as to what the most conservative means of improving their esthetics or their appearance may be, not necessarily recommend something that's going to afford us the greatest level of income"*[4].

Seidberg concurs. *"The determination of the standard of care must not be confused with the introduction of new materials and technology. Neither makes that a standard of care, even if the material or technology becomes a favorite of the profession. The microscope is now considered part of the armamentaria of endodontists; however, it is not the standard of care for treatment."*[4]

"Standard of care" is an ever evolving and a dynamic process which needs to be updated from time to time. Dental professionals need to understand and recognize the minimum *"standard of care*" as applicable to their profession, prescribed by the respective governing bodies [10]. This is necessary to provide quality care as well as protect themselves from legal issues against medical negligence. Dentists are also required to keep up with advances in dental health care which is progressing at a rapid rate through continuing dental education programs[11].

The following case report demonstrates how to avoid dental malpractice in the treatment and how it can be corrected using methods based on evidence based dentistry

Case Presentation

A 37 years Male, with secondary educational level working as soldier, married and has two children, with good socioeconomic status, and philosophical attitude (House classification)[12], cooperative, comes regularly to his appointments, and a non-smoker. He visited our dental institution with an issue of previous dental treatment elsewhere and was not very much satisfied with the treatment procedure as the pain for which he underwent treatment was not resolved and he was very much dissatisfied with the previous dentist. His chief complaint was *"Pain in the upper anterior teeth since 2 weeks"* (Figure 2). Further, he disliked the appearance of his teeth (Figure 3). The subjective questionnaire revealed that, nothing abnormal detected in his medical and family history.

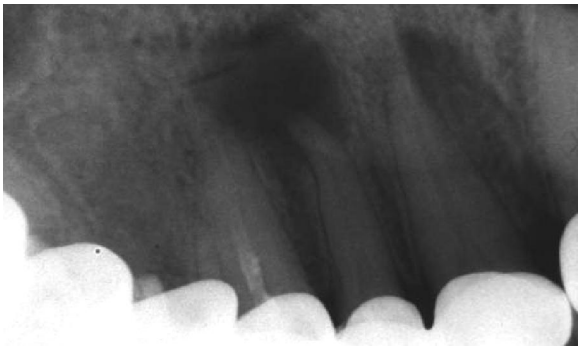

Figure 2. Periapical x-ray for upper anterior teeth showed Periapical pathology.

His previous dental treatment included several restorations, root canals treatment, and multiple porcelain fused to meta fixed partial denture (PFM F.P.D) in all upper and lower teeth (Figure 1).

Figure 3. The patient was unhappy with the teeth appearance.

Diet analysis revealed that, eats three meals/day, no snacks between the meals, low consumptions of carbohydrates and sugars, two cups of tea without sugar, and low amounts of fruits and vegetables.

Clinical Examination and Investigations:

In order to diagnose the case properly, a comprehensive extra and intra-oral examination were conducted inclusive of T.M.J for range of motion, soft tissue evaluation, periodontal probing and occlusion evaluation. Orthopantomogram x-ray, full-mouth periapical and bitewing radiographs were taken to evaluate and rule out caries detection, periapical and periodontal pathology and pathology associated with jaw bones. Special investigations including percussion & palpation tests, cold test, and electrical pulp test were used. Upper and lower models were made and mounted on a semi-adjustable articulator using a face-bow at his existing habitual bite.

Clinical Findings:

Extra-oral examination revealed no abnormalities. Evaluation of the TMJs was unremarkable, with normal jaw opening and range of

motion. The intra-oral examination revealed a patient with a normal soft tissue, and thin serous saliva. Cyanotic, rolled marginal gingiva, blunted interdental papilla, firm and stippled attached gingiva ranging from 2 to 3 mm in width, with 2 to 3 mm of probing depth. Oral hygiene was fair, the plaque index was 40%, and the bleeding index was 26%. Occlusion evaluation revealed class I right & left side angle's classification, 1 mm vertical & horizontal overlap (Figure 4), centric relation & centric occlusion were coincidental, right and left excursion guided by group function, anterior open bite, and midline shift.

Figure 4. 1 mm vertical & horizontal overlap.

The Orthopantomogram revealed retained tooth No. 85, all wisdom teeth, and tooth No. 45 were missing (Figure 1). The bitewing and periapical radiographs revealed a large number of old failed restorations, including root canals, and PFM F.P.D and as well many of the restored teeth showed periapical pathology (Figure 5).

Diagnosis:

The patient was fit medically with generalized plaque-induced Gingivitis. Faulty restorations and PFM F.P.D in all upper and lower teeth with missing tooth No. 45. Incomplete root canal treatment for teeth Nos. 17, 16, 15, 14, 13, 21, 22, 23, 24, 25, 26, 27, 37, 36, 35, 34. Necrotic pulp with Chronic apical radiolucent for teeth No. 11, 12, 46, 47.

The clinical examination and investigations revealed that previous dentist had not followed the *"standard of dental care*", as well the ethics while treating him, as there were many areas of focus of infections which were not taken into consideration.

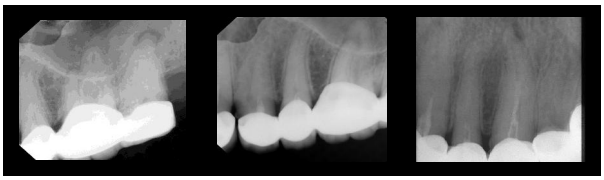

Figure 5. Periapical x-ray for upper teeth showed Periapical pathology and incomplete RCT.

So we planned for a stepwise treatment protocol in complete oral rehabilitation procedure. A step by step *"standard of dental care*" were followed in treating him can lead to a predictable and favorable prognosis.

Treatment Objectives

• To control all dental and periodontal pathology.

• To restore functions and esthetics.

• To motivate the patient in improving his oral hygiene.

Treatment plan*[13]*:-

After obtaining the Informed Consent, the treatment was explained to the patient and planned accordingly.

The treatment plan consisted of four phases.

Phase-I: Initial Treatment Plan:

1. Emergency endodontic treatment for teeth Nos. 12 & 11.
2. Case Presentation:

• Plaque control and its effect on hard and soft tissues.

• Treatment needs and longevity.

3. Prophylaxis and O.H.I.

• Using soft brush 3 times / day.

• Un-waxed dental floss.

4. Removing the old fixed prosthesis and crowns
5. Extraction # 85
6. Evaluation of the teeth.
7. Construction the provisional prosthesis and crowns
8. Scaling and root planning.

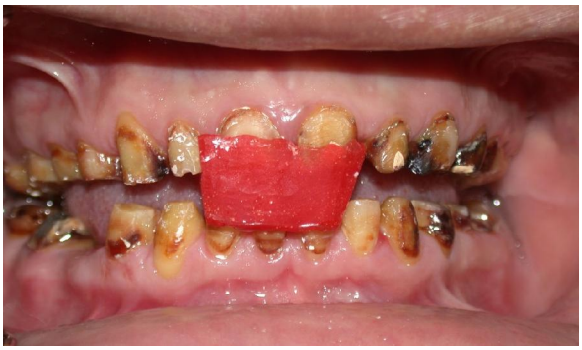

Figure 6. Lucia jig after the crowns were removed.

Phase-II: Cause Related Therapy:

- Endodontic treatment for teeth Nos. 17, 16, 15, 14, 13, 21, 22, 23, 24, 25, 26, 27, 37, 36, 35, 34, 46, and 47.
- Re-evaluation & O.H.I Reinforcement:

Figure 7. Maxillary arch after the crowns were removed.

Phase-III: Definitive Treatment Plan:

9. Prosthetic phase:

- Post and core for teeth Nos. 13, 12, 11, 21, 22, 23, 26, 27, 24, 36.
- Core build up for teeth Nos. 17, 16, 15, 14, 25, 37, 35, 34, 46, 47
- Full-mouth P.F.M F.P.D reconstruction to the correct functional relationship
- Improve cosmetics

Phase-IV: Maintenance and disease control:

- Every 6 months.

Figure 8. Mandibular arch after the crowns were removed show recurrent caries in most of the teeth.

Consultation

It was explained to the patient that his problems were associated predominantly with the incomplete previous endodontic treatment and failure of P.F.M F.P.D margins be suitable for the teeth preparation margins. The patient was informed that the total treatment time would be approximately 6 months, start to finish. The patient agreed to treatment and signed informed consent forms. The treatment provided free of cost.

Figure 9. Provisional crowns and FPD in the patient mouth lute with temporary cement.

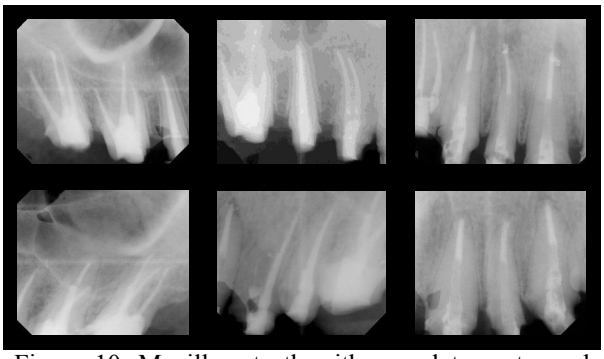

Figure 10. Maxillary teeth with complete root canal treatments were accomplished in Phase-II.

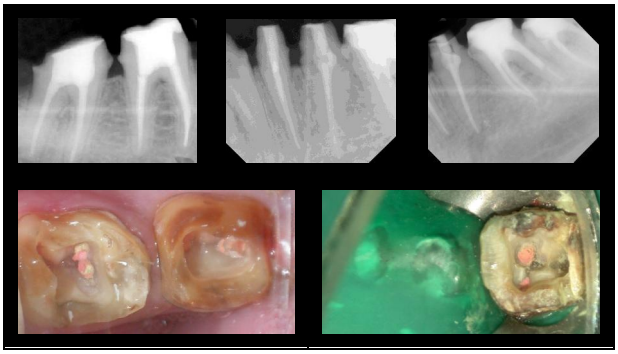

Figure 11. Mandibular teeth with complete root canal treatments were accomplished in Phase-II.

Phase-I: Initial Treatment Plan:

The first phase started with emergency root canal treatment for teeth Nos. 11 and 12 to relief pain. After removing the previous prosthetic crowns of upper and lower anterior teeth, root canal treatments of all necessary teeth were accomplished and Lucia jig was constructed to maintain the same vertical Occlusal dimension[14] (Figure 6). There is no reason to change the vertical dimension unless it is the only way to achieve an acceptable result[15]. Then the upper and lower rare crowns were removed. All the teeth affected by caries (Figure 7,8) White et.al in

1994 reported that, marginal discrepancy and micro leakage are important causes of dental crown failure, and leads to pulp inflammation [16]. The next step was to assisting the vitality of the teeth by a special investigation such as percussion test, cold test, and electrical pulp test. The results revealed all teeth required root canal treatment except teeth Nos. 33, 32, 31, 41, 42, 43, and 44. Provisional crowns and FPD were fabricated from auto-polymerizing acrylic resin using a vacuum formed matrix that was produced from the diagnostic wax-up, lute with temporary cement, after the caries was removed and the patient's adaptation was monitored (Figure 9). This completes the first stage which alleviated the pain and the focus of infection were controlled.

Phase-II : Cause Related Therapy:

At this stage all the root canal treatments were completed (Figure 10, 11), as well as the oral hygiene evaluation was done by determining the percentage of plaque and bleeding indexes. The plaque percentage was 35% while the bleeding percentage was 17% which shows us that there is an improvement in these ratios from the previous. Emphasis on oral hygiene reinforced to maintain progress on controlling gingivitis. The goals of Phase-II were accomplished.

Phase-III: Definitive Treatment Plan:

With the completion of Phase-II, the patient

was ready to start Phase-III with placing prefabricated posts in the planed teeth and composite build-ups.

Final preparation was performed (Figure 12, 13), and definitive impressions were made with polyvinylsiloxane impression material (Figure 14, 15). The patient's master casts were mounted on a semi-adjustable articulator (Figure 16) using a face-bow record and an interocclusal record that was made with the aid of a Lucia jig and polyvinylsiloxane occlusal registration material.

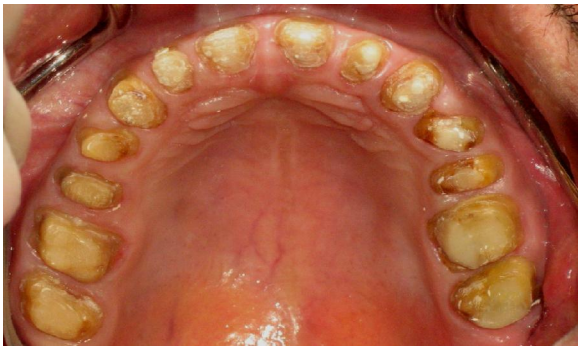

Figure 12. Final preparation of maxillary teeth.

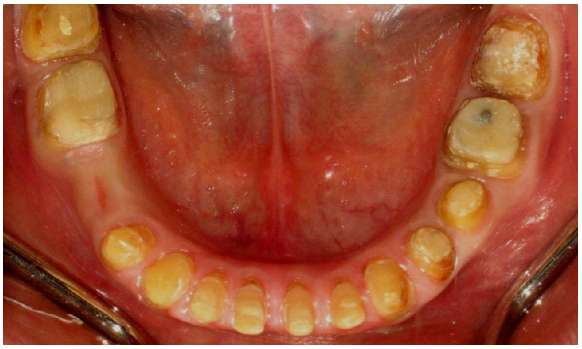

Figure 13. Final preparation of mandibular teeth.

Figure 14. Final impression for the maxillary teeth.

Metal-cop for the final restorations were made, then tried on the patient teeth to verify the margin integrity clinically as well as by X-ray which shows short margin distally with tooth no. 47, that's corrected by single impression and metal try-in

(Figure 17, 18).

The shade selected, then The master casts were remounted on the same articulator using with the aid of a Lucia jig and polyvinylsiloxane occlusal registration material (Figure 19).

Dawson (1973) reported that, remounting is the procedure whereby the restorations are accurately related to each other for the purpose of minute refining of the various surfaces. It is the most important single step in mouth rehabilitation[17].

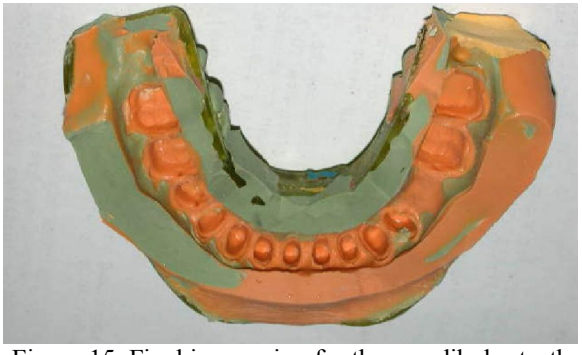

Figure 15. Final impression for the mandibular teeth

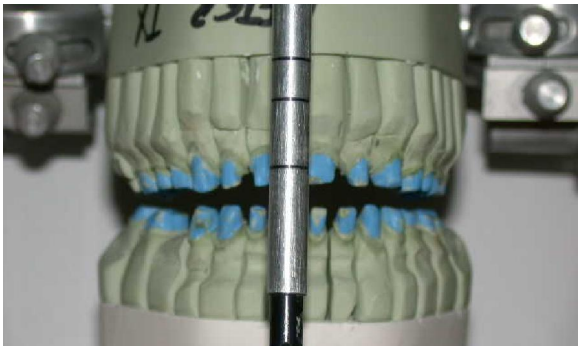
Figure 16. Master casts mounted on a semi-adjustable articulator.


Figure 17. Metal cop tried on the teeth.

Porcelain was applied to the metal cop and tried before glazing to verify the margin integrity as well as the occlusal stability. The PFM FPD and crowns were designed using mutually protected occlusion[18]. The anterior teeth protected the posterior teeth from excursive force and wear, right and left cusped disclusion the teeth during lateral movement, and posterior teeth supported the bite force[19, 20]. After that the crowns and PFM FPD were glazed and lute with permanent cement (Figure 20).

Oral hygiene instruction and regular check-up were administered.

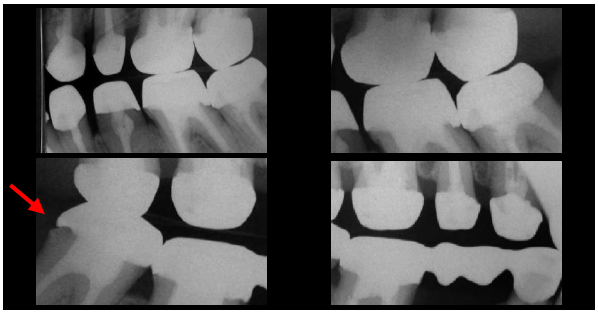
Figure 18. Bitewings X-ray show short margin with tooth no. 47.

Phase-IV: Maintenance and disease control:

The patient was reevaluated at 6 months, and 1 year post-treatment, it was found uneventful and much satisfactory. Follow-up examinations using periodontal probing, plaque index, and Orthopantomogram showed normal healthy gum and teeth.

At 6 months the plaque index was 30% and the bleeding index was 18% while 1 year post-treatment the plaque index was 24% and the bleeding index was 11%. The patient is blissful with his final result (Figure 21, 22, 23).


Figure 19. Lucia jig and polyvinylsiloxane occlusal registration material


Figure 20. Final restorations after lute with permanent cement.

Conclusion:

This case report shows the *"standard of care in dentistry*", following evidence based dentistry treatment approach. The patient presented with chief complaints of pain, and dislike of the appearance of his teeth. The patient went through four phases of treatment over a period of approximately 6 months. The phases dealt with his pain, controlling all dental and periodontal pathology, restoring functions and esthetics by complete oral rehabilitation and, finally, motivating the patient in improving his oral hygiene. The entire treatment plan was built on scientific evidence and established by using extensive record gathering through photographs, radiographic, mounted study castes, and clinical evaluation modalities. The information that gathered were analyzed to diagnose the cause of the patient's chief complaints before treatment and essentially to lead

the treatment course. The occlusion was evaluated by mounting models on semi-adjustable articulator. This mounting showed the relationship of the occlusal plane of the teeth to the maxilla, mandible, and jaw joints. Soft tissue evaluation and periodontal probing illustrated marginal gingivitis. The x-rays revealed retained tooth No. 85, some teeth were missing, large number of old failed restorations, including root canals, and PFM F.P.D and as well many of the restored teeth showed periapical pathology special investigations including percussion & palpation tests, cold test, and electrical pulp test illustrated all need root canal treatment except teeth Nos. 33, 32, 31, 41, 42, 43, and 44. All of the recognized diagnostic modalities straightway affected the path of treatment selected for this patient. The accomplished treatment was subjectively and objectively successful, with the patient performance well 1.5 years after treatment.

In this case report *"standard of care in dentistry*", were followed step by step and we could achieve an excellent results in complete oral rehabilitation.

Figure 21. Postoperative Orthopantomogram x-ray.

Figure 22. Before treatment.

Figure 23. After treatment

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