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CLINICAL AND RADIOGRAPHIC EVALUATION OF PULPAL AND PERIRADICULAR TISSUE

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ABSTRACT: Objective: The aim of the present study was to evaluate the clinical and radiographic aspects of pulpal and periradicular tissue for patient undergoes endodontic treatment. **Patient and method**: The present study was limited to patients who treated endodontically by postgraduate students of Conservative Department, School of Dentistry/Faculty of Medical Sciences between January 2014 to February 2015. A total number of 174 case sheets of patients age ranged from 16 years to 53 years with the mean age being 31.1 years and (92) male and (82) female. The data were categorized according to two parameters, clinical and radiographical evaluation of pulpal and periradicular tissue. **Results:** Out of the 174 patients who were included in the study, symptomatic irreversible pulpitis (44.25%) was the most common clinical diagnostic disease of pulpal tissue and (45.97%) of cases undergo root canal therapy had normal periradicular tissue. Regarding radiographic assessment of pulpal and periradicular tissue, all criteria (alveolar bone, lamina dura, roots, pulp chamber and pulpal canal) are within the normal limit. **Conclusion:** Symptomatic irreversible pulpitis was the most common reason for root canal treatment.

INTRODUCTION: Information on reasons for and pattern of a treatment are necessary for understanding disease pattern, performance of previous treatments, determination of cost effectiveness and devising future facilities based on patient needs [1]. The dental pulp located in rigid chamber surrounded by dentine, enamel and cementum, which provide strong mechanical support and protection from the microbial rich oral environment.

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However, if this rigid shell loses its structural integrity, the pulp is under the threat of the adverse stimuli from the mouth. Several factors such as caries, cracks, fractures and open restoration margins provide pathways for micro-organisms and their toxins to enter the pulp when . The response of the pulp to irritation is inflammation and, if unattended, this will eventually progress to pulp necrosis. Inflammation may spread to the surrounding alveolar bone and cause periapicalpathosis [2].

The objective of endodontic treatment is to prevent or cure apical periodontitis (AP) caused by infection of the root canal systems of the affected teeth or due to persistence of the primary infection or emergence of infection after treatment [3].

Toothaches or odontogenic pain are among the most common form of orofacial pain [4], the diagnosis of dental pulp diseases suffers from the operator's inability to test/or image that tissue directly because of its location within a relatively hard tissue, dentin. It appears to be impossible to directly test dental pulp; therefore, all information elicited must be interpreted indirectly from the patient response to a stimulus placed externally to the tissue [5].

The indications are based on the clinical diagnosis of normal pulp, reversible pulpitis (pulp is capable of healing), symptomatic or asymptomatic irreversible pulpitis (vital inflamed pulp is incapable of healing) and necrotic pulp or pulpless (pulp do not respond to vitality test) [6]. It might be interesting to try to find these indications that could be obtained from radiographic evidence of periapical radiolucency to diagnose pulpitis. It was impossible to achieve an accurate diagnosis of the state of the pulp on the basis of clinical proof alone; the only accurate method is to do a histological examination [7].

Endodontic diagnosis is similar to a jigsaw puzzle diagnosis cannot be made from a single isolated piece of information. The clinician must systematically gather all of the necessary information to make a "probable" diagnosis. When taking the medical and dental history, the clinician should already be formulating in his or her mind a preliminary but logical diagnosis, especially if there is a chief complaint. The clinical and radiographic examinations in combination with a thorough periodontal evaluation and clinical testing (pulp and periapical tests) are then used to confirm the preliminary diagnosis [8].

Radiograph has been a fundamental tool in the practice of endodontics [9, 10]. When combined with a thorough dental history, clinical examination and pulp-testing procedures; radiological examination is an integral and essential component of all phases of root-canal therapy from diagnosis and treatment planning to intraoperative control and assessment of treatment results [11, 12, 13]. At present, periapical (PA) radiographs (conventional or digital) are used during endodontic treatment as well as afterward to assess the outcome of treatment with limitation of periapical imaging provides a 2-dimensional view of a 3-dimensional (3D) structure [14].

The aim of this study was to identify clinical condition of pulpal and periradicular tissue based on a number of clinical diagnostic tests and radiographic evaluation using periapicalradiograph before effective dental treatment is performed.

MATERIALS AND METHODS: The present study was limited to patients who treated endodontically by postgraduate students of Conservative Department, School of Dentistry/Faculty of Medical Sciences between January 2014 to February 2015. A total number of 174 case sheets of patients age ranged from 16 years to 53 years with the mean age being 31.1 years and (92) male and (82) female.

The data were categorized according to two parameters, clinical classification of pulpal and periradicular tissue and radiographic evaluation.

Clinical classification:

Clinical classification of pulpal and periradicular tissue have been developed in order to formulate treatment plan options, the terminology and classification that follow in this study are based on those suggested by the American Association of Endodontists in 2012 [15]:

Pulpal disease:

- Normal pulp.
- Reversible pulpitis.
- Symptomatic irreversible pulpitis.
- Asymptomatic irreversible pulpitis.
- Pulp necrosis.
- Previously treated.
- Previously initiated therapy.

Apical (periapical) disease:

- Normal apical tissues.
- Symptomatic apical periodontitis.
- Asymptomatic apical periodontitis.
- Acute apical abscess.
- Chronic apical abscess.

Radiographic evaluation:

Radiographic examination of the periapical region is important when evaluating periapical status

before endodontic treatment and for the success and failure of root canal treatment, from preoperative intraoral periapical view radiograph, the following radicular findings was assessed [16]:

- Alveolar bone.
- Lamina dura.
- Roots.
- Pulp chamber.
- Pulpal canal.

Data were analyzed using SPSS version 12.0. Frequency and percentage were calculated for the study variables.

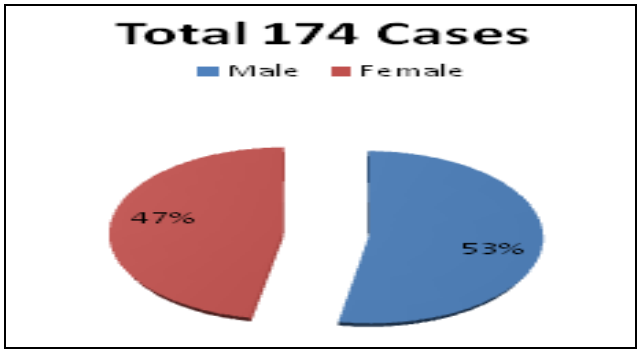

FIG. 1: GENDER DISTRIBUTION

The clinical diagnostic conditions of pulpal and periradicular diseases are presented in **Fig. 2**. In which symptomatic irreversible pulpitis (44.25%) (77 cases) was the most common clinical diagnostic disease of pulpal tissue followed by pulp necrosis (28.73%) (50 cases) and about (45.97%) (80 cases) treated endodontically by postgraduate students had normal periapical tissue followed by (18.39%) (32 cases) diagnosed as symptomatic apical periodontitis.

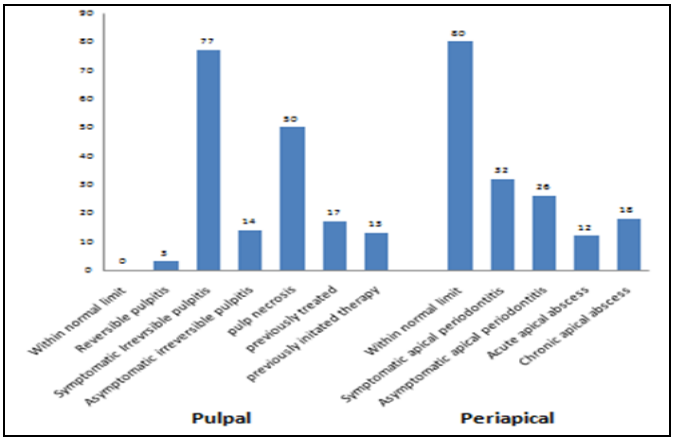

FIG. 2: CLINICAL CLASSIFICATION OF PULPAL AND PERIAPICAL TISSUE

RESULTS: Information was collected on 174 patients on specified proformas. Out of the174 patients majority of the patients 92 (53%) were male while the rest 82 (47%) were female **Fig.1**. The age of the patients ranged from 16 years to 53 years with the mean age being 31.1 years.

Regarding radiographic evaluation of alveolar bone (57.47%) (100 cases) exhibit normal alveolar bone with no any radiolucency or bone loss while (26.43%) (46 cases) had apical radiolucency with (9.7%) (17 cases) had lateral radiolucency, (6.32%) (11 cases) had crestal bone and only (1.14%) (2 cases) had combined apical and lateral radiolucency as shown in **Fig. 3**.

About (48.27%) (84 cases) among (174 cases) exhibit normal lamina dura and nearly (45.40%) (79 cases) diagnosed radiographically as widened lamina and (53.44%) (93 cases) had normal root curvature near to straight and (21.83%) (38 cases) showed degree of curvature either mesially or distally **Fig.3**.

Nearly most of the cases showed normal pulp chamber with no any pulp stone or sever degree of calcification and most of the pulp canals of root treated are within normal limit as shown in **Fig.3**.

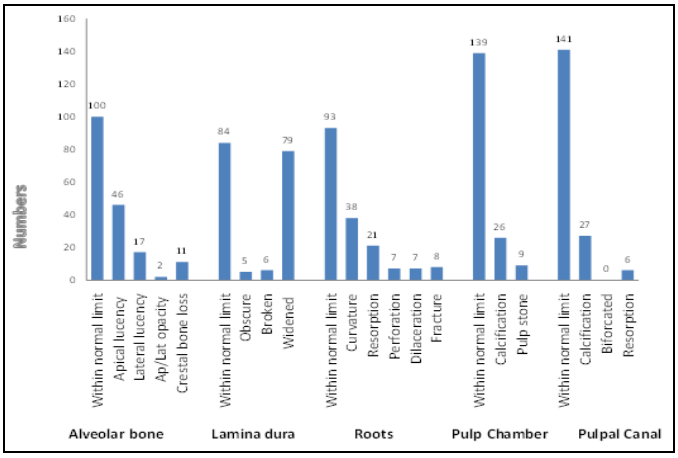

FIG. 3: RADIOGRAPHIC EVALUATION OF PULPAL AND PERIAPICAL TISSUE

DISCUSSION: This study has provided useful information on radiographic evaluation of pulpal and periradicular tissue and clinical diagnostic assessment as integral part on the treatment planning of endodontic therapy. The age of the patients fell between 16 years and 53 years.

The mean age was 31.1 years. This showed that pulpitis has become the most common cause of toothache followed by death of the pulp and spread of infection through the apical foramina into the periapical tissues and this could be found among all ages especially younger people due to several unhygienic factors like smoke, hormonal disturbance in woman, diabetes, stress, cancer, AIDS, genetic factors, insufficiently nutrients, and drugs [17].

Symptomatic irreversible pulpitis and necrotic pulp are the most common clinical diagnostic conditions for patient undergoing root canal treatment; this was in agreement with the findings Khattak et al [18] who reported an occurrence of necrosed pulp (38.31%) was the most common reason for root canal treatment followed by irreversible pulpitis (34.28%), the reason is both are sequel of dental caries which considered the most common cause of pulp damage and requiring root canal treatment[19, 20, 21].

The other fact which is evident is that dental awareness in our population is much less. Generally the concept of regular dental checkups is not very common. People come to the dental clinics or hospitals only when they start feeling symptoms for example pain or sensitivity. The idea of preventive dentistry for example prophylactic cleaning, fissure sealants or preventive resin restorations is not very common. This leads to the fact that many teeth which can be prevented from small restorations often go unnoticed and generally when they are close to the point of pulp exposure become symptomatic. It is then when the patient reports to the dentist for treatment [18]. During the diagnosis of oral and maxillofacial diseases, clinical and radiological data play a major role. In this region, only a good clinical diagnosis along with a radiological examination may lead to a successful diagnosis. A successful diagnosis and evaluation of clinical examination are generally up to a profound knowledge of the normal anatomy of the region [22].

The interpretation of width of periodontal ligament and lamina dura on the radiographs were evaluated in this study, Naik & Umarani [23] emphasizing the significance of evaluation of these structures which considered being accurate predictors of periapical lesion.

In the present study alveolar bone radiographically interpreted for any apical or lateral radiolucency and bone resorption. Gutmann et al [24] stated that ‘‘the roentgenograph is one of the best means at our disposal for determining the existence of acute and chronic apical abscess that characterized by a rather well-defined radiolucent area, or dark shadow, which may or may not be exactly at the apex of the tooth’’.

In this study, number of roots, curvature, and pulpal canal with pulp chamber conditions was evaluated. Radiographs provide much needed information about root canal morphology. Accurate multiple preoperative radiographs, straight and angled, using the paralleling technique are essential to provide evidences beneficial to successfully negotiate various anatomic aberrations that is, preoperative identification, root canal access opening, intraoperative identification, location, instrumentation, debridement, disinfection, obturation, and surgical endodontics [25].

CONCLUSION: With the results of the present study it is concluded that symptomatic irreversible pulpitis and necrotic are the predominant clinical diagnostic conditions for carrying out root canal treatment.

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