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Impact of quality of coronal restoration versus root canal restoration at selected dental clinics of cities of kingdom of Saudi Arabia (KSA)

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Abstract
Background: Based on Evidence the endodontic treatment measures were applied by the endodontists, who used aseptic procedures with rubber dam isolation to maintain the quality of coronal restoration which will result in higher quality of root canal restoration. Retrospective studies have suggested the role that endodontic infections take part in as local modifying-risk variables to periodontal healing. Moreover, it is crucial to assess the impact of periodontal parameters on the periapical status of endodontically treated teeth. It is worth highlighting that many researches findings are based solely on radiographic interpretations, (Matsumoto, Nagai, & Ida, 2015). A Retrospective and Clinical research design was utilized in the current research. The sample for this retrospective cohort study consisted of 230 adult patients. Preoperative pulpal and periradicular diagnoses were made during the first visit. All of the teeth were diagnosed as having a necrotic pulp and were treated following a standardized protocol. Thus, the aim of this study was to assess the Impact of Quality of Coronal Restoration versus Root Canal Restoration at Selected Dental Clinics of cities of Kingdom of Saudi Arabia (KSA). Looking forward for prevention strategies for improving the management outcome.
Methods: A Retrospective and Clinical research design was utilized in the current research. The sample for this retrospective cohort study consisted of 230 adult patients (100 male and 130 female) out of 679 patients who received endodontic treatment during the time of data collection. The patients were recalled by telephone. Those who responded and gave their written and informed consent were reexamined to determine treatment outcome from January to March 2016 within the selected setting. Only teeth with a follow-up period of one year were included in this study. A total of 230 of the 679 originally treated teeth were reexamined, representing a reply rate of 16.4%. Descriptive statistics like percentage was used to describe the findings using SPSS 20.
Results: The aim of this study was to assess the Impact of Quality of Coronal Restoration versus Root Canal Restoration at Selected Dental Clinics of cities of Kingdom of Saudi Arabia, which was found to be that the level of quality of coronal canal restoration was highly significant (P <. 0001*). However, the there was a significant level of the root canal restoration, in which (P < 0.05*).
Conclusion: Concerning the assessment for the Impact of Quality of Coronal Restoration versus Root Canal Restoration at Selected Dental Clinics of cities of Kingdom of Saudi Arabia, which was found to be that the level of quality of coronal canal restoration was highly significant However, the there was a significant level of the root canal restoration.

Keywords: coronal restoration, periodical status, quality & root canal restoration

Introduction
Currently, many research focused on the investigation of studying impact of the quality of coronal restoration and thus the coronal root canal restoration has been described previously. Numerous researchers had conduct surveys to discover variables which can clarify the relationship between the quality of coronal restoration, as well as how it could be relate its effect on the quality of root canal restoration. (Bergenholtz, *et al.* 2001) [1]. Furthermore, it has been demonstrated that provocative peri-radicular diseases expand as a result of infectivity which caused by germs and their by-products. Consequently, the main aim of utilizing a standardized level of restoration of root and canal impairment must include but not limited to overcome the intra-radicular bacteria and digest all soft tissues within the root canal system, stubborn the spotless and wrought organism in order to stop the new bacterial attack and reproduction or prevent residual bacteria from obtaining nourishment and thus re-emerging within the root canal hole. (Sunde, *et al.* 2002) [2]. Notwithstanding strict adherence to these values with contemporary state of the ability innovative technologies in modern endodontic practice, the arena of maintain the standardized level of quality concerning the coronal and root canal restoration. However, it was found faced with cases where well-filled root canals are re-contaminated and present with clinical manifestation of disease or – ironically – poorly executed root canal treatment with signs of healing. (Kerekes & Tronstad, 2000) [23].
Therefore, the current systematic review and meta-analysis by Gillen *et al.* (2013) [12], is more than welcome to bridge some of the gap between the two extremes. In the present study, the authors carefully identify potential design issues and

limitations to the work and ended up with nine studies performed between 1995 and 2009. The study did provide an important conclusion: the odds for ending up with 'healing' results of non-surgical root canal treatment increases with both adequate root canal treatment and coronal restoration, and less probability of healing if any of the two procedures fail to be adequate. According to Imura, Pinheiro, Gomes, (2007) [24], There is a strong correlation between a quality of coronal and root canal restoration with results in a strong therapeutic and research implications. These require firstly, adequately root filled teeth with adequate post-endodontic restoration produced better treatment outcomes. This by itself might be enough to motivate dental practitioners to consider immediate permanent restoration instead of provisional ones as this step is considered among the elements of the equation of success. The fear of ending up with non-healing periapical lesions can be dealt with as having plan B for managing refractory cases which is endodontic micro-surgery. Secondly, reliable and predictable results in endodontic can only are achieved by consistent approach of treatment.

Materials & Methods

A retrospective and clinical research design was utilized in the current research. Proper ethical clearance had been obtained for conducting the study. Clinical studies that provided sample size, and where success was based on radiographic and clinical criteria that evaluated quality of root filling, the quality of coronal restoration and periapical status at least one year after root canal treatment that provided an overall success rate or sufficient data to allow it to be calculated from the raw data were included. Data extraction and synthesis Data were collected based on predetermined criteria. Percentages of teeth without apical periodontitis were recorded for each category: adequate root canal treatment (AE); inadequate root canal treatment (IE); adequate restoration (AR); and inadequate restoration (IR).Data were analyzed using meta-analysis for odds ratios (ORs) concerning the previous treated cases.

Radiographic and Clinical Assessments

A single examiner performed the follow-up assessments. The teeth were grouped according to the quality of restoration of root and coronal. The quality of root canal filling was assessed both clinically and radio-graphically. All periapical radiographs were evaluated by using an x-ray viewer under _3.5 magnification. The criteria used for radiographic evaluation were slightly modified from those described by Tronstad *et al.* (1998). Concerning, the clinical evaluation, intraoral and extraoral examinations were performed to identify signs and symptoms related to root canal filling. The teeth were submitted to palpation and percussion. Thus, clinical and radiographic classification of root canal filling quality was made according to the criteria listed here:

1. Adequate root canal filling: All canals obturated, no voids present, root filling ends 0–2 mm short of the radiographic apex; no symptoms or clinical signs (elicited or spontaneous pain, fistula, edema, or exudation).
2. Inadequate root canal filling: Root filling ends more than 2 mm short of the radiographic apex or canal grossly overfilled or unfilled; root filling with voids or inadequate density; presence of symptoms or clinical signs.

Statistical Analysis

Descriptive statistics like percentage was used to describe the findings using SPSS 20. It was used for data processing and statistical analysis. The Cohen kappa was calculated to assess intra-examiner agreement (in 2 calibration sessions performed 1 month apart) for restoration quality, root canal filling, and periapical status as well as to assess inter-assessment (clinical and radiographic) agreement for restoration quality. The Mann-Whitney and Friedman tests were used as the univariate approach to detect statistically significant differences between categories. Logistic regression (multivariate approach) was further used to study the relationship between independent variables and periapical status. The level of significance adopted was 5%. Descriptive statistics like percentage was used to describe the findings using SPSS 20. All categories data were analyzed using the Chi-squared test with or without Yates' correction; Statistical significance for all analyses was presumed for (P at 0.05).

Results

The aim of this study was to assess the Impact of Quality of Coronal Restoration versus Root Canal Restoration at Selected Dental Clinics of cities of Kingdom of Saudi Arabia. The intra-examiner agreement values of 0.942, 0.844, and 0.971were found for root canal filling quality, coronal restoration quality, and periapical status, respectively, thus indicating almost perfect intra-observer agreement. A kappa value of 0.50 was found for the clinical and radiographic assessments of restoration quality, indicating moderate agreement between both assessments. It was found that, total number of the studied cases out of the (230) patients, 56.5% were female and 48.26% were aged 18–30 years. The most frequent tooth group was that of premolars, with 37.0%, and the most frequent restoration type was composite resin, with 27.0%of the cases. A descriptive analysis of the study sample is given in Table (1). The overall success rate for the 200 teeth was significantly higher than that of failure (P <. 05). Similarly, the rate of adequate root canal filling was significantly higher than that of adequate root canal filling (P < 0.05). Furthermore, there was a highly significant difference was observed between the rate of adequate coronal restoration and that of adequate coronal restoration at the follow-up examination as a highly significant difference was observed (P <. 0001*, Table 2).

Table 1: Descriptive analysis of study sample (230 patients, 200 teeth) by using relative (%) and absolute frequencies (n)

Variable	Category	N	%
Gender	Male	100	43.4
	Female	130	56.5
Age (y)	18-30	111	48.26
	30-50	59	26.52
	Older than 50	50	22.39
Teeth group	Anterior	98	49.0
	Premolar	74	37.0
	Molar	28	14.0
Restoration type	Amalgam	76	38.0
	Composite	54	27.0
	Crown and post	29	14.5
	Temporary	24	12.0
	Absent	17	8.5

Table 2: Correlations between the level of quality of coronal restoration and root canal restoration

Variable	Category	N	%	P
Quality of Coronal Restoration	Adequate	334	63.8	P <. 0001*
Quality of Root Canal Restoration	Adequate Success	434	82.9	P <. 05*

*Mann-Whitney and Friedman tests, P<. 05.

Discussion

The current research findings revealed that, a kappa value of (0.50) was found for the clinical and radiographic assessments of restoration quality, indicating moderate agreement between both assessments. It was found that, total number of the studied cases out of the (230) patients, 56.5% were female and 48.26% were aged 18–30 years. The most frequent tooth group was that of premolars, with 37.0%, and the most frequent restoration type was composite resin, with 27.0%of the cases. A descriptive analysis of the study sample is given in Table (1). These findings are congruent with the research results carried out by Dugas, *et al.* (2001) [15], which revealed that, the most frequent tooth group was that of premolars, with 33.9%, and the most frequent restoration type was composite resin, with 23.6%of the cases.

The current research findings revealed that the overall success rate for the 200 teeth was significantly higher than that of failure (P <. 05). Similarly, the rate of adequate root canal filling was significantly higher than that of adequate root canal filling (P < 0.05). Furthermore, there was a highly significant difference was observed between the rate of inadequate coronal restoration and that of adequate coronal restoration at the follow-up examination intra-examiner agreement values of 0.94, 0.84, and 0.97, were found for root canal filling quality, coronal restoration quality, and periapical status, respectively, thus indicating almost perfect intra-observer agreement. Moreover, similar studies have confirmed the validity of these results by correlating the quality of both root canal filling and coronal restoration to the resolution of apical periodontitis in various populations and with different results was reflecting highly significance differences in which, have evaluated coronal restorations both radio graphically and clinically.

However, contradictory results have been reported by different studies that investigated the influence of endodontic treatment and coronal restoration quality on periapical status. Ray and Trope, (2003) [16], suggested that the quality of the restoration had a greater impact on Periradicular health than the quality of the root canal filling. The results of their was a significantly higher than that of failure (P <. 05). Similarly, the rate of adequate root canal filling was significantly higher than that of adequate root canal filling (P < 0.0001). Furthermore, there was a highly significant difference was observed between the rate of inadequate coronal restoration and that of adequate coronal restoration at the follow-up examination intra-examiner agreement values of 0.64, 0.54, and 0.86, were found for root canal filling quality, coronal restoration quality, and periapical status, respectively, thus indicating almost perfect intra-observer agreement. Furthermore, other studies carried out by suggested that treatment success rates depend equally on the quality of the root canal filling and of the coronal restoration. Moreover, Ricucci, *et al.* (2009) [10] reported that exposure of root canal filling to the oral macrobiotic was not significantly correlated with peridiculer status. The results of the present study indicate that the influence of coronal restoration quality on endodontic treatment outcome was smaller when the root canal restoration was adequate, which is in agreement with the findings of other studies carried out by Chugal, *et al.* (2011) [15] and Safavi, *et al.* (2010) [28], in which their studies findings revealed that, treatment success decreased when no coronal restoration was in place, allowing frank exposure of the root canal filling to microorganisms from saliva and establishing a pathway for microbial ingress into the root canal system.

The research results revealed that according the type of the studied teeth there was a Amalgam was constitute a 38.0% and the composite was represent 27.0% of the total studied cases. Although the crown & post was reflect 12.0% of the total no of the examined teeth. Theses research findings was found to be congruent with the research studied done by Sjogren, Hagglund, Sundqvist, & Wing, (2013) [5], who observed that there was a successful results more frequently for teeth with a permanent restoration (amalgam, composite, crown) than for teeth with a temporary restoration; however, the differences did not reach statistical significance, which is in agreement with the results of the present study. Teeth assessed clinically as having either adequate or in adequate

coronal restorations had apical periodontitis in 12.8% versus 19.4% of the cases, respectively. In contrast, the quality of the coronal restoration assessed radio-graphically had a significantly greater influence on the level of the restoration of root canal.

Conclusions

The aim of this study was to assess the Impact of Quality of Coronal Restoration versus Root Canal Restoration at Selected Dental Clinics of cities of Kingdom of Saudi Arabia. Looking forwards prevention strategies for improving the management outcome. A Retrospective research design was utilized in the current research. The sample for this retrospective cohort study consisted of 230 adult patients. A Retrospective and Clinical research design was utilized in the current research. The sample for this retrospective cohort study consisted of 200 adult patients (100 male and 130 female) out of 679 patients who received endodontic treatment during the time of data collection. The patients were recalled by telephone. Those who responded and gave their written and informed consent were reexamined to determine treatment outcome from January to March 2016 within the selected setting. Only teeth with a follow-up period of one year were included in this study. A total of 200 of the 679 originally treated teeth were reexamined, representing a reply rate of 16.4%. Was found to be that the level of quality of coronal canal restoration was highly significant (P <. 0001*). However, the there was a significant level of the root canal restoration, in which (P < 0.05*).

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