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TODAY PRACTICE OF ROOT CANAL TREATMENT AMONG GENERAL DENTAL PRACTITIONERS IN KHARTOUM STATE – SUDAN

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ABSTRACT

General dental practitioners provide the majority of endodontic treatment in Sudan. The aim of the study was to access methods, materials and attitudes employed in root canal treatment by group of General dental practitioners. Self - administered well structured questionnaires distributed upon 125 registered general dental practitioners working in public and private clinics in Khartoum state. The questionnaires included information about methods, materials and techniques used in endodontic treatment. Response rate was 92% (n=115). 93.9% of the respondents tend to perform root canal treatment for their patients. Only 9.3% used rubber dam for isolation, whilst the remainder 47.8% used cotton wool rolls and 38.9% high volume suction. Majority (77.8%) used Sodium hypochlorite as canal irrigant and 88.9% used Calcium hydroxide as canal medication. The step back technique was the method of choice for the majority (81.5%) of respondents. More than half (55.6%) used hand instruments for canal preparation. Lateral condensation technique for obturation was the commonest by 96.3%. The vast majority of the respondents (75%) did not practice a single visit root canal treatment especially in the public practice and when treating multi-rooted teeth. Most of the Sudanese general dental practitioners' deviated from standards guidelines such as the use of rubber dam for isolation. The most common way for isolation was cotton rolls, in spite of that, most of the respondents tend to update their knowledge and practices with current root canal treatment techniques and materials.

Keywords: *Sudanese Dentists, Rubber Dam, Root Canal Treatment, Step Back Technique*

INTRODUCTION

Modern dentistry was introduced in Sudan in mid nineties, the number of dentists were very few to meet the needs for the whole population, until 1971 with the founding of the only dental school in the country. In 1990 Sudan had approximately 300 dentists to meet the needs of the country's 25 million inhabitants. At that time, the vast majority of dentists lives and practiced in Khartoum City (Abu Affan & Bjorvatn, 1990). Twenty years ago the predominant form of dental treatment were extraction, removable prosthodontics and, in some places, routine amalgam restorations but no endodontic treatment was available. The main reason for this was the lack of endodontic equipments and materials, which have to be imported from abroad. Most endodontic therapy at that time was therefore carried out in private dental practices or in the conservation department in the only faculty of dentistry in Sudan (Ahmed *et al.*, 2000).

After the year 2000, the numbers of dental schools have been increased. With marked increases in endodontic treatment and a vast knowledge in the aspects of new materials, techniques and method. Also, there is an increase in patient's knowledge and attitude towards treating their diseased teeth rather than extraction. The only study investigated this issue in Sudan was done in 1998 and published in 2000 (Ahmed *et al.*, 2000). The result revealed that, only one dentist used rubber dam, the majority (80 %) used hydrogen peroxide as canal irrigant, and 75 % used formacresol as canal medicament. Step back preparation technique was a method of choice for 98 % of the respondents, no one used rotary instrument

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for canal preparation. Today's Sudanese general dental practitioners seem to be knowledgeable and follow standard methods of endodontic treatment, and there is a need to evaluate this current status.

The objectives of this study were to evaluate the methods, materials employed in the root canal treatment by general dental practitioners in Khartoum state. Also, to compare the practice and attitude of dentists working in private and public clinics.

MATERIALS AND METHODS

Descriptive cross sectional study, among sample of general dental practitioners registered in Sudanese Medical Council working in private and public clinics in Khartoum state, excluding specialists, registrars in an endodontic department, house officers and non-Sudanese dentists. The sample size was (125) dentists, determined according to number of general dental practitioners in Khartoum state using random sampling technique, The sample size was gained according to Barllet, Kotlik & Miggis equation from total of 635 registered general dental practitioners. The number included 77 GDPs working in public and 38 working in private.

A well structured questionnaire distributed to the participants; including demographic background information, methods, materials and techniques used in endodontic treatment. Questionnaires were self-administered and collected after one week.dat was analyzed by SPSS version 17, results were displayed in form of tables and figures; comparison between variables was done by chi square test with the level of significance set at P value ≤ 0.05 .

RESULTS

The response rate was 92% (115) dentists. From descriptive statistics 93.9% were reported to perform endodontic treatment to their patients. Regarding the methods of isolation as displayed in Table 1, only (10) 9.3% of GDP used rubber dam. Table 2 revealed the choice of root-canal preparation techniques among GDPs in private and public clinic, Step down was the technique of choice for (7) 9.5% public and (13) 38.2% private with a P value 0.001. The reasons for not using rotary instrument were showed in Table 3. The percentages of practitioners who took radiographs at the various stages of root canal treatment were displayed in Table 4. The major root canal irrigant was sodium hypochlorite (84) 77, 8%, while the canal medicament of choice was calcium hydroxide 88.9%. Table 5 Showed the reasons for not following up the patients, half of the surveyed dentists thought that the patients were unmotivated to follow up.

Table 1: Method of isolation in endodontic treatment applied by GDPs

	Frequency &%
Rubber dam	10 9.3%
Cottons rolls only	51 47.2%
High volume suction only	5 4.6%
Cottons rolls & high volume suction	42 38.9%
Total	108 100%

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Table 2: Choice of root canal preparation techniques among GDPs in private and public clinics

	Public clinic	Private Clinic	Frequency & %	Sig
filling (push - pull)	16 21.6%	5 14.7%	21 19.4%	P=0.561
Step – back	56 75.7%	32 94.1%	88 81.5%	P=0.017
Step – down	7 9.5%	13 38.2%	20 18.5%	P=0.001
Others	4 5.4%		4 3.7%	P=0.215

Table 3: Reasons for not using rotary instrument by GDPs

Reasons	Frequency & %
Lack of the instrument	53 88.3%
lack of adequate skills and training	6 10%
Inadequate knowledge	1 1.7%
Total	60 100%

Table 4: Percentage of GDPs who took radiographs at the various stages of root canal treatment

	Frequency & %
Preoperative x ray	97 89.8%
working length determination	89 82.4%
Master cone determination	18 16.7%
post operative determination (after obturation)	71 65.7%
None	1 0.9%

Table 5: Reasons for not following up the patients after root canal treatment

	Frequency & %
Lack of time	16 27.6%
Unmotivated patients	29 50%
Cost of radio graph	8 13.8%
Others	5 8.6%
Total	58 100%

DISCUSSION

Very small number of specialized endodontists in Sudan, so the vast majority of general practitioners performed RCT. In accordance, the general dental practitioners' knowledge and practice varies greatly,

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The shift toward endodontic treatment could be explained by the increase in patient's knowledge and attitude about treating their diseased teeth rather than extraction, additionally increasing number of dentists and availability of the treatment in public practice also played a major role, It is necessary to point out to the patients, the financial advantage of retaining their teeth by root canal treatment rather than extraction and replacement (Ahmed *et al.*, 2000).

The use of rubber dam is mandatory nowadays. It provides isolation, protection and improves visual access. The success rate of endodontic treatment increased significantly with its use (Summitt *et al.*, 2001), based on the factors associated with success in RCT, rubber dam is recommended for all the procedures (Udoye *et al.*, 2010). Unfortunately very low percentage of our GDPS use rubber dam, similar to the result of the previous study in Sudan (Ahmed *et al.*, 2000) and others studies in literature (Slaus *et al.*, 2002; Al-Omari, 2004) but dissimilar to the result of studies done by (Lynch *et al.*, 2007; Koch *et al.*, 2009) where they reported using rubber dam routinely in endodontic treatment. The reasons for not using rubber dam in this study; could be extra cost, additional time, and lack of adequate skills or training or inadequate education in the undergraduate teaching curriculum. In the majority of dental schools in Sudan as a result of unpublished data, the students performed endodontic treatment without rubber dam. It was found that continuous education and training courses attendance seem to be encouraging the use of rubber dam (Koch *et al.*, 2009).

It is well documented that instrumentation alone cannot clean all the internal surfaces of the root canal. Bacteria can be found on the root canal walls, within dentinal tubules and in lateral canals. Antibacterial irrigants and interappointment medicaments are needed to kill the remaining micro-organisms and also to flush out the remnants. Sodium hypochlorite is recommended as the material of choice for irrigating the root canal system because of its effective antimicrobial and tissue solving action (Carrotte, 2000). A disadvantage of Sodium Hypochlorite is that it can cause tissue damage in small amounts if it gets to the periapical tissues (Fidalgo, 2010; Hubbezoglu, 2013), and cannot penetrate deep inside dentinal wall. In this study it was an irrigant of choice; similar results were obtained from the literatures (Summitt *et al.*, 2001; Al-Omari, 2004). Positive changes from using hydrogen peroxide as canal irrigant by 80 % in 1998 (Ahmed, 2000) to 23% in the present; this may be due to current updating and knowledge of the advantages of sodium hypochlorite.

Calcium hydroxide is recognized as a standard intracanal medicament for inter-appointment dressing (De Souza *et al.*, 2005) and has been reported to be the material of choice by dentists in many places (Summitt *et al.*, 2001; Bhomavat *et al.*, 2009 and Clarkson *et al.*, 2003) Fortunately the majority of our GDPS used calcium hydroxide as canal medicament, compared to 75% in the previous study used formacresol. Step back technique for canal preparation is a technique of choice for the majority, like the previous study (Ahmed *et al.*, 2000). Although step back technique is widely used (Michael *et al.*, 2005), it has some disadvantages, as it may result in over preparation forming an elliptically shaped defect at the end-point preparation (Hubbezoglu, 2013; Michael *et al.*, 2005) which could make it difficult to obturate completely the root canals and also more debris were pushed through the apical foramen (Michael *et al.*, 2005; Jenkins *et al.*, 2001; Sowmya *et al.*, 2014).

K-files and H-files were found to be the most used hand instruments (Ahmed *et al.*, 2000; Al-Omari, 2004). Regarding those who used rotary instruments; Gates Glidden was commonly used, no one used engine driven instruments in the previous study (Ahmed *et al.*, 2000), and this may reflect an updating of the practice and knowledge among Sudanese dentists nowadays. All participants used gutta percha as obturating material; seemingly, dentists in Sudan are not strong advocates of the more recently introduced advanced obturating materials techniques. This may be attributed to additional cost involved, or lack of skill and training. Single visit treatment appears to have gained more popularity and an increased credibility in the pre-clinical endodontic training (Slaus *et al.*, 2002), it indicated when the tooth with vital inflamed pulp in the absence of perapical symptoms or radiolucency. It offer many advantages like decreases number of operative procedure including additional anesthesia, gingival trauma from rubber dam application as well as eliminating the risk of inter appointment leakage through temporary restoration, also it is less time consuming and less cost for the patients (Rajesh *et al.*, 2008) The vast

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majority of our general dental practitioners did not practice single visit root canal treatment, especially in the public practice and when treating multi-rooted teeth. This finding was in agreement with the result of Jordanian study (Al-Omari, 2004). Multiple visit endodontic treatment could be a direct result of lacking adequate clinical time to complete the treatment in a single visit. The dentists may prefer to wait till the complete subsidence of pain and other symptoms before obturating the canal system. Another possible explanation could be focused on, treating the pain and acute symptoms (Udoye *et al.*, 2010). Inspite of all results from available evidence, single visit treatment appeared to be slightly more effective than multiple visits (Sathorn *et al.*, 2005)

Almost 85% of practitioners used radiographs to determine the working length. The reliance on the preoperative radiograph and tactile sensation to determine the working length has no place in modern endodontic, and practitioners should be aware of the serious complications that may arise from inappropriate methods of determining length, such as perforations, incomplete instrumentation, under filling and overfilling, as a result RCT failure (Yoshida *et al.*, 1995). Study done by (Foud & Reid, 2000) concluded that electronic apex locators are good supplement to working length radiographs and may improve length determination in a root canal; however it is not a substitute of radiographs.

Conclusion

Most of the Sudanese general dental practitioners, do not comply with the quality standards guidelines such as using of rubber dam as isolation. Cotton roll was the most popular isolation method. In spite of this, most of the respondents tend to update their knowledge and practices with current techniques and materials.

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Research Article

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