

# Assessment of Crown and Bridge Work Quality among Sudanese Dental Practitioners

A. B. Mohamed, Neamat Hassan Abu-Bakr

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**Purpose:** The aim of the present study is to investigate the quality of crown and bridge work among dentists in Khartoum state by mean of a questionnaire. **Materials and methods:** Questionnaire was distributed to all dentists (about 230) who work in private clinics and primary health centers in Khartoum state. A total of 152 usable questionnaires were collected, giving a response rate 66.09%. **Results:** High-speed hand pieces were the instrument of choice (80.54%) and according to number of spray ports single port was found to be the most common type (80.43%). Alginate was the material of choice as a final impression material (68.24%) followed by condensation-cured silicone (24.32%). Impression trays used by dentists were metal tray 23.53%, rigid plastic tray 12.5% and both 63.97%. Results in concern of the use of the retracting cord indicated that 53.69% never use it. Results also indicated that 36.05% never used temporary crown and bridge. Traditional glass ionomer cements and zinc phosphate cements (56%) were equally selected as best choice for final luting cement of crown and bridge work. Both verbal and written prescriptions (81.73%) were the most common used way of communication between dentists and dental technicians. **Conclusion:** It is concluded that the majority of the surveyed dentists mainly used alginate as a final impression material for crown and bridge work. It was also observed, the absence of application of retraction cord and temporary restoration in their practice for crown and bridge work.

**Keywords:** Impression materials, Retraction cord, Temporary restoration

## Introduction

As more patients demand crown and bridges for the replacement of missing teeth and endure a high cost, the quality of crown and bridge therapy becomes of increasing professional and public concern [1].

Crown and bridge of good quality should be well designed and constructed. It should restore the function and promote the health of the masticatory unit and provide a long service life [2]. These criteria are influenced by the quality of the clinical procedures, the standards of the

laboratory work, and the oral condition prevailing in patient [3]. A common method for gingival displacement is the mechano-chemical method [4]. Entire gingival margins of the preparation and a small surface beyond the finishing line must be recorded [5]. Gingival margin quality procedures of the impression and clinical application were affected by retraction systems [6]. Inadequate reduction or imprecise preparation of abutment teeth, particularly the finishing lines, may have a profound effect on the subsequent fit of the restoration [7, 8]. However, abutments that have been prepared and finished carefully require an equally carefully and correct suitable trays. Without this the impression stage can nullify earlier achievements in the preparation [9].

Transfer of an accurate replication of the patient's hard and soft tissue to the dental laboratory is important [10]. Most dentists have experienced the results of making a poor impression. The ability to identify and analyze inaccurate

A. B. Mohamed • N. H. Abu-Bakr ✉  
Conservative Dentistry Division,  
Faculty of Dentistry, University of Khartoum,  
P.O. Box 102, Khartoum 11111, Sudan

e-mail: nhabubakr@uofk.edu

impressions and to understand how to avoid them is the key to successful restoration.

A provisional fixed restoration provide a template for defining tooth contour, esthetics, proximal contacts and occlusion [11] and for evaluating the potential consequences from an alteration in the vertical dimension of occlusion [12]. Provisional treatment can also provide an important tool for the psychological management of patients where a mutual understanding of treatment outcome and limitations of treatment can be identified [10].

High failure rates in crown and bridge work recorded in previous study done in Khartoum state (65% in 2001) [13], which gives an indication for the importance of the assessment of the crown and bridge work.

## Materials and Methods

Upon approval of the research board of Faculty of Dentistry, University of Khartoum, and according to the data obtained from the Ministry of Health - Khartoum state, the number of the private clinics or centers in Khartoum state was about 210 private clinics and 70 health centers. Thirty of the 70 health centers were found not occupied by a dentist, and 20 of the 210 private clinics were closed.

According to above mentioned these finding the sample size were 230 dentists; one dentist was selected from each site. A questionnaire, which comprised 22 questions, was piloted by 10 dentists in Khartoum state and in the light of feedback from these dentists modified for the purposes of the study.

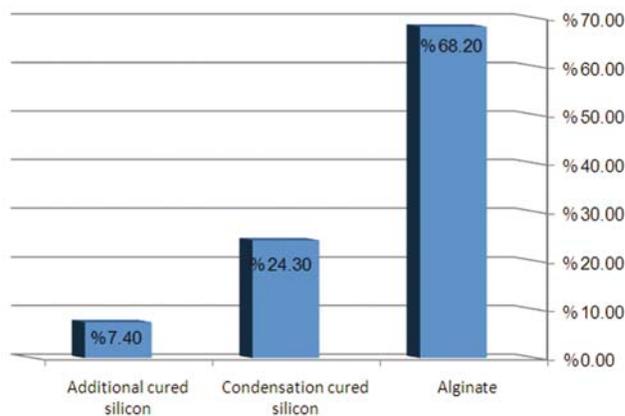
A precoded questionnaire was distributed to the 230 registered dental clinics and centers in Khartoum state, regarding of the provision of crown and bridge work in their practices. The questionnaire was anonymous and consisted of questions on the preoperative, operative and postoperative stages and materials and techniques that are usually used in crown and bridge work. The data was sorted, checked for completeness and consistency, processed and summarized. The data was analyzed using the Statistical Package for Social Sciences (SPSS). A possible relationship was explored using appropriate statistical tests. Cross tabulation and Chi-square tests were performed at confidence level of 95% and significant level of 5%.  $p$  value  $<0.05$  were considered as significant.

## Results

Completed questionnaires were obtained from 152 dentists, giving an overall response rate of 66.09%.

Forty-seven of the surveyed dentists (32.0%) never used study cast before starting fabricating crown and bridge work, 56 (38.1%) rarely, 24 (16.3%) often and 20 (13.6%) always. Only 53 of surveyed dentists (35.6%) rarely used radiographs before commencing crown and bridge work. Eight of the dentists (5.4%) never use it, 61 (40.9%) often used it while 27 (18.1%) always use radiographs in their crown and bridge practice. In concern of the vitality test of the abutment teeth results showed that 68 of surveyed dentists (46%) never used it.

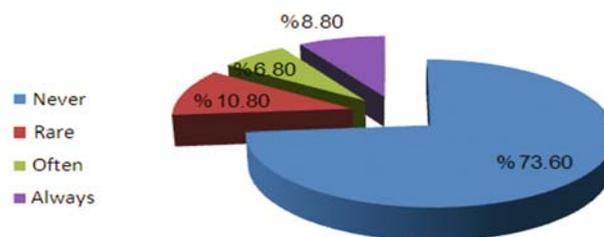
Alginate impression material was the most common used type of impression material by the surveyed dentists (68.2%) in the present study. Condensation cured silicone 36 (24.3%) and additional cured silicone 11 (7.4%) materials were also selected but less frequently (Fig. 1). Only 9.4% used retraction cord while 53.7% of the surveyed dentist never applied the use retraction cord in crown and bridge practice.



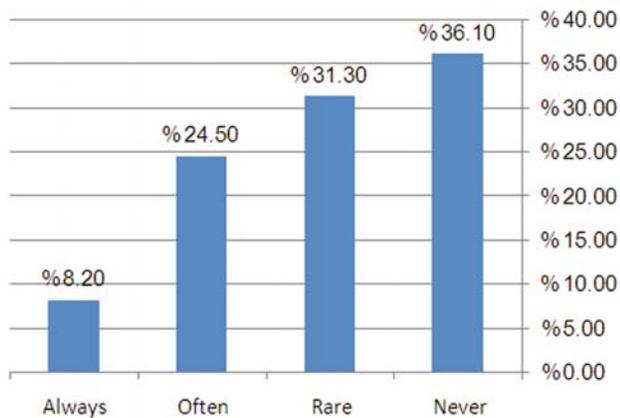
**Fig. 1** Frequency of disinfection of the impression material

One hundred and nine of the surveyed dentists in this study (73.6%) never disinfect the impression before send it to the dental laboratory (Fig. 2).

Results showed that 53 of the surveyed dentists (36.1%) never used temporary crown and bridge after tooth preparation, 44 (31.3%) rarely, 36 (24.5%) often and only 12 (8.2%) always used temporary crown and bridge after tooth preparation (Fig. 3).



**Fig. 2** Frequency of disinfection of the impression material



**Fig. 3** Frequent use of temporary restoration

## Discussion

A response rate of 66.09% is considered adequate for limiting non-response bias for questionnaire-based studies. The present investigation can provide useful information about the practice quality of crown and bridge work provided by 152 dentists in Khartoum state.

Accurate diagnostic casts transferred to a semi-adjustable articulator are essential in planning fixed prosthodontic treatment. Thirty-two percent of the surveyed dentists never made study cast for crown and bridge work [14].

Radiographs provide essential information to supplement the clinical examination. Detailed knowledge of the extent of bone support and the root morphology of each standing tooth is essential to establish comprehensive crown and bridge treatment plan [14]. The majority of the surveyed dentists; often (40.94%) and rarely (35.57%) use radiographs for the abutment tooth or teeth in crown and bridge work.

Alginate as a final impression material for the crown and bridge work was the principal choice for the majority of the surveyed dentists in the present study (68.2%), this result is in agreement with only one report [2] from the all reviewed reports, and it is known that alginate is dimensionally unstable and not suitable for producing good quality master cast for fabricating crown and bridge [1]. Fine details of the preparation and surrounding soft tissues can be recorded accurately when a suitable elastomeric material is used. The use of alginate as final impression material produce low quality master cast this can only lead to guesswork on the part of the technician and must result in restoration that will be compromised from the outset. Even skillful and experienced technician would fail to produce a restoration of acceptable strength, biologic compatibility, and esthetic from an impression with error [15].

Researches identified multiple areas of critical concern with provisional restorations including esthetics, comfort, speech and function, periodontal health, maxillomandibular relationships, and continued evaluation of the fixed prosthodontic treatment plan [16–18]. Provisional treatment can also provide an important tool for the psychological management of patients where a mutual understanding of treatment outcome and limitations of treatment can be identified [10]. The use of provisional restorations relies on a reasonable turnaround time from tooth preparation to completion of definitive treatment. Provisional treatment is usually well tolerated when this occurs. Longer time periods of use can promote tooth sensitivity and potential pulp damage [19]. More than third of the investigated dentists (36%) in this study never make provisional crown and bridge, and the majority of the two-thirds not always make it. Further study is needed to determine why dentists' not always making provisional crown and bridge after tooth preparation.

Recently, prevention of cross infection in dental practice in general and dental laboratory specifically should now be a routine practice. Nevertheless, 73% of the surveyed dentists never disinfect the impression before been send to the dental laboratory, and this in agreement with result of another study concluded that across infection control was not routine [15].

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