



## Material Selection For Tooth-Supported Single Crowns—A Survey Among Dentists In Gujarat

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### Abstract

#### Objectives

This study aimed to survey dentists in Gujarat to identify their favored materials for the fabrication of tooth supported single crowns (SCs) depending on the location of the abutment teeth and the preparation margin.

**Materials and methods:** The survey included questions regarding dentists/their dental practice and preferred restorative materials for the fabrication of SCs for abutment teeth 16, 11, 34, and 36 with either supra- or subgingival preparation margins. Results Between march 2023 and april 2023, 150 dentists participated in the survey; A significantly higher proportion of dentists recommended porcelain fused to metal for subgingival preparation margins than for supragingival margins ( $p < 0.001$ ). Characteristics of dentists/dental practices influenced a single scenario (11 subgingival) that was dependent on the dentist's time since graduation. When asked to specify the ceramic materials, numerous participants wrote a free response (1-2%).

#### Conclusions :

Dentists in Gujarat selected restorative materials for SCs depending on the clinical scenario. Since numerous dentists did not specify the ceramic materials, postgraduate information and education might help to extend expertise Clinical relevance. The results of this survey provide insight into the favored materials of dentists for the fabrication of tooth supported SCs.

**Keywords:** Ceramic , Composite resins,. Dental alloys. Dental material. Dental restoration (permanent). Survey

### Introduction

Dentists providing restorative and prosthetic treatment are confronted with a vast and steadily increasing variety of dental materials that are available on the market. Precious and base metal alloys have been available for decades. Consequently, evidence-based statements can be given regarding their long term performance in fixed prosthodontics [1]. However, while fixed prosthetic restorations fabricated from alloys are still the standard treatment option in the posterior dentition. These restorations do not meet the patients' expectations associated with favorable esthetic

appearances. While partial or complete veneering of alloy restorations (i.e., porcelain fused to metal, PFM) can relevantly improve esthetic appearance, shortcomings such as gray shimmering or complications such as chipping of the veneer are frequently described [2, 3]. With regard to this aspect, the use of tooth-colored materials might be helpful to overcome some of these problems. However, especially for recently introduced materials such as translucent zirconia, resin composites, or some lithium-X-silicate ceramics [4] fabricated with computer-aided design/computer aided

manufacturing (CAD/CAM) techniques, clinical outcomes in view of quality and longevity are sparse or missing [5, 6]. Moreover, current and future advances in digital dentistry can lead to the implementation of novel fabrication techniques and materials in daily dental practice that might serve as easy-to-use tooth-colored alternatives in fixed prosthodontics [7–9]. The restorative materials that are currently available on the market feature a wide range of mechanical properties that have an impact on the indication spectrum, adequate preparation design, and appropriate luting methods. Regarding the selection of the materials, it might be helpful to rely on results from randomized controlled clinical trials (RCTs). A recent review by the Cochrane Review Group emphasized that only a few RCTs are available for comparisons between metal-free and metal-based restorations, concluding that there is no evidence regarding the superiority of any of these materials. As a consequence, the authors suggested that dentists should base their decisions on their clinical experience, the individual circumstances, and the opinion of the patient [10]. In comparison to the results presented by the Cochrane Review Group, another research group included a wider range of study designs in a systematic review on the survival and complication rates of ceramic or metal-ceramic single crowns (SC). The authors concluded that SCs fabricated from ceramics showed similar survival rates as PFMs, yet layered zirconia SCs were more prone to technical complications such as chipping of the veneer

[2]. In recent years, the National Dental Practice-Based Research Network (PBRN) Collaborative Group has surveyed dentists in the United States (US). Among others, the topics of interest included the frequency of specific dental procedures, general health aspects in dentistry, and questionnaires related to tooth-supported SCs [11–13]. Regarding the selection of materials for fabricating SCs in the anterior area, the study identified that lithium disilicate (54%), layered zirconia (17%), and glass ceramics (13%) were favored by the participating dentists. For posterior SCs, monolithic zirconia (32%), PFM (31%), and lithium disilicate ceramics (21%) were preferred. The authors concluded that the selection of the materials was significantly associated with the individual characteristics of the participating dentists and their patients [12]. One of these

companies has shared data for scientific purposes over the last years [14], yet only general information can be retrieved from that database. Specific but relevant aspects of prosthetic restorations, such as the type of materials or the individual clinical situation (i.e., marginal preparation design), were not documented in detail. Thus, no valid estimation regarding the preferred materials of dentists in GUJARAT for the fabrication of SCs is possible from that dataset. Moreover, it is unclear whether these preferences depend on the individual characteristics of the dentist, the dental practice, or the patient.

Thus, the aim of this study was to survey dentists in GUJARAT to identify their favored materials for the fabrication of tooth-supported SCs depending on the location of the abutment teeth and the preparation margin. The working hypothesis was that dentists in Gujarat recommend the same materials for the fabrication of SCs independent of the individual clinical scenario, the characteristics of the dentists, or their dental practice.

## Materials And Methods

Questionnaire design and pretesting of the questionnaire

The questionnaire was developed by a team of three experienced dentists and a statistical data manager. The project was run under the title “selection Material selection for tooth-supported single crowns— a survey among dentists”. One part of the questionnaire aimed to gather data regarding the categories of the participating dentists, such as their name, age group, sex, area of expertise, and e-mail ID. Regarding the preference of materials for the fabrication of SCs, the questionnaire provided four potential locations of abutment teeth, including teeth (according to the FDI) 16, 11, 34, and 36 (A), as well as a description of the individual preparation margin (supra- or subgingival) (B). Each combination of tooth and preparation margin was addressed in a single question, resulting in an overall total of eight questions formulated as

the following: “What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth (A) and with a (B) preparation margin?”. Participating dentists were able to choose between full metal, PFM, ceramic, and

CAD/CAM resin composite. Moreover, it was possible to give a free response answer. If ceramics were selected, another question was required, asking the participant to specify the ceramic material from the following: feldspathic/leucite-reinforced glass ceramic, lithium disilicate ceramic, zirconia-reinforced lithium silicate ceramic, monolithic zirconia ceramic, or layered zirconia ceramic. Again, a free-response answer was allowed. Apart from the questions focusing on SCs, the survey included other aspects addressing the material choice for a multi-unit fixed dental prosthesis, cementation, and the intraoral repair of chipping, which will be described else where. The survey was designed to be completed within a maximum time frame of 7 min [15] and was available online (google suvey form).

Following are 9 questions asked in (google form) online survey form:

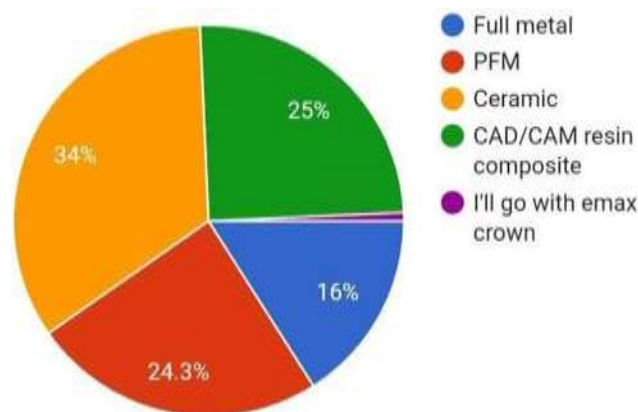
1. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 16 with a supragingival preparation margin?
2. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 11 with a supragingival preparation margin?
3. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 34 with a supragingival preparation margin?
4. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 36 with a subgingival preparation margin?
5. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 16 with a subgingival preparation margin?
6. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 11 with a subgingival preparation margin?
7. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 34 with a subgingival preparation margin?
8. What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 36 with a supragingival preparation margin?
9. What kind of ceramic do you recommend?

## Results

150 dentists included, 24.9% were males while 76.1% were females.

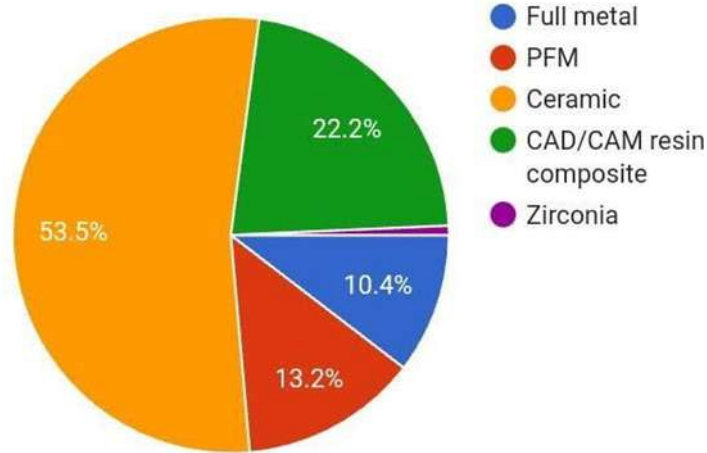
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 16 with a supragingival preparation margin?

150 responses



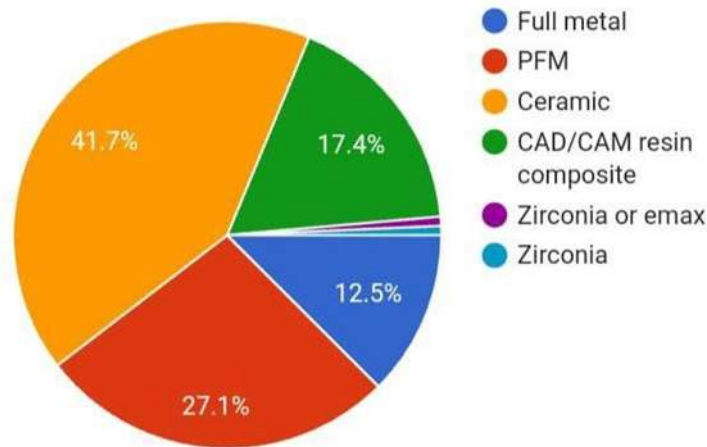
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 11 with a supragingival preparation margin?

150 responses



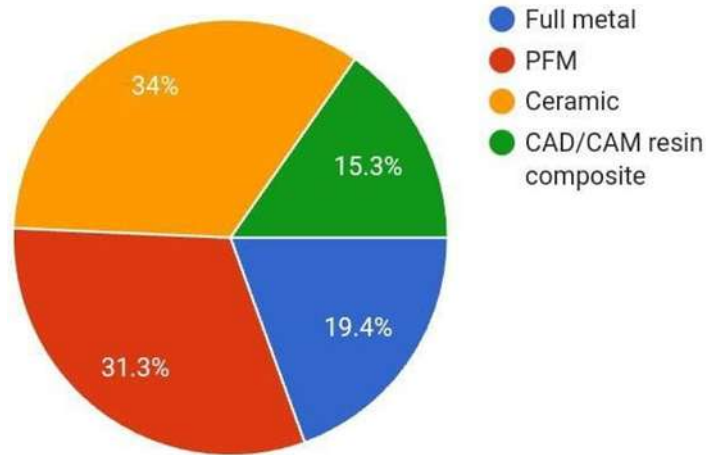
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 34 with a supragingival preparation margin?

150 responses



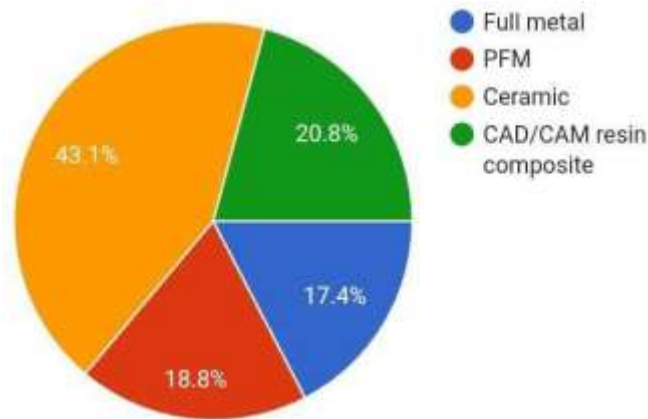
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 36 with a subgingival preparation margin?

150 responses



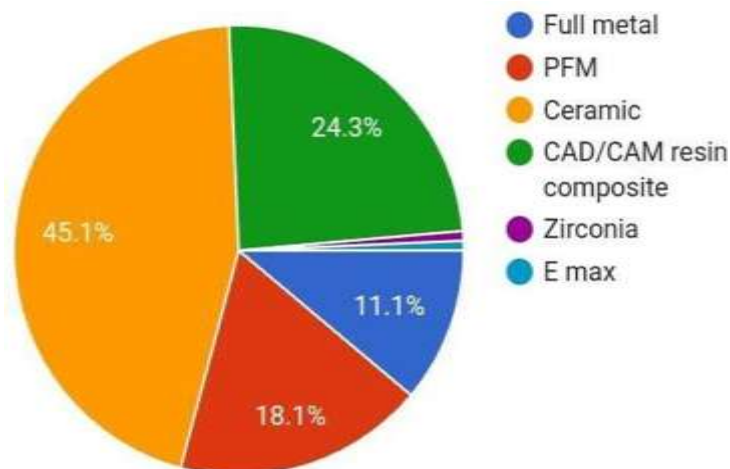
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 16 with a subgingival preparation margin?

150 responses



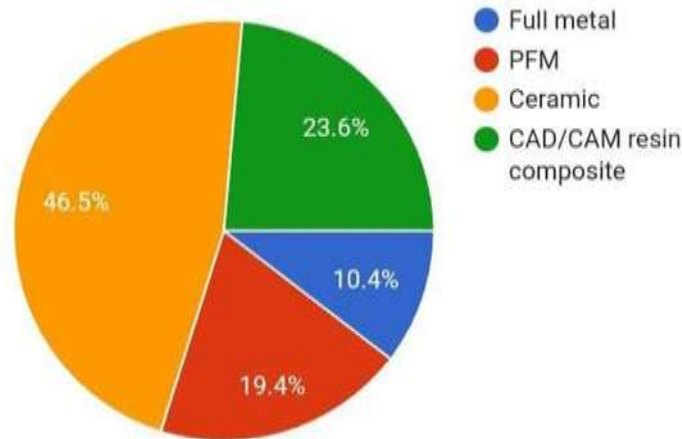
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 11 with a subgingival preparation margin?

150 responses



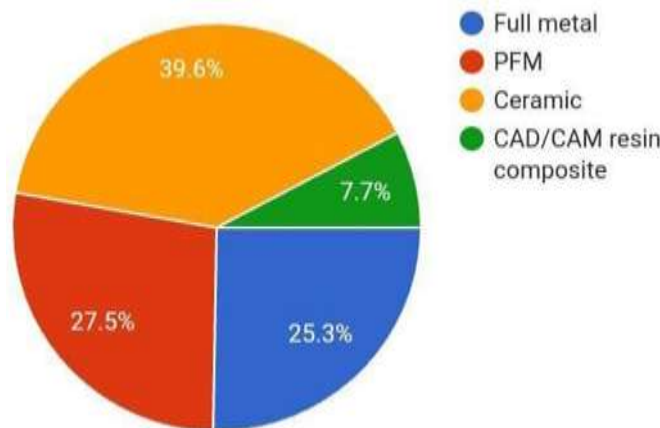
What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 34 with a subgingival preparation margin?

150 Responses



What kind of material do you usually recommend for a permanent tooth-supported single crown located on abutment tooth 36 with a supragingival preparation margin?

150 responses



What kind of ceramic do you recommend?

**Conclusion:**

The current study reveals that the dental students and practitioners concluded that review of dentists varies according to their experiences and exposure and knowledge regarding margin preparation in the esthetic zone and non-esthetic zone and choice of material according to that.

Materials for SCs with supragingival preparation margin

CERAMIC: (34 TO 53.5%) ,

PFM : (13.2 TO 27.1 %),

FULL METAL .: (10.4 TO 22.9 %)

CAD-CAM COMPOSITE: (15.3 TO 25.7%) and OTHER MATERIAL ARE ZIRCONIA AND EMAX (1-2%).

Materials for SCs with subgingival preparation margins

CERAMIC: (34 TO 46.5%),

PFM : (18.1 TO 31.3%),

FULL METAL .: (10.4 TO 19.4 %)

CAD -CAM COMPOSITE (15.3 TO 24.3 %) OTHER MATERIAL ARE ZIRCONIA AND EMAX (1%).

Kind of ceramic recommend

Feldspathic/leucite-reinforced glass ceramic : (13.9%)  
Lithium disilicate ceramic:13.2%)

Zirconia-reinforced lithium silicate ceramic :(38.2%)  
Monolithic zirconia ceramic: (25.7%)

Layered zirconia ceramic : (7.6%) and about 1% responded that its depend on teeth which need to replace and other 1% do not know about it.

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