

Assessment of Impression Techniques for Crowns and Bridges

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Abstract

The objective of this study is to evaluate techniques of impression for crowns and bridges sent to commercial laboratories from private practitioners. A number of 156 impressions for dental crown and bridges were examined. The most widely used impression technique is segmental dual arch with two different consistency condensation cured silicone impression material.

Keywords: Private practitioners, Impression technique, Crown and bridges

Introduction

Well-adapted crowns are mandatory for longevity of abutment teeth. A single prepared tooth for crown is at 3% risk for caries and endodontic failure, but multiple abutment teeth prepared for bridges are at 15% risk for caries and endodontic failure (1). An accurate impression of correct tooth preparation is necessary to perform a well-adapted crown. One of the most challenging procedure in prosthetic is, even now, making of a good impression (2,3). Despite the improvement of digital technology that made a shift in making dental impression (4), the impression remains a challenging step in making of perfect restoration, and in Romania, the majority of dentists use conventional impression techniques.

There are several ways that conventional impressions for crowns and bridges are taken: the single-step technique using only one material (monophase technique), the single-step technique with impression materials of two different viscosities light body and heavy body (dual-phase one-stage, known as sandwich technique), and the double-step technique which also includes two materials with different viscosities putty and wash (putty-wash two-stage technique, known as washing technique).

Depending on the extent of the impression, impressions are classified in full or complete

dental impressions and partial or segmental dental impressions. A wide variety of trays are used for taken dental impression: stock trays (partial and total), custom trays and dual arch trays (partial and total) with different dental impression materials: addition cured silicone, condensation cured silicone or polyether.

The objective of this study is to evaluate the type of impression technique for crowns and bridges sent to commercial laboratories.

Materials and Methods

Three dental laboratories are visited over one month period. A number of 156 impressions for dental crown and bridges were examined. Are excluded from the study impressions for veneers, resin bonded bridges and implant-supported restorations.

All impressions were evaluated under ambient room light without any additional room light and without magnification. All impressions were evaluated after disinfection and before being poured with stone.

For each impression were recorded following criteria: type of tray used, size of tray, type of impression material, impression material combination, number of units impressed, and type of prosthesis ordered.

Results

Results are presented in Table 1-5 and Fig. 1-3.

Table 1: Classification according to type and size of tray

| Partial dual arch tray | | Total dual arch tray | | Single arch tray | | No tray |
|------------------------|-----------|----------------------|-----------|------------------|-------------|-------------|
| Metal | Plastic | Metal | Plastic | Metal | Plastic | |
| 48 (30.77%) | | 35 (22.44%) | | 22 (14.10%) | | 51 (32.69%) |
| 0 (0%) | 48 (100%) | 0 (0%) | 35 (100%) | 5 (22.73%) | 17 (77.27%) | |

Table 2: Classification according to type of material

| Condensation cured silicone | Addition cured silicone | Polyether |
|-----------------------------|-------------------------|-----------|
| 89 (57.05%) | 64 (41.03%) | 3 (1.92%) |

Table 3: Classification according to impression material combination

| Putty and light combination | No combination |
|-----------------------------|----------------|
| 153 (98.08%) | 3 (1.92%) |

Table 4: Registration of the canine

| Partial dual arch tray | Total dual arch tray | Single arch tray | No tray |
|------------------------|----------------------|------------------|-------------------|
| 48 of 48 (100%) | 35 of 35 (100%) | 22 of (100%) | 47 of 51 (92.16%) |

Table 5: Classification according to type of restoration ordered

| Porcelain fused to metal | Zirconia based | Full cast | Pressed ceramic | Polymeric veneer crown |
|--------------------------|----------------|-----------|-----------------|------------------------|
| 98 (62.82%) | 6 (3.85%) | 2 (1.28%) | 1 (0.64%) | 49 (31.41%) |

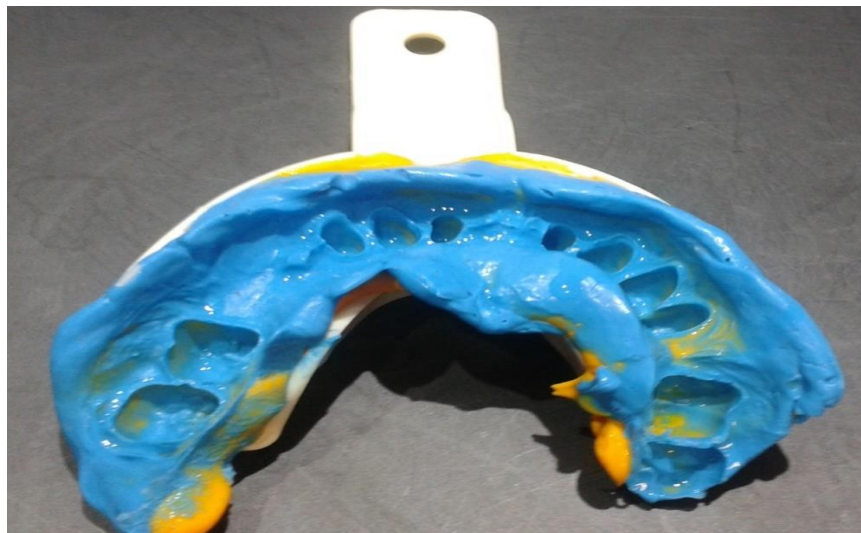


Fig. 1: Total arch impression with single arch plastic tray, two-step technique, for 10 unit porcelain fused to metal bridge



Fig. 2: Partial dental impression with partial dual arch plastic tray, two-step technique, for 3 unit porcelain fused to metal bridge



Fig. 3: Partial dental impression without tray, two-step technique for single crown

Discussion

The most widely used impression is segmental dual arch without tray and with two different consistency condensation cured silicone impression material. Majority of dentists chose plastic trays when trays are used.

According to results of this study, preferred method of impressioning for dental practitioners is dual arch (partial or total) without tray or with plastic flexible tray. The main reason is material economy comparative with full arch impression (5). Dual arch method permits impressioning of the prepared teeth, the opposing dentition, and the registration of intercuspal relationship in the same time, saving chair time and money, but practitioners seem not to be aware of limitations of this technique: one or two teeth in a quadrant when there are other teeth to occlude with and existing anterior guidance (6).

A rigorous case selection is mandatory for a successful dual arch impression technique and includes (7):

- The technique should be used in cases with class I or class II occlusion, if the occlusal scheme is acceptable.
- Canine guidance is the ideal occlusal scheme. When working with a group function occlusion, supply a lateral check bite.
- The opposing teeth must have intact occlusal surfaces.
- Adjacent teeth must have acceptable morphology.
- The patient must be able to close into maximum intercuspatation with no interference.
- The tray must not impinge on soft tissue.

- The impression must be poured and mounted before separating. Do not pour both sides and then try to articulate them using the impression.
- Hand articulation creates errors and destroys the occlusal information that is captured with the technique.

Also used of flexible plastic trays is questionable in making of a good dental impression, although these are frequently used in countries like the United States (8) and the United Kingdom (9). A study from 1998 (10) concluded that metal and rigid plastic stock trays give greater accuracy in the putty/wash silicone twin mix impression technique compared with flexible plastic ones for crown and bridge work. A rigid tray, stock or custom, with elastomeric impression material guarantees accurate gypsum cast (11) and a tray should be rigid in order to resist distortion during impressioning making process and after removal from the mouth (12). However, custom trays offers a more accurate in-mouth positioning, significant saving of heavy body material, and facilitated fabrication of the master model in the laboratory (13). In vivo studies revealed that heavy body light body two-step technique with custom tray provided the best results in terms of dimensional accuracy (14).

Registration of occlusal relationship is also uncertain when total dual arch impression technique is used for multiple abutment, but quadrant dual arch technique reproduces more accurate maximal intercuspal relationships than conventional full arch impressions technique according to Parker et al (15) and is suitable for fabrication of single crowns (16). The posterior

dual arch tray must be checked prior to impressing to extend distally in order to avoid interference to maximum intercuspation, while providing sufficient length to record the canine(8). In this study quadrant dual arch with tray technique succeed to impressing the canine, while without tray canine is missing in some cases.

The most common type of restorations ordered are porcelain fused to metal and nowadays full cast crowns are less ordered due to increased aesthetic demands.

Within the limitations of this study, these data lead to following conclusions: the most commonly used impression technique for crowns and bridges in private practice is segmental without tray with two different consistency condensation cured silicone impression material. Simplifying the technique of impression may result in distortion due to lack rigid support for impression material. The widespread of dual arch impression is related to low cost of material and armamentarium and perhaps of lack of knowledge about its deficiencies.

Conflicts of Interest

The author reported no conflicts of interest related to this study.

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