

Restoration methods used for aesthetic dental dysfunction correction in Arad



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Abstract

Aim and objectives: To evaluating dentists 'opinions on restoration methods, starting from the hypothesis that aesthetic restorative techniques are performed in more than 50% of dental department, the chosen methods being adapted to the requirements of each patient. **Material and methods:** A questionnaire referring to methods used in aesthetic dental restorations was applied to 105 dentists. Percentile, one sample t-test for normal distribution, Correlations and Pearson's r were used in statistical analysis. **Results:** Responders mean age was 29. The most applied methods in aesthetic dental restorations are veneer and metal-ceramic crowns. **Conclusions:** dental dyschromia, dental wear, interdental disproportions, changes in dental position were the most common aspects involved in dental aesthetics, Sig. (2-tailed) for items'correlation being between 0.000-0.041.

Keywords: dental dysfunction correction, correlation, veneer.

INTRODUCTION

Modern aesthetic dentistry, even if is not a specialty discipline itself, represents one goal of dental treatment interventions, covering a lot of specialty areas, including restorative dentistry, preventive dentistry, orthodontics, prosthodontics, periodontics and oral and maxillofacial surgery. It requires in-depth knowledge of natural tooth positions, colour, arrangements, shapes, and proportions in order to recreate the most natural aspect as much as possible. On the other hand, dental specialist must help the patient in identifying a personal aesthetic vision, to fulfill the psychological requirements of the final results [1].

The level of aesthetic requirement in clinical practice has increased over the past decade, and this has made it necessary for dentist to explore this field in order to satisfy the existing demand in this field [2].

Since their introduction in the early 1980's ceramic veneers have gained wide acceptance as a primary mode of restoration in esthetic dentistry [3]. Advances in ceramic materials and veneering techniques allow practitioners to restore function and aesthetics using conservative and biologically sound methods as well as promoting long term oral health [4].

Ceramics are replacing metals as materials of choice in dental crowns, as well as in other biomechanical prostheses [5]. The major advantage of ceramic crowns is the esthetic result. The thermal conductivity is low for ceramics also it is resistant to corrosion. Also, there are no galvanic reactions for ceramics. Dental ceramics are claimed to be the most biocompatible materials used to date for dental restorations [6].

Apart of some clinical practice guidelines of aesthetic dentistry, the latest published in 2022 in Journal of Conservative Dentistry [7], there are numerous valuable works on oral restoration, which take into account the functionality of the dental system, the patient's psychology, the perfect smile and self-esteem and last but not least, the costs involved in each chosen method.

Aim and objectives

To evaluating the opinions of trained dentists and of those registred in dental residency programs on dental restoration methods.

Hypothesis. Aesthetic restorative techniques are performed in more than 50% of dental department, the chosen methods being adapted to the requirements of each patient.

MATERIAL AND METHODS

An 11 questions questionnaire referring to methods used in aesthetic dental restorations was applied in June 2022 to 105 responders, for describing dental practice and techniques they experienced (in appendix). Sample size and margin of error (3.92%) were calculated taking into account the statistical data regarding the number of dentists in Arad in 2021 [8]. Frequency with percentile, one sample t-test for normal distribution, Paired Samples Correlations and Pearson's r were used in the statistical analysis.

RESULTS

Responders mean age was 29, StdDev. 5.04. Most of them work in private dental departments; gender ratio M:F = 1.36, 26% were frequently involved in aesthetic dental restorations and more than half motivate the patient in order to correct his dental dysfunctions through restorative techniques, table 1.

Table 1. Responders characteristics

Type of practice	Percent
Private	88.6
both private and budgeted	8.5
Budgeted	2.9
Gender	Percent
F	41.9
M	58.1
Performing aesthetic dental restorations	Percent
Never	21.0
Occasional	53.3
Frequent	25.7

The most applied methods in aesthetic dental restorations are veneer made by direct method and metal-ceramic crowns, table 2 and figure 1.

Table 2. Dental dysfunctions and elective aesthetic dental restorations

Item	Veneer/ direct method	Veneer/ indirect method	metal- ceramic crowns	full ceramic crowns
dental dyschromia	38.1	27.6	15.2	19.0
morphological changes consecutive to dental wear	29.5	13.3	31.4	25.7
interdental disproportions-interdental relations	29.5	20.0	25.7	24.8
changes in dental position	21.0	23.8	33.3	21.9
to increase the degree of exposure of maxillary anterior teeth	41.0	33.3	10.5	15.2

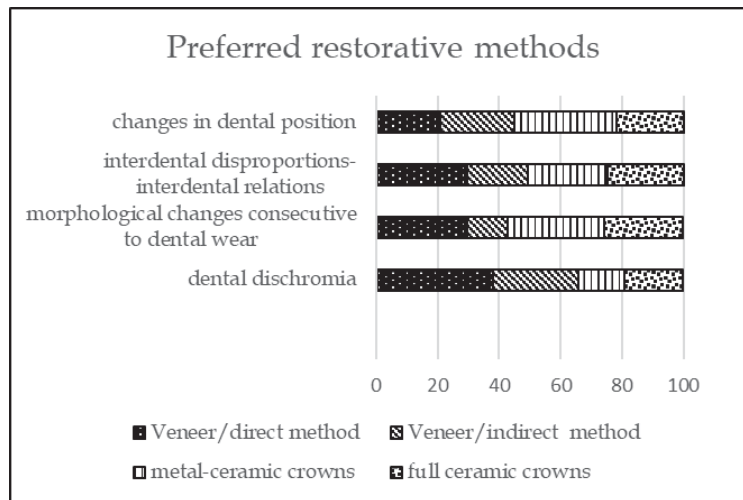


Figure 1. Dental dysfunctions and elective aesthetic dental restorations

Dental dyschromia. Porcelain laminate veneers are nowadays commonly used for aesthetic purposes owing to their better aesthetic properties, higher resistance to abrasion and discoloration, and better biological harmony with the oral flora [9]. Nowadays, restorative treatment has achieved high aesthetic standards. It protects the dental structure maximally thanks to the development of adhesive systems, resin cement, and ceramics. The resin infiltration technique, bleaching treatment, and laminate veneer applications, among other minimally invasive treatments, have gained importance due to greater protection rates of the tooth and high aesthetic standards [10]. More than half of the respondents use these techniques to correct dyschromia, table 3.

Table 3. Methods to correct dental dyschromia

methods to correct dental dyschromia	Percent
veneer/direct method	25.7
veneer/indirect method	23.8
full ceramic crowns	19
metal-ceramic crowns	11.4
veneer/ direct+indirect method+full ceramic crowns	9.5
veneer/direct+indirect method+metal-ceramic crowns+full ceramic crowns	6.7
metal-ceramic crowns+full ceramic crowns	3.8
Total	100

Dental wear. Early diagnosis and timely management of tooth or dental material wear is imperative to avoid extensive restorations. It is a normal physiological process that is macroscopically irreversible; Lambrechts et al. [11] estimated the normal vertical loss of enamel from physiological wear to be approximately 20-38 µm per annum. Various modalities, including direct or indirect techniques, can be successful in the treatment of these patients. More than half of the respondents use full ceramic crowns and veneer to correct the morphological changes consecutive to dental wear, table 4.

Table 4. Methods to correct the morphological changes consecutive to dental wear

methods to correct the morphological changes consecutive to dental wear	Percent
full ceramic crowns	25.7
veneer/direct method	24.8
metal-ceramic crowns	21
veneer/indirect method	10.5
metal-ceramic crowns+full ceramic crowns	10.5
veneer/indirect method+metal-ceramic crowns+ full ceramic crowns	1.9
veneer/direct+indirect method+metal-ceramic crowns+ full ceramic crowns	6
Total	100

Interdental spacing is disliked by all, and the size and pattern of spacing has an influence on aesthetic perception. Professionals tolerated interdental spacing more than their patients [12]. Restorations methods are in table 5.

Table 5. Methods to correct interdental disproportions-interdental relations and changes in dental position

methods to correct interdental disproportions-interdental relations	Percent
full ceramic crowns	24.8
veneer/direct method	21
metal-ceramic crowns	18.1
veneer/indirect method	17.1
metal-ceramic crowns+full ceramic crowns	7.6
veneer/ direct +indirect method+metal-ceramic crowns+full ceramic crowns	6.7
veneer/indirect method+full ceramic crowns	4.9
Total	100
methods to correct changes in dental position	Percent
metal-ceramic crowns	21.9
full ceramic crowns	21.9
veneer/indirect method	18.1
veneer/direct method	16.2
metal-ceramic crowns+full ceramic crowns	11.4
veneer/direct+indirect method+metal-ceramic crowns+full ceramic crowns	10.7
Total	100

Exposure of maxillary anterior teeth. In females aged 20 to 29, 30 to 39, 40 to 49 and 50 to 59 years, the mean exposure of central incisor is 2.16, 2.1, 2.18 mm and that of canine is 0.04, -0.36, -0.44 mm. For male of age group 20 to 29, 30 to 39, 40 to 49 and 50 to 59 years

exposed 2.04, 2.04, 1.84, 1.76 mm of central incisor respectively and 0.08, -0.52, -0.4 and -0.4mm exposure of canine. Female subjects with lip length 10 to 15, 15 to 20, 21 to 25, 25 to 30 and 31 to 35 mm showed 3.7, 3.4, 2.3, 0.9, 0.25 mm exposure of central incisor and 0.35, -0.15, -0.7, -0.8, -0.6 mm exposure of canine, respectively. Male subjects exposed 3.4, 3.3, 2.05, 0.7, 0.15 mm of central incisor and 0.4, 0.3, -0.6, -0.95, -0.7 mm of canine respective to lip length. The range of exposure of maxillary central incisors is wider than that of canine. The average dimensions for maxillary canines relating to age and sex were closer to the extremes of the range. The canine position relative to the maxillary lip appeared to be a more predictable determinant [13]. The correction methods used by the responders are in the table 6.

Table 6. Methods to increase the degree of exposure of maxillary anterior teeth

methods to increase the degree of exposure of maxillary anterior teeth	Percent
veneer/direct method	30.5
veneer/indirect method	28.6
full ceramic crowns	15.2
metal-ceramic crowns	5.7
metal-ceramic crowns+full ceramic crowns	4.8
veneer/direct+indirect method	3.8
veneer/direct method+full ceramic crowns	3.8
veneer/indirect method+metal-ceramic crowns+full ceramic crowns	2.9
veneer/indirect method+full ceramic crowns	1.9
veneer/direct+indirect method+metal-ceramic crowns+full ceramic crowns	3
Total	100

Psychologic assessment of the aesthetic facial patient. Surgeons and other medical professionals who perform aesthetic treatments should evaluate and monitor the psychosocial status and functioning of patients who seek these procedures. Most patients who present for aesthetic treatments are as psychologically stable as other individuals from the general population [14]. The responders say that less than a quarter of the patients requested invasive aesthetic intervention, table 7.

Table 7. Acceptance an invasive aesthetic intervention

Do you include surgical therapy as a pre-prosthetic stage in the treatment plan?	Percent
No	20
Yes	80
When do you aesthetically correct dental dysfunctions?	Percent
At the request of the patient	24.8
Both situations	2.9
I make the patient aware of the aesthetic dental dysfunction and I motivate him in order to correct it through restorative techniques	72.4
What method do you use for the patient's acceptance of an invasive aesthetic intervention (partial or total coverage of the teeth)?	Percent
Mock-ups	34.6
Photos of other patients, before and after treatment	24.3
Simulation on photos	19.8
Diagnostic models with wax models	19.8
Another method	1.2
Do you consider that the type of cementing material is important for obtaining an aesthetic result of restoration method?	Percent
No	14.3
yes	85.7
The translucency of some of the ceramic materials is important for obtaining an aesthetic effect	Percent
Both in the third incisal area and in the cervical area	46.7
In the third incisal area	44.8
In the cervical area	8.6

There are significant correlations between items in questionnaire, which shows that the aesthetic interventions are motivated by the existing dental dysfunctions, with the patients' acceptance, at their wish, at the specialist's recommendation, and the chosen corrective methods are appropriate, table 8.

Table 8. The correlations between the items of the questionnaire

Pearson Correlation	item	Sig. (2-tailed)
Age	correcting aesthetic dental dysfunctions	0.003
morphological changes consecutive to dental wear	changes in dental position	0.001
	patient's acceptance	0.001
	interdental disproportions	0.000
changes in dental position	patient's acceptance	0.003
	interdental disproportions	0.000
surgical therapy as a pre-prosthetic stage	performing aesthetic dental restorations	0.032
correcting aesthetic dental dysfunctions	performing aesthetic dental restorations	0.041
patient's acceptance	changes in dental position	0.003
	interdental disproportions	0.031
dental dyschromia	interdental disproportions	0.002
	to increase the degree of exposure of maxillary anterior teeth	0.005

DISCUSSIONS

This study was undertaken to find out whether dentists' perceptions of the aesthetic zone is it different from that of the patients or not, and if the decisions taken are mainly related to the presence of dental dysfunction versus just the aesthetic aspect. Some areas were assessed: restorative method to correct dental dyschromia, dental wear, dental dysfunctions, changes in dental position, to increase the degree of exposure of maxillary anterior teeth, interdental disproportions, patient's acceptance for invasive interventions, type of cementing material.

As the study was carried out both in budgeted and private general dental practices there will be a sampling bias and, although the responders were randomly selected, they may not represent the general dentistry population. One hundred and five responders took part in the study, 44 women and 61 men, ranging in age from 24 to 51 years old. The small size of the study meant that in some of the age range groups there were only a very small number of participants, as is the case in the over 40 year - old category.

Esthetic dentistry is currently receiving increased attention in dental practice. Many studies and digital smile analysis programs have attempted to formulate a protocol for helping dentists assess smile esthetics to reach an accurate diagnosis and to plan the required treatment [15].

The results of this study demonstrated that dentists in Arad the dentists in Arad give equal importance to both real dental dysfunction and the wishes of the patients, with whom they form a team.

CONCLUSIONS

The hypothesis from which the study started is confirmed, aesthetic restorative techniques being performed in more than 50% of dental department and the chosen methods are adapted to the requirements of each patient.

Questionnaire for investigating the use of restoration methods for aesthetic dental dysfunction correction, in order to carrying out a specialized study

APPENDIX

Questionnaire for investigating the use of restoration methods for aesthetic dental dysfunction correction

1. Age 2. Gender 3. Type of practice: a. private b. budgeted c. both types
4. I perform aesthetic dental restorations: a. never b. occasional c. frequent
5. What restorative method do you use to correct dental dischromia?
 - a. veneer made by direct method
 - b. veneer made by indirect method
 - c. Metal-ceramic crowns
 - d. Full ceramic crowns
6. What restorative method do you use to correct the morphological changes consecutive to dental wear?
 - a. veneer made by direct method
 - b. veneer made by indirect method
 - c. Metal-ceramic crowns
 - d. Full ceramic crowns
7. What restorative method do you use to correct interdental disproportions - interdental relations?
 - a. veneer made by direct method
 - b. veneer made by indirect method
 - c. Metal-ceramic crowns
 - d. Full ceramic crowns
8. What restorative method do you use to correct changes in dental position?
 - a. veneer made by direct method
 - b. veneer made by indirect method
 - c. Metal-ceramic crowns
 - d. Full ceramic crowns
9. What restorative method do you use to increase the degree of exposure (visibility) of the maxillary frontals?
 - a. veneer made by direct method
 - b. veneer made by indirect method
 - c. Metal-ceramic crowns
 - d. Full ceramic crowns
10. Do you include surgical therapy as a pre-prosthetic stage in the treatment plan (for optimizing the aesthetic result of prosthetic restorations)? Yes No
11. Are you correcting aesthetic dental dysfunctions:
 - a. At the request of the patient
 - b. I make the patient aware of the aesthetic dental dysfunction and I motivate him in order to correct it through restorative techniques.
12. What method do you use for the patient's acceptance of an aesthetic intervention invasive (partial or total coverage of the teeth)
 - a. Photos of other patients, before and after treatment
 - b. Simulation on photos
 - c. Diagnostic models with wax models
 - d. Mock-ups
 - e. Another method
 - f. No method

13. Do you consider that the type of cementing material is important for obtaining an aesthetic result of restoration methods? Yes No

14. The translucency of some of the ceramic materials is important for obtaining an aesthetic effect:

- a. In the third incisal area
- b. In the cervical area
- c. Both in the third incisal area and in the cervical area

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