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Journal of Clinical Periodontology

# Aesthetic perception after root coverage procedure

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***Abstract***

**Aim:** To investigate the aesthetic perception of the clinical outcomes of a simulated root coverage procedure in three different groups: patients, dentists, and periodontists.

**Material and Methods:** 100 patients, 107 general dentists affiliated with the Dental Association of Prato, Italy, and 81 active members of the Italian Society of Periodontology were recruited for this study. The following variables: age, gender, level of education, place of residence, and years of practice (only for dentists and periodontists) were recorded by means of a questionnaire administered to each subject within the three different groups. In addition, the participants in the study were requested to assign scores to images of eight simulated clinical cases of gingival recessions: a pre- and post-treatment image for each case.

**Results:** Statistically significant differences between groups were not detected in most of the scores. Gender and residence were not significantly associated with the scores, while age was correlated for two clinical cases ($p = 0.0014$ and 0.0017). All the cases of complete root coverage showed the highest scores among all the participants.

**Conclusions:** These results showed that complete root coverage following root coverage procedure is perceived as the most successful outcome by patients, dentists, and periodontists.

Key words: aesthetics; gingival recession; mucogingival; root coverage; treatment/therapy

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During the centuries, human beings have given great importance in terms of care, beauty, and aesthetics of the face. Modern society shows a great interest in physical attractiveness and it is well known that the smile plays an important role in aesthetic appearance and thus self-esteem. At the same time, it is possible to observe that today's cultures are able to dictate the standards of beauty through the media: for example, the actual ideal smile is represented by a bright, vigorous, and youthful model, with well-aligned teeth. Several factors such as the midline, the black spaces, the tooth-size, -shape, -position, and -colour may influence the aesthetics of the smile. All these factors should not be evaluated alone but in combination with each other (Moskowitz & Nayyar 1995, Kokich et al. 1999, 2006, Morley & Eubank 2001). In fact, the anatomy of the smile involves all the elements of the oral region and, therefore, clinicians should consider not only the teeth and the gingiva but also the curvature and the exposure of the lips, the philtrum, and the nasolabial grooves in order to create a harmonious smile (Matthews 1978).

Tjan & Miller (1984) attempted to formulate a standard of an aesthetic smile through the description of some desirable dental and facial characteristic features. A survey of the characteristics of an open smile was performed by the two authors independently using 454 full-face photographs of randomly selected dental and dental hygiene students. The results showed that an average smile exhibits approximately the full length of the maxillary anterior teeth, with an incisal curve of the teeth parallel to the inner curvature of the lower lip, touching it slightly, and displaying the six upper anterior teeth and premolars, with the midline that coincides with a harmonious balance of the smile.

Some years later, Dunn et al. (1996) used standardized photographs framing only the lips and teeth of eight male and eight female smiles to interview 297 subjects. They investigated which distinctive factors contribute to an attractive smile according to a sample of the general population. The preferred (most attractive) smiles shared the following features: unrestored teeth with a light shade, a high lip line, a large display of teeth, and radiating symmetry.

More recently, Höfel et al. (2007) have reported that teeth are the second most important facial feature when

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assessing beauty, after the eye. However, they observed that a positive or a negative evaluation of tooth colour does not reflect on the more positive or negative judgement of overall facial attractiveness.

Little information is provided by the literature about the relationship between the teeth and the gingiva. Kokich et al. (1999) reported that none of the subjects interviewed for their epidemiological study (patients, dentists, orthodontists) was able to discriminate among the discrepancies simulated at the level of the gingival margin.

On the other hand, Zaher et al. (2005) investigated the treatment of gingival recessions by means of a cross-sectional postal survey of 3780 dentists including all members of the Swiss Society of Odontology and the Swiss Dental Society, representing over 95% of all dentists working in Switzerland. The authors evaluated the views, knowledge, and preferences of the sample through a questionnaire. The results showed that the aesthetic concerns were the predominant indication for root coverage procedures and further research should include aesthetic aspects as primary clinical outcome variables. The opinions of patients were not investigated.

Many studies have been published suggesting several surgical techniques, but none of them has determined which is the clinical outcome that can be considered to be successful. Based on his own opinion, Miller (1987) indicated that a successful treatment of the gingival recessions should be characterized by the following clinical conditions: the gingival margin positioned at the level of the cementoenamel junction, the presence of a physiologic sulcus depth with an adequate amount of attached gingiva, and no associated bleeding on probing.

The aim of this study is to assess the aesthetic perception of the different clinical outcomes of simulated root coverage procedure by three different groups of subjects: patients, general dentists, and periodontists.

## Material and Methods

Three different groups of subjects were identified and recruited for the study. The first group consisted of 100 consecutive patients referred to the Department of Periodontology of the University of Florence, Italy, for periodontal treatment. A second group consisted of all the dentists (181) of the Provincial Dental Association of Prato, Italy, while the third sample consisted of the entire group of the active members of the Italian Society of Periodontology (SIdP) (101).

*Fig. 1.* Original three-quarter smile of a young female used to create the different pre- and post-treatment images.

An investigator administered a questionnaire personally to each participant. The questions included the following variables: name, gender, age, place of residence (main city or provincial town), level of education (primary school, secondary school, university, only for the patient group), and years of dental practice (only for dentists and periodontists).

After answering these questions, eight couples of simulated cases were shown to the participants in the study. Each case consisted of the pre- and post-treatment images of a three-quarter smile including a tooth with one treated gingival recession. In order to standardize the light exposure, colours, and magnification among the pictures, it was decided to choose one original photograph showing a three-quarter smile of a young female with no signs of gingival recessions or other periodontal alterations (Fig. 1) and simulate both the recession and the treatment outcome using a specific software (Adobe Photoshop CS, ver. 8.0.1.) for photo-editing. Three different features were altered to produce the simulated clinical images: gingival recession (shallow = 2 mm; deep = 4 mm), colour of the exposed root (dischromic; non-dischromic), and amount of root coverage (CRC, complete root coverage; PRC, partial root coverage). These variations resulted in the following images:

(1) baseline gingival recession of 2 mm with the colour of the root surface similar to the clinical crown's (non-dischromic) (Fig. 2a) paired with a final CRC (Fig. 2b)
(2) baseline gingival recession of 2 mm, with a dischromic root (Fig. 3a) paired with a final CRC (Fig. 3b)
(3) baseline gingival recession of 2 mm, with a colour of the root surface similar to the clinical crown's (Fig. 4a) paired with a final partial root coverage (PRC) with 1 mm of root exposed (Fig. 4b)
(4) baseline gingival recession of 2 mm, with a dischromic root (Fig. 5a) paired with a final partial root coverage (PRC) with 1 mm of root exposed (Fig. 5b)
(5) baseline gingival recession of 4 mm, with a colour of the root surface similar to the clinical crown's (Fig. 6a) paired with a final complete root coverage (CRC) (Fig. 6b)
(6) baseline gingival recession of 4 mm, with a dischromic root (Fig. 7a) paired with a final complete root coverage (CRC) (Fig. 7b)
(7) baseline gingival recession of 4 mm, with a colour of the root surface similar to the clinical crown's (Fig. 8a) paired with a final partial root coverage (PRC) with 2 mm of root exposed (Fig. 8b)
(8) baseline gingival recession of 4 mm, with a dischromic root (Fig. 9a) paired with a final partial root coverage (PRC) with 2 mm of root exposed (Fig. 9b).

For each pair of images (pre- and post-treatment), the examiner asked the same following question to each subject selected for this study: ''*What score (from 0–''very bad'' to 10–''very good'') do you assign to the outcome of this treatment of gingival recession?*''

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*Fig. 2*. a. Baseline gingival recession of 2 mm with a colour of the root surface similar to that of the clinical crown; b. post-operative simulated image with complete root coverage.

*Fig. 3*. a. Baseline gingival recession of 2 mm with a dischromic root; b. post-operative simulated image with complete root coverage.

*Fig. 4*. a. Baseline gingival recession of 2 mm with a colour of the root surface similar to that of the clinical crown; b. post-operative simulated image with partial root coverage.

*Fig. 5*. a. Baseline gingival recession of 2 mm with a dischromic root; b. post-operative simulated image with partial root coverage.

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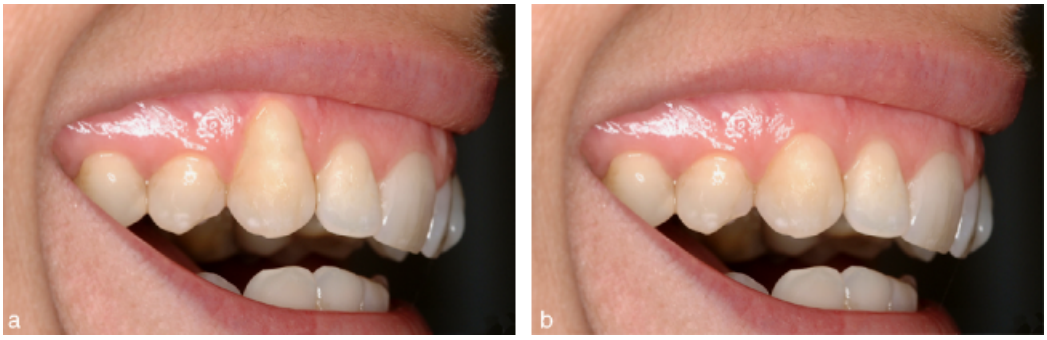


*Fig. 6.* a. Baseline gingival recession of 4 mm with a colour of the root surface similar to clinical crown's; b. post-operative simulated image with complete root coverage.

*Fig. 7.* a. Baseline gingival recession of 4 mm with a dischromic root; b. post-operative simulated image with complete root coverage.

*Fig. 8.* a. Baseline gingival recession of 4 mm with a colour of the root surface similar to that of the clinical crown; b. post-operative simulated result with partial root coverage.

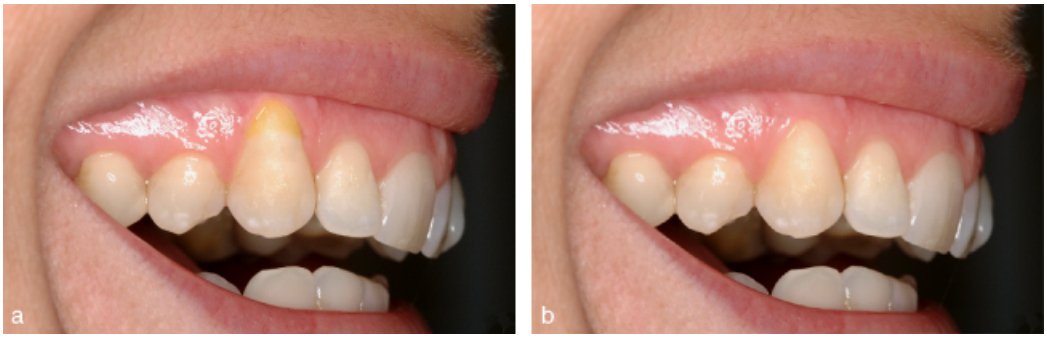


*Fig. 9.* a. Baseline gingival recession of 4 mm with a dischromic root; b. post-operative simulated image with partial root coverage.

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Each pair of images was reported in one single page and was shown consecutively as described previously (#1–#8). The score expressed by the interviewed subject was recorded in a paper form.

After the completion of the interviews, all the data were recorded on an electronic sheet (Microsoft® Office Excel 2003).

#### Statistical Analyses

Descriptive statistic analysis was performed using *frequency* and *percentage* for the qualitative variables, while *mean* and *standard deviation* were computed for the quantitative variables.

Inferential statistics (JMP® 7, SAS Institute Inc.) were applied in order to answer the following questions:

1. Were the mean scores of the three groups (patients, general dentists, periodontists) different for each question after adjusting for gender, age, and residence?
2. Considering the subjects nested into the three groups, were the mean scores of the eight pairing different?

In order to answer the first question, eight linear models were built up using the score obtained from the questions as outcome variables and the group, gender, age, and residence as explicative variables.

In order to answer the second question, an inferential statistic analysis was applied using a mixed REstricted Maximum Likelihood (REML) model in which the single score was considered to be the outcome variable, questions (#1–#8) and the group were the explicative variables, and the interviewed subject was the random variable.

Eventual differences among the questions were investigated using Tukey's test Honestly Significant Difference (HSD) and confidence interval at 95%.

## Results

Of all the approached subjects, 100 patients, 107 general dentists (belonging to the Dental Provincial Association of Prato, Italy), and 81 periodontists (active members – Italian Society of Periodontology) agreed to participate in the survey. The sex ratio varied among the groups. There were 77 female subjects (77%) in the patient group, 18 (17%) in the dentist group, and four (5%) in the periodontist group. The mean age was $48.5 \pm 11.5$, $47.9 \pm 9.0$ and $54.0 \pm 10.1$ years in the patient group, dentist group, and periodontist group, respectively. Only 30% of the patients had a university degree (Table 1). The mean scores attributed to the eight cases were quite homogeneous among the groups (Table 2).

The inferential statistics (Table 3) revealed that only the scores relative to case 1 (Q1) were significantly different between the dentist group and the periodontist group ($p = 0.0440$), while scores attributed to the other cases did not show statistically significant differences among groups. Gender and residence were not significantly associated with the scores, while age was significantly correlated for Q4 ($p = 0.0014$) and Q8 ($p = 0.0017$). In particular, cases 4 and 8 were characterized by gingival recession with a dischromic root paired with a partial root coverage. In these cases, the lower scores were mainly given by young subjects.

The mean scores were significantly different among the questions

*Table 1*. Descriptive statistics

| Variable | Patients, $n = 100$ | General dentist, $n = 107$ | Periodontists, $n = 81$ |
|---|---|---|---|
| Gender (F) | 77 (77%) | 18 (17%) | 4 (5%) |
| Age (years, mean ± SD) | 48.5 ± 11.5 | 47.9 ± 9.0 | 54.0 ± 10.1 |
| Residence (main town) | 51 (51%) | 24 (22%) | 10 (12%) |
| School education | | | |
| Primary | 5 (5%) | | |
| Secondary | 19 (19%) | | |
| High | 46 (46%) | | |
| University | 30 (30%) | 107 (100%) | 81 (100%) |
| Years of practice | | | |
| Mean ± SD | – | 18.7 ± 8.8 | 26.5 ± 9.2 |

Categorical variables (frequency index and percentage) were used to describe the three different groups

*Table 2*. Descriptive statistics

| Variable | Patients, $n = 100$ (Mean ± SD) | General dentists, $n = 107$ (Mean ± SD) | Periodontists, $n = 81$ (Mean ± SD) | Total score, $n = 288$ (Mean ± SD) |
|---|---|---|---|---|
| Q1 (pre-op: 2 mmNC; post-op: CRC) | 8.4 ± 1.2 | 8.8 ± 1.1 | 8.4 ± 1.7 | 8.5 ± 1.3 |
| Q2 (pre-op: 2 mmDC; post-op: CRC) | 8.6 ± 1.2 | 8.7 ± 1.1 | 8.5 ± 1.5 | 8.6 ± 1.2 |
| Q3 (pre-op: 2 mmNC; post-op: PRC) | 6.2 ± 2.1 | 6.1 ± 2.5 | 5.9 ± 2.6 | 6.1 ± 2.4 |
| Q4 (pre-op: 2 mmDC; post-op: PRC) | 5.6 ± 2.1 | 5.7 ± 2.2 | 5.4 ± 2.5 | 5.6 ± 2.2 |
| Q5 (pre-op: 4 mmNC; post-op: CRC) | 8.8 ± 1.2 | 8.6 ± 1.3 | 8.2 ± 1.4 | 8.6 ± 1.3 |
| Q6 (pre-op: 4 mmDC; post-op: CRC) | 9.0 ± 1.1 | 8.7 ± 1.1 | 8.5 ± 1.4 | 8.8 ± 1.2 |
| Q7 (pre-op: 4 mmNC; post-op: PRC) | 7.4 ± 1.5 | 7.3 ± 1.8 | 6.9 ± 2.0 | 7.2 ± 1.7 |
| Q8 (pre-op: 4 mmDC; post-op: PRC) | 6.7 ± 1.9 | 6.6 ± 1.8 | 6.3 ± 1.9 | 6.6 ± 1.8 |

Metric variables (mean and standard deviation) were used to measure the answers at the eight questions. Q, question; NC, non-dischromic colour; DC, dischromic colour; CRC, complete root coverage; PRC, partial root coverage.

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*Table 3*. Inferential statistics

| Source | DF | *p*-value |
|---|---|---|
| Q1 | | |
| Group | 2 | 0.0440 |
| Gender | 1 | 0.4127 |
| Age | 1 | 0.3683 |
| Residence | 1 | 0.2015 |
| Q2 | | |
| Group | 2 | 0.3214 |
| Gender | 1 | 0.5588 |
| Age | 1 | 0.5468 |
| Residence | 1 | 0.7933 |
| Q3 | | |
| Group | 2 | 0.5474 |
| Gender | 1 | 0.6935 |
| Age | 1 | 0.0542 |
| Residence | 1 | 0.5330 |
| Q4 | | |
| Group | 2 | 0.2292 |
| Gender | 1 | 0.9132 |
| Age | 1 | 0.0014 |
| Residence | 1 | 0.5313 |
| Q5 | | |
| Group | 2 | 0.0695 |
| Gender | 1 | 0.8308 |
| Age | 1 | 0.6488 |
| Residence | 1 | 0.9909 |
| Q6 | | |
| Group | 2 | 0.0766 |
| Gender | 1 | 0.9880 |
| Age | 1 | 0.8716 |
| Residence | 1 | 0.8380 |
| Q7 | | |
| Group | 2 | 0.1218 |
| Gender | 1 | 0.4812 |
| Age | 1 | 0.1811 |
| Residence | 1 | 0.1801 |
| Q8 | | |
| Group | 2 | 0.0896 |
| Gender | 1 | 0.9971 |
| Age | 1 | 0.0017 |
| Residence | 1 | 0.1130 |

Effect tests regarding the group, gender, age, and residence. Q, question; DF, degrees of freedom

*Table 4*. Inferential statistics

| Mean[i] – Mean[j]<br>Std Err Diff<br>Lower CI95% Diff<br>Upper CI95% Diff | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 |
|---|---|---|---|---|---|---|---|---|
| Q1 | 0 | – 0.09 | 2.45 | 2.97 | – 0.02 | – 0.22 | 1.31 | 1.99 |
| | 0 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| | 0 | – 0.44 | 2.11 | 2.62 | – 0.37 | – 0.56 | 0.97 | 1.64 |
| | 0 | 0.25 | 2.80 | 3.31 | 0.33 | 0.13 | 1.66 | 2.33 |
| Q2 | | 0 | 2.55 | 3.06 | 0.07 | – 0.12 | 1.41 | 2.08 |
| | | 0 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| | | 0 | 2.20 | 2.72 | – 0.27 | – 0.47 | 1.06 | 1.73 |
| | | 0 | 2.89 | 3.41 | 0.42 | 0.22 | 1.75 | 2.43 |
| Q3 | | | 0 | 0.51 | – 2.47 | – 2.67 | – 1.14 | – 0.47 |
| | | | 0 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| | | | 0 | 0.17 | – 2.82 | – 3.02 | – 1.49 | – 0.81 |
| | | | 0 | 0.86 | – 2.13 | – 2.32 | – 0.80 | – 0.12 |
| Q4 | | | | 0 | – 2.99 | – 3.18 | – 1.66 | – 0.98 |
| | | | | 0 | 0.11 | 0.11 | 0.11 | 0.11 |
| | | | | 0 | – 3.34 | – 3.53 | – 2.00 | – 1.33 |
| | | | | 0 | – 2.64 | – 2.84 | – 1.31 | – 0.64 |
| Q5 | | | | | 0 | – 0.19 | 1.33 | 2.01 |
| | | | | | 0 | 0.11 | 0.11 | 0.11 |
| | | | | | 0 | – 0.54 | 0.99 | 1.66 |
| | | | | | 0 | 0.15 | 1.68 | 2.35 |
| Q6 | | | | | | 0 | 1.53 | 2.20 |
| | | | | | | 0 | 0.11 | 0.11 |
| | | | | | | 0 | 1.18 | 1.86 |
| | | | | | | 0 | 1.87 | 2.55 |
| Q7 | | | | | | | 0 | 0.67 |
| | | | | | | | 0 | 0.11 |
| | | | | | | | 0 | 0.33 |
| Q8 | | | | | | | 0 | 1.02 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |
| | | | | | | | | 0 |

Mean differences among the questions and confidence interval (CI) at 95%.
Std Err, standard error; Diff, difference.

*Table 5*. The levels with different letters are significantly different

| | Level | Least square mean |
|---|---|---|
| Q6 | A | 8.7 |
| Q2 | A | 8.6 |
| Q5 | A | 8.5 |
| Q1 | A | 8.5 |
| Q7 | B | 7.2 |
| Q8 | C | 6.5 |
| Q3 | D | 6.1 |
| Q4 | E | 5.6 |

($p < 0.0001$), showing that the differences among the proposed clinical cases were perceived by the sample subjects. No difference was observed among the groups, considering the score given to the questions as the outcome variable ($p = 0.1003$). The mean differences among the eight mean question scores and the relative C.I 95% are reported in Tables 4 and 5.

All the cases that showed a final CRC (Q6, Q2, Q5, Q1) did not show any significant difference among the groups while cases with a final PRC (Q7, Q8, Q3, Q4) were assigned significantly lower scores. In particular, Question #4 (baseline gingival recession of 2 mm, with a dischromic root associated with a final partial root coverage with 2 mm of root exposed) showed the lowest score.

## Discussion

Nowadays, beauty and aesthetics are of great importance in industrialized societies. This attitude also affects the reconstructive approaches in Medicine and treatment planning. Several studies (Kokich et al. 1999, 2006, Zaher et al. 2005) showed that aesthetic concerns were the predominant indication for dental treatment and that future research should include an evaluation of the aesthetic result as a primary clinical outcome variable. The treatment of gingival recessions may provide a useful example. The main outcome variables differ among the clinical studies that are quoted to prove the effectiveness of different therapeutic approaches. It is important to know whether the amount of root coverage should be measured as the number of covered linear millimetres, as a percentage of the covered area or as a binary variable (Yes/No), in order to assess the efficacy of a periodontal treatment.

Little information is available about the aesthetic result of these surgical procedures. Zucchelli et al. (2003) reported that a better aesthetic outcome and post-operative course were

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indicated by the patients treated by means of a bilaminar technique using a reduced connective tissue graft.

Aesthetic judgement is intrinsically subjective and may be remarkably affected by cultural factors. The judgement about a clinical result may differ considerably between professionals and patients. Therefore, the present investigation was planned to assess what a ''successful'' treatment of an isolated gingival recession means for patients, dentists, and periodontists. The different level of knowledge in terms of treatment of gingival recessions could affect their evaluation of the aesthetic results. This was the rationale to form the three groups.

The results of the present study did not confirm the original hypothesis and showed a homogeneous judgement among the groups, independent of the level of education, place of living/working, and gender. In particular, it was observed that only the images of post-operative complete root coverage obtained higher scores, denoting a successful treatment of gingival recession. These results confirm the opinion stated by Miller (1987) and do not support the conclusions of other studies (Kokich et al. 1999, 2006), where minor alterations in the gingival complex did not affect the aesthetic evaluation of the smile appreciably. However, the limits of this study are represented by the fact that the clinical situation considered is based on a simulation model that does not take into account other variables that may influence the subjective perception. For example, it does not take into account the integration of the experimental tooth in the smile, the colour of the soft tissues, the level of the mucogingival line, etc.

Nevetheless, complete root coverage appears to be widely accepted as the main successful outcome from the subjects enrolled for this study, while the judgement of cases ending with partial root coverage depends on the pre-operative condition of the gingival recession significantly. In particular, an incomplete root coverage appears to be more accepted by both the patients and the clinicians (general dentists and periodontists) in cases of deep initial gingival recession (i.e., 4 mm) than in cases of shallow recession (2 mm). This could be explained by the higher expectation of the interviewed patients and the clinicians in the presence of a smaller gingival recession.

This information may be very helpful for obtaining a correctly informed consent. A patient with a shallow recession is expected to be treated successfully ending with complete root coverage, independent of the type of surgical procedure (Clauser et al. 2003), but he/she should also know in advance that the possible incomplete coverage would equal complete failure, especially in the case of a dischromic root surface.

On the other hand, a patient with a deep recession associated with a non-dischromic dental root should be informed about the likelihood of an incomplete coverage, but also reassured that even this partial result would be a definite improvement from the aesthetic standpoint.

The age effect is also noteworthy: the young interviewed people, whether patients, general dentists, or periodontists, tended to assign the poorest scores to the results of the treatments, in case of dischromic root paired with a final partial root coverage. Based on these results, the clinician will expect a more exacting attitude from the younger patients: he will therefore be more careful when illustrating the expected results to his/her young patients. This consideration may especially affect older clinicians.

In conclusion, the following statements may be drawn from our data:

1. A complete root coverage has been considered to be the main successful outcome by a sample of patients, general dentists, and periodontists.
2. It could be suggested that complete root coverage may be reported as a primary outcome in future studies on the therapy of recessions.
3. A partial root coverage may be viewed as a positive outcome in cases of deep gingival recession associated with a non-dischromic root.

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## References

Clauser, C., Nieri, M., Franceschi, D. & Pagliaro, U. (2003) Evidence-based mucogingival therapy. Part 2: Ordinary and individual patient data meta-analyses of surgical treatment of recession using complete root coverage as the outcome variable. *Journal of Periodontology* **74**, 741–756.

Dunn, W. J., Murchison, D. F. & Broome, J. C. (1996) Esthetics: patient's perceptions of dental attractiveness. *Journal of Prosthodontic* **5**, 166–171.

Höfel, L., Matthias, L. & Thomas, J. (2007) Beauty and the teeth: perception of tooth color and its influence on the overall judgment of facial attractiveness. *International Journal of Periodontics and Restorative Dentistry* **27**, 349–357.

Kokich, V. O., Kiyak, H. A. & Shapiro, P. A. (1999) Comparing the perception of dentists and lay people to altered dental esthetics. *Journal of Esthetic Dentistry* **11**, 311–324.

Kokich, V. O., Kokich, V. G. & Kiyak, H. A. (2006) Perceptions of dental professionals and laypersons to altered dental esthetics: asymmetric and symmetric situations. *American Journal of Orthodontics and Dentofacial Orthopedics* **130**, 141–151.

Matthews, T. G. (1978) The anatomy of a smile. *Journal of Prosthetic Dentistry* **39**, 128–134.

Miller, P. D. Jr. (1987) Root coverage with the free gingival graft. Factors associated with incomplete coverage. *Journal of Periodontology* **58**, 674–681.

Morley, J. & Eubank, J. (2001) Macroesthetic elements of smile design. *Journal of American Dental Association* **132**, 39–45.

Moskowitz, M. E. & Nayyar, A. (1995) Determinants of dental esthetics: a rationale for smile analisys and treatment. *The Compendium of Continuing Education in Dentistry* **16**, 1164–1166.

Tjan, A. & Miller, G. D. (1984) Some esthetics factors in a smile. *Journal of Prosthetic Dentistry* **51**, 24–28.

Zaher, C. A., Hachem, J., Puhan, M. A. & Mombelli, A. (2005) Interest in periodontology and preferences for treatment of localized gingival recession. *Journal of Clinical Periodontology* **32**, 375–382.

Zucchelli, G., Amore, C., Sforza, N. M., Montebugnoli, L. & De Sanctis, M. (2003) Bilaminar technique for the treatment of recession-type defects. A comparative clinical study. *Journal of Clinical Periodontology* **30**, 862–870.

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**Clinical Relevance**

*Scientific rationale for the study:* To evaluate the successful outcomes of the treatment of gingival recession.
*Principal findings:* This study showed that patients, general dentists, and periodontists agreed on accepting complete root coverage as the main successful outcome.
*Practical implications:* The clinicians should take into account the fact that the patient is expected to be fully satisfied only when a complete root coverage is achieved when treating a recession.

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