

Different Failures in Crown Lengthening Procedures: A Clinical Study

Rajesh Kumar Reddy¹ Padmakanth Mannava² Harkanwal Preet Singh^{3*} Sujan Shetty⁴

¹Reader, Department of Prosthodontics, Lenora Institute of Dental Sciences and Research Centre, Rajahmundry, Andhra Pradesh, India.

²Associate Professor, Department of Periodontology, Triveni Institute of Dental Sciences and Hospital, Bilaspur, Chhattisgarh, India.

³Reader, Department of Oral Pathology, Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, India.

⁴Associate Professor, Department of Periodontology, Triveni Institute of Dental Sciences, Hospital & Research Centre, Chhattisgarh, India.

ABSTRACT

Background: The purpose of clinical crown lengthening is to increase the extent of supragingival tooth structure for restorative or esthetic purposes. The present article aims at recording different failures.

Material & Methods: This study was conducted in department of periodontics. It consisted of 112 patients who required crown lengthening procedures. After performing the procedure, the reasons for the early failure of surgical treatments were recorded at second and fifth weeks.

Results: Out of 112 patients, 68 were males and 44 were females. The difference was non significant. 17 patients showed early failure while 95 patients did not showed failure. The main reason for failure was absence of adequate keratinized gingiva around the tooth (47%) at both 2nd and 5th weeks postoperatively. Other reason was presence of granulation tissue around the tooth and the number of cases was 4 in 2nd weeks and 1 in 5th weeks ($p=0.02$). We reported 3 cases of inadequate surgery at 2nd weeks and 2 at 5th weeks. 2 cases were due to fracture of the tooth structure after surgery reported both at 2nd and 5th weeks. 3 (20%) cases were due to coronal returning of the gingival tissue on the tooth structure recorded at 5th weeks ($p=0.01$).

Conclusion: Author concluded that clinical crown lengthening is required to increase the extent of supragingival tooth structure for restorative or esthetic purposes. Both early and late failures are common. Absence of adequate keratinized gingiva around the tooth was main reason for failures in present study.

Keywords: Clinical crown lengthening, keratinized gingival, supragingival.

INTRODUCTION

Clinical crown lengthening refers to procedures designed to increase the extent of supragingival tooth structure for restorative or esthetic purposes. Clinicians often encounter the need for crown lengthening in the practice of dentistry and have to make treatment decisions taking into consideration how to best address the biological, functional, and esthetic requirements of each particular case.¹ A short clinical crown may lead to poor retention form thereby leading to

improper tooth preparation. Surgical crown lengthening procedure is done to increase the clinical crown length without violating the biologic width. Several techniques have been proposed for clinical crown lengthening which includes gingivectomy, apically displaced flap with or without resective osseous surgery, and surgical extrusion using periotome.²

The concept of crown lengthening was first introduced by D.W. Cohen³ and is presently a procedure that often employs some combination of

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*Correspondence Dr. Harkanwal Preet Singh.

Department of Oral Pathology, Dasmesh Institute of Research and Dental Sciences, Faridkot, Punjab, India.

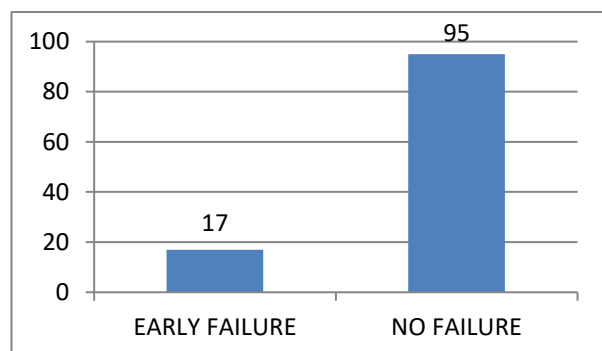
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Table 1: Distribution of patients.

TOTAL - 112		
MALE	FEMALE	P- VALUE
68	44	0.5

Table 2: Reasons for failures at 2nd & 5th weeks.

Reason	2 WEEKS		5 TH WEEKS		P VALUE
	NUMBER	%	NUMBER	%	
Coronal returning of the gingival tissue on the tooth structure	0	0	3	20	0.01
Inadequate surgery	3	17.6	2	13.3	0.1
Fracture of the tooth structure after surgery	2	11.8	2	13.3	0.3
Presence of granulation tissue around the tooth	4	23.6	1	6.7	0.02
Absence of adequate keratinized gingiva around the tooth	8	47	7	46	1
TOTAL	17	100	15	100	



Graph 1: Number of failure cases.

tissue reduction or removal, osseous surgery, and / or orthodontics for tooth exposure. The amount of tooth structure exposed above the osseous crest (about 4mm) must be enough to provide for a stable dento gingival complex and biologic width to permit proper tooth preparation and account for an adequate marginal placement, thus ensuring a good marginal seal with retention for both provisional and final restorations.⁴

A clinician faces 3 choices for the placement of restoration margin: supragingival, at the gingival margin level and subgingival. Placing restoration margins supragingivally facilitates impression taking, observation of hygienic instructions and

identification of recurrent caries, and it results in the health of soft tissues. However badly mutilated teeth or the grossly decayed teeth often pose problems to the restorative dentists during their treatment due to unavailability of sufficient clinical crowns. Hence a crown lengthening procedure prior to restorative treatment is mandatory during management of such teeth.⁵

Failures are common in this procedure which is divided into early failures and late failures. Early failures include coronal returning of the gingival tissue on the tooth structure, absence of adequate keratinized gingiva around the tooth, presence of granulation tissue in the coronal areas of tooth structure and not creating an adequate distance between the bone crest and the tooth margin. If the interproximal bone is removed, the odds are high for the restoration of the interdental papilla and creation of an unaesthetic triangular space beneath then interdental contact area.⁶ Late failures are mainly due to the impingement of the restoration on the biologic space.

This article aims at recording the early failures in crown lengthening procedures.

MATERIALS & METHODS

This study was conducted in department of periodontics. It consisted of 112 patients who required crown lengthening procedures. Plaque index was recorded before the surgical procedure and during the follow-up sessions, and patients with a plaque index of >20 were excluded from the study. All patients after procedure were instructed to maintain oral hygiene with the help of chlorhexidine mouth wash and dental flossing and to maintain the surgical site clean. The reasons for the early failure of surgical treatments were recorded at second and fifth weeks. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Out of 112 patients, 68 were males and 44 were females (Table - I). The difference was non significant. Graph I shows that 17 patients showed early failure while 95 patients did not showed failure. Table II shows that main reason for failure was absence of adequate keratinized gingiva around the tooth (47%) at both 2nd and 5th weeks postoperatively. Other reason was presence of granulation tissue around the tooth and the number of cases was 4 in 2nd weeks and 1 in 5th weeks ($p=0.02$). We reported 3 cases of inadequate surgery at 2nd weeks and 2 at 5th weeks. 2 cases were due to fracture of the tooth structure after surgery reported both at 2nd and 5th weeks. 3 (20%) cases were due to coronal returning of the gingival tissue on the tooth structure recorded at 5th weeks ($p=0.01$).

DISCUSSION

Crown Lengthening is a surgical procedure that requires exposure of adequate tooth structure for restorative procedures. Various techniques and methods used for performing Crown Lengthening should be treated in such a way so as to avoid any violation to Biologic Width that can have deleterious effect on periodontium leading to gingival inflammation, loss of attachment and alveolar resorption. The goal of surgical crown lengthening is to provide the restorative dentist with sufficient clinical crown to permit optimum restoration of a tooth.⁷

Crown lengthening surgical procedure is a resective surgery in which a part of periodontal tissues are

removed by surgery and the clinician removes a part of the soft tissue or places it at a more apical position. In addition, the underlying osseous structures play an important role in the final tissue healing and the treatment outcomes. When there is osseous deformity, removal of bone and the more apical position of the flap have dual advantages of decreasing the probing depth and the exposure of the tooth for restoration procedures.⁸

In present study we included 112 cases that required crown lengthening procedures. It consisted of 68 males and 44 females. Results of our study shows that 17 patients showed early failure while 95 patients did not showed failure. In our study, among various causes for failure, the most common reason was absence of adequate keratinized gingiva around the tooth followed by inadequate surgery, fracture of tooth structure after surgery, coronal returning of the gingival tissue on the tooth structure and presence of granulation tissue around the tooth.

Han et al⁹ evaluated the outcomes of crown lengthening procedures and factors affecting their success. They suggested that factors such as anatomical complexities and occlusal forces limit the success of such surgeries and are not proper indications for crown lengthening procedures. Arora et al¹⁰ evaluated changes in the level of the periodontal tissue 6 months after crown lengthening procedure and also evaluated factors affecting the stability of the lengthened root; they reported that the achieved crown length during surgery decreased significantly 6 months postoperatively.

In the present study, no coronal returning of the gingival tissue on tooth structure was observed at the 2-week interval; however, at the 5-week interval, there were 3 cases. Pontoriero et al¹¹ in his study, reported a re-growth of 3.2 mm of the supra-crestal gingival tissue 6 months after restoration; Perez et al reported 3.12 mm of gingival tissue re-growth 12 months after restoration.

CONCLUSION

Author concluded that clinical crown lengthening is required to increase the extent of supragingival tooth structure for restorative or

esthetic purposes. Both early and late failures are common. Absence of adequate keratinized gingiva around the tooth was main reason for failures in present study.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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