

Two years periodontal evaluation of surveyed crown teeth

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أجريت هذه الدراسة لتقييم التغيرات حول السنبة لأربع وثلاثين من التيجان المسوحة لتثبيت ودعم أنواع مختلفة من الضمات التي استعملت في تصميم تعويضات جزئية متحركة. تم قياس مشعر التهابات اللثة وتجمع اللويحات الجرثومية وفقاً لطريقة (لو). وكان قياس نسبة حركة الأسنان كالتالي: - (1) لا توجد حركة. (2) توجد حركة 1 مم في الاتجاه اللساني الدهليزي. (3) توجد حركة 2 مم في الاتجاه اللساني الدهليزي. تم استدعاء المرضى خلال أربع فترات زمنية.

أو ضحت الدراسة أنه لا يوجد فرق إحصائي هام في حركة الأسنان أو التهابات اللثة حول هذه التيجان بينما وجد فرقاً إحصائياً هاماً في اللويحات الجرثومية ما بين الفترة الأولى والفترة الرابعة.

This study was undertaken to evaluate the periodontal conditions of thirty-four (34) surveyed crowns which support and retain different designs of removable partial dentures with different clasping systems. The patients were called at four intervals. The gingival and plaque indices were measured according to Loé. The tooth mobility was measured according to the following criteria: 0 - no mobility; 1 - mobility 1 mm buccolingually; and 2 - mobility more than 1 mm buccolingually. The findings indicated no significant difference in tooth mobility or the gingival index. However, a significant difference was found in plaque index between the day of denture placement and the fourth visit.

Introduction and Literature Review

The advantages of the so-called surveyed crown were reported by many authors. Chandler *et al.*¹ indicated that the uses of surveyed crowns included the treatment of badly broken down teeth to achieve the desire path of insertion, to obtain a favorable occlusal relationship, the necessity to splint adjacent teeth and to provide additional stabilization. Miller,² on the other hand, stated twenty-one advantages for the surveyed crown. Surveyed crowns yield more ideal contours than natural teeth for receiving the various components of the removable partial denture (RPD).^{3,4} Other authors had described the alterations in tooth preparations for surveyed crowns.^{4,5} The design requirement for the RPD must also be determined before treatment is initiated to account for the position, the facial and labial contours, and the size of the existing restorations.⁷ Porcelain-to-metal crowns are routinely fabricated with retentive contours in veneering porcelain, but until recently, the contours of the other portions of the restoration were developed in metals.⁸

The aim of this study was to evaluate the periodontal status of a number of surveyed crowns which were used to stabilize and retain a removable partial denture.

Materials and Methods

Material

This study was conducted in the Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia. A total of thirty-four (34) teeth were randomly selected for this study. All the teeth were either malposed or badly broken ones and which required surveyed crowns to support and retain an RPD. Their distribution was as follows: eight (8) molars, twenty-two (22) premolars and four (4) canines. Out of the thirty-four used clasps, eight (8) were circlet, ten (10) were RPA referred as rest proximal plate and half aker, twelve (12) were RPI illustrated as rest, proximal plate and a bar, and four (4) bar-type clasps composed of ledge and bar. The surveyed crowns were prepared to achieve the following criteria:

1. Have a rest that was ideally located
2. Have a guiding plane that was neither overcontoured nor had a large undercut gingival to the guiding plane.
3. Its reciprocal surface provided true reciprocation and a cervically placed height of contour.
4. An undercut which did not exceed 0.01 of an inch. In the study, all the finished lines were supragingival.

Method of Measurements

On the day of RPD placement which was referred to as level 1, the plaque and gingival indices were measured according to Loé.⁹ Tooth mobility was measured according to the following criteria:

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- 0- no mobility
- 1- a tooth mobility of 1mm buccalingually
- 2- a tooth mobility of 2mm buccalingually

The patients were then recalled for repeated measures after six months, one year, and two years, referred to as levels 2, 3 and 4, respectively. All the measurements were done by one operator.

Statistical Analysis

The data were then analyzed using the one-way ANOVA of the repeated measure designs with the four-time period.

Results

The mean, standard deviation with upper and lower bounds for tooth mobility, gingival and plaque indices were shown in Table 1. The analysis of variance (ANOVA) was used to compare the different levels. A significant difference was found only in the plaque index between levels (4) and (1) respectively (P=0.002).

relationship of the oral hard and soft tissues were accomplished in association with decisions regarding the determination of the path of insertion/dislodgement, the selection of the abutments, the location of clasp assemblies and the type of major connector. The so-called stress release clasps, the RPI,¹¹ were used in the cases of posterior extended types and the RPA¹² was used to overcome some of the problems encountered with the RPI. However, rigid type clasp (circlet) were used in cases of tooth-supported RPDs. The findings of this study was that there was a significant increase in the plaque index from level 1 to level 4 which may be mainly due to neglect of oral hygiene measures. Placement of an RPD in the oral cavity seems to influence the existing ecologic situation by causing increase plaque formation on the remaining teeth together with the surveyed crowns.¹³ However, the plaque accumulations did not show any significant signs of gingival inflammation and this might have been mainly due to the short interval visits and follow-up. The crowned teeth which were overloaded with the RPD did not show any significant

Table 1. Descriptive status and 95% confidence of Gingival Index, Tooth Mobility and Plaque Index.

Level	Gingival Index				Tooth Mobility				Plaque Index			
	Mean	SD	95% CI		Mean	95% CI		Mean	SD	95% CI		
			Lower	Upper		Lower	Upper			Lower	Upper	
Baseline												
6 months	0.70 ^a	0.61 ^a	0.48 ^a	0.90 ^a	0.45 ^a	0.51 ^a	0.27 ^a	0.61 ^a	1.02 ^a	2.66 ^a	0.76 ^a	1.30 ^a
12 months	0.71 ^a	0.62 ^a	0.49 ^a	0.95 ^a	0.47 ^a	0.51 ^a	0.29 ^a	0.65 ^a	1.19 ^a	0.58 ^a	0.98 ^a	1.38 ^a
1/2 years	0.85 ^a	0.66 ^a	0.63 ^a	1.89 ^a	0.43 ^a	0.52 ^a	0.24 ^a	0.62 ^a	1.22 ^a	0.35 ^a	1.10 ^a	1.35 ^a
2 years	0.90 ^a	0.65 ^a	0.67 ^a	1.13 ^a	0.46 ^a	0.54 ^a	0.26 ^a	0.66 ^a	1.40 ^b	0.44 ^a	1.20 ^a	1.51 ^a

Different alphabets mean significant difference. From baseline
CI = Confidence interval

Discussion

Single crowns and fixed partial denture retainers used to support clasp type RPDs have been referred to as surveyed crowns.⁹⁻¹⁰ The success of such prosthodontic treatment was heavily dependent on the care with which the diagnostic phase was completed. A total treatment plan must be developed in advance of any definitive therapy. In this study, proper surveying that analyzed the dimensional

difference in tooth mobility for the surveyed crowns, and this was supported in the literature by many authors¹⁴ who concluded that there was no evidence or experimental studies showing whether forces transmitted to the abutment teeth by the RPD could initiate or aggravate periodontitis or cause increase in tooth mobility.

Summary

Within the limitations of this study the

following conclusions can be drawn:

1. Although the literature pertaining to the design and fabricating of the surveyed crown was extensive, studies on clinical follow-up and prognosis after placement are however sparse.
2. A well-designed RPD supported by a well-designed surveyed crown should yield good service without any risk of periodontal damage or tooth mobility provided short-interval visits and hygiene instructions are instituted.
3. This was a two-year longitudinal study. Longer period for further assessment is required.

References

1. Chandler HT, Brundic JS, Fisher WT. Surveyed crown. *J Prosthet Dent* 1973; 30(5): 775-780.
2. Miller EL. The surveyed cast crown key to more successful partial dentures. *Dental Survey* 1979; February: 38-45.
3. Culpepper WD, Moulton PS. Consideration in fixed prosthodontics. *Dent Clin North Am* 1979; 23(1): 21-39.
4. Gardener MF. Alterations in tooth preparations for surveyed crowns. *Gen Dent* 1984; November-December: 498-500.
5. Rudd RW, Bange AA, Rudd KD, Montalvo R. Preparing teeth to receive a removable partial denture. *J Prosthet Dent* 1999; 82(5): 536-549.
6. Burns DR, Unger JW. The construction of crowns for removable partial denture abutment teeth. *Quintessence Int* 1994; 25(71): 471-475.
7. Macpharson JR, Evans DB. Fabricating crowns to fit existing removable partial dentures: An illustrations of two techniques. *J Prosthet Dent* 1993; 2(3): 199-205.
8. Kancyper S, Sierralta M, Razzoog ME. All ceramic partial abutments. *J Prosthet Dent* 1984; 84(4): 400-402.
9. Loe H. The gingival index, the plaque index and the retention index system. *J Periodontol* 1967;38: 610-616.
10. Seals RR, Stratton RJ. Surveyed crowns: A key for integrating fixed and removable prosthodontics. *Quintessence Dent Tech* 1987; 11(1): 43-49.
11. Demmer WF. An analysis of mesial I-bar clasp designs. *J Prosthet Dent* 1976; 36(3): 243-253.
12. Eliason CM. RPA clasp design for distal extension removable partial dentures. *J Prosthet Dent* 1983; 49(1): 25-27.
13. Bergman B. Periodontal reactions related to removable partial dentures. A literature review. *J Prosthet Dent* 1987; 58(4): 454-458.
14. Tebrock OC, Rohen RM, Fenster RK, Pellen BG Jr. The effect of various clasping systems on the mobility of abutment teeth for distal-extension removable partial dentures. *J Prosthet Dent* 1979; 41:511-516.