

Original Article

The Preparation Faults Manifesting As Finish Line Defects

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ABSTRACT

This study was done to evaluate different finish line defects due to fault preparation, In addition to that to determination of their locations (upper, lower, anterior, posterior).

Methods: 175 working casts with different finish line defects (common errors and mistakes happens in the finish line) were collected from various dental laboratories in Benghazi. The working casts were classified to five groups according to the type of the finish line defect. group (1): Unidentifiable or light finish line, group (2): The finish line Not continuous, group (3): Double or several finish lines, group (4): Rough finish line and group(5): Nodules on finish line. The collected data have analyzed statically. Each group subdivided into two divisions (upper, lower) then each division divided into three subgroups (Anterior, premolar, Molar) according to position of tooth in the arch.

Results: The percentage for incidence of each group were as follow **Group (1) = 30%** mostly in lower molars and upper premolars (40.4%, 32.7%) respectively. **Group (2) =24%** the highest percentage in lower molar (33.3%). **Group (3) =16%** the highest was 39.3% of them occur in lower molars also. **Group (4) = 22%** with (35.9%, 23.1%) in lower molars and upper molars respectively. **Group (5) = 8%** mostly in lower molars (35.7%). independent-samples t-test was conducted which revealed lower molars are the most significant for all the subdivisions (M13, SD5.8) $t(4)=5$, $p=0.07$

Conclusion: The careful inspection of the finish line on the working cast is an essential critical step for obtaining a restoration with an accurate marginal integrity .

Key words: Finish Line (FL), cavosurface finish line (C.S.L).

INTRODUCTION

The first and most basic objective of restorative dentistry is preservation of the periodontium health for the long-term survival of the restoration or vice versa ⁽¹⁾.

The restoration can survive in the biological environment of the oral cavity only if the margins are closely adapted to the cavosurface finish line (C.S.L) of the preparation. The marginal integrity is an important element in general agreement about the definition of evaluation a restoration, however there is no a clinically acceptable margin ⁽²⁾.

A restoration's margin marks the transition between the restoration itself and the finishing line of the tooth structure. This is a critical interface representing a significant clinical weak point for any marginal discrepancies render the site vulnerable to plaque accumulation leading to

microleakage. However, ensuring adequate between periodontal tissues and restorative dentistry there must be a well- designed preparation with a smooth and even margin ⁽³⁾. The inspection for finish line on working cast is very important step. When doubt exists "If you can't see it, you can't wax it" Although an experienced technician will probably bring any unrealistic demands to the attention of the dentist, some of them may attempt to meet a request that is doomed to failure. with the advent of the latest advancements in fixed prosthodontics, the failure rate have also increased. A poor marginal integrity accounts for the most of these failure ⁽⁴⁾. So that in this study the different finish line defects and where most they occur were evaluated.

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MATERIALS AND METHODS

At the beginning many work casts were collected from various dental laboratories in Benghazi. 175 working casts with different defects (common errors and mistakes happens in the finish line) were chosen. The chosen working casts were classified

into main five different groups according to the type of the finish line defect. Each group subdivided into two divisions (upper, lower) then each division divided into three subdivisions (Anterior, premolar, Molar) according to position of tooth in the arch.



Figure 1: Unidentifiable finish line

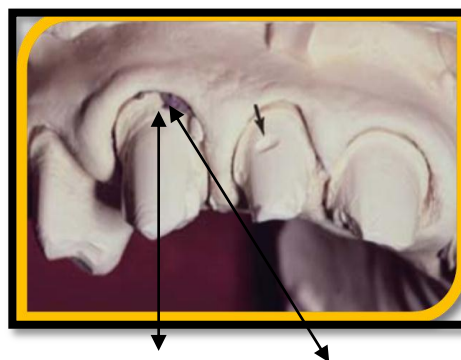


Figure 2: The finish line Not continuous, Nodules on finish line



Figure 3: Rough finish line



Figure 4: Double or several finish lines

RESULTS

The incidence percentage for of each main group and for their subgroups were calculated from the collected data. The unidentifiable or light finish line group was the highest percentage occurrence. In addition to that, the lower molars scored the highest percentage of defects in each group. An independent-samples t-test was conducted to compare the incidence of defects within the different teeth in all the subdivisions within the all main groups. There was a significant difference in the scores for upper anterior (M=2.2, SD 0.4)

t(4)=11, p=0, lower anterior (M=1, SD 2.2) t(4)=1, p=0.4 upper premolar (M=8, SD 5.6) t(4)=3.2, p=0.032 lower premolar (M=3.6, SD 1.8) t(4)=4.4, p=0.01 upper molar (M=7, SD 3.9) t(4)=3.9, p=0.016 and lower molar (M=13, SD 5.8) t(4)=5, p=0.07. From our statistical analysis, the lower molars are the most significant for all the subdivisions .

The following tables demonstrate the number and the percentage of them and the a statistical analysis of the data.

Table 1: Description of the main classified groups.

Group No	Type of finish line defect	Number casts	Description
1	Unidentifiable or light finish line	52	Finish line fades from the prep to the tooth; there is no margin or it is too light).
2	Not continuous finish line	42	Finish line does not go all around the tooth; it looks like a zigzag or stepped margin
3	Double or several finish lines	28	There are two or several finish lines on top of each other
4	Rough finish line	39	Finish line has many scratches or nicks from the bur it is not a sharp or well-defined line
5	Nodules on finish line	14	Small nodules or large on the finish line identified

Table 2: The number of each subdivisions group (1)

position / location	Upper	Lower
Anterior	2	5
Premolar	17	4
Molar	3	21

Table 5: The number of each subdivisions group (4)

position / location	Upper	Lower
Anterior	3	0
premolar	7	6
Molar	9	14

Table 3: The number of each subdivisions group (2)

position / location	Upper	Lower
Anterior	3	0
premolar	9	4
Molar	12	14

Table 6: The number of each subdivisions group(5)

position / location	Upper	Lower
Anterior	2	0
Premolar	3	1
Molar	3	5

Table 4: The number of each subdivisions group(3)

position / location	Upper	Lower
Anterior	2	0
Premolar	4	3
Molar	8	11



Table 7: The percentage main groups in the study .

Group Number	Group(1)	Group(2)	Group(3)	Group(4)	Group(5)
Sample count	52	42	28	39	14
percentage	30%	24%	16%	22%	8%

Table 8: The percentage of group (1) subdivisions

position / location	Upper	Lower
Anterior	3.7%	9.6%
Premolar	32.7%	7.8%
Molar	5.8%	40.4%

Table 9: The percentage of group (2) subdivisions

position / location	Upper	Lower
Anterior	7.1%	0%
premolar	21.4%	9.5%
Molar	28.6%	33.3%

Table 10: The percentage of group (3) subdivisions

position / location	Upper	Lower
Anterior	7.1%	0%
Premolar	14.3%	10.7%
Molar	28.6%	39.3%

Table 11: The percentage of group (4) subdivisions

position / location	Upper	Lower
Anterior	7.7%	0%
premolar	17.9%	15.4%
Molar	23.1%	35.9%

Table 12: The percentage of group (5) subdivisions

position / location	Upper	Lower
Anterior	14.3%	0%
Premolar	21.4%	7.1%
Molar	21.4%	35.7%

Table 13: The statistic test for the subdivisions within the all main groups.

Subdivisions	Std. Error Mean	Std. Deviation	Mean	N
up anterior	.20000	.44721	2.2000	5
lower anterior	1.00000	2.23607	1.0000	5
up premolar	2.48998	5.56776	8.0000	5
lower premolar	.81240	1.81659	3.6000	5
up molars	1.76068	3.93700	7.0000	5
lower molars	2.58844	5.78792	13.0000	5

Table 14: The results of t-test sample analysis.

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
up anterior	11.000	4	.000	2.20000	1.6447	2.7553
lower anterior	1.000	4	.374	1.00000	-1.7764	3.7764
up premolar	3.213	4	.032	8.00000	1.0867	14.9133
lower premolar	4.431	4	.011	3.60000	1.3444	5.8556
up molars	3.976	4	.016	7.00000	2.1116	11.8884
lower molars	5.022	4	.007	13.00000	5.8134	20.1866

DISCUSSION

The tooth preparation is a technically complicated and irreversible procedure. Therefore, it should be done following the general principles for tooth preparation. It is the practitioner's responsibility to carry it out properly every time. Each step of a tooth preparation should be carefully evaluated to avoid the mistakes occurrence. The mistakes are often difficult, if not impossible, to correct them. Experience will help in determining whether preparations are "complete or not" Each tooth preparation step must be measured by clearly defined criteria, which can be used to identify and correct the problems within the limitations. With the advent of the latest advancements in fixed prosthodontics the failure rate have also increased. A poor marginal integrity accounts for the most of these failure⁽⁴⁾.

For that reason the present study was done to

evaluate the finish line preparations mistakes representing them as defects in the working casts. The divisions of the study groups was done according to the most common errors and mistakes happens in the finish line area and as mentioned in some articles⁽⁵⁾.

The results of current study showing the unidentifiable finish line defect was the highest percentage occurrence especially with the lower molar teeth followed by upper premolars. That means there are not attention to finish line step preparation which it could be due to lake of dentist about the basic knowledge and skills in fixed prosthodontics field. The second finding that the posteriors (the molars epically lowers and upper premolars) have the highest percentage of finish line defects occurrences than anterior. The explanation of this could be due the accessibility and visibility to lower molars especially in lingual and distal surfaces is more difficult. while in upper

premolars the destruction usually extending to root surface complicate the situation making the finish line establishment very complicated task need a crown lengthening before fixed restorations placement.

The rough finish line defect in present study accounts for 22% that is giving an idea the most dentists skip the smoothing and finishing step in the preparation. The proper finishing of the preparation is essential to ensure the smoothest possible transition between the tooth and the restoration. The time spent in obtaining smooth margins will make the subsequent steps of tissue displacement, impression making, die formation, waxing, and finishing much easier and will ultimately provide the patient with a longer-lasting restoration. While a rough and irregular or "stepped" finish line greatly reduce the adaptation of the restoration ^(6,7).

The dentist should always be aware in order to minimize the errors during the complicated prosthetic procedures and to the his responsibilities inherent to each one involved in the treatment ⁽⁸⁾. It is imperative to understand that a successful fixed prosthodontic practice requires knowledge of sound biological and mechanical principles involved in abutment selection and subsequent preparation techniques. Beside that the growth of desirable and acceptable manipulative skills to implement the treatment plan identified for the particular patient ⁽⁹⁾ from the beginning when you discover an error has occurred, STOP Don't proceed. Return to the step where the error occurred and correct it. Attempting to blunder on without correcting it or managed properly will only compound and complicate the error ⁽¹⁰⁾.

With the limitations of the study (examination of working casts without the impressions evaluation which used to pour them). It could be say that there are many defects occurring in the finish line. Accordingly, with these defects the restoration cannot provide acceptable marginal integrity which it is an essential factor in reducing the failure rate in fixed prosthodontics.

CONCLUSIONS

In summary, the present study suggests that there different finish line defects. They more occurring in lower molars followed by upper premolars. Within the limitations of this study (The sample could be include the clinical examination to the preparation with the impression and the working cast) need

further studying for its importance. The careful preparation of the finish line is an essential critical role in determining the long term-viability of not only the restoration itself but also the overall oral cavity health. The dentist has the overall responsibility for the complete procedures in treatment of his patients. Delegating many procedures to auxiliary personnel is possible if all the necessary information is provided to enable them to deliver high-quality service. Significantly improved interaction with his dental technicians, resulting in improved clinical decision making and more predictable and successful fixed prostheses.

REFERENCES

1. Arvind Shenoy, Nina Shenoy, Roopa Babannavar: Periodontal considerations determining the design and location of margins in restorative dentistry, Journal of interdisciplinary Dentistry 2012 | Volume : 2 | Issue : 1 | Page : 3-10
2. Philip Newsome and Siobhan :Owen: Improving your margins, international Dentistry SA vol. 11, No. 6.
3. Babitha Nugala, BB Santosh Kumar,1 S Sahitya,2 and P Mohana Krishna. Biologic width and its importance in periodontal and restorative dentistry, J Conserv Dent. 2012 Jan-Mar; 15(1): 12–17.
4. Kapoor .V ,Kumar.N,Singh .K. Identification of marginal defects in fixed Prosthodontic restorations for successful treatment outcome: A research study. Journal of pharmaceutical and biomedical sciences (J Pharm Biomed Sci.) 2013, January; 26(26): 382-389. (Article no 22)
5. Radjaeipour G. Improving Decision- making in Restorations: Evaluation of Impressions and Working Casts, CDA JOURNAL, 2007, VOL 35, N°9.
6. The Contemporary fixed prosthodontics by rosenstiel, land, fujimoto. Third or latest edition,publisher:mosby.1997.
7. Shillingburg, hobo, whitsett. Fundamentals of Fixed Prosthodontics. 3 rd ed. Chicago, IL by latest Ed publisher quintessence 2003.
8. Singh D, Nishad SG, Sharma M, Sareen A. Marginal integrity of metal copings of various porcelain fused to metal alloys using different ring casting techniques: A systematic literature review. Eur J Prosthodont 2014;2:7-14.
9. Harish P, Sonila. A, Syed. S, Veenadharini .G, Sachidananda. C, Ambica. Iatrogenic Damage to the Periodontium Caused by Fixed Prosthodontic Treatment Procedures, The Open Dentistry Journal, 2015, 9, (Suppl 1: M4) 190-196
10. Gleghorn T. Improving communication with the laboratory when fabricating porcelain veneers, J Am Dent Assoc, 1997; 128:1571.