

Original Article

Comparative evaluation of putty index and custom template for direct composite restoration of uncomplicated crown fractures in permanent anterior teeth

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Abstract: Objectives: The aim of this study was to compare and evaluate Putty Index and Custom Template Technique for Direct Composite restoration of uncomplicated crown fractures in permanent anterior teeth. Material and methods: A total of 100 teeth were randomly allocated to the respective groups, n=49 in Group I and n=51 in Group II. Composite build up using Putty Index technique in Group I and vacuum formed Custom Template in Group II was done followed by finishing and polishing of the restoration. The restorations were scored using Modified USPHS criteria by two blinded and calibrated evaluators at baseline, 6 months and 12 months followed by Spectrophotometric evaluation. The clinical chair side time was recorded using digital clock. Results: No statistically significant difference was seen between ITT and PP analysis among the two groups at 6 months and 12 months follow-up. Mean time chair side time taken for Group I was 20 minutes and for 24.4 minutes for Group II which was statistically significant (P=0.00). No statistically significant change was seen in the colour of the restoration at 6 months (P=0.45) and 12 months (P=1.00) using spectrophotometer. Conclusion: Custom Template technique and Putty Index technique showed no statistically significant difference in terms of clinical evaluation at baseline, 6 months and 12 months except for postoperative sensitivity.

Keywords: Enamel fracture, enamel and dentine fracture, putty index, custom template, composite

Introduction

Traumatic dental injuries (TDI) have emerged as a significant public health problem and it is estimated that around one billion people has suffered from TDI globally [1, 2]. Among the different types of TDI, the uncomplicated crown fractures (UCCFs) of the maxillary permanent central incisors are the commonest [1]. Since the front teeth form an integral part of an individual's appearance, any fracture or loss affects the self-image and poses negative impact on the social, emotional and psychological development. Additionally, the UCCFs, confined within the enamel and/or dentin, can result in sensitivity pain or future pulpal complications [3]. The most acceptable classification system for TDI is the Andreasen's classification which

was recently accepted by the World Health Organization. This descriptive classification provides information of the dental tissues that have been damaged and also the extent of damage [3, 4].

International Association of Dental Traumatology (IADT) has been providing the guidelines for management of TSI since 2003. In the most recent version given in the year 2020, the UCCFs should be managed by fragment reattachment whenever possible. However, in cases where fragment has been lost, the choice of treatment remains restoration with tooth coloured light cured composite resin [4]. The direct composite restoration, can be done by the conventional free-hand layering technique, putty index technique or custom template tech-

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nique [5]. Free hand layering technique has been the more commonly performed in clinical practice in a single appointment however; it is a skill-based procedure with no palatal guide or other reference [6]. Putty Index Technique on the other hand is done in two appointments, requiring an impression, lab procedures and creation of a palatal guide initially [7]. The die stone model is used to create the fractured tooth segments by inlay way. A second impression is made by a rubber based impression material, which can be shaped by a BP blade to serve as a guide for shaping the palatal aspect of the fractured crown. This provides precision and predictability over the free hand technique. However, it is still dependent upon the skill of the operator for establishing the adequate contours of the fractured tooth on the labial side [8].

A newer technique utilizing vacuum formed Custom Template for direct composite restorations has been used for full mouth rehabilitation in patients with Amelogenesis Imperfecta [5]. It gives a better three-dimensional control on the contours with simultaneous restoration of multiple teeth, and reducing the dependence upon the operator skills [9-11]. Both Putty index and Custom template technique seems to be reliable however, they have not been compared for the clinical performance in past. Hence, this study was designed to evaluate and compare the Putty Index Technique and Custom Template Technique for Direct Composite restoration of UCCFs in permanent anterior teeth.

Materials and methods

Study design and sampling

A parallel two-arm equivalence trial was designed as per the CONSORT guidelines [12]. Prior approval was obtained from by Institute Ethics Committee (IECPG-179/19.04.2018) and the trial was registered under Clinical Trials Registry of India (CTRI/2018/05/013724). The sample size was calculated using data from study by Lempel et al (2017) [13] in which the success rate of composite restorations using putty index was reported as 87%. As there was no literature pertaining to the success rate of restorations using Custom template technique, the difference of 5% between the two techniques was assumed with power 80% (α -error 0.05 and Confidence Interval 95%). The sample

size was calculated as 86 teeth for both the groups. The final sample size was taken as 100 teeth after considering the loss to follow up.

Inclusion and exclusion

Children reporting to the Out Patient Department were included in the present study as per predefined inclusion and exclusion criteria. *Inclusion criteria:* 1. Uncomplicated crown fracture (enamel and dentin) in any of the maxillary incisor tooth/teeth 11, 12, 21, 22 (FDI notation), 2. Age between 7 to 14 years, 3. Around 1/2 to 2/3 of the crown structure remaining, 4. Cooperation of the child. *Exclusion criteria:* 1. Those with pulpal and peri-radicular pathologies as seen on radiographs or showing clinical signs and symptoms. 2. Luxation injury or root fracture. 3. Edge to edge occlusal relation. 4. Patient with any systemic disease, syndromes of head and neck and oral habits (mouth breathing, thumb sucking, nail biting).

Randomization and allocation concealment

The patients' teeth so selected were subjected to random allocation to one of the two treatment groups using block randomisation method comprising of blocks of varying size using computer software (www.sealedenvelope.com). It was generated by a person not directly involved in the trial. The codes for group allocation were sealed in brown opaque envelope and were opened only at the time of recruitment of the patient in the trial. A self-designed, pre-tested data collection sheet was used to record the demographics and clinical details. In order to maintain the uniformity of the clinical protocol, the operator was trained through a pre-calibration exercise.

General techniques

During the first appointment, a minimal tooth preparation was done along with provision of a short bevel. This was followed by shade selection using a shade guide (Vasa Denticity Private Limited, Delhi, India) and making maxillary and mandibular full arch impressions using alginate. A working model was prepared and used for the lab procedures. The wax mock-up was done manually by using blue pattern wax (Ruthinium Dental Products Limited, India).

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Figure 1. Composite build up using Custom Template technique. A. Preoperative clinical photograph. B. Try-in of Putty index. C. Palatal build up. D. Final restoration after finishing. E. Preoperative clinical photograph. F. Try-in of Custom template. G. Composite filled in the template and cured. H. Final restoration after finishing.

Putty index method

In Putty Index group, a putty index was fabricated on the wax pattern using addition silicone impression material (Dentsply Aquasil Soft Putty Regular Set, Vasa Denticity Private Limited, Delhi, India). During the second appointment, palatal shelf of 1 mm thickness was prepared on the putty index by placing the light cured composite resin (3M ESPE Filtek Z 350 XT, 3M India Limited) of selected shade on the putty index. This was placed over the prepared tooth and after ensuring adequate approximation cured for 15 seconds. The putty index was then removed and the palatal composite shelf was used for building up the entire tooth incrementally using same shade of the composite resin (**Figure 1**).

Custom template method

In Custom Template group, the wax mock-up was duplicated by using addition silicone putty

impression material to produce a working model. The custom template was fabricated using 0.75 mm transparent Biocryl sheet (DURAN Scheu Dental Product, Private Limited, India) and vacuum forming machine (Biostar, Scheu Dental Product, Private Limited, India). This custom template was examined for pores or any deformity. The fracture line was marked on the template on the labial and palatal surface using a marker pen of 0.3 mm tip diameter. On the second appointment, a try fit of the template was evaluated on the fractured teeth and fracture line was used as a guide. In order to avoid the air entrapment, a relief aperture was created on the incisal edge in the template using a dental explorer a composite filling instrument was used to fill the light cure composite resin of the selected shade, inside the custom template by packing gently in 2 mm increments. The amount of composite was filled

till the fracture line marked on the custom template. The template was then placed on the prepared tooth and pressed to ensure its appropriate seating. The excess material, if any, was removed from the aperture. The composite within the custom template was cured using curing light for 15 seconds each from labial, palatal and incisal directions. The template was removed manually by lifting it from the adjacent teeth carefully, without putting any extra pressure on the restoration (**Figure 1**).

Finishing and polishing

The restorations in both the groups were finished and polished using ultra-fine composite finishing kit (SHOFU Super Snap, SHOFU Dental Private Limited) and composite polishing kit (SHOFU Super Snap Rainbow Technique kit, SHOFU Dental Private Limited) as per the manufacturer's instructions. Occlusion was evaluated during the lateral and protrusive move-

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Table 1. Sample distribution, attrition and recall rate during follow up

Groups	Sample recruited at baseline	Follow up time intervals	Sample Attrition			Sample available for final analysis	p-value
			Not Reported	Pulpal Necrosis	Dislodged		
Putty Index Group	M=38 (78%)	6 months	4 (8%)	3 (6%)	22 (45%)	15 (31%)	0.06
	F=11 (22%)	12 months	0	0	5 (10%)		
Custom Template Group	M=30 (59%)	6 months	3 (6%)	5 (10%)	16 (31%)	24 (47%)	
	F=21 (41%)	12 months	0	0	3 (6%)		

ments of the mandible and any prematurity or abnormality of contact was removed.

Follow up evaluations

Clinical evaluation of restorations was done by two independent, calibrated, blinded evaluators immediately after treatment at 6 months and 12 months postoperatively using modified USPHS criteria [14]. Objective evaluation for colour/shade was done using spectrophotometer. The teeth which developed pulp necrosis during follow up were excluded from the final analysis. Similarly, the teeth with dislodged restorations were excluded from final analysis.

Statistical analysis

Data from the patients record sheet was entered in a Micro Soft excel sheet and statistical analysis was performed using Stata 16 software (State Corp, College Station, Texas, USA). The data was discussed in the expert group and strategies were formulated to present the data. Cohen's kappa statistics and percentage agreement was done for the agreement between the two evaluators. Baseline characteristics like age and gender and the chair side time were analysed using unpaired t test and chi square test respectively. For the primary outcome, both Intention to Treat (ITT) and Per Protocol Analysis (PP) was carried out. Each clinical parameter between the two groups was compared using chi square/Fisher's exact test. The change in all the parameters within the two groups was compared using McNemar's test. For post hoc analysis, Fisher's exact test was done to compare the cause of dislodged restoration with gender and Kaplan Meir Survival analysis was done to know the probability of survival of restorations till the last date of evaluation. All the statistical test were performed at a significance level of P=0.05.

Results

The mean age of the children in Putty index group was 11.5 ± 2.06 and 11.39 ± 1.89 in Custom template group. Putty Index group had 38 (78%) males and 11 (22%) females while Custom Template group included 30 (59%) males and 21 (41%) females (Table 1). At the end of 12 months, Putty index group had 31% (n=15) and Custom Template group had 47% (n=24) of the restorations which were available for final outcome analysis (Figure 2).

Percentage agreement among the evaluators was in the range of 93.3%-100% for different clinical parameters of modified USPHS criteria. No significant difference was seen between the two groups in terms of clinical performance of composite restoration in Intention to Treat (ITT) analysis and Per Protocol (PP) analysis for each clinical parameter except for postoperative sensitivity in Custom template group at 12 months in ITT Analysis (P=0.00) (Table 2). Intra group comparison within each group for change in scores of clinical parameters from baseline to 6 months and 6 months to 12 months showed no significant changes in the surface roughness, secondary caries and colour stability of restorations in each of the groups. However, there was a significant change in the scores of anatomical form, post-operative sensitivity and marginal integrity in both the groups from baseline to 12 months (P<0.05) (Table 3). According to the shade evaluation using spectrophotometer, at 6 months, 87% restoration in Putty index group and 75% restorations in Custom template group showed no change (Table 4). The survival of the restoration has been shown in the Kaplan Meier Survival analysis (Figure 4). Mean survival time (MST) in Putty index group was 12 months and Custom template group was 16 months (P=0.11) and the hazard ratio was 0.62 (95% CI, 0.34-1.14).

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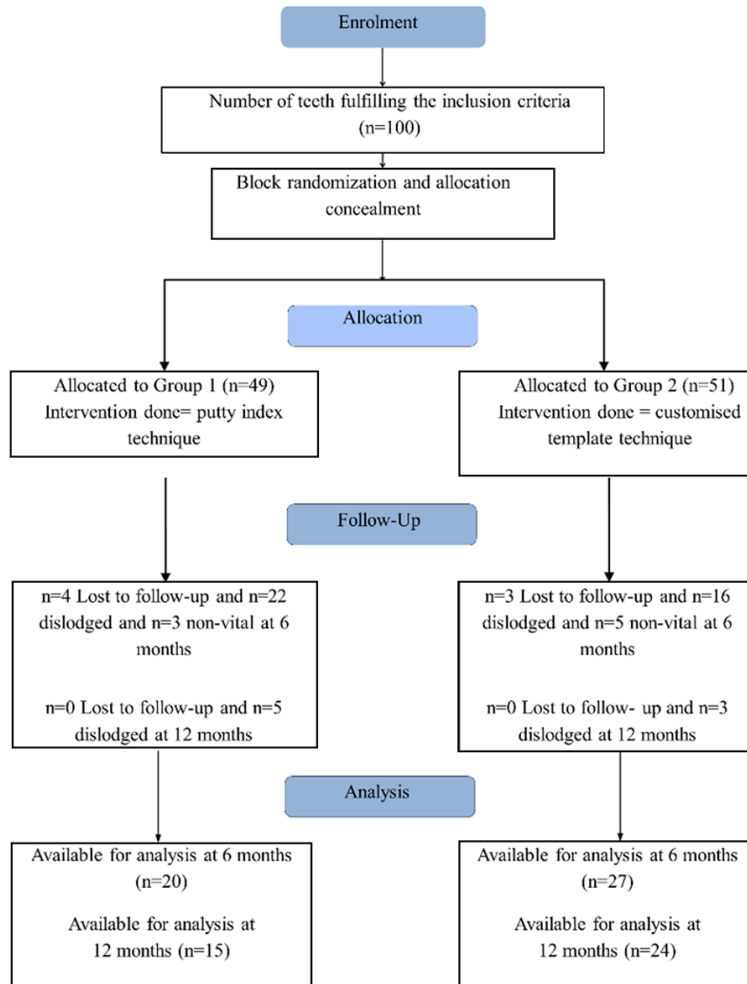


Figure 2. CONSORT 2010 flow diagram.

Post hoc analysis to find out the association between the cause of dislodged restoration and gender showed that 50% of the males had trauma due to fall as the major cause for the dislodged restorations while the major cause in female was reported to be biting on hard food items ($P=0.01$) (Table 5).

Discussion

Since the present study was a de novo comparison, no study could be elucidated for comparing the two techniques per se in literature and hence a direct comparison of results was not possible. Heintze et al (2015) [15] in a systematic review, concluded that there can be a variability in the success rates of the direct composite restorations in permanent anterior teeth. These ranged from moderate (53.4%) to high (100%) in most studies, except for Spinaz

et al [16] where all the restorations had failed. They attributed this variability to the differences in study designs. They also reported 100% success rate in the studies with limited sample size in restorations on traumatised permanent incisors. It was further emphasized that there was a higher failure rate with endodontic complications being the major cause of failures. The patient's age and gender and experience of operator were found to affect the longevity of the composite restorations [17].

In order to improve the generalizability and validity of the results, Intention to Treat (ITT) and Per Protocol analyses (PP) were undertaken. However, there were no statistically significant differences in the inter group comparisons in both the analyses. The scores for surface roughness were found to be acceptable in both the groups at 6 months and 12 months. Schmidlin et al (2009) [9] and Moura et al (2011) [17] showed 100% cases with acceptable scores for surface roughness. It is an important

characteristic of the anterior aesthetic restorations. Unacceptable or poor surface finish can lead to plaque accumulation, poor gingival health, marginal breakdown of restoration and secondary caries [18, 19]. Restorations in Custom template group showed better anatomical form as compared to Putty index group, though the difference was not found to be statistically significant. In the intra-group comparisons, both the groups showed similar number of cases with deterioration in anatomical form and this difference was significant for Putty Index group at 6 months and both the groups at 12 months. These findings were also in accordance to the case series published by Schmidlin et al (2009) [9].

The marginal integrity was found to be better in Custom template group as compared to Putty index group at 12 months. The intra group com-

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Table 2. Intention to Treat (ITT) analysis and Per Protocol (PP) analysis for each clinical parameter

Clinical parameters	ITT Analysis	Score	Baseline			6 months			12 months		
			Putty Index Group	Custom Template Group	p-value	Putty Index Group	Custom Template Group	P-value	Putty Index Group	Custom Template Group	P-value
Surface roughness	Per protocol analysis	0	44 (90%)	47 (92%)	0.74	17 (35%)	23 (45%)	0.29	13 (27%)	18 (35%)	0.34
		1	5 (10%)	4 (8%)		32 (65%)	28 (55%)		36 (74%)	33 (65%)	
	ITT Analysis	0	44 (90%)	47 (92%)	0.74	17 (85%)	23 (85%)	0.99	13 (87%)	18 (75%)	0.38
		1	5 (10%)	4 (8%)		3 (15%)	4 (15%)		2 (13%)	6 (25%)	
Anatomical form	ITT Analysis	0	46 (94%)	48 (94%)	1.00	46 (33%)	48 (45%)	0.44	10 (20%)	18 (36%)	0.21
		1	3 (6%)	3 (6%)		4 (8%)	4 (8%)		5 (10%)	6 (12%)	
		2	0	0		29 (59%)	24 (47%)		34 (69%)	27 (53%)	
	Per protocol analysis	0	46 (94%)	48 (94%)	1.00	16 (80%)	23 (85%)	0.64	10 (67%)	18 (75%)	0.58
		1	3 (6%)	3 (6%)		4 (20%)	4 (15%)		5 (33%)	6 (25%)	
		2	0	0		0	0		0	0	
Marginal integrity	ITT Analysis	0	41 (84%)	44 (86%)	0.72	15 (31%)	19 (37%)	0.45	9 (18%)	13 (26%)	0.23
		1	8 (16%)	7 (13.8%)		5 (10%)	8 (16%)		6 (12%)	11 (22%)	
		2	0	0		29 (59%)	24 (47%)		34 (69%)	27 (53%)	
	Per protocol analysis	0	41 (84%)	44 (86%)	0.72	15 (75%)	19 (70%)	0.73	9 (60%)	13 (4%)	0.73
		1	8 (16%)	7 (13.8%)		5 (25%)	8 (30%)		6 (40%)	11 (46%)	
		2	0	0		0	0		0	0	
Marginal discoloration	ITT Analysis	0	48 (98%)	51 (100%)	0.49	17 (35%)	23 (45%)	0.47	10 (23%)	19 (37%)	0.31
		1	1 (2%)	0		3 (6%)	4 (8%)		5 (11%)	5 (10%)	
		2	0	0		29 (60%)	24 (47%)		24 (66%)	27 (53%)	
	Per protocol analysis	0	48 (98%)	51 (100%)	0.49	17 (85%)	23 (85%)	1.00	10 (67%)	19 (79.2%)	0.38
		1	1 (2%)	0		3 (15%)	4 (15%)		5 (33%)	5 (21%)	
		2	0	0		0	0		0	0	
Secondary caries	ITT Analysis	0	49 (100%)	51 (100%)	-	19 (39%)	27 (53%)	0.16	14 (29%)	24 (47%)	0.06
		1	0	0		30 (61%)	24 (47%)		35 (71%)	27 (53%)	
	Per protocol analysis	0	49 (100%)	51 (100%)	-	19 (95%)	27 (100%)	0.43	14 (93%)	24 (100%)	0.20
		1	0	0		1 (5%)	0		1 (67%)	0	
Restoration color stability	ITT Analysis	0	49 (100%)	50 (98%)	1.00	19 (39%)	26 (51%)	0.22	13 (27%)	23 (45%)	0.06
		1	0	1 (2%)		30 (61%)	25 (49%)		36 (74%)	28 (55%)	
	Per protocol analysis	0	49 (100%)	50 (98%)	1.00	19 (95%)	26 (96%)	1.00	13 (87%)	23 (91%)	0.55
		1	0	1 (2%)		1 (5%)	1 (4%)		2 (3%)	1 (4%)	
Post operative sensitivity	ITT Analysis	0	49 (100%)	51 (100%)	--	19 (39%)	21 (41%)	0.00*	12 (25%)	17 (33%)	--
		1	0	0		0	1 (2%)		0	0	
		2	0	0		30 (61%)	30 (59%)		37 (76%)	34 (67%)	
	Per protocol analysis	0	49 (100%)	51 (100%)	--	19 (100%)	21 (96%)	0.35	12 (100%)	17 (100%)	--
		1	0	0		0	1 (5%)		0	0	
		2	0	0		0	0		0	0	

Intention to Treat (ITT) analysis and Per Protocol (PP) analysis for each clinical parameter (* indicates statistical significance).

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Table 3. Intra group comparison for each clinical parameter at 6 months and 12 months

Clinical parameter	Scores	Group I				Group II			
		Baseline	6 months	Baseline	12 months	Baseline	6 months	Baseline	12 months
Surface roughness	0	18	17	13	13	24	23	21	18
	1	2	3	2	2	3	4	3	6
	p-value	0.32		1.00		0.65		0.18	
Anatomical Form	0	20	16	15	10	26	23	23	18
	1	0	4	0	5	1	4	1	6
	2	0	0	0	0	0	0	0	0
	p-value	0.06		0.03*		0.08		0.03*	
Marginal integrity	0	18	15	14	9	24	19	21	13
	1	2	5	1	6	3	8	3	11
	2	0	0	0	0	0	0	0	0
	p-value	0.18		0.03*		0.10		0.01*	
Marginal discoloration	0	19	17	14	10	27	23	24	19
	1	1	3	1	5	0	4	0	5
	2	0	0	0	0	0	0	0	0
	p-value	0.16		0.06		0.06		0.03*	
Secondary caries	0	20	19	15	14	27	27	24	24
	1	0	1	0	1	0	0	0	0
	P-value	0.32		0.32		-		-	
Restoration color stability	0	20	19	15	13	26	26	23	23
	1	0	1	0	2	1	1	1	1
	P-value	0.32		0.16		-		1.00	
Postoperative sensitivity	0	19	19	12	12	22	21	12	12
	1	0	0	0	0	0	1	0	0
	2	0	0	0	0	0	0	0	0
	P-value	0.00*		0.00*		0.32		0.00*	

Intra-group comparison for each clinical parameter at 6 months and 12 months (* indicates statistical significance).

Table 4. Objective change in Spectrophotometric shade of restoration at 6 and 12 months follow up

Spectrophotometric Change in shade of restoration	Time of evaluation	Group I	Group II	p-value
1 (lighter shade)	6 months	0	0	0.45
2 (same shade)		13 (87%)	18 (75%)	
3 (darker shade)		2 (13%)	6 (25%)	
1 (lighter shade)	12 months	0	0	1.00
2 (same shade)		12 (100%)	14 (93%)	
3 (darker shade)		0	1 (7%)	

parisons revealed deterioration in marginal integrity in both the groups, which was statistically significant only at 12 months follow up. The marginal discoloration was apparent in 21% of the restorations in Custom template group at 12 months follow up as compared to 33% in Putty index group. However, the intra group comparisons showed that the restorations in both the groups had significant marginal discoloration at 12 months follow up. These findings were in concordance to that of

Schmidlin et al (2009) [9]. Similar findings were reported in a systematic review by Demarco et al (2015) [20] that secondary caries is generally less common in anterior composite restorations. Among all the teeth which completed the evaluation protocol, only one tooth in Putty index group at 12 months follow up was found to have secondary caries. An implication of this variable is

to assess the biological effect of the mechanical properties of the restorations, which were found to be adequate within the limitations of sample size.

The present study evaluated the colour stability of the restorations by subjective and objective methods. Restoration colour stability by clinical examination (subjective method) was found to be adequate in 91% of the restored teeth in Custom template group as compared to 87% in

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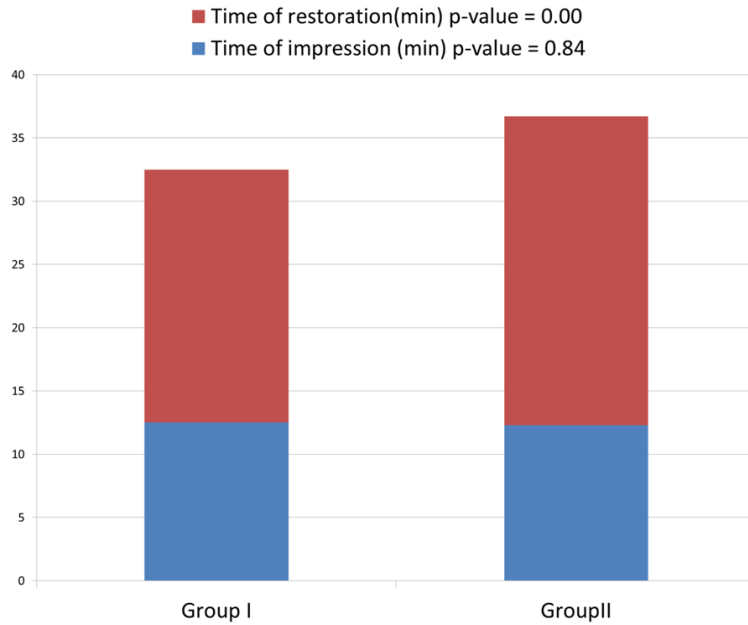


Figure 3. Clinical chair side time taken for impression making and composite restoration.

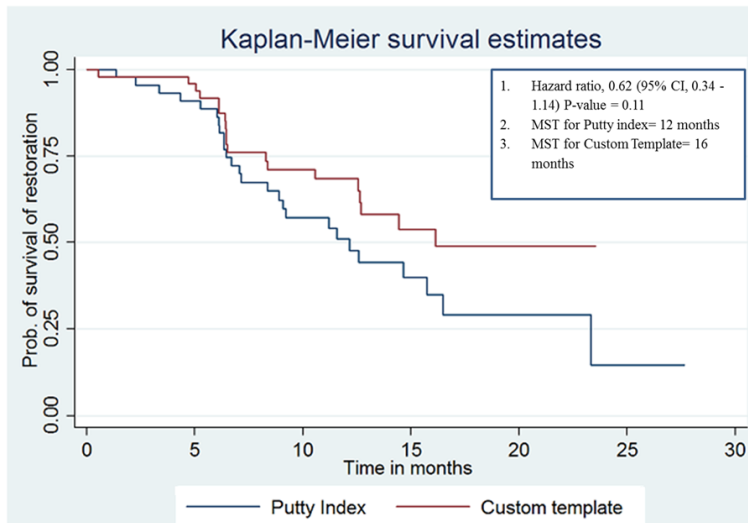


Figure 4. Showing Kaplan Meier survival Analysis for the survival of restorations.

Table 5. Association between gender and causes of dislodged restoration

Category (Trauma due to)	Gender		p-value
	Male	Female	
1 (Trauma due to fighting)	3 (10%)	2 (12.5%)	-
2 (Trauma due to fall-playing, slip injury)	15 (50%)	1 (6%)	0.01
3 (Trauma due to biting hard food items)	6 (20%)	9 (56%)	0.01
4 (Trauma due to unspecified causes)	6 (20%)	4 (20%)	-

Putty index group at 12 months follow up. This was also negligible or absent in objective shade assessment and the intra group comparisons. These findings were similar to those of Schmidlin et al (2009) [9], Moura et al (2011) [17] and Alonso V and Caserio M (2012) [11]. As emphasized for surface roughness, anatomical form, marginal integrity and discoloration, the stability of colour or shade of the composite restoration is also essential so that the patient and peers do not find marked differences between the fractured tooth and restoration [21]. Due to the unique situation in the COVID-19 pandemic, some of the study subjects could not report physically for the 12th month evaluation. The photographs of 19 teeth, as per the instructions of the research group, were supplied by the parents and evaluated for the seven parameters of USPHS criteria. The assessment of postoperative sensitivity and spectrophotometric analysis in these 19 teeth were not done.

Custom template technique was found to have a higher mean chair side time ($P=0.00$). Although this finding was contrary to this study's hypothesis, the fact that it could be completed in approximately 24 minutes makes the custom template technique as a clinically feasible method of direct composite restoration of UCCFs in terms of time audit (**Figure 3**).

There was significant attrition of the sample for final evaluation due to several reasons yet, the newer technique of custom template showed promising results. Presence of

less than the estimated sample (31% in Putty index group and 47% in Custom template group) at the time of final evaluation may have caused the lack of statistical significance in the present randomized clinical trial. The lack of statistical significance does not allow the acceptance of the null hypothesis which will require a future study with bigger sample size to compensate for possible attrition of the magnitude observed in the present study.

In order to further analyse the reasons for restoration loss in significant number of subjects, post hoc analysis of the causes and survival analysis was performed. The most common cause of dislodged restorations in both the groups was re-trauma on the same tooth. This was similar to the findings of Demirci et al (2018) [22]. The most common cause of re-trauma among boys was due to fall while it was due to biting on hard objects among girls. This difference was found to be statistically significant ($P=0.01$). Malikaew et al (2006) [23], Glendor U (2008) [24] and Nagarajappa et al (2020) [25] have emphasized higher involvement of boys in violent sports and adventure activities which makes them more vulnerable to TDI. Kaplan Meier survival analysis showed that the mean survival time (MST) was better in custom template than putty index. The probability of restorations getting dislodged was 0.62 times higher in Putty index group compared to Custom template group ($P=0.11$). Although these comparisons were statistically not significant, they indicated towards, better survival rate of restorations done with custom template technique (**Figure 4**).

Conclusion

1. Custom template technique and Putty index technique showed no statistically significant difference in terms of inter group clinical evaluation at baseline, 6 months and 12 months except for postoperative sensitivity. 2. Custom template technique and Putty index technique showed significant difference in terms of surface roughness, secondary caries and colour stability of restorations in intra group comparisons. 3. Custom template technique and Putty index technique is a clinically feasible method for direct composite restoration of uncomplicated crown fractures in terms of clinical chair side time, though the difference was statisti-

cally significant, but in numeric terms the mean time was 4 minutes more than to be of lesser significance clinically. 4. Custom template technique is a clinically feasible method for direct composite restoration of uncomplicated crown fractures in terms of clinical chair side time.

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Disclosure of conflict of interest

None.

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