

**MOST COMMON METHODS OF FINISHING AND POLISHING OF DENTAL  
COMPOSITES USED BY DENTISTS**

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**ABSTRACT**

**Objective:** To determine the most common methods of finishing and polishing of dental composites used by dentists in an urban city of India. **Material and Methods:** It was a survey based study involving 210 dental professionals from different institutes and hospitals of the city. Questionnaires were distributed among them and were collected. Data were analyzed in software “SPSS 16”. **Results:** Out of 210 subjects, 157 used composite finishing disks, 147 used finishing burs, 78 used interdental strips and 74 used rubber cups, however only 33% of subjects used polishing pastes. From two main types of finishing burs, 66.7% of subjects used diamond burs and 31.9% used tungsten carbide burs. In polishing pastes, 67.6% of dentists go for pumice while 21.9% for Prisma gloss. 57.1% of subjects after composite finishing also prefer using ‘Rebonding technique’. **Conclusion:** Finishing disks were the most commonly used method by the dentists in the city. However polishing was the least commonly used method. Diamond finishing burs (yellow band) were the second most commonly used.

**KEYWORDS:** Resins, Composites, Finishing, Dentists, Burs, Practice.

**INTRODUCTION**

Resin composite restoration currently achieves esthetically pleasing and natural-looking results through the use of nanoparticle-sized small fillers, variations of color, and newly developed Restorative techniques such as the layering technique.<sup>[1]</sup>

Composite resins are most commonly composed of Bis-GMA monomers or some Bis-GMA analog, a filler material photo initiator. Dimethacrylates are also commonly added to achieve certain physical properties such as flowability.<sup>[2]</sup> The main advantages of resins are related to the material's esthetic properties, decrease of marginal leakage, increased resistance of the tooth remnant and less need for removal of healthy tooth structure.<sup>[2]</sup> In addition, the reduced polymerization contraction and improved wear resistance of resins permit their use not only in anterior but also in posterior teeth.<sup>[3]</sup> Both esthetics and longevity of restorations strongly depend on the quality of the surface finishing and polishing.<sup>[4]</sup> The presence of irregularities can

influence appearance, plaque retention, surface discoloration, gingival inflammation.<sup>[5]</sup>

The smoothness of restorative material's surfaces has a great importance in the success and clinical longevity of the restorations.<sup>[6]</sup> It is known that materials with rough surfaces enhance bacterial adhesion and decrease stain resistance.<sup>[5]</sup>

Finishing is defined as the gross contouring or reduction of a restoration to obtain ideal anatomy and Polishing refers to the reduction in roughness and scratches created by finishing instruments.<sup>[7]</sup>

Clinicians have their choice among a wide range of finishing and polishing instruments.<sup>[8]</sup> A variety of instruments such as carbide and diamond burs, abrasive finishing strips and polishing pastes may be frequently used to finish tooth-colored restorative materials.<sup>[9]</sup>

Previously, significant importance was given the application of progressively finer grits of abrasives to

polish resin composite restorations.<sup>[9]</sup> Today, many attempts have been made to develop composite finishing instruments that are suitable for all four steps of the trimming procedure.<sup>[10]</sup> Current one-step systems appear to be as effective as multi-step systems for polishing dental composites.<sup>[10]</sup>

The timing of the finishing/polishing procedure might have an effect on the physical properties of the restorative materials and might increase the risk of premature failures.<sup>[11]</sup> The finishing and polishing process can affect many aspects of the final restoration, including surface staining and wear characteristics of the resin composite.<sup>[12]</sup> Also traumatic finishing technique or overheating can damage the surface of resin composite materials and result in accelerated wear.<sup>[13]</sup> A low viscosity surface sealer or rebonding resin, applied after finishing the resin composite, may help stop crack propagation, improve wear resistance and color stability and enhance marginal integrity over time.<sup>[14]</sup>

Though the implications of finishing and polishing process on composite restorations have been fully established in western literature, the effective method of finishing and polishing in Indian population have not been documented. The aim of this study was to determine the most common methods of finishing and polishing of dental composites used by dentists in India.

#### MATERIAL AND METHODS

It was a survey based cross sectional study. All included subjects were dentists at different designations in different institutes, hospitals and clinics. Designations which were included consisted of undergraduate students (final year only), house-residents, graduates, postgraduates and private practitioners. The duration of study was six months. A total of 210 subjects were included out of which 57 were undergraduate students, 51 house officers, 56 graduates, 29 postgraduates and 17 were private practitioners. Materials used were a proforma consisting of total 10 questions which were taken to them and distributed.

#### RESULTS

Data was analyzed using SPSS version 16. Frequencies of all question asked were calculated. 49% of dental professionals preferred hybrid dental composites for use in their practice, 31% used Nano-composites, 19.5% used micro filled composites and 0.5% chose 'others'.

Finishing disks (74%) are found to be the most commonly used method by subjects. Followed by finishing burs (70%), interdental strips (37%) and rubber cups (35%). Polishing (15%) of composite was found to be the least common method.

Finishing and polishing methods which were preferred by dental professionals in their daily clinical practice is given in table 1.

Subjects who used finishing burs, out of them 66.7% used diamond burs and 31.9% professionals chose tungsten carbide burs for finishing; however 1% used none of them.

Subjects who prefer diamond burs were asked the type of diamond burs they use, of which results are given in figure 1, and those who prefer tungsten carbide burs were asked that which type of tungsten carbide burs they prefer, their results are given in figure 2.

Subjects were asked that what type of finishing disks they prefer for dental composite, the results in percentages are shown in figure 3. 18 subjects said coarse, 17 said medium, 56 chose fine, 9 chose superfine, however 106 subjects prefer all of them.

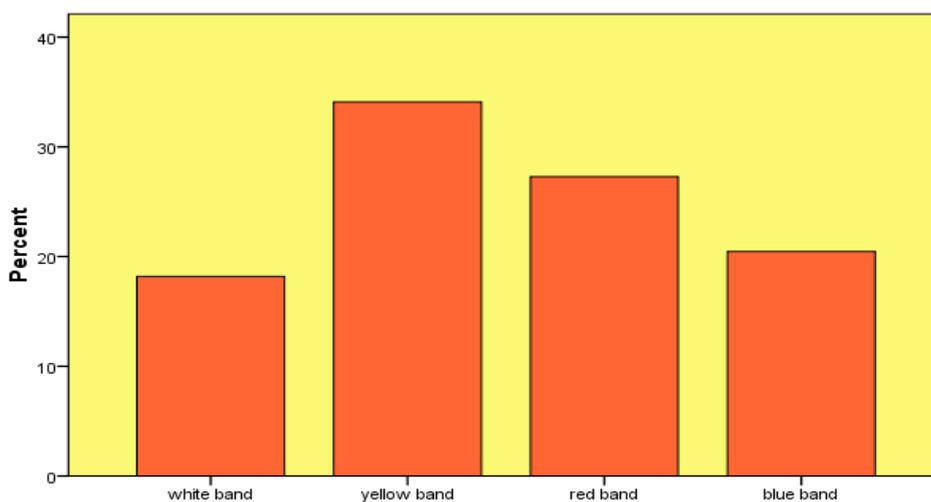
Out of 210 subjects 67.6% said that they prefer pumice for polishing of dental composite, 21.9% prefer using prisma gloss for polishing, while 1.9 percent do not use any of them. They were asked if they use layer of unfilled resin or bonding agent over composite restoration for gloss (REBONDING), 57.1% said 'yes' however 41.4% said 'No'. Time of finishing of composite was asked by subjects, results in percentages are shown in figure 4.

**Table 1. Method of finishing and polishing preferred by dentists**

	Frequency	Percent	Valid Percent	Cumulative Percent
finishing burs	15	7.1	7.1	7.1
finishing disks	27	12.9	12.9	20.0
interdental strips	3	1.4	1.4	21.4
polishing pastes	2	1.0	1.0	22.4
rubber cups	6	2.9	2.9	25.2
burs and disks	39	18.6	18.6	43.8
burs and strips	1	.5	.5	44.3
burs and interdental strips	3	1.4	1.4	45.7
burs and rubber cups	11	5.2	5.2	51.0
burs and sic stones	1	.5	.5	51.4

disk and interdental strip	3	1.4	1.4	52.9
disk and rubbercups	5	2.4	2.4	55.2
disk and sic stones	2	1.0	1.0	56.2
interdental strip and polishing paste	2	1.0	1.0	57.1
interdental strip and rubber cups	4	1.9	1.9	59.0
polishing paste and rubber cups	1	0.5	0.5	59.5
rubber cups and sic stones	1	0.5	0.5	60.0
burs disk strips	12	5.7	5.7	65.7
disk interdental strip polishing paste	5	2.4	2.4	68.1
interdental strip polishing paste rubbercups	1	0.5	0.5	68.6
burs rubber cups sic stones	1	0.5	0.5	69.0
disc rubber cups sic stones	1	0.5	0.5	69.5
burs disks interdental strip polishing paste	17	8.1	8.1	77.6
burs disks interdental strip rubber cups	18	8.6	8.6	86.2
burs disks interdental strip sic stones	4	1.9	1.9	88.1
burs disks interdental strip polishing pastes rubber cups sic stones	5	2.4	2.4	90.5
burs disk cups	20	9.5	9.5	100.0
Total	210	100.0	100.0	

if diamond burs, which of these?



if diamond burs, which of these?

Figure 1. Types of diamond burs used

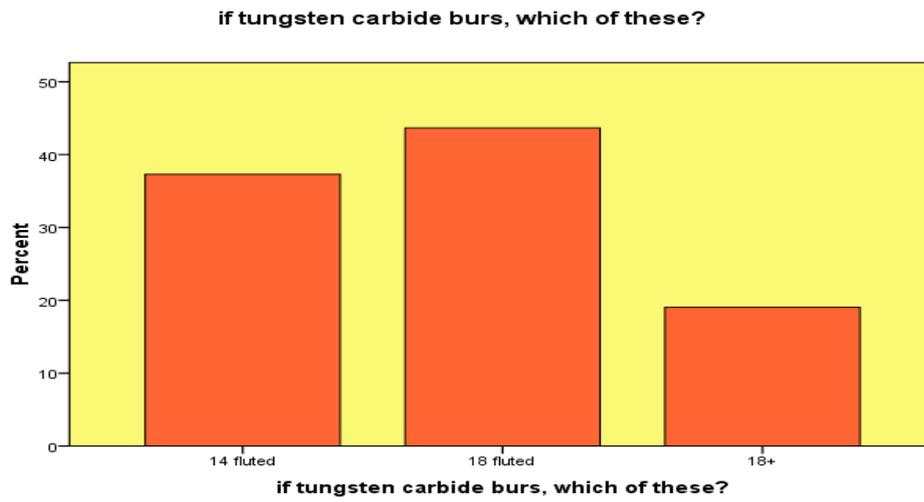


Figure 2. Types of tungsten carbide burs used

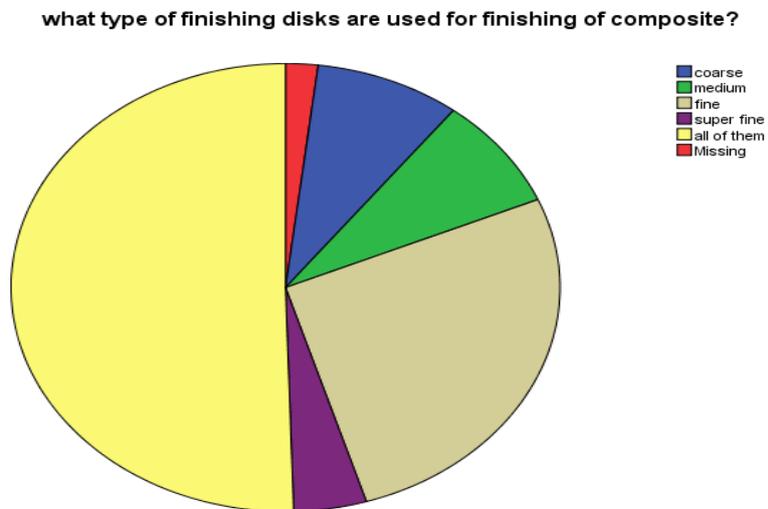


Figure 3. Finishing disk types

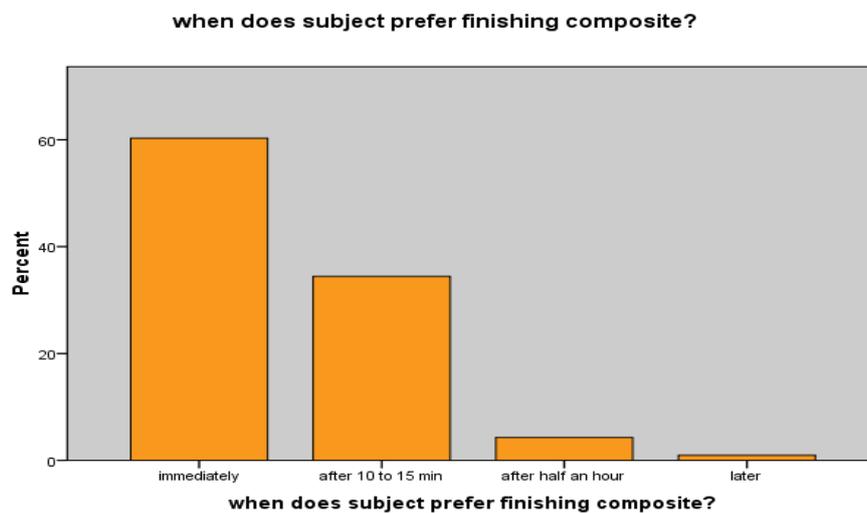


Figure 4. Time of finishing of composite

## DISCUSSION

To ensure the longevity of these esthetic composite restorations some aspects must be taken in consideration, such as: strong and stable adhesion to teeth, techniques involving gap-free filling, authentic polymerization, functional and anatomical contouring with over-or-less filling and smooth and glossy polishing.<sup>[15]</sup>

Finishing and polishing processes, including the removal of excess-filled resin composite, shaping, contouring, and smoothing of the restoration, can affect many aspects of the final restoration, such as surface staining, plaque accumulation, gingival irritation, and wear characteristics of the composite.<sup>[16]</sup> Even if care is taken in the placement of the matrix, removal of excess material and recontouring of restorations are frequently necessary. However, these procedures significantly increase surface roughness. Thus, a large number of polishing techniques is available for composites.<sup>[17]</sup>

A wide variety of finishing and polishing instruments are commercially available to the clinician. As initial finishing, it has been advocate the use a fine-grit diamond or multi-fluted tungsten carbide bur to remove the excess-filled composite and shape the anatomical contouring; and silicone-based points and/or abrasive discs for final polish (Jung OD 2003). The additional use of an aluminum-oxide abrasive point may be applied for second finishing between first finishing and final polishing.<sup>[18]</sup>

The capacity of disks impregnated with aluminum oxide particles to produce smooth surfaces is related to their ability of equally removing particles and organic matrix. The plane movement of the disk contributes to a smoother surface.<sup>[19]</sup> However, this system has limitations because of geometry. The disks are difficult to produce, as is the finishing and polishing of the anatomic contours of the surfaces, especially in the posterior regions of the mouth.<sup>[20]</sup>

According to the results of present study, out of all finishing and polishing methods finishing disks are most commonly preferred which is also in correlation with study of Turssi et al., who observed a smoother surface when the specimens were polished with abrasive disks (Sof-Lex) as compared to other methods.<sup>[21,22]</sup> In some previous studies the aluminum oxide discs have been shown to produce better surface smoothness because they do not displace the composite fillers.<sup>[23,24]</sup> Berastegui et al. reported that aluminum oxide discs are best recommended because their malleability promotes a homogeneous abrasion of the fillers and the resin matrix.<sup>[25]</sup> Yap et al. and Hoelscher et al. obtained similar finishing using either aluminum oxide discs or abrasive points (Enhance) plus polishing pastes for microfilled composite resins.<sup>[26,27]</sup> It was found that in types of finishing burs, diamond finishing burs are more preferred than tungsten carbide burs according to the results of present study which counters the results of study of

Silvia et al, which showed that the Ra values obtained with diamond burs were significantly greater than those obtained with the use of *carbide* burs for all composite resins,<sup>[28]</sup> which is also consistent with the findings of other previous studies.<sup>[29,30,31,32,33]</sup> Diamond burs are only recommended for initial countering of the restorations, after using diamond burs, finishing and polishing should be complemented with application of rubber points, polishing pastes and different systems of aluminum oxide discs.<sup>[28]</sup> The use of carbide and diamond burs associated with rubber polishing points provided surface roughness means above the threshold Ra value suggested by Bollen et al, which is of clinical importance in bacterial retention.<sup>[34]</sup>

The results show that 49% of dental professionals preferred hybrid dental composites for use, 31% used Nano-composites, 19.5% used micro filled composites, and however 0.5% prefers others. For a composite finishing system to be rendered effective the cutting particles must be harder than the filler particles, otherwise the abrasive medium may abrade the softer matrix and only round the filler particles. This may paradoxically result in higher surface roughness.<sup>[35,36,37]</sup> The effectiveness of finishing/polishing procedures on contemporary packable composite surface may be more critical. In contrast to the preference of composite in this study, Reis et al. (2003) reported that the smoothest surfaces were recorded for Z250 microhybrid resin when compared to Solitaire, SureFil and ALERT (condensable) composites and better polishing was obtained when diamond paste was applied. The good results observed for this composite might be explained by particle size (0.01 to 3.5  $\mu\text{m}$ ) and arrangement.<sup>[18]</sup>

Our results show that finishing and polishing of composite restorations are done immediately most of the time which is not in correlation with the study of Rayu A et al which concluded that the surface hardness of the resin composites tested increased when finishing and polishing procedures were delayed. In previous studies, it has also been stated that finishing can be performed immediately after a light-cured resin composite material that has been polymerized, or 5 minutes after the initial hardening of a self-cured material.<sup>[38,39]</sup> On the other hand, several studies have concluded that microleakage is reduced if polishing of the margins is delayed because of the hydroscopic expansion of the material that reduces the contraction gaps.<sup>[40,41]</sup>

## CONCLUSION

Finishing disks (74%) are found to be the most commonly used method by subjects. Followed by finishing burs (70%), interdental strips (37%) and rubber cups (35%). Polishing (15%) of composite was found to be the least common method.

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