

**CARIES PREVENTIVE MEASURES AMONG RAJASTHANI ORTHODONTISTS:  
A QUESTIONNAIRE STUDY**Ruchi Sharma<sup>1</sup>, Anil Kumar Mittal<sup>2</sup>, Vijay Agarwal<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT: INTRODUCTION:** Patients undergoing fixed orthodontic therapy are at high risk of developing decalcification, caries and white spot lesions. **AIM:** As little information is available about preventive measures taken by orthodontists, this study surveyed the measures used by orthodontists those practicing in Rajasthan in prevention of such problems. **MATERIALS AND METHODS:** A questionnaire regarding preventive measures undertaken before, during and after the orthodontic treatment was sent to 128 orthodontists, out of them 100 orthodontists replied to the questionnaire. All the data obtained from this questionnaire was tabulated and analyzed statistically using ANOVA test. **RESULTS:** Before starting the treatment, majority of orthodontists always prescribed oral hygiene instructions and recommended the use of fluoride rinses while chlorhexidine rinses and other cleansing aids were usually recommended. During the treatment when demineralization was seen developing, majority of orthodontists explained the consequences, gave extra oral hygiene instructions and recommended the use of fluoride rinses as well as other oral hygiene aids which was found to be statistically significant ( $p < 0.05$ ). At the completion of treatment, majority of orthodontists always gave extra oral hygiene instructions and recommended the use of fluoride rinses as well as fluoride gel. Fluoride varnish, chlorhexidine rinses, oral hygiene aids like brushes and other measures such as polishing of white spot lesions were occasionally recommended which was also found to be statistically significant ( $p < 0.05$ ). **CONCLUSION:** Rajasthani orthodontists undertake satisfactory measures to prevent demineralization and caries within practical limits.

**KEYWORDS:** caries, prevention, fluoride rinses, fluoride gel, fluoride varnish, chlorhexidine, white spot lesions.

**INTRODUCTION:** Maintaining a good oral hygiene is a challenge and particularly for orthodontic patients, as their appliances make them more susceptible to gingivitis, hyperplastic tissues, decalcification and dental caries.<sup>1</sup> Orthodontists undertake preventive measures to overcome these problems but little information is available about which preventive measures they should use and how often. So this study attempts to survey the measures used in prevention of caries, decalcification and white spot problems among Rajasthani orthodontists.

**MATERIALS AND METHODS:** A questionnaire regarding preventive measures used before, during and after the orthodontic treatment, was sent to 128 orthodontists. Among all the participants, 100 orthodontists replied to the questionnaire.

In the first part of questionnaire, questions were asked regarding the measures used for prevention of demineralization at the start of the treatment by Rajasthani orthodontists. The questions were:

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1. Do you motivate your patient to follow oral hygiene instructions before going for orthodontic treatment? Always/Usually/Occasionally/Never
2. Do you recommend fluoride rinses once the orthodontic treatment has started?  
Always/Usually/Occasionally/Never
3. Do you use fluoride releasing bonding agent in your office/clinic?  
Always/Usually/Occasionally/Never
4. Do you recommend the use of fluoride gel to the patients at the start of orthodontic treatment?  
Always/Usually/Occasionally/Never
5. Do you recommend the use of fluoride varnish to the patients at the start of orthodontic treatment? Always/Usually/Occasionally/Never
6. Do you recommend the use of chlorhexidine rinses to the patients at the start of orthodontic treatment? Always/Usually/Occasionally/Never
7. Do you recommend the use of oral hygiene aids, like orthodontic brushes, flosses, interdental cleansing aids, etc.? Always/Usually/Occasionally/Never.

In the second part of questionnaire, questions were asked regarding the preventive measures used by orthodontists when demineralization is noticed developing during orthodontic treatment.

1. Do explain the consequences of poor oral hygiene when demineralizations develop during orthodontic treatment? Always/Usually/Occasionally/Never
2. Do you give additional oral hygiene instructions in such a case?  
Always/Usually/Occasionally/Never
3. Do you recommend the use of fluoride rinses when the demineralization is seen developing?  
Always/Usually/Occasionally/Never
4. Do you recommend the use of fluoride gel to the patients in such cases?  
Always/Usually/Occasionally/Never
5. Do you recommend the use of fluoride varnish to the patients in such cases?  
Always/Usually/Occasionally/Never
6. Do you recommend the use of chlorhexidine rinses to the patients in such cases?  
Always/Usually/Occasionally/Never
7. Do you recommend the additional use of oral hygiene aids, like orthodontic brushes, flosses, interdental cleansing aids, etc.? Always/Usually/Occasionally/Never.

In the third part of the questionnaire, questions were included regarding preventive measures taken by orthodontists when demineralization is diagnosed at completion of orthodontic treatment.

1. Do you give the additional oral hygiene instructions when demineralization is diagnosed at the completion of orthodontic treatment? Always/Usually/Occasionally/Never
2. Do you recommend the use of fluoride rinses once the demineralization has developed?  
Always/Usually/Occasionally/Never.
3. Do you recommend the use of fluoride gel to the patients in such cases?  
Always/Usually/Occasionally/Never.
4. Do you recommend the use of fluoride varnish to the patients in such cases?  
Always/Usually/Occasionally/Never.

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5. Do you recommend the use of chlorhexidine rinses to the patients in such cases?  
Always/Usually/Occasionally/Never.
6. Do you recommend the additional use of oral hygiene aids, like orthodontic brushes, flosses, interdental cleansing aids, etc.? Always/Usually/Occasionally/Never.
7. Do you take any other measures such as polishing of white spot lesions in such cases?  
Always/Usually/Occasionally/Never.

All the data obtained from this questionnaire, was tabulated and analyzed statistically.

**RESULTS:** The data obtained from first part of questionnaire were summarized in table 1 and represented in chart 1. According to this 90% orthodontists always gave oral hygiene instructions and 86% orthodontists always recommended the use of fluoride rinses. However, the use of fluoride bonding material (75%), fluoride gel (60%) and fluoride varnish (62%) as a preventive agent was occasional among majority of orthodontists.

The use of chlorhexidine rinses and other cleansing aids was usually (83%) recommended by orthodontists rather than always, occasional or no use recommended at all. However, the statistical analysis with ANOVA test shows no significant variations in this regard. It shows that all preventive measures were recommended at the start of the treatment.

Preventive measures	Always	Usually	Occasionally	Never
Oral hygiene instructions	90 (90.00%)	5 (05.00%)	3 (03.00%)	2 (02.00%)
Fluoride rinses	86 (86.00%)	6 (06.00%)	5 (05.00%)	3 (03.00%)
Fluoride bonding material	5 (05.00%)	5 (05.00%)	75 (75.00%)	15 (15.00%)
Fluoride gel	8 (08.00%)	12 (12.00%)	60 (60.00%)	20 (20.00%)
Fluoride varnish	5 (05.00%)	9 (09.00%)	62 (62.00%)	24 (24.00%)
Chlorhexidine rinses	7 (07.00%)	83 (83.00%)	6 (06.00%)	4 (04.00%)
Oral hygiene aids like brushes, interdental cleaning aids etc.	7 (07.00%)	60 (60.00%)	30 (30.00%)	3 (03.00%)

Table 1: Preventive measures at the start of the treatment and their frequencies

$F = 0.85$   $df = 3, 24$   $p = 0.481$

**Chart 1: Preventive measures at the start of the treatment and their frequencies.**

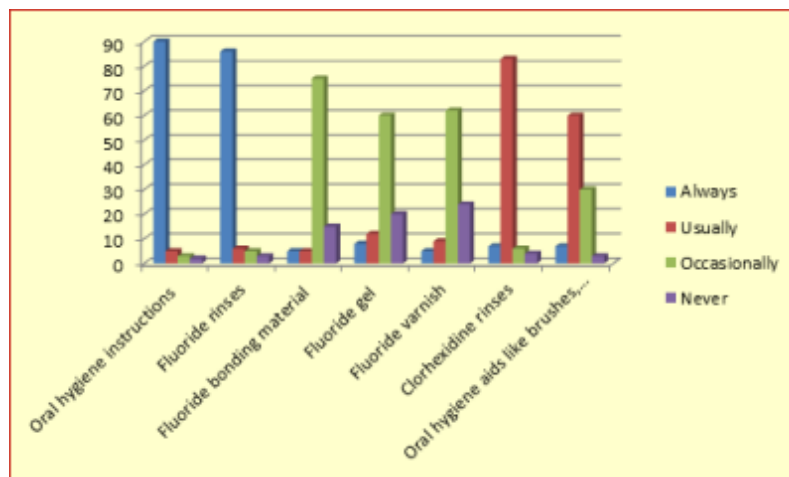


Chart 1

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The data obtained from second part of questionnaire, were summarized in table 2 and represented in chart 2. Among all orthodontists, 90% orthodontists always explained the consequences, 81% always gave extra oral hygiene instructions and 86% always recommended the use of fluoride rinses. The use of fluoride gel was recommended usually (77%) and the use of fluoride varnish and chlorhexidine rinses was recommended occasionally.

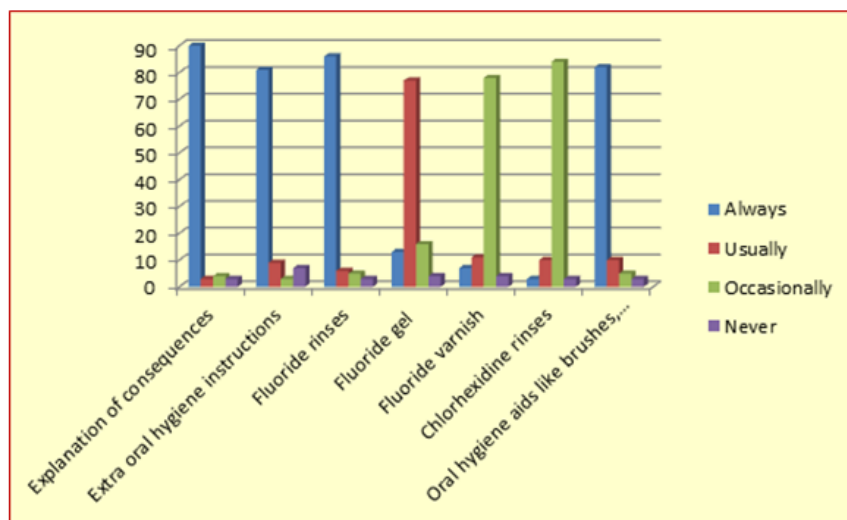
Other oral hygiene aids like brushes, interdental cleaning aids, etc. were always recommended by majority (82%) of orthodontists. The findings were found to be statistically significant ( $p < 0.05$ ) on application of ANOVA test.

Preventive measures	Always	Usually	Occasionally	Never
Explanation of consequences	90 (90.00%)	3 (03.00%)	4 (04.00%)	3 (03.00%)
Extra oral hygiene instructions	81 (81.00%)	9 (09.00%)	3 (03.00%)	7 (07.00%)
Fluoride rinses	86 (86.00%)	6 (06.00%)	5 (05.00%)	3 (03.00%)
Fluoride gel	13 (13.00%)	77 (77.00%)	16 (16.00%)	4 (04.00%)
Fluoride varnish	7 (07.00%)	11 (11.00%)	78 (78.00%)	4 (04.00%)
Chlorhexidine rinses	3 (03.00%)	10 (10.00%)	84 (84.00%)	3 (03.00%)
Oral hygiene aids like brushes, interdental cleaning aids etc.	82 (82.00%)	10 (10.00%)	5 (05.00%)	3 (03.00%)

**Table 2: Preventive measures during the treatment and their frequencies**

$F = 3.04$   $df = 3, 24$   $p = 0.049$

**Chart 2: Preventive measures during the treatment and their frequencies.**



**Chart 2**

The data received from third part of questionnaire were summarized in table 3 and represented in chart 3. According to this, 91% always gave extra oral hygiene instructions; 86% always recommended the use of fluoride rinses and 81% always recommended use of fluoride gel.

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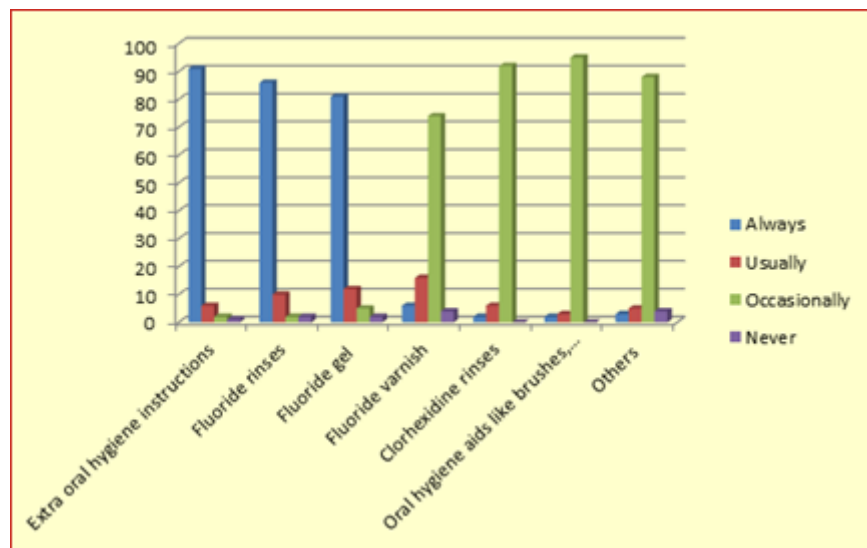
The use of fluoride varnish, chlorhexidine rinses, oral hygiene aids like brushes and other measures such as polishing of white spot lesions, was however, occasionally recommended. These findings were also found to be statistically significant ( $p < 0.05$ ) on application of ANOVA test.

Preventive measures	Always	Usually	Occasionally	Never
Extra oral hygiene instructions	91 (91.00%)	6 (06.00%)	2 (02.00%)	1 (01.00%)
Fluoride rinses	86 (86.00%)	10 (10.00%)	2 (02.00%)	2 (02.00%)
Fluoride gel	81 (81.00%)	12 (12.00%)	5 (05.00%)	2 (02.00%)
Fluoride varnish	6 (06.00%)	16 (16.00%)	74 (74.00%)	4 (04.00%)
Clorhexidine rinses	2 (02.00%)	6 (06.00%)	92 (92.00%)	0 (00.00%)
Oral hygiene aids like brushes, interdental cleaning aids etc.	2 (02.00%)	3 (03.00%)	95 (95.00%)	0 (00.00%)
Others like polishing of WSLs	3 (03.00%)	5 (05.00%)	88 (88.00%)	4 (04.00%)

**Table 3: Preventive measures at the completion of the treatment and their frequencies**

$F = 3.80$   $df = 3, 24$   $p = 0.023$

**Chart 3: Preventive measures at the completion of the treatment and their frequencies.**



**Chart 3**

**DISCUSSION:** This study was designed to survey the measures used for prevention of demineralization by Rajasthani orthodontists, before, during and at completion of orthodontic treatment; especially when demineralization is seen developing during treatment or it has developed at the time when treatment is about to complete.

Table 1 and chart 1 show no significant results on statistical application and explains the importance of recommendation of all preventive measures by Rajasthani orthodontists at the start of the treatment. This finding supports a review, in which good evidence has been available for the effectiveness of fluoride gel and varnish, chlorhexidine gel, and sealant when used to prevent caries in permanent teeth of children and adolescents.<sup>2</sup> However; they may need to be used selectively.

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Also, in our study we found that fluoride releasing bonding materials were used occasionally by majority of orthodontists. This data supports the view that it has a little role in reducing demineralization, so it is not routinely used for prevention. These data also support an *in vitro* study done to evaluate the effectiveness of a fluoride releasing bonding agent in inhibiting enamel demineralization around orthodontic brackets after the exposure to a demineralizing solution. The fluoride content appeared weakly able to reduce the enamel demineralization.<sup>3</sup>

In our study, it was found that orthodontists recommended other oral hygiene aids like brushes and interdental cleaning aids also. Among these, manual orthodontic toothbrushes were mostly prescribed followed by powered toothbrushes and interdental cleaning aids which were cost effective and efficient in removing plaque around orthodontic brackets. This finding is in accordance with a review, no conclusions on the comparative effectiveness of powered toothbrushes to reduce gingivitis in clinical orthodontic practice can be drawn.<sup>4</sup>

Table 2 and chart 2 show that along with explanation of consequences, extra oral hygiene instructions, other oral hygiene aids like brushes; fluoride rinses were recommended always when the demineralization was noticed developing during orthodontic treatment. These findings are also similar to a survey<sup>5</sup> in which fluoride rinse with a low fluoride concentration was prescribed most often by the Dutch orthodontists. Fluoride gels were prescribed usually in this study. However, fluoride varnishes and chlorhexidine rinses were recommended occasionally.

This is in agreement with a review which suggests that the regular and supervised use of fluoride mouth rinse by children is associated with a clear reduction in caries increment.<sup>6</sup> On the other hand; it is the commonest method to help prevent caries rather than the professional application of varnishes.

Table 3 and chart 3 show that extra oral hygiene instructions, use of fluoride rinses and fluoride gel was always recommended while the use of fluoride varnish, chlorhexidine rinses, oral hygiene aids like brushes and other measures such as polishing of white spot lesions, was occasionally recommended.

According to another study, which investigated the effect of fluoride on carious lesion development and on lesions established during fixed orthodontic therapy; daily fluoride mouth rinsing with a 0.2% solution of sodium fluoride (NaF) retarded lesion development significantly, whereas the fluoride solution with low pH inhibited lesion formation completely. Fluoride applied as a mouth rinse to plaque-covered lesion underneath orthodontic bands retarded lesion progression.<sup>7</sup> Fluoride gels are also helpful in achieving high concentrations of fluoride, if required as various fluoride compounds, concentrations and methods of gel application can be used.

The use of fluoride varnishes was found to be occasional in this study as patient's motivation is needed and their co-operation is required to follow intensive treatment schedule. However according to a recent study<sup>8</sup> done to evaluate the efficacy of a fluoride varnish in preventing White-Spot Lesions measured with laser fluorescence, fluoride varnishes are less expensive and easier to apply than fluoride gels and, unlike home rinses, require no patient compliance.

**CONCLUSION:** Rajasthani orthodontists, however, undertake satisfactory measures to prevent demineralization and caries within practical limits. Further studies with extensive follow-up are needed to provide stronger statistical and clinical information.

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