

Efficacy of slurry water

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Aims: 1) To study the effect of slurry water on surface of gypsum cast at different time intervals. 2) To study the effect of tap water on surface of gypsum cast at different time intervals. 3) To compare the effect the slurry and tap water on surface of gypsum cast at different time intervals. **Methods and Materials:** Seventy specimens of dental stone were prepared with central longitudinal groove and horizontal groove. Specimens were immersed up to central horizontal groove in tap water and slurry water for 15min, 30min, 60min, and 120min then specimens were removed and observed under stereomicroscope with respect to clarity of the groove. **Results:** 1) Significant difference was present between specimens of slurry water group and tap water group in relation to the time intervals. 2) Tap water group specimens get affected when immersed for 15min also however there were no change in slurry water group specimen kept for 30 min. 3) Along the loss of continuity of groove, there was color change and loss of surface roughness was present in specimens, which were immersed in tap water for 60 min and 120min. Such changes were not observed in slurry water group specimens. **Conclusion:** Slurry water dissolves the surface of gypsum cast less than tap water so to maintain the accuracy of the cast and the indirectly the prosthesis, use of slurry water is must.

Key words: Tap water, slurry water, accuracy, gypsum cast

INTRODUCTION

Gypsum products are widely used in dentistry for production of diagnostic and definitive cast. These casts are direct link between the clinical procedure and laboratory work, so it is important to fabricate and maintain the accuracy of the cast carefully.

Solubility of the gypsum cast in water is one of the known factor as disadvantage. For the various reasons casts are immersed in water such as before trimming to prevent spattered slurry from sticking to cast, prior to mounting, duplication and during flasking etc.

It is postulated that the immersion of casts under running water causes decrease in linear dimension approximately by 0.1%.^[1]

The purpose of this study is to evaluate the effect of tap water and slurry water on the surface of gypsum cast at different time intervals.

MATERIALS AND METHODS

Master stone block (Gyproc, ultra hard dental stone, manufactured by Prevest denpro limited, Modi group

company, Jammu 180 010, India) of 6 cm in length, 0.8 cm.in width, and 0.5 cm breath with central longitudinal groove of approximately 0.025 mm and central horizontal groove was prepared.^[2] This central longitudinal groove was prepared with help of copper wire. The putty wash impressions (Reprosil vinyl polysiloxane impression material type 1 very high viscosity putty and low viscosity light body, Dentsply caulk, Dentsply international Inc. made in USA.) were made of the master stone block. Dental type III stone (Gyproc, ultra hard dental stone) was mixed according to manufacture's instructions (powder\water ratio =100\28) and poured into impression. Like this forty specimens were prepared and equally divided to study the effect with slurry and tap water. Each specimen was labeled for identification. All specimens allowed to dry for 48 hrs.

Slurry water was prepared by placing the dental plaster block in the water for 72 hrs. Slurry water was standardized for saturation with help of complex metric titration test.

Specimens of the both groups were suspended in respective solutions in a plastic container up to central horizontal groove for 15 min, 30 min, 60 min, 120

min. Five specimens from each group were removed after respective time intervals and allowed them to dry for 48hrs. Later they had been examined for accuracy.

Evaluation

Submerged half and non-submerged half portion of specimens were compared by examining them under stereomicroscope (X10 Lambomad, zoomar, SZ-790, Bombay). Each specimen had given score according to clarity of the groove. Criteria used for scoring is mentioned in [Table 1].

Scoring of specimens done by one operator only. Two-way ANOVA test and unpaired 'T' test were applied to analyze the score.

RESULTS

Unpaired 'T' test indicated significant difference between both groups immersed for 15 and 60 min time. Highly significant difference for group immersed for 30min and very significant difference was found for groups immersed for 120 minute. There is significant difference between tap water group and slurry water group in relation to period of immersion. [Table 2] In slurry water group of 15 min and 30 min mean score was 1 with standard deviation 0.00000 [Figure 1 and 2], for 60 min and 120 min mean score was 1.4 with standard deviation 0.5477 [Figure 3 and 4]. In tap water group of 15 min mean score was 1.6 with standard deviation 0.5477 [Figure 1], for 30 min and 60 min mean score was 2.4 with standard deviation 0.5477 [Figure 2 and 3] and for 120 min mean score was 2.8 with standard deviation 0.4472 [Figure 4 and

Table 3].

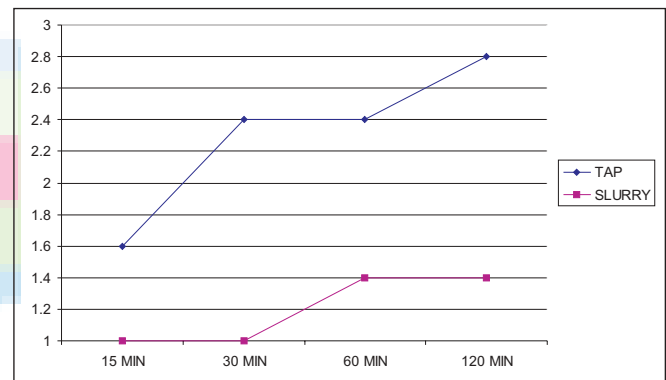
Graph 1 shows mean value for tap water increased considerably with soaking period than mean values for slurry water.

DISCUSSION

Solvent action of tap water has been observed on surface of gypsum cast. In this study, gypsum specimens which are immersed in tap water for short period (15 minute) had more deteriorating effect on surface than specimen, which were placed in slurry water for 2 hr.

Graph shows no change in the deteriorating effect that may be due to the constant release of calcium sulphate with both groups that can be because of the pH of solution, room temp or amount of concentration of calcium sulphate in slurry water.

Though slurry water affects the surface but takes longer time. During the various procedures cast is immersed in water but not for more time. Slurry water can be prepared by keeping waste plaster casts in



Graph 1: showing the amount of dissolution per time

Table 1: Criteria for score

Score 1	No difference between the submerged half and non-submerged half in relation to groove.
Score 2	Slight difference between Submerged half and non-submerged half in relation to groove
Score 3	Discontinuity of the groove on submerged half and non-submerged portion.
Score 4	Absences of groove on submerged half and non-submerged half.

Table 3: Mean values for solutions by soaking time

	15 min	30 min	60 min	120 min
Tap	1.6	2.4	2.4	2.8
Slurry	1	1	1.4	1.4

Table 2: Mean values for solutions by soaking times, 'P' values and 't' test

Solution	Tap water				Slurry water			
	15 min	30 min	60 min	120 min	15 min	30 min	60 min	120 min
Time intervals	1	3	3	3	1	1	1	1
	2	3	2	2	1	1	1	1
	2	2	3	3	1	1	2	1
	1	2	2	3	1	1	2	2
	2	2	2	3	1	1	1	2
Mean	1.6	2.4	2.4	2.8	1	1	1.4	1.4
S.D.	0.5477	0.5477	0.5477	0.4472	0.0000	0.0000	0.5477	0.5477
P values	0.039968524	0.000446	0.0203	0.002205				
t test	S	HS	S	VS				



Figure 1: Figure shows specimens of tap water and slurry water group which were kept for 15 min in solution

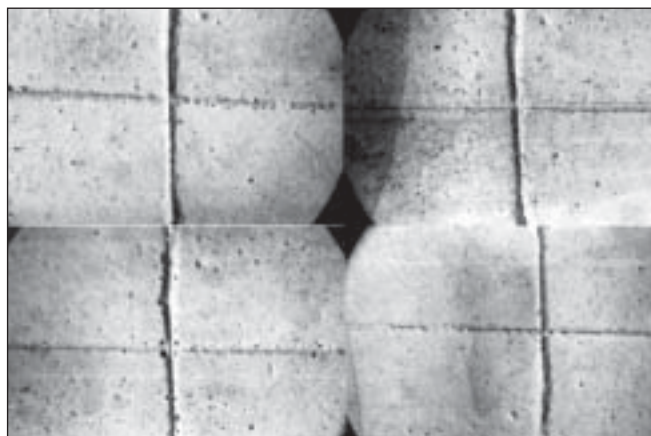


Figure 3: Figure shows specimens of tap water and slurry water group which were kept for 60 min in solution

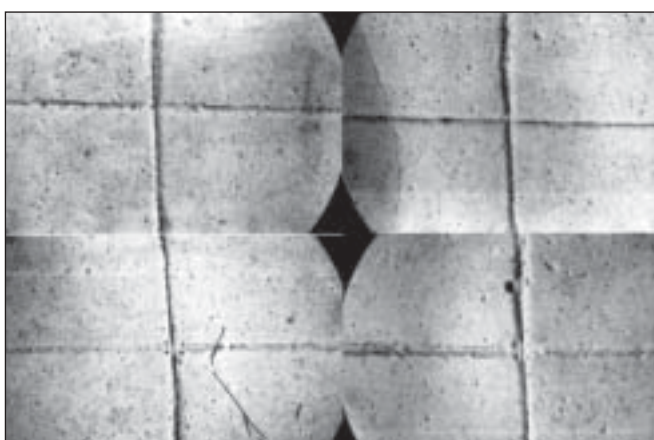


Figure 2: figure shows specimens of tap water and slurry water group which were kept for 30 min in solution

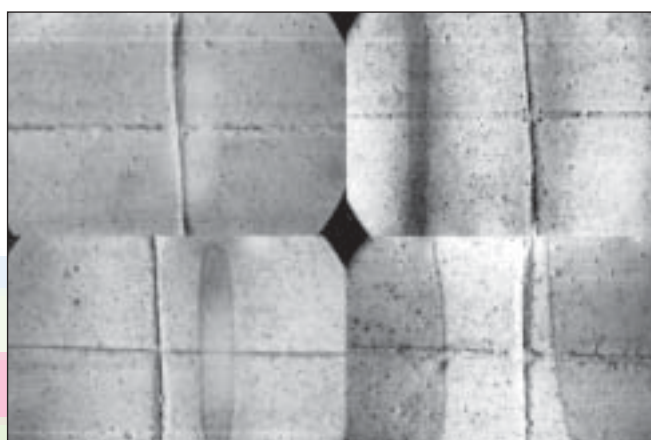


Figure 4: Figure shows specimens of tap water and slurry water group which were kept for 120 min in solution

water 3. Thus preparation of slurry water requires less effort, time, money, and is efficient to preserve the accuracy of the cast and indirectly final prosthesis.

Clinical Importance

Immersion for short period in tap water can hamper accuracy of cast.

To save cast from the solvent action of tap water, use of slurry water is must.

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