International Journal of Recent Advances in Multidisciplinary Topics
Volume 2, Issue 10, October 2021
https://www.ijramt.com | ISSN (Online): 2582-7839

Herbal Bonding Agent-Going Natural

A. R. Sanshavi Ponnamma[1*], A. Shoaib Ulla Khan[2], Belwin Baby[3], Goutham B. Reddy[4], Sanju Somaiah[5], Sunil Muddaiah[6], B. K. Shetty[7]
[1,2,3]*Student, Coorg Institute of Dental Sciences, Virajpet, India*
[4,5,6,7]*Professor, Coorg Institute of Dental Sciences, Virajpet, India*

***Abstract*: *Introduction:* There are various types of bonding agents and generations have evolved over time. Bonding agents play a pivotal role in the field of orthodontics. Through this article we would like to highlight the effects of natural herbal products on the shear bond strength and their effect on enamel surface. *Objectives:* To determine the effect of natural herbal products on enamel surface after etching, de-bonding and clean up through scanning electron microscope. To compare the efficacy of a naturally occurring antioxidant Amla(Indian Gooseberry),Lemon And Aloe Vera in adjunction with carboxymethylcellulose(CMC) in normalizing the shear bond strength of enamel. *Background:* In this in-vitro study we will evaluate the effect of Amla(Phyllantus Embilica ,Indian Gooseberry),Lemon And Aloe Vera extract in adjunction with carboxymethylcellulose (CMC) on the shear bond strength of composite resin to etched enamel. *Method*: Forty extracted premolars were divided into 4 equal groups consisting of 10 each: *Group 1* - Control group. *Group 2* - Amla extract adjunct as bonding agent. *Group 3* - Aloe vera extract adjunct as bonding agent. *Group 4* - Lemon extract adjunct as bonding agent. Shear Bond strength was checked using Universal Testing Machine *Results:* Results showed that Amla as a bonding agent has the highest shear bond strength followed by Lemon, Conventional bonding agent and Aloevera. Shear bond strength of Amla was significantly higher than that of conventional bonding agent.**

***Keywords*: Antioxidants, shear bond strength, carboxymethyl cellulose**

1. Introduction

There are various types of bonding agents and generations have evolved over time. Bonding agents play a pivotal role in the field of orthodontics. Through this article we would like to highlight the effects of natural herbal products on shear bond strength and enamel surface [1].

2. Objectives

- To determine the effect of natural herbal products on enamel surface after etching, de-bonding and clean up through scanning electron microscope
- To determine and compare the efficacy of a naturally occurring antioxidant Amla (Indian Gooseberry), Lemon and Aloe Vera in adjunction with carboxymethylcellulose (CMC) on shear bond strength. (FIGURE 1).

3. Background

In this in-vitro pilot study we evaluated the effect of Amla (Phyllantus Embilica, Indian Gooseberry), Lemon And Aloe Vera extract in adjunction with carboxymethylcellulose (CMC) on the shear bond strength of composite resin to etched enamel. (FIGURE 2).

1) Method

Forty extracted premolars were collected and divided into 4 groups. Each group consisted of 10-extracted tooth and their aggregates post evaluation was done: (FIGURE 3)

- Group 1 - Control group.
- Group 2 - Amla extract adjunct as bonding agent.
- Group 3 - Aloe vera extract adjunct as bonding agent.
- Group 4 - Lemon extract adjunct as bonding agent.

The extracted premolars were first subjected to an antioxidant treatment. Once the antioxidant treatment was finished, the premolars were etched and the respective natural herbal bonding agents were applied. Orthodontic brackets (Koden MBT series, 022 x 028) were then bonded to the tooth surface using Ormco Enlight composite material and cured. Post bonding of all teeth the bond strength tested using the Universal Testing Machine (MECMESIN multitest 10 i, Indian institute of science (IISc), Bangalore) the crosshead speed of which was kept at 1 mm/min. A computer, electronically connected to the Universal Testing Machine, recorded the results of each test. The bonded layer evaluation was done using Scanning Electron Microscope. (FIGURE 4)

4. Results

The Shear Bond strength was tested using the Universal Testing Machine (MECMESIN multitest 10 i, Indian institute of science (IISc), Bangalore) the crosshead speed of which was kept at 1 mm/min. A computer, electronically connected to the Universal Testing Machine, recorded the results of each test. The bonded layer evaluation was done using Scanning Electron Microscope. (FIGURE 5)

Following results (aggregate) on Shear bond strength were obtained:

1. Conventional bonding agent was evaluated to be 45.17N

*Corresponding author: sanchavialamengadaravi@gmail.com

2. Amla bonding agent was evaluated to be 64.34 N
3. Lemon bonding agent was evaluated to be 48.56 N
4. Aloe vera bonding agent was evaluated to be 41.79 N.

5. Discussion

Through this study an attempt was made to find a naturally occurring alternative to conventional bonding agent that will have similar shear bond strength of Conventional bonding agent. Several naturally occurring antioxidants have been used in the past such as rosemary leaf extract, grape seed extract, and pine bark extract [2]. Gooseberry (amla), lemon and Aloe Vera were chosen as they are highly potent antioxidants, are very easily available and highly economical. Ascorbic acid, citric acid and its compounds are derivatives of Vitamin C and are well-known antioxidants. They have been shown to have the ability to quench the reactive free radicals in biological systems [3,4 ,5]. Results showed that Amla as a bonding agent has the highest shear bond strength followed by Lemon, Conventional bonding agent and Aloevera. Shear bond strength of Amla was significantly higher than that of conventional bonding agent. (FIGURE 6).

Fig. 1. Lemon Aloe Vera And Amla Extract

Fig. 2. Mounted Tooth with Bracket Bonded

- Black –Aloe Vera Bonding Agent
- Orange – Amla Bonding Agent
- Dark Blue – Lemon Bonding Agent

Fig. 3. ADJUNCT -CMC

Fig. 4. Etchant, Ortho Solo Bonding Agent, Ormco Enlight Comopsite

Fig. 5. Herbal Extracts

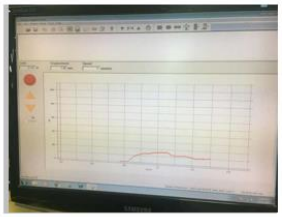

Fig. 6. Universal Testing Machine (Mecmesin Multitest 10 I)

6. Conclusion

- The shear bond strength results obtained of the Amla and Lemon extract bonding agent are far stronger than that of conventional bonding agent.
- The shear bond strength results obtained of the Aloevera extract-bonding agent is slightly less than that of conventional bonding agent.
- Amla and Lemon extract bonding agent can be used as an alternative to conventional bonding agent as they are completely safe, nontoxic, and have numerous medicinal properties.

7. Funding source

No

8. Any Conflict Of Interest

No

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