International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment

Dates

10th - 12th February, 2019

Venue

Novotel Phuket Resort, Phuket, Thailand

Organized by

Faculty of Dentistry, Khon Kaen University

Niigata University Faculty of Dentistry

Network for International Education and Research in Advanced Dental Sciences

The International Collaborative Symposium on Development of Human Resources in Practical Oral Health and Treatment

Organized by

Niigata University
Graduate School of Medical and Dental Sciences
JAPAN
&
Khon Kaen University
Faculty of Dentistry
THAILAND

February 10th-12th, 2019
at Novotel Phuket Resort, Thailand

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Sunday February 10th

07.30- **Registration** @Foyer, in front of Siam A-C

08.00-08.30 **Poster mounting** @Siam D, Siam Conference Center

08.30-09.00 **Opening Ceremony** @Siam A-C, Siam Conference Center

09.00-10.00 **Keynote Lecture** @Siam A-C, Siam Conference Center
Current Research Topics on Tissue Engineering of Oral Mucosa and Our Future Directions
Prof Kenji IZUMI
Niigata University, Japan
Chair:
Prof Waranun BUAJEEB, Dean, Mahidol University, Thailand

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Prof Miho TERUNUMA, Niigata University, Japan

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Prof Miho TERUNUMA
Niigata University, Japan

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Dr Genki ITO
Niigata University, Japan

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Asst Prof Yurie YAMADA
Niigata University, Japan

11.10-11.20 S1-4: The Role of NF-κB in Tooth Development
Dr Akane YAMADA
Niigata University, Japan

11.20-11.45 S1-5: New Findings in Organogenesis
Prof Atsushi OHAZAMA
Niigata University, Japan

11.45-13.00 **Lunch Break** @Coffee House Restaurant

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Maranatha Christian University, Indonesia

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Hokkaido University, Japan

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Natthapol THINSATHID, Matana KETTRATAD*
Thammasat University, Thailand

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Thammasat University, Thailand

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Jirayu ANANTAWAN, Teerasak DAMRONGRUNGRUANG, Aroon TEERAKAPONG*
Khon Kaen University, Thailand

P1 Shear Bond Strength Differences Between Dry, Wet, and Rewetting Dentin Bonding Technique Using Chitosan 2% Solution

Angela EVELYNA*, Rudy DJUANDA, Sanchia Jovita BUDIONO

Faculty of Dentistry, Maranatha Christian University, Indonesia. <angela.evelyna@gmail.com>

Background: There are several techniques can be used on dental adhesive system which are dry, wet, and rewetting technique. However, it is difficult to achieve good bond strength between composite restoration and dentine tissue compared with enamel. Chitosan is a natural polymer hydrophilic polysaccharide, derivate from chitin, it has natural bonding ability.

Objectives: The purpose of this study is to determine shear bond strength of several dentine adhesive system which are dry, wet, and rewetting bonding technique using chitosan 2% solution.

Materials and Methods: This experimental study used 30 samples of free caries first-premolars teeth. Teeth soaked in normal saline solution before cut straight up to 2 mm above CEJ. Samples divided into three groups. Dentine surface treated with dry bonding technique for the first group, wet bonding technique for the second group, and rewetting technique using chitosan 2% for the last group. Samples were tested for shear bond strength using LLOYD Testing Machine with a speed of 0.5 mm/minute. The data were analyzed using one-way ANOVA statistic test.

Results: The average shear bond strength of three groups are, 6.919 MPa, 17.818 MPa, and 11.528 MPa for groups 1, 2, and 3. The highest shear bond strength is in group 2, which is the wet bonding technique. There is significant shear bond strength difference between the three groups, that is $p=0.000$ ($p<0.005$).

Conclusion: The best shear bond strength between the three bonding technique is the wet bonding techniqup. Chitosan 2% solution used in rewetting technique of this study don't have significant effect on raising shear bond strength between dentine and dental composite.

Keywords: Shear Bond Strength, Dentine Bonding Technique, Chitosan 2%

Research Report

Shear Bond Strength Differences Between Dry, Wet, and Rewetting Dentin Bonding Technique Using Chitosan 2% Solution

Angela Evelyna, Rudy Djuanda, Sanchia Jovita Budiono
Faculty of Dentistry, Maranatha Christian University, Bandung-Indonesia

ABSTRACT

Background: There are several techniques can be used on dental adhesive system which are dry, wet, and rewetting technique. However, it is difficult to achieve good bond strength between composite restoration and dentine tissue compared with enamel. Chitosan is a natural polymer hydrophilic polysaccharide, derivate from chitin, it has natural bonding ability. **Objectives:** The purpose of this study is to determine shear bond strength of several dentine adhesive system which are dry, wet, and rewetting bonding technique using chitosan 2% solution. **Methods:** This experimental study used 15 samples of free caries first-premolars teeth. Teeth soaked in normal saline solution before cut straight up to 2 mm above CEJ. Samples divided into three groups. Dentine surface treated with dry bonding technique for the first group, wet bonding technique for the second group, and rewetting technique using chitosan 2% for the last group. Samples tested for shear bond strength using LLOYD Testing Machine with a speed of 0.5 mm/minute. The data were analyzed using one-way ANOVA statistic test. **Results**: The average shear bond strength of three groups are, 6.919 MPa, 17.818 MPa, and 11.528 MPa for groups 1, 2, and 3. The highest shear bond strength is in group 2, which is the wet bonding technique. There is significant shear bond strength difference between the three groups, that is p=0.000 (p<0.005). **Conclusion:** The best shear bond strength between the three bonding technique is the wet bonding technique. Chitosan 2% solution used in rewetting technique of this study don't have significant effect on raising shear bond strength between dentine and dental composite.

Key words: Shear bond strength, Dentine bonding technique, Chitosan 2%.

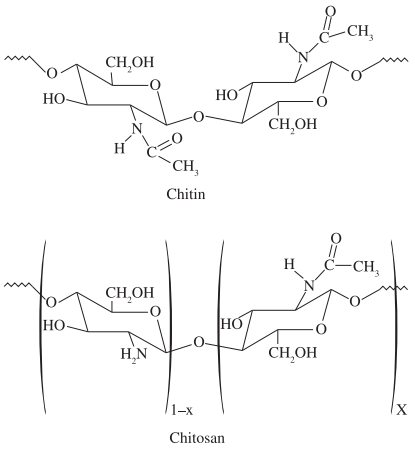
Correspondence: Angela Evelyna, Faculty of Dentistry Maranatha Christian University, Jl. Prof. drg. Surya Sumantri, M.P.H. No. 65 Bandung-40164 Indonesia, angela.evelyna@gmail.com, +62818614319.

INTRODUCTION

There are several bonding techniques developed nowadays. The bonding system has revolutionized the practice of restorative dentistry. Although it is difficult to bond the dentine structure, there are improvement on the performance of dentine bonding. The several techniques mentioned before are dry, wet, and rewetting techniques. [1, 2]

Dry technique is mentioned when we don't use water wetting or rewetting agent. When the dentine air-dried, it will result on collagen fibers collapse and shrinkage, this will lead to resin lack of penetration. In wet bonding technique water play main function to support collagen fibers. Re-wetting agent is uses to moisture dentine before placement of bonding agent. [2]

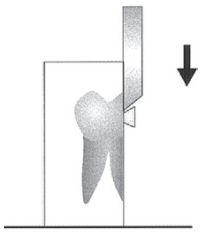
There are several re-wetting agents on dental markets. This study focused on using chitosan 2% as re-wetting agent for dental composite bonding.



Picture 1. Chemical Structures of Chitin and Chitosan[3]

Chitosan is chitin derivate, a natural polysaccharide, the main structural component of sea creatures. Chitosan based biomaterials gain a lot of researchers interests because its huge availability in nature and excellent mechanical properties as well as its biocompatibility. Chitosan film is a biocompatible material that can tolerated easily with the living tissue and structure. It is used particularly as coatings to prolong shelf-life of fresh foods. It also has antimicrobial and antifungal properties. [3,4]

Laboratory tests have been used to compare bond performance of different bonding techniques. Shear bond strength is the most popular method to test bonding efficacy (ISO/TS11405 (2003)). Average of bond strength calculated by dividing the failure load of the specimen cross-sectional area using universal testing machine. [5]



Picture 2. Diagram of Shear Bond Strength Test [5]

OBJECTIVES

The purpose of this study is to determine shear bond strength of several dentine adhesive system which are dry, wet, and rewetting bonding technique using chitosan 2% solution.

MATERIALS AND METHODS

This experimental study used 15 samples of free caries first-premolars teeth. Teeth soaked in normal saline solution before cut straight up to 2 mm above CEJ and polished with sandpaper. Teeth put into clear resin in PVC pipes. Samples divided into three groups. Dentine surface treated with dry bonding technique for the first group using etch and adhesive system, wet bonding technique for the second group, and rewetting technique using chitosan 2% for the last group and filled with nanofiller composite resin and cured using LED (light emitting diode) light curing unit. Samples tested for shear bond strength using LLOYD Universal Testing Machine. Samples held in the machine, with the knife chisel edge in position 1 mm above resin-dentine interface. The speed of the crosshead is 0.5 mm/minute. The data were analyzed using one-way ANOVA statistic test with SPSS computer program.

RESULTS

The average shear bond strength of three groups are, 6.919 MPa, 17.818 MPa, and 11.528 MPa for groups 1, 2, and 3. The highest shear bond strength is in group 2, which is the wet bonding technique. Followed by group 3, the chitosan 2% re-wetting technique, and group 3 as the last, which is dry technique.

Table 1. Shear Bond Strength Result

Sample	Shear Bond Strength of Dry Techniques (MPa)	Shear Bond Strength of Wetting Techniques (MPa)	Shear Bond Strength of Re-Wetting Techniques (MPa)
1	6.021	19.741	14.292
2	4.049	20.241	6.764
3	8.919	16.371	14.396
4	5.727	18.933	13.503
5	9.879	13.806	8.685
Average	6.919	17.8184	11.528

The statistic test used to know the normality of the data is Kolmogorov-Smirnov and Shapiro-Wilk Tests as bellow. This test show that the data is normal.

Table 2. Normality Test

Tests of Normality

	tes	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
data	dry	.245	5	.200*	.929	5	.590
	wet	.261	5	.200*	.893	5	.375
	chitosan	.311	5	.129	.817	5	.111

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

ANOVA one-way statistic show different significance of every groups as the p obtained is p=0.000 (p<0.005). The data can be seen in table 3.

Table 3. ANOVA Statistical Test

ANOVA

data

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	299.340	2	149.670	17.477	.000
Within Groups	102.767	12	8.564		
Total	402.108	14			

DISCUSSION

There are several factors influence shear bond strength of dental resin composite to dentine that are dental types, ages, dentine mineralization grade, bonded dentine surface and humidity of oral environment. Collagen structure is very important to enhance good bond strength. Hydrated dentine makes difficulty for adhesive resin to bond and contact with collagen. Chemical reactivity of collagens is quite low, this happen because collagen is biological polymer consist of collagen peptide aggregate chain. Many conventional bonding techniques are unsuitable with dentine structure. [6,7]

Result of this study show that nano-filled restorative composite resin with dry bonding, wet bonding, and rewetting bonding technique to dentin have significant difference. Shear bond strength in dry bonding is lower than wet bonding and rewetting bonding technique, with average of 6.919 MPa. The shear bond strength of wetting technique is the highest with the average of 17.818 MPa, and rewetting system with chitosan with the average of 11.528 MPa. This result show that dentin collagen structure has collapse at dry bonding technique, and maintained in wet bonding technique, while chitosan 2% could not infiltrate smoothly to dentin structure, so the shear bond strength was not as high as wetting bonding technique.

At wet bonding technique, water maintain collagen fibril at wide condition that result in good shear bond strength. Wet bonding technique result in good bond strength, but it still has disadvantage which is there's too many waters at resin and dentin interface, that can lead to over-wet condition. Over-wet condition lead to sub-optimal adhesive system, phase separation, and nano-leakage which influence resin dentin bonding. [6,7]

CONCLUSION

The best shear bond strength between the three bonding technique is the wet bonding technique. Chitosan 2% solution used in rewetting technique of this study don't have significant effect on raising shear bond strength between dentine and dental composite.

REFERENCES

1. Edward, J S. 1998. *Bonding Systems for Restorative Materials: A Comprehensive Review*. American Academy of Pediatric Dentistry: 20:2 P: 80-84.
2. Yildiz E, et al. 2015. *Effect of a re-wetting agent on bond strength of an adhesive to primary and permanent teeth dentin after different etching techniques*. Nigerian Journal of Clinical Practice. Vol 18, Issue 3. P: 364-370
3. Rejane C G, Douglas B, Odilio B G A. 2009. A Review of the Antimicrobial Activity of Chitosan. Ciencia e Tecnologia: Vol 19 No 3 P: 241-247.
4. Junhe C, Zechuan Y, Devid L. 2016. *Effect of Acetyl Group on Mechanical Properties of Chitin/Chitosan Nanocrystal: A Molecular Dynamics Study*. International Journal of Molecular Sciences:17, 61.
5. Ronald L Sakaguchi, J M Powers. 2012. *Craig's Restorative Dental Materials 13th ed*. India: Elsevier Mosby. P: 329-334.
6. Abhishek B, Vasundhara S. 2007. Effect of Rewetting Agents on the Shear Bond Strength of Different Bonding Agent When Applied on Dry Dentin. Journal of Conservative Dentistry. X(1)
7. Roulet JF. 2000. Adhesion The Silent Revolution in Dentistry. 1st ed. US: Quintessen