

## **Evaluation of the mummification treatment success at Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran in February 2011-2012**

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### **ABSTRACT**

Indonesia is one of many developing countries with high caries prevalence which needs more attention regarding the countermeasures as well as the preventive treatment. Dental problems or pulp injury was able to treated with an endodontic procedure such as pulpotomy. The success of the mummification treatment was able to evaluated through subjective and objective examinations. The purpose of this study was to describe an evaluation of the success of the mummification treatment at Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran by examining the condition of the teeth that have received mummification treatment. This study was a descriptive study with purposive sampling technique. The number of samples was as much as 38 teeth from patients who have completed mummification treatment. The results showed the success of mummification treatment was as much as 67% in less than three months, 44% in the range of time 3-6 months, and 29% in more than 6 months. The conclusion of this study was the mummification treatment success at Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran was high in less than three months and decreasing in more than six months after treatment.

**Keywords:** Mummification treatment, treatment success evaluation.

### **INTRODUCTION**

Healthy teeth will function well in mastication, verbal communication as well as an aesthetic support.<sup>1</sup> Oral hygiene is one of the most important things to be taken care of to maintain the good function of teeth and avoid any dental problems. Based on Indonesia Health Survey (SKRT-Surkesnas) in 2001, as much as 60% of Indonesian population was having dental problems, which includes tooth decay (dental caries).<sup>2</sup>

According to the studies conducted by Joelimar and Mandel in 1985 and Sundoro in 2005, the increase of caries prevalence occurred in most of developing countries. Indonesia is one of many developing countries with high caries prevalence which needs more attention regarding the countermeasures as well as the preventive treatment.<sup>3</sup> A study held by Faculty of Dentistry Universitas Indonesia showed that 80% of Indonesian population suffered dental caries. Indonesian National Household Health Survey

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(SKRT) in 2004 discovered that the prevalence of caries in Indonesia was as much as 90.05%.<sup>4</sup>

One of the factors causing the defect in the dental hard tissue is the plaque accumulation that is also initiated dental caries. Bacteria invasion caused acid formation on the tooth surface causing demineralization of the tooth enamel which progressively reaching the dentine. Bacteria accumulation formed calcification inside the pulp and tubule causing direct contact with the pulp thus causes inflammation (Eccles, 1994). Dental problems or pulp injury can be treated with endodontic procedure such as pulpotomy.<sup>5</sup>

American Association of Endodontists divides pulpotomy/pulp amputation into vital amputation and mortal/devitalization/mummification amputation. Mummification is the removal of a devitalized pulpal tissue inside the pulp. The pulp tissue inside the root canal was left in a sterile condition and mummified by mummification medicament.<sup>6</sup>

A study conducted by Zeng at China in 2004, had explained the advantage of mummification and low complexity of the procedure, fast and simple treatment with affordable cost, and popular for pulp treatment in few hospitals of the remote areas. As one of the developing countries, Indonesia uses mummification as a permanent endodontic treatment due to many factors, which includes time and money, despite the incomplete instruments especially in the Community Health Center (Puskesmas) located in the remote areas. Mummification used as an emergency procedure in many developing countries to decrease pain until the advanced endodontic treatment can be done.<sup>7</sup>

A study conducted by Xie and Hong at China in 2010 by mummified the patient's teeth in the age range above 70 years old. This research revealed that this procedure was effective within one month of treatment, while the percentage of success was as much as 86.9% in one year, and 76.2% in 2 years after treatment. Criteria for a successful treatment can be seen through subjective and objective examination.<sup>7</sup> Pulpotomy was successful if the patient did not complaining any pain in the subjective examination while functioning the teeth (masticating). However, the objective examination resulted in negative results on the percussion testing, with no periapical abnormalities in radiography results.<sup>5</sup> The soreness

was significantly decreased after mummification. Thus clinicians were assuming the treatment was successful,<sup>8</sup> without any radiographic examination for evaluation.

Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran and Dental Polyclinic of Hasan Sadikin Hospital, Bandung, Indonesia, were still performing mummification treatment to prepare their medical graduates for dental practices in the remote areas with limited instruments compared to developed countries with a middle economic population. Zeng's study in China stated that the mummification procedure was still popular in the hospital of remote areas in China. Xie and Hong also performed mummification on patients with the age range of above 70 years old, although this procedure has already been eliminated in several developing countries and most recent literature. The purpose of this study was to describe an evaluation of the success of the mummification treatment at Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran by examining the condition of the teeth that have received mummification treatment in 3 months, 3-6 months, and more than 6 months after obturation control.

## **METHODS**

This research type is descriptive, which gives a picture or description regarding an event as clear as possible, without any treatment on objects under study.<sup>9</sup>

The population of this research was the teeth of patients that treated with mummification procedure in the Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran. The sample was taken using the purposive sampling technique, which gathers samples within criteria according to researcher's consideration.<sup>9</sup> Inclusion criteria included less than 3 months, 3-6 months, and more than 6 months mummified teeth; patients willing to do a post-treatment radiographic examination; agreed to participated in this research. The instruments and materials used were patient's status, radiographic photo, treatment diagnosis, mouth mirror, dental explorer, and dental tweezers.

The procedure of the research was as follows: the subjects were given an initial

explanation regarding the research procedures and the objective of a radiographic examination; filling and signing informed consent; examining patient's tooth as a subjective examination by asking patient's complaints, and an objective examination by doing percussion testing and radiographic interpretation.

**RESULTS**

Research results were obtained from 38 mummified teeth that have been mummified. Sample distribution was based on the time range from the obturation control until the next control treatment, as seen in **Figure 1**.

Figure 1 showed that the amount of mummified teeth in the range of less than 3 months since obturation control until the next control was as much as 12 teeth (32%), the range of 3-6 months was 9 teeth (24%), and the range of more than 6 months was as much as 17 teeth (44%).

Sample distribution based on time range difference showed the treatment success. The treatment success determined according to the subjective and objective examination. From the subjective examination by the patient's complaint obtained the results that the teeth were functioning, while from the objective examination

by the percussion testing and radiographic interpretation obtained only one positive results indicated unsuccessfulness of the mummification treatment.

Treatment success based on the time range since obturation control until the next control treatment was seen in Table 1.

Table 1 showed that in the range of less than 3 months, 8 teeth (67% successful treatment) of which the patient did not complaining any pain while functioning the teeth, a negative result on percussion test and no signs of periapical abnormality. As much as 4 teeth (33% unsuccessful treatment) showing abnormality in radiographic results and positive response in percussion test. In the range of 3-6 months, as much as 4 teeth (44%) were successfully treated, and 5 teeth (56%) were unsuccessfully treated. In the range of more than 6 months, as much as 5 teeth (29%) were successfully treated, and 12 teeth (71%) were unsuccessfully treated.

**DISCUSSION**

This research showed higher success percentage in the range of less than 3 months. This result was consistent with clinical research conducted by Berger in 1965 and Redig in 1968 that showed higher success percentage in a short-range period.<sup>8</sup> However, the result did not consistent with Guelmann's research in 2002 that showed a low success in the first three months of treatment due to diagnostic error and abnormality before the treatment choice was performed, where the tooth was having a periapical abnormality. This condition was restricted for the mummification treatment as written in Bence (1990)<sup>5</sup> that explaining the condition for mummification were irreversible pulpitis teeth without any periapical abnormality.

This research results showed that treatments in the range of more than six months resulted in low success percentage. This result was consistent with Wang's research in 1995 that showed a high unsuccessfulness in mummification when evaluated in a long period. A study conducted by Xie in 2010 also suggested that the treatment was effective only in the first month after treatment.

In 2011, a study conducted by Cohen explained that the unsuccessfulness of this

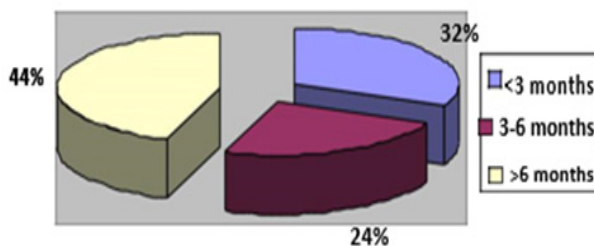


Figure 1. Sample distribution based on the time range from obturation control until the next control

Table 1. Percentage of mummification treatment succes based on the time range since obturation control until the next control treatment

	Successful			Unsuccessful	
	N	Total	Percentage	Total	Percentage
<3 months	12	8	67%	4	33%
3-6 months	9	4	44%	5	56%
>6 months	17	5	29%	12	71%

treatment might caused by the wrong consideration in diagnosis, patient's bad health condition causing decrease in immunity thus weakens the body towards bacteria, where bacterial virulence was stronger in the host's low immunity.<sup>10</sup> Inadequate debridement during cavity preparation may cause entrance of saliva into the dried cavity, operator error may cause perforation, and inadequate sterilization may increase the amount of bacteria in the sterilized cavity.

Endodontic treatment was successful if the tooth was able to functioning without pain, and showed negative responses to percussion test, with no radiolucent interpretation found in radiography results.<sup>8</sup> This statement was consistent with the study held by Guelmann in 2002 that stated no pain complaint on the treated tooth indicated the treatment success.

Operator error in ensuring the diagnosis might become the reason of an unsuccessful treatment in less than three months period, as well as error in deciding whether the infection was only localized in the pulp or had also infected the periapical. A periapical abnormality was only seen after six months of obturation, as an indicator of the treatment success. This condition was consistent with Guelmann's study in 2002 that showed unsuccessfulness of treatment in the first three months of the procedure due to the operator error when diagnosing the tooth and pulp infection condition.<sup>11</sup>

Unsuccessfulness in a long range of time might cause by the pulp tissue left inside the root canal in a sterilized and non-vital condition that may cause focal infection. Grossman stated this statement in 1998 regarding mummification definition as the procedure of removing devitalized pulp tissue from the pulpal room leaving the tissue inside the root canal in a sterilized condition and mummified by mummification medicament.

A post-treatment evaluation should be followed up within 6-12 months after obturation control to observed any changes in the periapical tissue. This condition was consistent with Walton and Torabinejad (2008) recommended for re-examination within six months to 4 years after mummification, as six months considered as a rational interval of control treatment for most patient.

Table 1 showed as much as 12 teeth (71%) were having unsuccessful treatment in more

than six months period. This unsuccessfulness was indicated by the positive response in the objective examination (complaining pain during percussion test) and also supported by periapical abnormalities showing the widening periodontal ligament and the presence of radiolucent lesion surrounded by a radiopaque linear lesion in the apex area. This condition was consistent with the research conducted by Wang in 1995. The research performed by Pudjonirmolo in 1993 stated that the treatment was clinically successful if the tooth was able to function normally without any pain, no complaint during percussion testing, and no periapical abnormalities.

No lesion since the beginning until the end of the treatment proofed the treatment success.<sup>7</sup> A study conducted by Ingle in 2002 showed a decrease up to 20% in treatment success that might caused by a microleakage restoration that may caused by bacteria. This result was also consisted by Guelmann's research in 2002 stated that the low percentage of successful treatment after three months might caused by incorrect diagnosis and inflamed pulp condition, while unsuccessfulness in a long period might relate to the microleakage of its restoration.<sup>11</sup>

Table 1 showed that as much as 17 teeth had completed the treatment for more than 6 months, with 12 of them showed unsuccessfulness indicated by the soreness feeling during percussion testing and the presence of periapical abnormality showing a widening periodontal ligament and the presence of radiolucent lesion surrounded by a radiopaque linear lesion of the apex area in the post-treatment radiography. This condition was consistent with research by Huth in 2011 that stated clinically, one of the indications of an unsuccessful treatment was the soreness feeling during the percussion test. Unsuccessfulness shown in radiographic results were radiolucent in the periapical region and the widening periodontal membrane.

## **CONCLUSION**

The mummification treatment success at Conservative Dentistry Clinics of Faculty of Dentistry Universitas Padjadjaran was high in less than three months and decreasing in more than six months after treatment.

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