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Dear Member,

I am very happy to present to you this 19th Volume of the Endodontic Bulletin. I would like to express my heartfelt thanks to all the Authors who contributed articles to the bulletin. I am very grateful for their support not only to me as the editor but also for their valuable contribution and their willingness to share their experience and knowledge with all of us, the members of the Malaysian Endodontic Society. This year has been very challenging due to multiple hiccups due to a crashed computer where all the work achieved until then was wiped out and I had to redo the whole work with a lot of help and understanding from the Authors. There were also other overwhelming circumstances personally which had further delayed the final publication of this bulletin. I would also like to thank my fellow Colleagues in the executive committee who have been very understanding and patient with the publication of this issue. I would also like to express my thanks to all the members for having given me the opportunity be the editor for the Bulletin for the past 4 years. I hope all members would enjoy this issue and request you to kindly send in your feedback to meselink@hotmail.com regarding the bulletin and the articles. I also wish the future Editor All the Best in bringing out more exciting issues of the Bulletin.

Thanking you.

Dr. Sapuram Ravindranath
(Editor)
PRESIDENT'S MESSAGE

Dear members

MES turns twenty this year.

As a special interest organisation, the society has earned its credentials in Malaysia in promoting and providing continuing professional education (CPE) opportunities for dentists. We have a healthy turnout for our events and excellent support from the dental trade companies.

Nevertheless, in recent years regulatory changes and economic pressures as well as the continued development of our country have thrown up new challenges for organisations such as us. The continued relevance of MES in this fast changing landscape must be addressed or the society will gradually fade away.

Having reached this milestone, it is time for MES to revitalise itself and break new ground.

With best regards

[Signature]

Dr Lam Jac Meng
President 2007/08
MES SECRETARY’S ANNUAL REPORT 2007 / 2008

This year, the main focus of the committee was to reorganize and restructure the committee and MES. Clerical and secretarial works were identified as barriers to the growth of the society. After careful deliberation, the committee had decided to outsource this to an Administrative Secretary. In this way the committee will be able to focus on the more critical aspects of planning and organisation of activities. A part-time Administrative Secretary was appointed for the period leading up to the Annual General Meeting.

EXECUTIVE COMMITTEE 2008

The members of 2008 Executive Committee were elected during the reconvened 19th Annual General Meeting on Sunday 20th January 2008 at the Balai Ungku Aziz, University Malaya, Kuala Lumpur. The 19th Annual General Meeting was originally scheduled for Saturday 24/11/07 but was called off due to lack of quorum.

Four new members were elected to the committee. They were Dr Chua Meei Jinn, Dr Noorhayati Azami, Dr Sunil Bangah and Dr Santhi Thambryrajah.

In its term of office, the committee held seven meetings.

1. ATTENDANCE AT THE COMMITTEE MEETINGS

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2. EVENTS

2.1. GARY CHEUNG EVENING LECTURE (6TH MAY 2008)

On 6th May 2008, MES organized an evening lecture with Dr Gary Cheung at MDA Lecture Hall. Dr Gary presented two lectures titled “An Overview of Techniques for Root Canal Obturation” and “Problem-solving in Endodontics”.

2.2. SES-MES JOINT MEETING 2008 (30TH-31ST AUGUST 2008)

The 6th biennial joint meeting between the MES and the Society of Endodontists Singapore was held at the Raffles Town Club, Singapore. The event comprised of 2 full-day of scientific lecture with a pre- and post- conference workshop. The speakers were Asgeir Sigurdsson (Iceland), Phillipe Guettler (Vietnam/France), Carlo Castellucci (Hong Kong), Kim Sung Kyo (South Korea), Tan Boon Tik (Malaysia) and Anil Kishen (Singapore). The two workshops were on Microendodontics and Microsurgery and Endodontic Rotary Instrumentation at the National Dental Centre, Singapore on 29th August and 1st September 2008 respectively. Ten Malaysians were amongst the 230 participants who attended the meeting.

2.3. 2008 MES ANNUAL SCIENTIFIC MEETING (1ST-2ND NOVEMBER 2008)

The theme for the Annual Scientific Meeting this year was ‘Managing Endodontic Failures in Endodontics’ and will be held at the Prince Hotel Kuala Lumpur.

Two international speakers from Europe: Dr Chong Bun San (London) and Dr Jean Pierre Mallet (Paris) were invited to share their views and experience on Endodontic Failures and Retreatments. In addition, pre-meeting hands-on workshop will be conducted by Dr Mallet at Faculty of Dentistry, Universiti Kebangsaan Malaysia. Dr Mallet is sponsored by Micro Mega and Altis-Pro Marketing.

For the convenience of members, MES 20th Annual General Meeting will be held concurrently with this meeting.

Dr Yew Hsu Zenn
Secretary 2008
TREASURER’S REPORT

Dear members,

The financial status of the Malaysian Endodontic Society remains positive with profit amount of RM 2,747.32 in our last financial year while our net assets stand at RM 297,713.29. The small surplus of revenue over expenditure was contributed mostly to outstanding subscription fee. Our membership number is growing but we are also losing old members despite the decision to maintain the annual subscription rate at RM50.

We would reduce the number of committee members and employ an administrative secretary to upkeep the membership record and financial account. Nevertheless, we would keep the seminar fees as low as feasible.

We are looking forward to organize more seminars and conferences with the help from more volunteers and continuous support from our members in the near future.

Wish you a healthy and prosperous year ahead.

Dr. Chua Meei Jinn
MES Treasurer 2008
MINERAL TRIOXIDE AGGREGATE AS A FURCATION PERFORATION SEALING MATERIAL ON MAXILLARY RIGHT FIRST MOLAR WITH FIBER POST RESTORED AND PORCELAIN FUSED TO METAL CROWN

Bernard Iskandar

ABSTRACT

The purpose of this case report was to inform the procedure of root canal treatment and the use of mineral trioxide aggregate (MTA) on furcation perforation sealing caused by iatrogenic endodontic procedure, and also informing the use of fiber post as retention of porcelain fused to metal crown with composite core to restore tooth function on maxillary right first molar.

Before root canal treatment was conducted the tooth colored filling and root canal post were removed so that the furcation perforation could be seen on the pulp chamber's base. Perforation closure at the floor of the chamber utilized MTA which set after 4-6 hours. The biomechanical preparation was performed using crown down technique with ProTaper hand use. Calcium hydroxide paste was then placed in the root canal as dressing material and left for one week. The root canal was obturated using vertical condensation technique. The root canal treated tooth was restored using peerless type fiber post and chemical activated composite resin core followed by placement of porcelain fused to metal crown.

The result of treatment was evaluated one week since the placement of porcelain fused to metal crown, and four weeks after perforation sealing. It showed that treated tooth was asymptomatic and the radiographic examination demonstrated regeneration of periapical lesion (the size reducing of radiolucency at the apex).

Keywords: endodontic, retreatment, furcation perforation, mineral trioxide aggregate (MTA), proTaper hand use

INTRODUCTION

Endodontic treatment, just like any other dental treatments, is also subjected to failure. This failure usually occur due to operator lack of knowledge or care in performing correct endodontic treatment procedure, therefore attempt to retain tooth function failed (Doumer, 2004). Some mistakes in endodontic treatment procedure are imperfect root canal obturation, one of root canal is not obturated, perforation of floor of pulp chamber or on the wall of root canal and final restoration procedure using inadequate materials and instruments. Operator needs to identify the cause of failure and know how to overcome it (Cohen and Burm, 2002).

Imperfect access cavity will make root canal cleaning and shaping difficult. An undetected root canal during treatment can cause failure and difficulties in all endodontic treatment procedure. Treatment failure might also caused by inadequate working length, ineffective irrigation, dentine debris prevent from measuring the correct working length, legge, a broken instrument and even root canal wall perforation. Imperfect root canal preparation will effect to unhermetic root canal obturation (Clifford, 2002).

Iatrogenic mistake is a mistake done by operator during treatment. This will lower treatment success rate, some which occur quite frequently are post placements in an untreated tooth. Post placement must be done in a treated and perfectly obturated root canal. Furcation perforation as iatrogenic mistake is one of the cause of root canal failure. Prognosis of perforation case depends on perforation location, contamination time from when perforation took place and ease of coronal access to perforation area (Ferris dan Baumgartner, 2004).

Periodontium is always involved in base of pulp chamber or furcation perforation. Contact between periodontal tissue and microorganisms will lower the healing ability of tooth supporting structure including bone around that area (Nakata et al, 1998), therefore perforation area must be sealed immediately to minimize contamination during and after treatment. Sealing of perforation area can be accomplished using restorative material which conform to following criteria, non-toxic, compatible with tooth and periodontal tissue, initiate development of calcification barrier, short setting time, antimicrobial and does not induce inflammation (Vizgirda et al, 2004).

Materials used to seal furcation perforation are Cavit, ZOE (Zinc Oxide Eugenol), Ca(OH)₂ (Calcium Hydroxide), amalgam, gutta percha, tricalcium phosphate, IRM (Intermediate Restorative Material), hydroxyapatite, glass ionomer cement and a material that is recently widely used is MTA (mineral trioxide aggregate). When set this material gives a very good seal. Other advantage is its high biocompatibility with periodontal and periapical tissue (Torabinejad et al, 1995., Joffe, 2002).

Dr. Bernard Iskandar is best known as the founder of The "Building Solid Foundation Endodontic Study Club". He has been a faculty member at the USAKTI since 1986. Bernard has a Certificate in Implantology from Germany, was trained in Aesthetic and Implant Dentistry at the New York University and undertaken Endodontic Microscopy training. Since 1995, he maintains a private practice limited to endodontics.
Although good root canal treatment is accomplished, but if the coronal restoration is not good, leakage can occur on restoration and result in failure of treatment. Root canal treatment must be finalize with a restoration that protect tooth and its supporting structure also return tooth function, because usually only little hard tissue structure remain and it is weak (Ferris and Baumgartner, 2004., Ibbetson, 2004).

Porcelain fused to metal crown restoration protects, returns tooth function, prevents coronal leakage and gives esthetic result. Porcelain fused to metal crown is a good choice because it fulfills some requirements such as color stability, resistant to corrosion, and good adaptation with tooth surrounding structure. Problem that sometime arise is only little and weak tooth structure remain so build up using for example amalgam and type II glass ionomer cement is needed (Mount, 1994., Kostka and Roulet, 2003). A post is needed in the root canal to retain those restorative materials (Robbins, 1996., Ibbetson, 2004).

CASE REPORT

A 34-year-old woman with a non-contributory medical history was referred to USAKTI dental hospital for endodontic treatment of tooth 16. Main complaint of this patient is cannot chew and tenderness on this tooth. Gingiva often bleeds due to food impaction. This tooth was treated 6 months ago, but the discomfort started last month. Intra oral examination showed tooth colored MOD filling of tooth 46. Normal occlusal relationship was observed and a fracture line was observed in the filling border but no tooth fragment was separated. However, the mobility test was negative as well as palpation. A secondary decay was observed in distal side of the filling. Radiographic examination reveal radiopaque threaded post in the pulp chamber extending to distopalatal direction passing through base of pulp chamber. An overhanging restoration was observed in mesiocervical site along with secondary decay. Root canals were not obturated. There was thickening of distal lamina dura, resorption of mesial alveolar bone, radiolucency of mesial periapex showed communication between periodontal and endodontic lesion. Based on subjective, objective and radiographic findings, it was concluded that the diagnosis for tooth 16 was non vital tooth with furcation perforation and periapical lesion (Figure 1).

Treatment plan carried out was sealing of iatrogenic furcation perforation using mineral trioxide aggregate (MTA), root canal treatment, followed with fiber post (Peerless, SybronEndo) placement and the tooth then restored with porcelain fused to metal crown.

TREATMENT PROCEDURE

The composite filling was removed initially in the first visit followed with pin removal using ultrasonic instrument (Figure 2).

Composite artificial wall was built (MultiCore, Ivoclar Vivadent) inside matrix circling the tooth (Automatriks,

![Figure 1](image1.png)

**Figure 1:** Tooth 16. Intra oral and radiographically before treatment (a) Tooth colored filling of class II MOD cavity, fracture line along border. Proximal contact point was not adequate, contributing to food impaction. (b). Post and unobturated root canals. Radiolucency in periapex of tooth 16.

![Figure 2](image2.png)

**Figure 2:** Intra oral before and after post removal.
Figure 3: Palatal root canal after Ca(OH)2 filling and inflamed tissue in perforation area was cleaned and hemorrhage was controlled. Furcation perforation after MTA placement and evaluation using periapical radiograph.

Figure 4: MTA has set, root canal treatment of mesiobuccal and distobuccal canals. All three canals were disinfected using Ca(OH)2, and temporary filling was placed.

Figure 5: Root canal obturation using vertical condensation technique. The cavity was then filled.

Denstply. After rubber dam placement, access cavity was made and palatal root canal was prepared with Crown Down technique (ProTaper Hand Use, Dentsply) with 17mm working length and 5F as the last instrument. Root canal was disinfected using calcium hydroxide (Metapaste) and orifice was temporarily filled. Next step is perforation sealing using MTA. Perforation area was cleaned and curettage was performed on inflamed periodontal tissue then followed by irrigation with NaOCl, hemorrage control and dried with paper point. MAP system (micro apical placement, PD, Vevey, Switzerland) was used for MTA placement on perforation area. Cavity was then sealed (Figure 3).

On the second visit, MTA setting was checked then mesiobuccal and distobuccal root canals were prepared (ProTaper Hand Use, Dentsply) until F2 file with 16mm working length. Next the root canal were disinfected using calcium hydroxide and temporary filling was placed (Figure 4).

On the third visit, root canals were obturated. Rubber dam was placed, temporary filling was removed and calcium hydroxide dressing was cleaned by irrigation using NaOCl 2.5%, EDTA 15%, CHX 0.2%, then canals were dried. Main gutta percha was sterilized and TopSeal (Dentsply) was used as sealer. Root canal obturation was done using vertical condensation technique with System B. Root canal obturation was evaluated with periapical radiograph, afterwards orifices were sealed with type 1 glass ionomer cement and temporary filling was placed (Figure 5).

On the fourth visit, during subjective examination, patient had no pain complaint. On objective examination, percussion and palpation test was negative. Post placement (Peerless, SybronEndo) were done in palatal canal as main post and distobuccal canal for second post. The diameter of the posts was 0.9mm-4% (blue) and 0.8mm-6% (red) for palatal and distobuccal canal respectively.
Mineral trioxide aggregate as a furcation perforation sealing material on maxillary right first molar

Figure 6: Periapical radiograph after preparation and try in of porcelain fused to metal crown.

Figure 7: Tooth 16 before and after treatment.

The posts were cemented with resin cement (C&B cement, Bisco, USA) and silane coupling agent (Pentron, USA) to increase bonding of resin cement to post. Cavity and root canal were etched with H3PO4 37% for 15s, rinsed and dried. Distobuccal, palatal canal and cavity was bonded (PrimeBond NT, Dentsply), dried and light cured for 30s. Resin cement mix was put on the tip of posts and in the root canals. Posts were then placed inside the canals. Core was made using chemically cured resin composite (Multicore HB, Ivoclar Vivadent). Core material was introduced into cavity using unitip applier (GC), and light cured for 30s. Rubber dam was then removed.

Porcelain fused to metal crown was prepared by reducing tooth structure to give enough space for porcelain material and cervical finish line was put subgingivally, 1mm below free gingival margin. Gingival retraction cord (Ultrapak, Ultradent) was placed before making the impression. Tooth shade A3.5 was chosen from tooth shade guide (Vita Lumin) that correspond to adjacent teeth, then temporary crown was placed.

On the fifth visit, temporary crown was placed, tooth was cleaned from temporary cement and porcelain fused to metal crown was inserted. Occlusion, marginal adaptation, proximal contact, anatomic shape and color were evaluated. Crown was cemented using type I glass ionomer cement. Excess cement was cleaned with dental floss (Figure 6).

On the sixth visit, evaluation one week after crown placement, subjectively there was no pain and the patient could masticate on the tooth. Percussion and palpation on buccal mucosa was negative. There was also no mobility observed on the treated tooth. Mucosa around porcelain fused to metal crown was healthy, no gingival inflammation was present.

TREATMENT EVALUATION

Periapical radiograph 1 yr after root canal treatment and furcation perforation sealing showed no radiolucency in furcation area nor in mesial apex (Figure 7).

DISCUSSION

In this patient the maxillary right first molar was non vital with radiolucency in periapex. Inflammation due necrotic pulp can spread to furcation area through perforation of base of pulp chamber. According to Gutmann and Lovdahl (1997), this is a chronic case of periodontal tissue that could lead to pulp degeneration via apical foramen.

Sign of perforation of maxillary right first molar is obvious from periapical radiograph, with radiopaque image passing through base of the pulp chamber. In this case, post removal was done using ultrasonic instrument. After
post removal, it was seen that post canal is at the bottom of the cavity. Furcation perforation sealing was done with mineral trioxide aggregate (MTA). This material is biocompatible, bactericidal with pH 12.5, and has very low toxicity therefore non-cytotoxic and non-mutagenic (Torabinejad et al., 1995, Sarkar et al., 2005, Jafari et al., 2005). Perforation seal is very good even in the presence of blood (Lee et al., 1993).

Root canal treatment success depends on accuracy of diagnosis, treatment planning, biomechanical preparation step, and obturation using material that can provide hermetic seal until junction of dentin and cementum. Artificial wall made from chemically cured resin composite is needed for ease of treatment procedure and rubber dam placement to prevent saliva contamination.

Aim of root canal treatment performed was to prevent disease from spreading more from pulp to periapical tissue and to return periapical tissue condition back to normal. First step of biomechanical preparation was making access cavity exploration to define root canal path in order to help root canal preparation and to avoid wrong instrument direction. Palatal root canal was prepared to see how much tissue remained between palatal orifice and perforation area. Biomechanical preparation using crown down technique was chosen because radiographic image showed narrow and slightly curved root canals. This technique is useful in eliminating servical constriction and reducing root canal curvature therefore apical one third can be better reached and irrigation can penetrate deeper (Pitt Ford, 2004). Other advantage of crown down technique is elimination of debris and bacteria started from coronal part thus preventing inoculation to apical tissue, allowing movement of large amount of irritant and lubricant to apical part and facilitates accurate working length determination (Regan and Gutmann, 2004). This technique also prevent dentine debris from being pushed to apex or out from foramen, prevent ledge formation, prevent apical transport and perforation and prevent instrument breakage inside the canal (Clifford, 2002). Root canal apex preparation with bigger instrument will help in eliminating microorganisms present at the most apical part of root canal (Card, et al., 2002, Stuart et al., 2006).

Root canals were irrigated with sodium hypochlorite solution (NaOCl 2.5%). This solution is effective in helping to dissolve necrotic pulp tissue, prevent formation of smear layer, has wide antibacterial spectrum and effective against anaerobic bacteria (Estrela et al., 2002, Regan and Gutmann, 2004, Siqueira, 2007). Root canal sterilization was performed using calcium hydroxide which effective as intracanal medication although not as effective in eradicating Enterococcus faecalis because this bacteria can maintain pH homeostasis and with dentine buffer, pH of 11.5 cannot be maintained in the dentinal tubules (Stuart et al., 2006).

Obturation of the root canals in this case was using vertical condensation technique using System B. This instrument shortens setting time of resin based sealer used due to heat from gutta percha. Thus allergic and inflammation reaction can be limited, hence no pain felt (Schmalz, 2003, Dummer, 2004).

Peerless fiber post has elastic modulus comparable to dentine, and maximum strength from carbon fibers material (Ferari et al., 2003). Post was cemented using chemically cured resin cement. This type of cement is recommended because resin in post will bond well and increases retention within post canal (Cohen and Burns, 1998, Koetka and Roulet, 2003).

Crown preparation by uniform reduction of tooth 16 around and on the occlusal part gives 2mm clearance with antagonist teeth. Cervical finish line was put on tooth structure and gingival retraction cord was placed on cervical area before impression was made, thus cervical preparation line clearly shown on the model (Torabinejad et al., 1990).

Porcelain fused to metal crown was used to return mastication function of the tooth. Kayser et al (1984) stated that porcelain fused to metal crown restoration is more resistant compare to all porcelain crown due to metal layer. A research by Robbin (1996) proves that restoration of root canal treated tooth with porcelain fused to metal crown has higher treatment success rate.

CONCLUSION

Furcation perforation accompanied by periapical lesion can be overcome by sealing perforation with MTA and performing root canal treatment thus bring back tooth function. Final restoration using porcelain fused to metal crown with Peerless fiber post as reinforcement can restore mastication function and protect remaining tooth structure and give more esthetic value to this tooth.

Based on this case report, this good and proper technique to overcome iatrogenic perforation needs to be socialized to other endodontists, as well as how to choose a good fiber post and restoration technique to restore tooth function.

REFERENCES


