



THE MAGICAL INSTRUMENT WHICH CAN POSTPONE ENDODONTIC SURGERY

Garima Sinha*

Department of Conservative Dentistry and Endodontics, VDCH, Farathiya, Garhwa, Jharkhand. *Corresponding Author

Vinay Oraon

M.Sc. Biotechnology, University Department of Botany, Ranchi University, Ranchi, Jharkhand.

ABSTRACT The ultimate target of any endodontic treatment with periapical lesion is to induce complete bony healing of the lesion in which faster healing comprises with apical surgery but patient always wants an alternative of the surgery and this is the magical instrument which can postpone the endodontic surgery-The Apexum Device.

KEYWORDS :

INTRODUCTION

The Apexum procedure was intended to bring the debridement concept one step further into the apical foramen proper and beyond it into the periapical lesion¹. It is minimally invasive compared with open flap surgery. It has been planned to be followed during, or as a supplementary stage to, traditionalist root canal treatment².

AIM

It is aimed to enhance the treatment with the faster healing that classically occurs with apical surgery, but without the use of periosteal elevators, scalpels, or sutures³⁻⁵.

HISTORICAL BACKGROUND

In apexum device, NITINOL is used which is a super elastic nickel titanium alloy and it was first developed for the US Navy. The first use was seen in 2008⁶. Apexum procedure in endodontic was first carried out by Metzger et al for enhancing healing kinetics of periapical lesions in dogs in January 2009⁷.

VARIOUS NON-SURGICAL METHODS FOR APICAL PERIODONTITIS-Conservative root canal treatment without adjunctive therapy

1. Decompression Technique
2. Active nonsurgical decompression technique
3. Aspiration and irrigation technique
4. Aspiration through the root canal technique
5. Method using calcium hydroxide
6. Lesion sterilization and repair therapy
7. Apex Device

APEXUM DEVICE CONSISTS OF THE FOLLOWING:

- The two rotary files used in successive order:
The Apexum NiTi ablator and the Apexum PGA ablator.

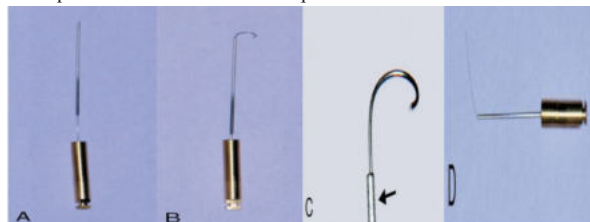


Figure: The Apexum device. (A) The Apexum Ni-Ti Ablator in its sheath. (B) The Apexum Ni-Ti Ablator pushed in and extruded from its sheath (arrow). (C) An enlarged view of the active part of the Apexum NiTi Ablator. (D) The Apexum PGA Ablator.

- The Apexum NiTi ablator primarily consists of a preshaped Nitinol wire.
- One end is procurved or bent in order to aid its entry into the periapical area.
- The other end has a latch type design in order to fit into the low-speed contra-angle handpiece.
- Through super elastic Nitinol tube, wire is passed that permits the entry and move the file through the root canal space.
- Once the file has reached the apex of the tooth post negotiation of the canal, the wire projects out of the tube and curves when pressed

thus assuming its procurved shape owing to Nitinol's shape memory property.

- This precurving forms an arc which helps crumble the inflamed tissue when the file revolves at a slow speed of 200 to 250 rpm⁸.
- The Apexum PGA ablator is built from a Nitinol shaft, equipped on one end with a Latch type organization to ease the use of the low-speed contra angle handpiece.
- The other end has PGA (Poly Glycolic Acid) which is an absorbable suture material available as braided multifilament or monofilament form.
- PGA helps to turn the shredded tissue into a thin suspension that may be flushed through the root canal. This file rotates at 5000 to 7000 rpm⁸.

PROCEDURE

- #20 K file inserted through the apical foramen beyond the apex to get the patency
- #30 K file inserted 1mm beyond apex to create passage of 330 micro meter diameter.
- Insert Apexum NiTi Ablator with sheath till Working length.
- Sheath is stabilized with occlusal surface of tooth with the help of glass ionomer cement.
- Nitinol filament pressed manually through the enlarged apical foramen into periapical tissue.
- Rotate at 200-250 rpm for 30 seconds. This results in crumbling of the periapical inflamed tissue.
- Remove the stabilizing Glass Ionomer Cement and remove the ablator
- The canal is cleaned with sterile saline
- The Apexum PGA Ablator is inserted and rotate for 30 seconds at 5000 to 7000 rpm to turn shredded tissue into a thin suspension.
- Rinse out suspension with sterile saline solution⁹.

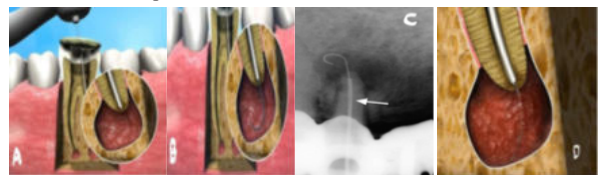


Figure: (A) Apexum NiTi Ablator inserted in periapical region. (B) The Apexum NiTi Ablator pushed in and extruded from its sheath. (C) The Apexum NiTi Ablator in a periapical lesion fully extruded from its sheath (arrow). (D) The Apexum PGA Ablator with bioabsorbable filament in periapical region¹⁰.

ADVANTAGES

1. It is a non-surgical method for treating periapical lesions causing lesser trauma and patient discomfort.
2. Minimal invasive technique.
3. Procedure can be accomplished through conventional root canal access.
4. Increased healing kinetics of periapical lesions¹¹.
5. Decreased probabilities of post-operative sensitivity or pain.
6. It is a gentle procedure.
7. Surgical skills not required.
8. Exclusion of bacterial biofilm

DISADVANTAGES

1. Some authors have their uncertainties regarding the procedure, as it is well known that insertion of any instrument beyond the apex often results in a flare-up causing post-operative pain and sensitivity¹².
2. Widening the apical diameter to 330 micrometer diameters may result in extrusion of the soft gutta percha beyond the apex⁸.
3. Management of procedural errors is a matter of concern⁹.

INDICATIONS¹³

1. Lesion mean diameter: 3-6 mm, Peri-Apical Index score 4 or 5.
2. Roots with open apices.
3. Routine conventional root canal treatment cases, to promote faster periapical healing.
4. Medically compromised patients in whom surgery is contraindicated.
5. Cases with recurrent lesions.
6. Chronic inactive periapical lesion.
7. Patients anxious for surgery.

CONTRAINdicATIONS¹³

1. Roots with abnormal root canal morphology.
2. Active acute infection – cellulitis, abscess.
3. Proximity of vital anatomical structures to the periapical lesion.

DISCUSSION

Natkin et al stated that a radiographic lesion with size of 200 mm² or larger, the incidence of cysts was almost 100%¹⁴. A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported¹⁵. Caliskan MK reported 73.8% success in nonsurgical management of large cyst using calcium hydroxide medicament¹⁶. Bhaskar advocated the over-instrumentation beyond the apex, which results in an inflammatory reaction that destroys the cyst lining and transforms the lesion into granuloma. This granuloma further heals by itself spontaneously after the microbiological factors are removed¹⁷.

CONCLUSION

Many times, it is difficult to treat the periapical pathology with conventional procedures and takes a lot of time to heal. At the same time surgical approach may cause lot of undesirable trauma and sometimes may be very difficult to convince the patient for surgery. So, in such cases, Apexum procedure which causes minimal trauma to the tissues seems to be a promising alternative. Although Apexum procedure seems to be promising alternative to periapical surgeries more long-term in vivo studies are warranted in this aspect.

REFERENCES

1. Metzger Z, Abramovitz I. Periapical lesions of endodontic origin. In: Ingle JI, Bakland LK, Baumgartner JC, eds. Ingle's endodontics. 6th ed. Hamilton, ON, Canada: B C Decker, 2008:494–519.
2. Dr. Seema D. Pathak Apexum-Lets make apex smile Journal of Medical and Dental Science Research Volume 4– Issue 9 (2017) pp:21-24.
3. Metzger Z et al. Healing kinetics of periapical lesions enhanced by the Apexum procedure: a clinical trial. *J Endod.* 2009; 35(1):153-9.
4. Deepak B.S et al. Apexum Ablator: A Minimal Invasive Periapical Procedure. *J Dent Pract Res* 2013;1(1): 13-15.
5. Mortman RE. Technologic advances in endodontics. *Dent Clin North Am.* 2011; 55(3): 461-80.
6. David Shamah. 2008. Apexum goes to the root of the problem. Israel. <http://israel21c.org>.
7. Metzger, Z., Huber, R., Tobis, I. and Better, H. 2009. Enhancement of healing kinetics of periapical lesions in dogs by the Apexum procedure. *J Endod.*, 35 :40-5.
8. Dr. Prem Prakash, APEXUM: THE MAGIC WAND IN ENDODONTICS. International Journal of Current Research Vol. 8, Issue, 03, pp.27527-27531, March, 2016.
9. Urvashi Keswani Apexum – The Future of Minimally Invasive Endodontics. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861, Volume 16, Issue 10 Ver. XIII (Oct. 2017), PP 90-92.*
10. Karan Bansal, APEXUM PROCEDURE: CLEANING INFLAMED PERIAPICAL REGION THROUGH ROOT CANAL International Journal of Dental and Health Sciences Volume 04, Issue 05.
11. Metzger Z, Huber R, Slavescu D, Dragomirescu D, Tobis I, Better H. Healing kinetics of periapical lesions enhanced by the apexum procedure: A clinical trial. *J Endod.* 2009 Feb;35(2):153–159.
12. Raisingani, D. (2011). Apexum: A Minimum Invasive Procedure. *International Journal of Clinical Pediatric Dentistry*, 4(3), 224–227.
13. Deepak B S, Hridya E, Mallikarjun Goud, Nandini D B: Apexum ablator: a minimal invasive periapical procedure: *J Dent Prac and Res.* 2013 Jan-Jun: 13-15.
14. Natkin E, Oswald RJ, Carnes LI. The relationship of lesion size to diagnosis, incidence and treatment of periapical cysts and granulomas. *Oral Surg Oral Med Oral Pathol* 1984;57(1):82-94.
15. Murphy WK, Kaugars GE, Collet WK, Dodds RN. Healing of periapical radiolucencies after nonsurgical endodontic therapy. *Oral Surg Oral Med Oral Pathol* 1991; 71:620-4.
16. Caliskan MK. Prognosis of large cyst-like periapical lesions following nonsurgical root canal treatment: A clinical review. *Int Endod J.* 2004;37(6):408-16.
17. Bhaskar SN. Periapical lesions-types, incidence, and clinical features. *O Surg O Med O Path* 1996; 21: 657–71.