

GUIDED ENDODONTICS MICROSURGERY

GEMS Method Protocol

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GEMS METHOD PROTOCOL

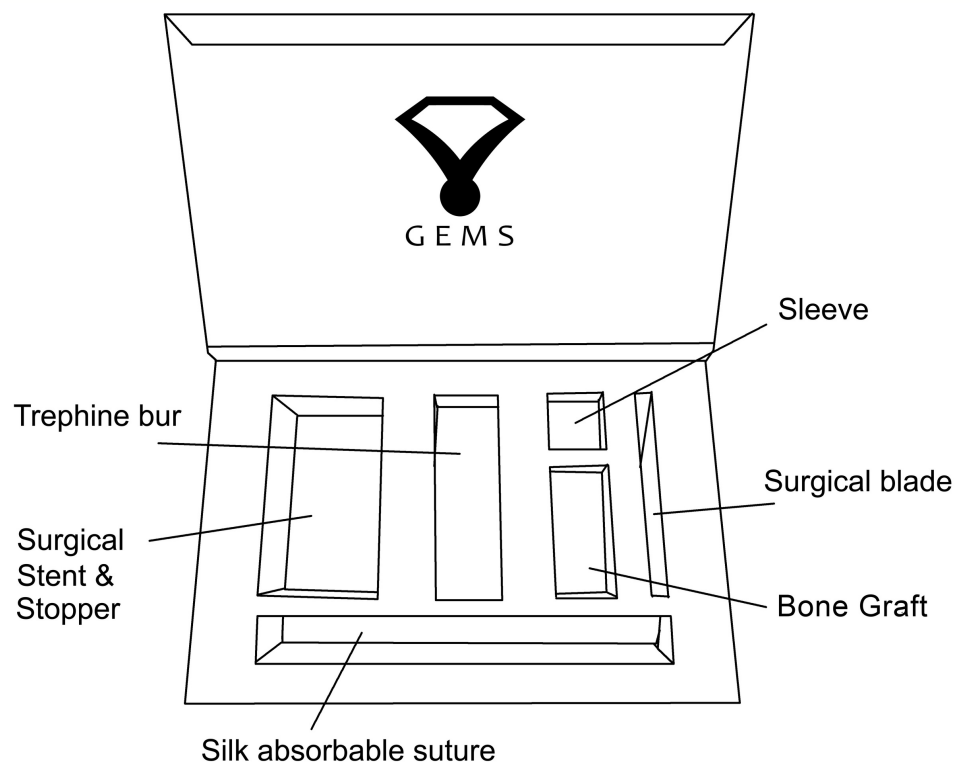
Guided Endodontic Microsurgery (GEMS) is a proven method for failing non-surgically Endodontically retreated teeth. Utilizing magnification, root-end preparation, and root-end filling materials. The practitioner can expect good success rates following this protocol. There are occasions however where endodontic microsurgery may be particularly difficult, such as challenging anatomical features or limited surgical access.



PROTOCOL SUMMARY

A) INSTRUMENTATION

- 1- GEMS Kit:
 - a. Surgical Guide (SG)
 - b. Stopper
 - c. Trepine bur
 - i. #2.8mm (Anterior teeth)
 - ii. #3.3mm (Premolar teeth)
 - iii. #4.3mm (Molar teeth)
 - d. Bone Graft
 - e. #15 surgical blade
 - f. NiTi Rotary file (#20/06 and #25/06)
 - g. 3/0 Silk absorbable suture
- 2- Endodontic handpiece
- 3- Dental Implant handpiece
- 4- CBCT .DICOM file
- 5- Intraoral 3D scanning .STL file



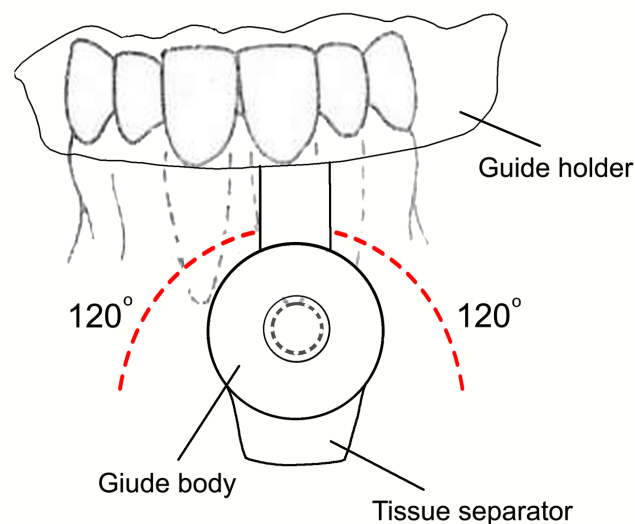
B) SURGICAL PROCEDURE

First, the doctor should take a full CBCT and intraoral scan of the patient. Intraoral scan must sufficiently cover enough buccal soft tissue up to the mucobuccal fold, many IO scanners allow operators to disable artificial scan to extend beyond the limits of the attached gingiva. After completion, the doctor will send the .DICOM and .STL file format to the CSP designing department.

1- Test the fit of the SG on the patient supporting teeth. Make sure the SG fits well and is stable enough to resist any rocking motion Faciolingually and Mesiodistally. There might be a little rocking Faciolingually due to soft tissue. This will be resolve after reflecting the flap and adapting the stent to the bone.

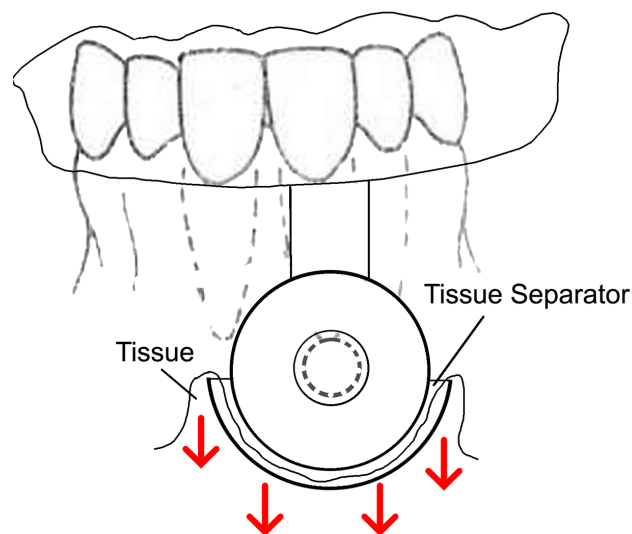
2- Administer proper anesthesia. For most surgical procedures, anesthetic approaches are conventional. In most regions, a block is administered. Then local infiltration of an anesthetic with 1:50,000 epinephrine is given to enhance hemostasis. A long-acting anesthetic agent is recommended, such as bupivacaine or etidocaine. Bupivacaine 0.5% with epinephrine 1:200,000 has been shown to give long-lasting anesthesia and later provide lingering analgesia.

3- Flap design: A properly designed, and carefully reflected flap will result in proper access and post-op healing. The basic principles of full thickness Semi-Lunar flap design should be followed. Put the SG as indicated in the following picture. horizontal incisions (120° clockwise and 120° anti-clockwise) are made with blade #15 to the alveolar mucosa around the SG. (See the picture)



SURGICAL PROCEDURE ...

- 4- Take off the SG and a firm incision should be made through periosteum to alveolar bone connecting the two previous incisions. It is important to incise and reflect a full - thickness flap to minimize hemorrhage and to prevent tearing of the tissue.
- 5- The SG should be placed gently on the teeth so that the tissue is directed towards the back of the tissue separator. (See the picture)

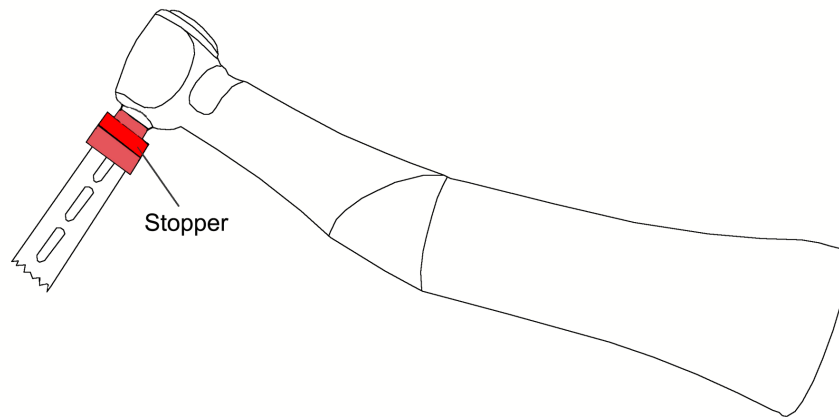


6- If hemorrhage from soft or hard tissue is excessive to the extent that visibility is compromised, homeostatic agents or other techniques are useful. The best hemorrhage control is to apply and hold direct pressure over the bleeding site with gauze and to also minimize suction at the site of a bleeder.

7- After putting the SG on the patient's teeth, the patient should bite the SG and keep it for stability. They can also bite on a bite-block.

8- Now, everything is ready for the surgery. Before using the trephine bur, the stopper should be set on the trephine tip and then look the bur in the handpiece. There are different sizes for the trephine bur. Please make sure to follow the recommended size for each tooth you are treating. (See the picture)

SURGICAL PROCEDURE ...



9- Set the speed of the surgical handpiece to 1000rpm, Torque 35-50 Ncm. Insert the trephine bur with the stopper attached to it into the SG hole. Practice caution and move slowly while drilling through bone until the stopper touches the stent body. The Stopper is designed according to the working length.

10- Bone and root tip are removed. Usually the hard tissue is stuck inside the trephine bur. If some in case there are debris from root tip or bone left in the surgical site, you can remove it with bone curette.

11- Irrigation: The surgical site is flushed with copious amounts of sterile saline to remove soft and hard tissue debris, hemorrhage, blood clots, and excess root end filling material.

12- Radiographic verification: Before injecting the bone graft, a radiograph is made to verify that the canal is properly prepared with the rotary instruments. If corrections are needed, these are made before injecting root end filling material.

C) PREPARATION AND RESTORATION

1- Bone graft material is mixed with sterile saline and applied to the surgical site until the hole is filled.

2- Flap replacement and suturing: The flap is returned to its original position and held with moderate digital pressure and moistened gauze. This expresses hemorrhage from under the flap and initial adaptation and more accurate suturing. Silk sutures are generally used. 4-0 suture is used which is absorbable. Both vertical and horizontal sutures are given. After suturing, the flap should again be compressed digitally with moisten gauze for several minutes to express more hemorrhage. The suture knots should not be too tight or it may strangle the tissue and decrease blood supply and cause hypertrophic scars. This encourages less postoperative swelling and more rapid healing.

D) POSTOPERATIVE INSTRUCTIONS

1- Pain management: Pain medications should be started immediately postoperatively, analgesics or nonsteroidal anti-inflammatory drugs (NSAIDs) are highly effective. Antibiotics are usually not necessary, because the infection rate following endodontics surgery is minimal. In certain cases, Antibiotic may be prescribed for indicated cases. Slight to moderate swelling should be expected, icepacks and NSAIDs may help. Steroids are not recommended. Oral hygiene procedures are indicated. Careful brushing and flossing may begin after 24 hours. Proper nutrition and fluids are important but should not traumatize the area. A chlorhexidine rinse, twice daily, reduces bacterial count at the surgical site. Patient should avoid hot food or drinks on the day of the surgery.

2- After 3 days swelling and discomfort should be decreasing. There should be evidence of primary wound closure. Follow-ups visits should be at 4 weeks if absorbable suture is used and 10 days for non-absorbable suture, then at 6 and 12 months intervals.

3- Intraoperative complications: Bleeding - control with local application of adrenaline pack, pressure pack. Damage to the neighboring root: assess the extent of damage and reevaluate, patient may need to be rescheduled for another RCT and possible Apicoectomy of damaged adjacent tooth. Entry into sinus/inferior alveolar canal-stop treatment and re-assess, if lacking surgical experience, you must refer the patient to and oral surgeon and chart the incident. Postoperative: Abscess formation. Fenestration, sinus tract formation. Increased mobility of tooth, you must reassess treatment plan and whether tooth was indicated for an apicoectomy, discuss alternative with patient. If swelling is and abscess is present appropriate protocol must be followed. When necessary patient must be referred to an oral surgeon or to medical emergency room if infection becomes a life-threatening case.



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